LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR:

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Enclosures:

Document 1 – Hillcrest Elementary School Energy Report
Document 2 – Franklin Park Elementary School Energy Report
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I. EXECUTIVE SUMMARY

This report presents the findings of the energy audit conducted for:

Entity: Franklin Township Board of Education

Facilities: Hillcrest Elementary School
Franklin Park Elementary School
Franklin Township High School

District Contact Person: Connie Coriell, Energy Efficiency Coordinator

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program for Franklin Township School District. The purpose of this analysis is to provide the School District insight into the energy savings potential that exists within facilities at Franklin Township School District. Energy Efficiency changes and upgrades require support from the building occupants, operations personnel and the administrators of the School District in order to maximize the savings and overall benefit. The efficiency improvement of public buildings provides a benefit for the environment and the residents of New Jersey. Throughout this report it has been demonstrated that there is a great potential for energy savings and infrastructure improvements at Franklin Township School District.

The Energy Conservation Measures (ECMs) identified within the report represents the potential annual savings at the facilities. It is recommended to consider all ECMs as part of the District's initiative to save energy, reduce emissions, and lower operating costs. Concord Engineering recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. All of the ECM's presented in this report have been categorized into three groups defined as Short-term (or Fast) Paybacks ranging from 0 to 5 years, Medium-term Paybacks ranging from 5 to 10 years, and Long-term Paybacks of over 10 years to assist the District in prioritizing projects.

Short-term Payback Energy Conservation Measures:

The Energy Conservation Measures (ECMs) identified with a simple payback of 0 to 5 years are considered very cost effective and should be considered a high priority for the District. It should be noted that in many cases ECM's lying in this range can be performed utilizing qualified "in house" staff that can further reduce the payback period. It is recommended if the District proceeds with "in house" installation they review equipment being purchased to ensure the energy efficiency equipment standards outlined in this report are met or exceeded.

Medium-term Payback Energy Conservation Measures:

The Energy Conservation Measures (ECMs) identified with a simple payback of 5 to 10 years are considered cost effective and should be considered by the District. In many cases these measures can provide significant savings, however the costs to implement are higher, stretching the payback beyond five years.

Long-term Payback Energy Conservation Measures:

The Energy Conservation Measures (ECMs) identified with a simple payback of over 10 years. The ECMs that have much longer paybacks are considered capital improvement ECMs. These typically have high installation costs that are more difficult to justify based solely on the energy savings associated with the improvement. Despite the long paybacks, these ECMs in many cases provide valuable and much needed infrastructure improvements for the facility. These ECMs include boiler upgrades, HVAC equipment upgrades, etc. It should also be noted that projects under a 15 year payback should be reviewed in the event the District wishes to move forward with an Energy Savings Improvement Program where these projects could be included that program.

Energy Education:

Franklin Township Board of Education has taken an active step in closely monitoring, tracking and controlling existing energy consumption and expenditures as well as promoting energy efficiency throughout the School District through the use of an Energy Efficiency Coordinator.

School Districts that promote energy efficiency have an opportunity to introduce students to the benefits of energy management. Several K-12 schools have used energy efficiency improvements as opportunities to adapt academic curricula to promote awareness of energy and environmental issues. Some School Districts have installed energy data kiosks in K-12 school buildings so students can monitor their school's energy consumption.

By promoting energy efficiency throughout the School District to its students, staff and facility operators, Concord Engineering estimates that the Franklin Township Board of Education is reducing their baseline energy consumption by approximately 5-10% when compared to other School Districts that do not participate in such programs. The US Environmental Protection Agency has issued guides for following such energy awareness plans as is being implemented by the BOE. The Franklin Township BOE should be commended for taking this important step in Energy Education and recommends that the use of such pro-active measures be continued in the future, in conjunction with the implementation of the ECM's recommended in this report.

The following table outlines the District's Short, Medium, and Long Term payback Energy Conservation Measures.

FRANKLIN SCHOOL DISTRICT ECMs LIST			
ENERGY CONSERVATION MEASURES LIST	**Hillcrest Elementary School**	**Franklin Park Elementary School**	**Franklin High School**
General Lighting Upgrades	S		
Lighting Upgrades - Gym Areas		S	S
Lighting Upgrades - Cafeteria			S
Lighting Upgrades - Auditorium			S
Lighting Controls	S	S	S
Condensing Boiler Installation	L	L	
Domestic Hot Water Heater Uprade	L		
DDC System Installation	L		
Window AC Unit Upgrade	L		
NEMA Premium Pump Motors	M	L	L
HW Pump VFD	M	L	
CHW Pump VFD		L	
AC Unit Replacement		M	
Demand Controlled Ventilation		L	
NEMA Premium AHU Motors		M	
Window Replacement	L		
Rooftop Unit Replacement	L		
Retro Commissioning			S
Water Conservation	L	L	L
Solar Photovoltaic System	M		
TOTAL	**12**	**10**	**7**
COMMENTS	1) ECM's are catagorized into Short Term (0 - 5 yrs) designated "S", Medium Term (5 - 10 yrs) 2) Grey ECM boxes indicate that the ECM is		

Renewable Energy Conservation Measures:

Franklin Township School District has already installed roof mounted solar systems at the Franklin Elementary School and Franklin High School. Hillcrest Elementary School has an estimated solar system potential of 259 kW DC that could generate nearly 300,000 kilowatt-hours annually offsetting 73% of the total energy purchased from the grid at this school. While solar is an economically viable option for the District to pursue, using either existing financing methods or alternative routes, such as a Power Purchase. It is recommended given the large system potential at this school that the district strongly consider preparing a Request for Proposal for a third party developer to provide them with a power purchase agreement, however it should be noted the district review their supplier contract to ensure onsite generation is allowed.

Energy Procurement Recommendations:

The District is currently contracted with a third party supplier for electric and natural gas. Concord Engineering recommends they continue to purchase their electric and gas commodities through a third party supplier once the current contract has expired. Further recommendations are outlined in the Energy Procurement Section of this report that could assist the District in finding additional savings through their utility bills.

Maintenance and Operational Recommendations:

In addition to the ECMs and REMs, there are maintenance and operational measures that can provide significant energy savings and provide immediate benefit. The ECMs listed above represent investments that can be made to the facility which are justified by the savings seen overtime. However, the maintenance items and small operational improvements below are typically achievable with on site staff or maintenance contractors and in turn have the potential to provide substantial operational savings compared to the costs associated. The following are recommendations which should be considered a priority in achieving an energy efficient building, further recommendations per building our provided in the building reports:

1. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
2. Maintain all weather stripping on windows and doors.
3. Clean all light fixtures to maximize light output.
4. Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.
5. Verify all thermostats are utilizing setback and scheduling capabilities.
6. Educate staff and students on awareness of wasteful energy practices such as leaving lights on unnecessarily, leaving on of non-essential computer and/or equipment at the end of the day, leaving of outside doors/windows open as a means to control room temperature, etc

Implementation Strategy Moving Forward:

It is recommended the School District strongly consider all projects with a simple payback of ten (10) years and under for implementation. However consideration should be taken on projects over ten years as they may be necessary capital improvements. The District should also consider pursuing any and all additional NJ Clean Energy Programs in order to receive the maximum incentives available.

Furthermore, although individual projects with a simple payback of 10 years and less are considered financially self sustaining, it is important to consider how multiple projects can be combined together. When ECMs are aggregated into a single project, the lower cost ECMs provides valuable savings to offset the higher cost ECMs. Likewise when multiple facilities are aggregated together into a single entity energy efficiency project, the same benefits are seen on a larger scale.

The Energy Savings Improvement Program (ESIP) allows for financing of any combination of energy efficiency projects across multiple facilities into one large project. The term of the financing must be under 15 years and the savings provides the revenue for the financing cost. The combination of all facilities into one large energy efficiency project provides the District with the opportunity to implement many of the ECMs identified within this report with an overall simple payback of 11.5 years. The program financing allows for the implementation with little to no upfront cost for the District. Implementation of an ESIP provides significant benefits and should be strongly considered. The District should also keep in mind that interest in utilizing the ESIP program should be combined with incentive programs such as NJ Smart Start and Direct Install in order to help offset the total project costs with incentives in order to try and include longer payback (or "capital") improvements that could not otherwise be performed. The total Entity Project Summary table below shows the savings, costs, incentives and paybacks for all ECMs at each facility. (Note Renewable Energy Measures are not included in this summary table). It is recommended the District Review all Facility ECM's to achieve the most effect ESIP plan moving forward.

Table 1
ESIP -Total Entity Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL ENERGY EFFICIENCY PROJECT					
FACILITY ENERGY EFFICIENCY PROJECTS	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Hillcrest Elementary School	$32,862	$858,766	$13,995	$844,771	25.7
Franklin Park Elementary School	$41,790	$674,219	$15,561	$658,658	15.8
Franklin High School	$83,126	$399,562	$11,429	$388,133	4.7
Total Entity Project	**$157,778**	**$1,932,546**	**$40,985**	**$1,891,561**	**12.0**
			Total Entity Energy Costs:	**$1,079,786**	
			Est. Total Entity Energy Savings:	**$157,778**	
			Overall Entity Percent Reduction:	**14.6%**	

Overall Assessment:

Overall, the facilities assessed in the Franklin Township School District are reasonably maintained and operating fairly efficiently. Through the implementation of measures outlined in this study and improving the overall operational efficiency of some of its more efficient schools it is likely the District has potential to further reduce its total energy cost of $1,079,786 by approximately 14.6%. The District also is in a unique position to implement energy efficiency improvements and still include many large capital projects, such as air side system upgrades and boiler replacement at Hillcrest Elementary School. Since the overall project is capable of being funded through the savings, Concord Engineering highly recommends taking advantage of this opportunity.

II. INTRODUCTION

The comprehensive energy audit covers the following buildings in Franklin Township Public Schools:

- Hillcrest Elementary School
- Franklin Park Elementary School
- Franklin High School

This audit is performed in connection with the New Jersey Clean Energy - Local Government Energy Audit Program. The energy audit is conducted to promote the mission of the office of Clean Energy, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of each building. The utility information allows for analysis of the building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

The Energy Use Index (EUI) is established for the building. Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr), which is used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting the annual consumption of all energy sources to BTU's and dividing by the area (gross square footage) of the building. Blueprints (where available) are utilized to verify the gross area of the facility. The EUI is a good indicator of the relative potential for energy savings. A low EUI indicates less potential for energy savings, while a high EUI indicates poor building performance therefore a high potential for energy savings.

Existing building architectural and engineering drawings (where available) are utilized for additional background information. The building envelope, lighting systems, HVAC equipment, and controls information gathered from building drawings allow for a more accurate and detailed review of the building. The information is compared to the energy usage profiles developed from utility data. Through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc.

The preliminary audit information is gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is spent and opportunities exist within a facility. The entire site is surveyed to inventory the following to gain an understanding of how each facility operates:

- Building envelope (roof, windows, etc.)

- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

The building site visit is performed to survey all major building components and systems. The site visit includes detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager are collected along with the system and components to determine a more accurate impact on energy consumption.

III. METHOD OF ANALYSIS

This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Post site visit work includes evaluation of the information gathered, researching possible conservation opportunities, organizing the audit into a comprehensive report, and making recommendations on HVAC, lighting and building envelope improvements. Data collected is processed using energy engineering calculations to anticipate energy usage for each of the proposed energy conservation measures (ECMs). The actual building's energy usage is entered directly from the utility bills provided by the owner. The anticipated energy usage is compared to the historical data to determine energy savings for the proposed ECMs.

It is pertinent to note that the savings noted in this report are not additive. The savings for each recommendation is calculated as standalone energy conservation measures. Implementation of more than one ECM may in some cases affect the savings of each ECM. The savings may in some cases be relatively higher if an individual ECM is implemented in lieu of multiple recommended ECMs. For example implementing reduced operating schedules for inefficient lighting will result in a greater relative savings. Implementing reduced operating schedules for newly installed efficient lighting will result in a lower relative savings, because there is less energy to be saved.

The project / Entity summary tables are based on the implementation of multiple measures. The analysis is reviewed and determined if the nature of the ECMs will cause a major conflict of the overall savings. When additive measures do not cause a major effect on the overall savings the ECMs are included. Where a major conflict is identified, the combined savings is evaluated appropriately to ensure the overall estimates are ± 20%.

ECMs are determined by identifying the building's unique properties and deciphering the most beneficial energy saving measures available that meet the specific needs of the facility. The building construction type, function, operational schedule, existing conditions, and foreseen future plans are critical in the evaluation and final recommendations. Energy savings are calculated base on industry standard methods and engineering estimations. Energy consumption is calculated based on manufacturer's cataloged information when new equipment is proposed.

Cost savings are calculated based on the actual historical energy costs for the facility. Installation costs include labor and equipment costs to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers. The NJ Smart Start Building® program incentives savings (where applicable) are included for the appropriate ECM's and subtracted from the installed cost. Maintenance savings are calculated where applicable and added to the energy savings for each ECM. The life-time for each ECM is estimated based on the typical life of the equipment being replaced or altered. The costs and savings are applied and a simple payback, simple lifetime savings, and simple return on investment are calculated. See below for calculation methods:

ECM Calculation Equations:

$$Simple\ Payback = \left(\frac{Net\ Cost}{Yearly\ Savings} \right)$$

$$Simple\ Lifetime\ Savings = (Yearly\ Savings \times ECM\ Lifetime)$$

$$Simple\ Lifetime\ ROI = \frac{(Simple\ Lifetime\ Savings - Net\ Cost)}{Net\ Cost}$$

$$Lifetime\ Maintenance\ Savings = (Yearly\ Maintenance\ Savings \times ECM\ Lifetime)$$

$$Internal\ Rate\ of\ Return = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + IRR)^n} \right)$$

$$Net\ Present\ Value = \sum_{n=0}^{N} \left(\frac{Cash\ Flow\ of\ Period}{(1 + DR)^n} \right)$$

Net Present Value calculations based on Interest Rate of 3%.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage

The energy usage for the facilities is tabulated and plotted in graph form as depicted within each facility report (see the individual facility energy audit reports for details). Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner. The electric and natural gas utilities are shown below in Table 2 & 3 for all facilities:

Table 2
Electric Utility Summary

ELECTRIC UTILITY USAGE PER FACILITY			
FACILITY	**ANNUAL ELECTRIC UTILITY**		
DESCRIPTION	**USAGE (KWH)**	**COST ($)**	**AVE RATE ($/KWH)**
Hillcrest Elementary School	399,323	$53,911	$0.135
Franklin Park Elementary School	695,966	$120,458	$0.173
Franklin High School	4,301,878	$653,557	$0.152
Total	**5,397,167**	**$827,926**	**$0.153**

Table 3
Natural Gas Summary

NATURAL GAS UTILTY USAGE PER FACILITY			
FACILITY	**ANNUAL NATURAL GAS UTILITY**		
DESCRIPTION	**USAGE (THERMS)**	**COST ($)**	**AVE RATE ($/THERM)**
Hillcrest Elementary School	26,785	$31,474	$1.18
Franklin Park Elementary School	51,077	$57,617	$1.13
Franklin High School	143,889	$162,769	$1.13
Total	**221,751**	**$251,860**	**$1.14**

B. 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. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

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 all facilities is calculated as follows:

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

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

Table 4
Energy Use Index Summary

ENERGY USE INDEX PER FACILITY				
FACILITY	**BUILDING AREA**	**ENERGY USE INDEX**		
DESCRIPTION	**(SF)**	**SITE (KBTU/SF/YR)**	**SOURCE (KBTU/SF/YR)**	**ELECTRIC (KWH/SF/YR)**
Hillcrest Elementary School	52,122	79.9	145.0	7.8
Franklin Park Elementary School	99,000	75.6	134.2	7.0
Franklin High School	343,000	88.0	198.3	13.6

See the Appendix C - Statement of Energy Performance for comparason to other facilities
Highlighted areas are estimated.

Figure 1 and 2 below depicts a national EUI grading for the source energy use of various building types similar to the buildings at Franklin Township School District.

Figure 1
Source Energy Use Intensity Distributions: Elementary School

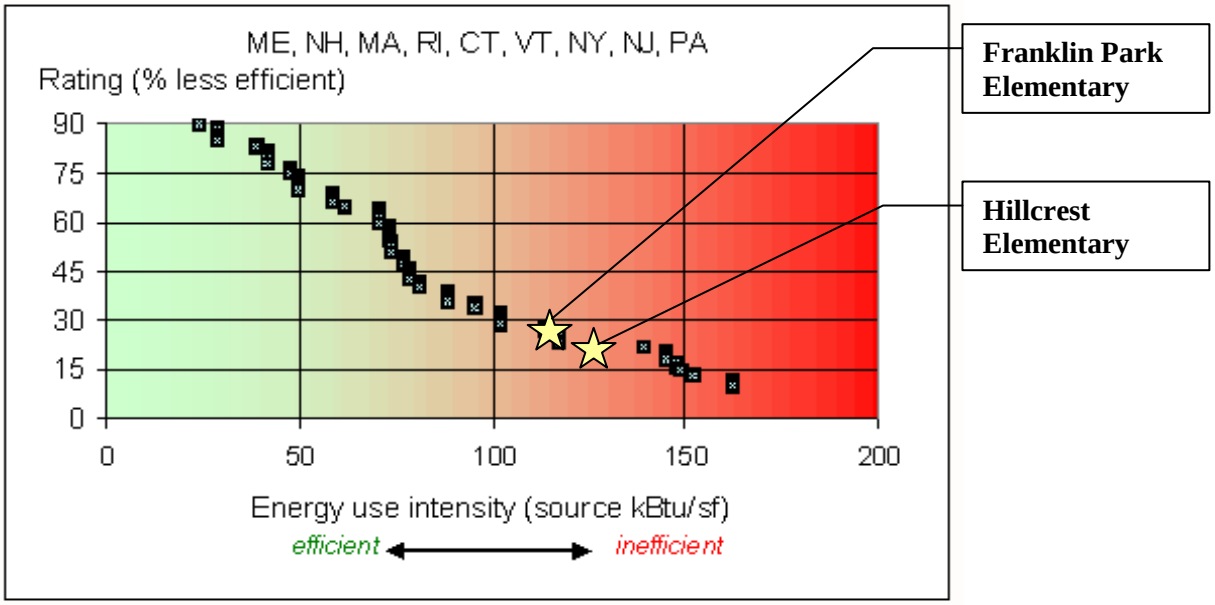
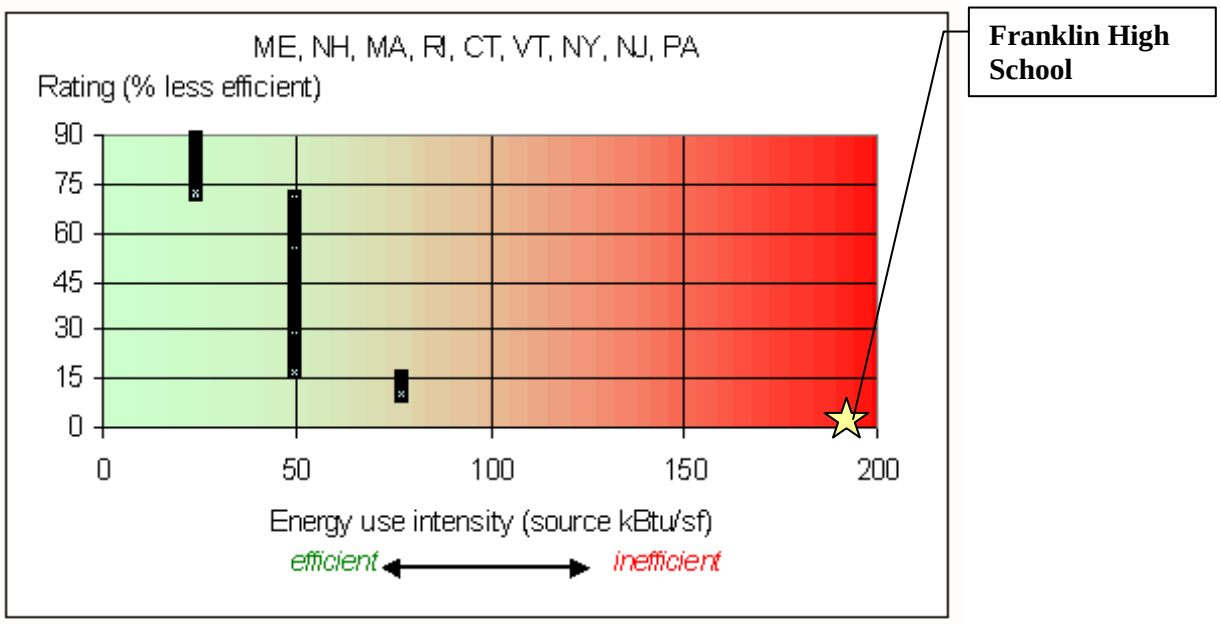


Figure 2
Source Energy Use Intensity Distributions: High School



C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows tracking and assessment of energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and emphasis is being placed on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than $10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. It is vital that local government municipalities assess facility energy usage, benchmark energy usage utilizing Portfolio Manager, set priorities and goals to lessen energy usage and move forward with priorities and goals.

The school district has already created and Energy Star Portfolio Manager Account. The information contained in this account was used to generate the Statement of Energy Performance for each facility included in this report.

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login

The following is a summary of the results for the facility:

Table 5
Energy Star Performance Summary

ENERGY STAR PERFORMANCE RATING PER FACILITY			
FACILITY	**ENERGY STAR PERFORMANCE RATING**		
DESCRIPTION	**SCORE**	**AVERAGE**	**POTENTIAL CERTIFICATIONS**
Hillcrest Elementary School	78	50	N/A
Franklin Park Elementary School	69	50	N/A
Franklin High School	50	50	N/A

See the Appendix C - Statement of Energy Performance for comparative facilities
Score: "N/A" represents facility that could not receive a rating. See Energy Star website for details.

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary for each facility. Facilities that do not have a rating are a result of one of the following issues:

- Utility data is not consistent over the same 12 months worth of data
- Facility size is less than 5000 SF
- More than 50% of the facility space is not a pre-designated space type defined by energy star where insufficient data is available for a rating

V. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. Concord Engineering has assessed the feasibility of installing renewable energy measures (REM) for the school district utilizing renewable technologies and concluded that there is potential for solar energy generation.

Solar Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park vehicles under the array and no parking lot area is lost.

The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The credit value used in our financial calculations varies over the fifteen year outlook from an initial value of $550 per MWH down to $200 per MWH at year fifteen. This equates to an average value of $383 per MWH, or $0.383 per kWh generated.

Concord Engineering has reviewed all of the facilities for applicability to install solar on roof, ground, or on parking lot canopies. As previously stated, the school district has already installed a roof mounted solar system at Franklin Park Elementary School and Franklin High School. The following table describes our findings for Hillcrest Elementary School's potential system size. Further information regarding locations of arrays and defined arrays can be found in each building's report.

A depiction of the area utilized at Hillcrest Elementary School is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. The total KWH production for Hillcrest Elementary School is 299,252 kWh annually, reducing the overall utility bill for this facility by approximately 73% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix** within each facility report. This analysis illustrates the payback of the system over a 15 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

Table 6
Renewable Energy Summary

POWER PRODUCTION SUMMARY - PHOTOVOLTAIC SYSTEM PER FACILITY			
FACILITY	**PRODUCTION SUMMARY**		
DESCRIPTION	**ELECTRIC PRODUCTION (KWH)**	**TOTAL FACILITY USE (KWH)**	**% REDUCTION**
Hillcrest Elementary School	299,252	399,323	75%
Franklin Park Elementary School	N/A	N/A	N/A
Franklin High School	N/A	N/A	N/A
Total	**299,252**	**399,323**	75%

The proposed photovoltaic array layout is designed based on the specifications for the Sharp NU-U235F2 panel. This panel has a "DC" rated full load output of 235 watts, and has a total panel conversion efficiency of 14.4%. Although panels rated at higher wattages are available through Sharp and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized based on available roof space or canopy style system area available at this existing facility. Estimated solar array generation is calculated based on the National Renewable Energy Laboratory PVWatts Version 1.0 Calculator. In order to calculate the array generation an appropriate location with solar data on file must be selected. In addition the system DC rated kilowatt (kW) capacity must be inputted, a DC to AC de-rate factor, panel tilt angle, and array azimuth angle. The DC to AC de-rate factor is based on the panel nameplate DC rating, inverter and transformer efficiencies (95%), mismatch factor (98%), diodes and connections (100%), dc and ac wiring(98%, 99%), soiling, (95%), system availability (95%), shading (if applicable), and age(new/100%). The overall DC to AC de-rate factor has been calculated at an overall rating of 81%. The PVWatts Calculator program then calculates estimated system generation based on average monthly solar irradiance and user provided inputs. The monthly energy generation and offset electric costs from the PVWatts calculator is shown in the **Renewable/Distributed Energy Measures Calculation Appendix**.

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month

basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

Direct purchase involves Franklin Township School District paying for 100% of the total project cost upfront in lieu of one of the methods noted in the Installation Funding Options section below. Calculations include a utility inflation rate as well as the degradation of the solar panels over time. The financial summary is as follows:

Table 7
Renewable Financial Summary

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM PER FACILITY			
FACILITY	**DIRECT PURCHASE FINANCIAL SUMMARY**		
DESCRIPTION	**INSTALATION COST ($)**	**TOTAL SAVINGS ($)**	**INTERNAL RATE OF RETURN**
Hillcrest Elementary School	$1,542,842	$2,336,880	5.7%
Franklin Park Elementary School	N/A	N/A	N/A
Franklin High School	N/A	N/A	N/A
Total	**$1,542,842**	**$2,336,880**	

Given the large amount of capital required by the District to invest in a solar system through a Direct Purchase Concord does not recommend pursuing this route. It would be more advantageous for the District to solicit Power Purchase Agreement (PPA) Providers who will own, operate, and maintain the system for a period of 15 years. During this time the PPA Provider would sell all of the electric generated by the Solar Arrays to the District at a reduced rate compared to their existing electric rate. Concord has performed a preliminary analysis that shows the potential benefits to the District in reduced electric pricing over the life of the agreement. It is estimated that the District could potentially see a reduction in electric rate from 10% to 30% and thus the analysis performed shows three alternative pricing elements based on a 2 cent, 4 cent, and 5 cent rate reduction. The following table shows the potential year 1 and total 15 year electric cost savings for each of these alternative prices.

Table 8
Summary – PPA Analysis

POWER PURCHASE AGREEMENT SUMMARY	
Solar System Size (kW)	258.97
Annual Solar System Production (kWh)	299,252
Existing Utility Electric Rate ($/kWh)	$0.152
Existing Electric Utility Cost	$45,486
Analysis - 1	
Year 1 PPA Electric Rate ($/kWh)	$0.132
Year 1 PPA Electric Cost	$39,501
Electric Cost Savings Year 1	$5,985
Analysis - 2	
Year 1 PPA Electric Rate ($/kWh)	$0.127
Year 1 PPA Electric Cost	$38,005
Electric Cost Savings Year 1	$7,481
Analysis - 3	
Year 1 PPA Electric Rate ($/kWh)	$0.122
Year 1 PPA Electric Cost	$36,509
Electric Cost Savings Year 1	$8,978

Wind Generation

In addition to the Solar Analysis, Concord Engineering also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on Concord Engineering's review of the applicability of wind energy for the facility, it was determined that the average wind speed of. 5.0 m/s is not adequate enough to make wind an economically viable option for the District to pursue.

VI. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of each of the schools included in the audit. Irregularities in the load profile will indicate potential problems within the facilities. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facilities' energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to The Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity:

The electricity usage profile demonstrates a both a summer cooling and winter heating load profile. Historical usage is relatively steady throughout the year with an average monthly usage of 449,764 kWh across all three schools. The average summer (June - Sept) consumption is 459,545 kWh and the average winter (Oct – May) consumption is 444,874 kWh. The largest consumption months were September, December and February.

The historical usage profile is very beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively steady year-long load profile. Third Party Supplier (TPS) electric commodity contracts that offer's a firm, fixed price for 100% of the facilities electric requirements and are lower than the PSE&G's BGS-FP default rate are recommended.

Natural Gas:

The Natural Gas Usage Profile demonstrates a typical natural gas (heat load) profile. The average winter (Nov-Mar) consumption is 396,840 therms and the average summer (Apr-Oct) consumption is 3,221 therms. The largest consumption months were December, January, and February.

This load profile will yield less favorable natural gas pricing when shopping for alternative suppliers. This is because the higher winter month consumption will yield higher pricing which will not be offset by similar summer month consumption. Nymex commodity pricing is generally higher in the winter months of November – March and lower in the summer months of April – October. Obtaining a flat load profile, (usage is similar each month), will yield optimum natural gas pricing when shopping for alternative suppliers.

Tariff Analysis:

Electricity:

The facilities receive electric distribution service through Public Service Electric & Gas Company (PSE&G) on rate schedule LPLS (Large Power and Light Secondary) and GLP

(General Light and Power). All facilities are currently contracted with a Third Party Supplier (TPS), GDF Suez, through April 2013 to provide electric commodity service. For electric supply (generation) service, the client has a choice to either use PSE&G's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electric.

Each year since 2002, the four New Jersey Electric Distribution Companies (EDCs) - Public Service Gas & Electric Company (PSE&G), Atlantic City Electric Company (ACE), Jersey Central Power & Light Company (JCP&L), and Rockland Electric Company (RECO) - have procured several billion dollars of electric supply to serve their Basic Generation Service (BGS) customers through a statewide auction process held in February.

BGS refers to the service of customers who are not served by a third party supplier or competitive retailer. This service is sometimes known as Standard Offer Service, Default Service, or Provider of Last Resort Service.

The Auction Process has consisted of two auctions that are held concurrently, one for larger customers on an hourly price plan (BGS-CIEP) and one for smaller commercial and residential customers on a fixed-price plan (BGS-FP). This facility's rate structure is based on the fixed-price plan (BGS-FP).

The utility, PSE&G will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge (kWh and Demand), Societal Benefits Charge (SBC), and Securitization Transition Charge.

Natural Gas:

All facilities currently receive natural gas distribution service through PSE&G on rate schedule LVG (Large Volume General Service) and GSG (General Service Gas). All facilities are currently receiving natural gas commodity supply from Hess Energy, a Third Party Supplier, through July, 31 2012.

PSE&G provides basic gas supply service (BGSS) to customers who choose not to shop from a Third Party Supplier (TPS) for natural gas commodity. The option is essential to protect the reliability of service to consumers as well as protecting consumers if a third party supplier defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from PSE&G for rate schedule LVG. http://www.pseg.com/companies/pseandg/schedules/pdf/commodity.pdf

The utility, PSE&G is responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, & Societal Benefits Charge (SBC).

Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2011, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

It is important to note that both natural gas and electric commodity market prices are moved by supply and demand, political conditions, market technicals and trader sentiment. This market is continuously changing. Energy commodity pricing is also correlated to weather forecasts. Because weather forecasts are dependable only in the short-term, prolonged temperature extremes can really cause extreme price swings.

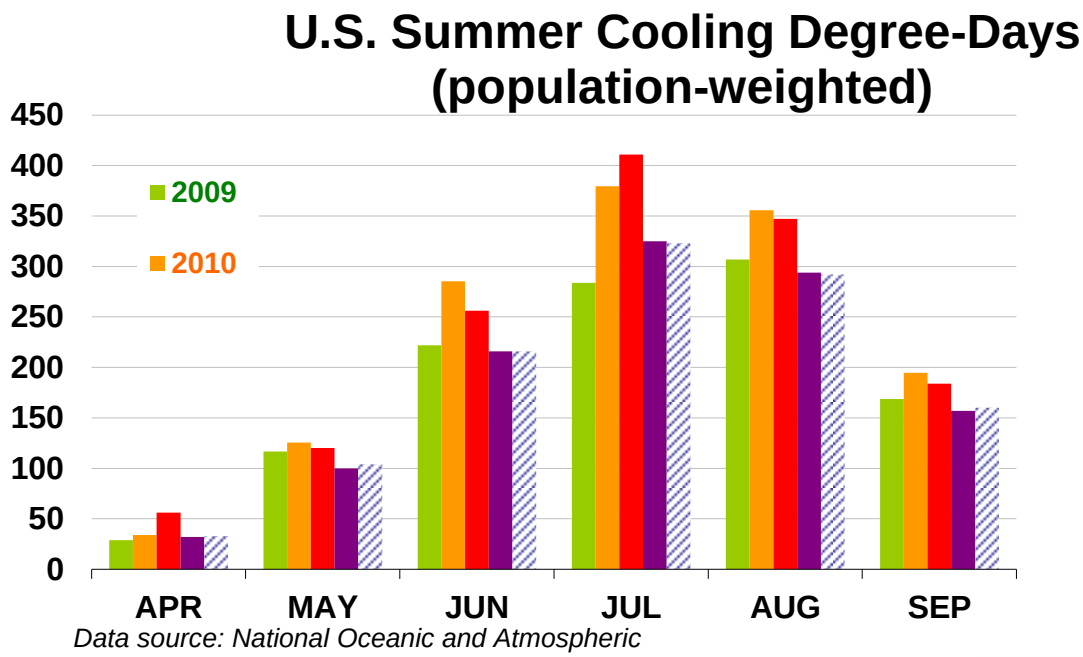
Short Term Energy Outlook - US Energy Information Administration (11/08/2011):

U.S. Natural Gas Prices. *The Henry Hub spot price averaged $3.56 per MMBtu in October 2011, 34 cents lower than the September 2011 average and 49 cents lower than the August 2011 average. This month's Outlook lowers the 2011 forecast by 6 cents to $4.09 per MMBtu and lowers the 2012 forecast by 19 cents to $4.13 per MMBtu compared with last month's Outlook.*

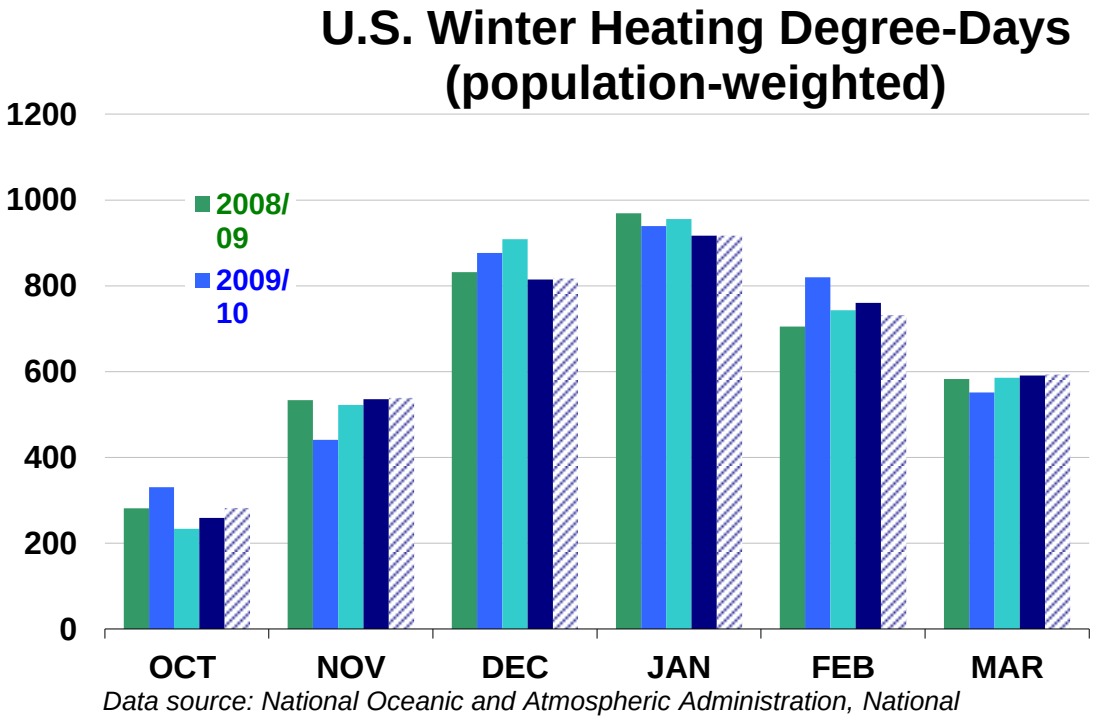
Natural gas futures prices for January 2012 delivery (for the 5-day period ending November 3, 2011) averaged $3.96 per MMBtu, and the average implied volatility was 35 percent. The lower and upper bounds for the 95-percent confidence interval for January 2012 contracts are $3.06 per MMBtu and $5.13 per MMBtu. At this time last year, the January 2011 natural gas futures contract averaged $4.13 per MMBtu and implied volatility averaged 41 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.06 per MMBtu and $5.59 per MMBtu.

U.S. Electricity Consumption. *Total U.S. consumption of electricity across all sectors is forecast to fall by 0.6 percent during 2012 after having grown by an estimated 0.3 percent this year. Despite the recent cold snap and snowstorm in the Northeast, NOAA expects overall temperatures this winter to be milder than last year. In the South Atlantic region, where a majority of households heat with electricity, heating degree-days between October 2011 and March 2012 are expected to be 5.9 percent lower than in the same period last year. This implies a drop of 2.6 percent in winter electricity sales to the residential sector in the South Atlantic.*

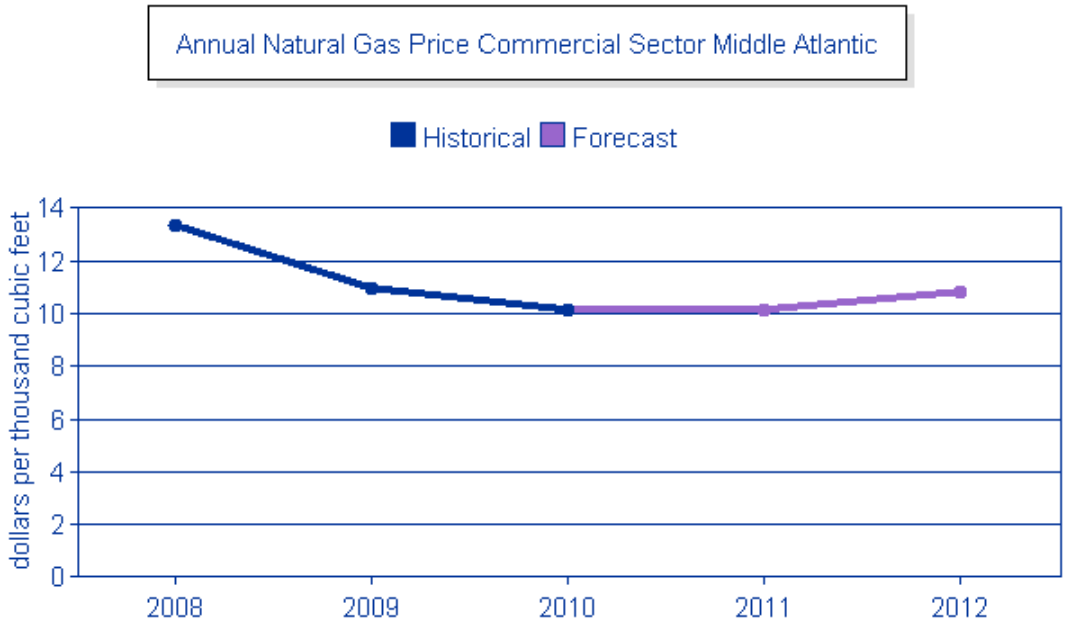
U.S. Electricity Retail Prices. *The cost of coal delivered to electric generators is expected to increase by 6.4 percent during 2011, while the delivered cost of natural gas continues to decline. The net effect will be relatively modest growth in retail electricity prices over the forecast horizon. EIA expects average U.S. residential electricity prices to increase by 1.7 percent in 2011 and by 1.2 percent in 2012.*

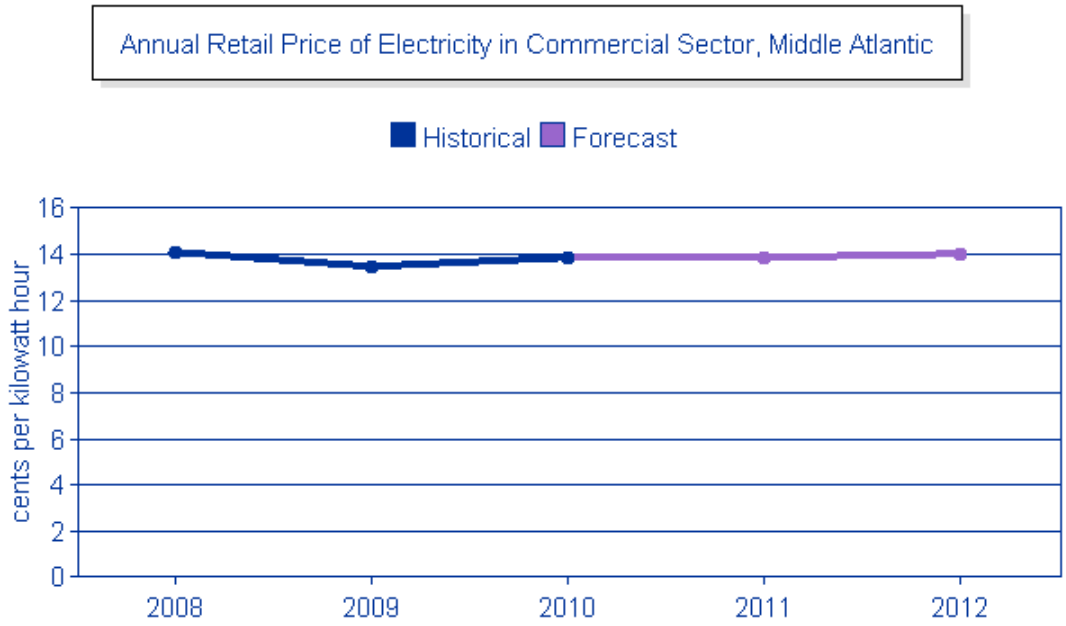


Source: Short-Term Energy Outlook,



Source: Short-Term Energy Outlook,





Pricing in the chart above includes both utility distribution and energy commodity charges.

Recommendations:

1. CEG recommends a continued account aggregation approach for 3rd party commodity supply procurement strategies for electric supply service as well as natural gas commodity supply service options. Aggregating the usage of all facilities for electricity and natural gas supply service would allow the facilities to either continue to achieve or achieve a reduction in commodity supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive and contract terms longer than 12 months are desirable. Contracts due to expire in the near term would continue to yield favorable pricing. It is important to aggregate usage where available and take advantage of these current market prices quickly, before energy increases.

2. CEG recommends exploring new electricity pricing options that would either extend the existing electric supply contract beyond the April 2013 expiration date, or have a new contract price commence upon the expiration date. CEG also recommends exploring new natural gas pricing options or have a new contract price commence on the July 30, 2012 expiration date.

3. After review of the utility consumption, billing, third party supply contracts and current commodity pricing outlook, CEG recommends that Franklin BOE explore the utilization and advisement of a 3rd party unbiased Energy Consulting Firm experienced in the procurement of commodities, New Jersey procurement laws, aggregation of facilities and energy supply risk and commodity management. This firm should be able to provide full service advisement over the term of the contract, provide market watch opportunities and identify any additional opportunities that may further reduce costs. Many of these opportunities may include: energy rates; utility bill auditing; energy data analytics; and efficiency improvements.

   It is important that a rational, defensible strategy for purchasing commodity in volatile markets is incorporated. Examples include:

   - Budgets that reflect sound market intelligence
   - An understanding of utility and market historical prices and trends
   - Awareness of seasonal opportunities (e.g. shoulder months)
   - Negotiation of fair contractual terms
   - An aggressive, market based price

4. CEG recommends that the Franklin BOE consider utilizing a third party utility billing-auditing service to further analyze historical utility invoices such as water, sewer, natural gas and electric for incorrect billings and rate tariff optimization services. This service can be based on a shared savings model with no cost to Franklin BOE. The service could provide refunds on potential incorrect billings that may have been passed through by the utilities and or supplier and paid by Franklin BOE.

The recommendations and projected savings presented by CEG are based on current information provided by the Franklin BOE for its facilities utility usage. Any projected savings presented with these recommendations are estimates only based on that information. It is recommended that further analysis and review of more recent utility data and actual Third Party Suppler invoices be performed prior to performing any of the presented recommendations.

VII. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the facility owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

A. Incentive Programs:

Pay For Performance

The New Jersey Smart Start Pay for Performance program includes incentives based on savings resulted from implemented ECMs. The program is available for all buildings that were audited as part of the NJ Clean Energy's Local Government Energy Audit Program. The facility's participation in the program is assisted by an approved program partner. An "Energy Reduction Plan" is created with the facility and approved partner to shown at least 15% reduction in the building's current energy use. Multiple energy conservation measures implemented together are applicable toward the total savings of at least 15%. No more than 50% of the total energy savings can result from lighting upgrades / changes.

Total incentive is capped at 50% of the project cost. The program savings is broken down into three benchmarks; Energy Reduction Plan, Project Implementation, and Measurement and Verification. Each step provides additional incentives as the energy reduction project continues. The benchmark incentives are as follows:

1. Energy Reduction Plan – Upon completion of an energy reduction plan by an approved program partner, the incentive will grant $0.10 per square foot between $5,000 and $50,000, and not to exceed 50% of the facility's annual energy expense. (Benchmark #1 is not provided in addition to the local government energy audit program incentive.)

2. Project Implementation – Upon installation of the recommended measures along with the "Substantial Completion Construction Report," the incentive will grant savings per KWH or Therm based on the program's rates. Minimum saving must be 15%. (Example $0.11 / kWh for 15% savings, $0.12/ kWh for 17% savings, … and $1.10 / Therm for 15% savings, $1.20 / Therm for 17% saving, …) Increased incentives result from projected savings above 15%.

3. Measurement and Verification – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program's rates. Minimum savings must be 15%. (Example $0.07 / kWh for 15% savings, $0.08/ kWh for 17% savings, … and

$0.70 / Therm for 15% savings, $0.80 / Therm for 17% saving, …)
Increased incentives result from verified savings above 15%.

Direct Install Program

The New Jersey Clean Energy's Direct Install Program is a state funded program that targets small commercial and industrial facilities with peak demand of less than 150 kW. This turnkey program is aimed at providing owners a seamless, comprehensive process for analysis, equipment replacement and financial incentives to reduce consumption, lower utility costs and improve profitability. The program covers up to 60% of the cost for eligible upgrades including lighting, lighting controls, refrigeration, HVAC, motors, variable speed drives, natural gas and food service. Participating contractors (refer to www.njcleanenergy.com) conduct energy assessments in addition to your standard local government energy audit and install the cost-effective measures. Currently, only Hillcrest Elementary School is below the maximum demand threshold of 150kW. The following measures are potential candidates for Direct Install at Hillcrest Elementary School:

- ECM#1 - Lighting Upgrade
- ECM#2 - Lighting Controls
- ECM#7 – HW Pump VFD
- ECM#8 – NEMA Premium Pump Motors
- ECM#9 - Rooftop Unit upgrade

Smart Start Program

Prescriptive Measures - The New Jersey Clean Energy's Smart Start prescriptive measures incentives include unit pricing incentives for installation of energy efficient equipment and controls. Proposed equipment and controls must meet the minimum efficiency requirements as well as other application requirements. The Smart Start prescriptive incentives applicable for new construction, renovations, remodeling and equipment replacements, for a wide range of equipment including:

- Electric Chillers
- Gas Cooling
- Electric Unitary HVAC
- Ground Source Heat Pumps
- Gas Heating
- Variable Frequency Drives
- Gas Water Heating
- Premium Motors
- Prescriptive Lighting
- Lighting Controls
- Technical Studies

Custom Measures - The New Jersey Clean Energy's Smart Start prescriptive measures incentives include all measures not identified in the prescriptive measures category or measures that must have savings verified through additional analysis such as energy model simulations. Custom measures are intended to include savings as a result of unique energy efficiency measures, which are typically facility specific such as waste heat recovery. Custom incentives are provided based on the amount of energy saved and minimum internal rate of return in order to be eligible.

Energy Efficiency and Conservation Block Grants

The EECGB provides supplemental funding up to $50,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

Concord Engineering recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

B. Financing Options:

Municipal Bonds

Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

Power Purchase Agreement

Public Law 2008, Chapter 3 authorizes contracts of up to fifteen (15) years for energy purchase contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

Energy Savings Improvement Program (ESIP):

Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources. This program provides public entities to make valuable facility infrastructure improvements that are associated with energy savings. All energy savings projects are eligible as long as the financing period does not extend beyond 15 years. The financing can be utilized for all aspects of energy efficiency project implementation including, energy savings plan development, engineering, construction management, construction management, commissioning, and measurement and verification.

This program provides the much needed financing for energy efficiency projects without the burden of increased debt. The program allows for procurement of financing without voter approval or extending existing dept. The program requires evaluation to ensure a positive cash-flow through the entire 15 year financing period. The first phase of implementing an ESIP is the development of an Energy Savings Plan (ESP) to verify the energy savings, construction costs, and overall financial model.

The underlining program requirement is the limitation of the project term to 15 years. The ESIP project size is open for multiple buildings to be included within one project. In addition all applicable incentive programs can also be utilized to help reduce the overall construction cost.

The following breakdown is an estimated project scope with the potential to qualify for the ESIP. An ESP is required to verify the costs and savings as part of an ESIP project.

Table 8
ESIP -Total Entity Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL ENERGY EFFICIENCY PROJECT					
FACILITY ENERGY EFFICIENCY PROJECTS	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Hillcrest Elementary School	$32,862	$858,766	$13,995	$844,771	25.7
Franklin Park Elementary School	$41,790	$674,219	$15,561	$658,658	15.8
Franklin High School	$83,126	$399,562	$11,429	$388,133	4.7
Total Entity Project	**$157,778**	**$1,932,546**	**$40,985**	**$1,891,561**	**12.0**
			Total Entity Energy Costs:	**$1,079,786**	
			Est. Total Entity Energy Savings:	**$157,778**	
			Overall Entity Percent Reduction:	**14.6%**	

VIII. ENERGY AUDIT ASSUMPTIONS

The assumptions utilized in this energy audit include but are not limited to following:

A. Cost Estimates noted within this report are based on industry accepted costing data such as RS Means™ Cost Data, contractor pricing and engineering estimates. All cost estimates for this level of auditing are +/- 20%. Prevailing wage rates for the specified region has been utilized to calculate installation costs. The cost estimates indicated within this audit should be utilized by the owner for prioritizing further project development post the energy audit. Project development would include investment grade auditing and detailed engineering.
B. Energy savings noted within this audit are calculated utilizing industry standard procedures and accepted engineering assumptions. For this level of auditing, energy savings are not guaranteed.
C. Information gathering for each facility is strongly based on interviews with operations personnel. Information dependent on verbal feedback is used for calculation assumptions including but not limited to the following:
    a. operating hours
    b. equipment type
    c. control strategies
    d. scheduling
D. Information contained within the major equipment list is based on the existing owner documentation where available (drawings, O&M manuals, etc.). If existing owner documentation is not available, catalog information is utilized to populate the required information.
E. Equipment incentives and energy credits are based on current pricing and status of rebate programs. Rebate availability is dependent on the individual program funding and applicability.
F. Equipment (HVAC, Plumbing, Electrical, & Lighting) noted within an ECM recommendation is strictly noted as a **basis for calculation** of energy savings. The owner should use this equipment information as a benchmark when pursuing further investment grade project development and detailed engineering for specific energy conservation measures.
G. Utility bill annual averages are utilized for calculation of all energy costs unless otherwise noted. Accuracy of the utility energy usage and costs are based on the information provided. Utility information including usage and costs is estimated where incomplete data is provided.

HILLCREST
ELEMENTARY SCHOOL

500 FRANKLIN BOULEVARD
SOMERSET, NJ 08873

FACILITY ENERGY REPORT

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Appendix C – Portfolio Manager "Statement of Energy Performance"

Appendix D – Major Equipment List

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Appendix F – Renewable / Distributed Energy Measures Calculations

I. HISTORIC ENERGY CONSUMPTION/COST

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	General Lighting & Power (GLP)
Third Party Supplier:	GDF Suez

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	Hess

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

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

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: GLP
Meter No: 238000548 / 728011881
Account # 6596426505
Third Party Utility GDF Suez
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Nov-10	36,340	133.4	$5,041
Dec-10	49,790	143.5	$6,905
Jan-11	56,660	150.3	$7,765
Feb-11	49,270	149.2	$6,729
Mar-11	40,410	140.9	$5,520
Apr-11	36,210	130.7	$5,011
May-11	25,920	123.6	$3,277
Jun-11	34,240	182.0	$4,584
Jul-11	12,243	66.4	$1,560
Aug-11	11,080	60.4	$1,465
Sep-11	21,840	146.8	$2,879
Oct-11	25,320	139.2	$3,173
Totals	**399,323**	**182.0 Max**	**$53,911**

AVERAGE DEMAND 130.5 KW average

AVERAGE RATE $0.135 $/kWh

Figure 1
Electricity Usage Profile

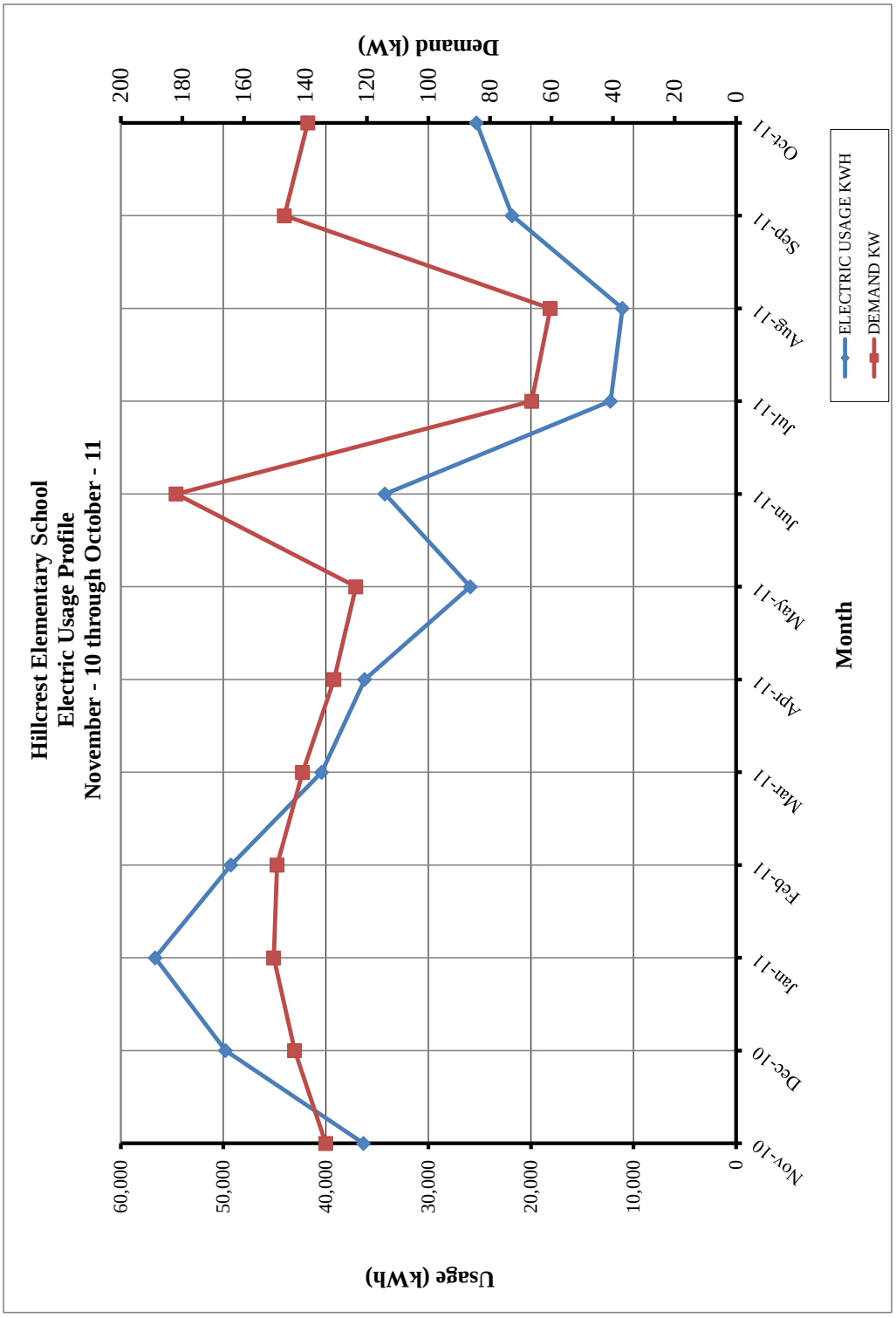
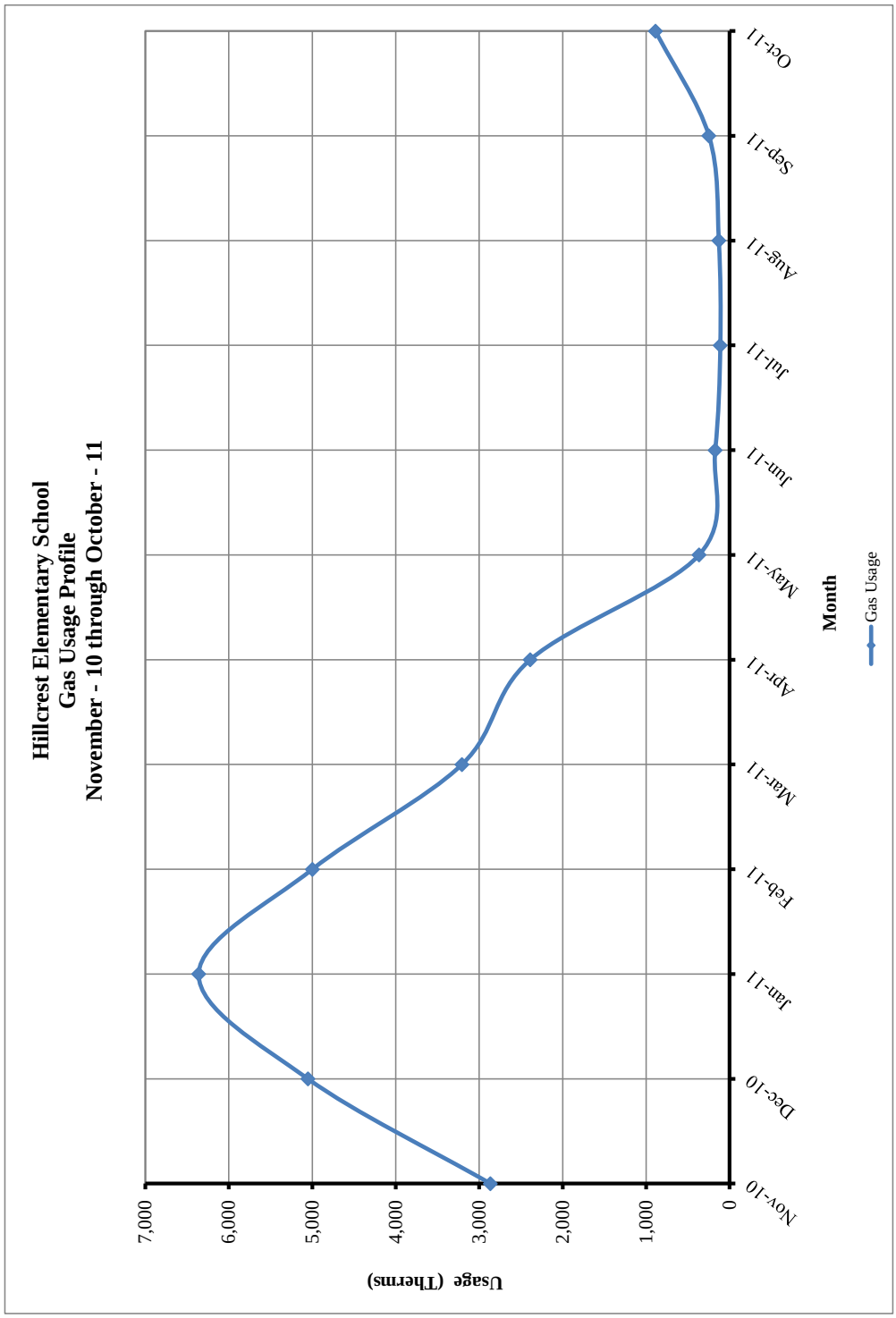


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	LVG	
Meter No:	2808904	
Point of Delivery ID:	4200444208	
Third Party Utility Provider:	Hess	
TPS Meter No:	-	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Nov-10	2,864.90	$3,737.39
Dec-10	5,051.80	$5,931.16
Jan-11	6,361.00	$7,213.02
Feb-11	4,999.20	$5,848.31
Mar-11	3,206.80	$4,050.84
Apr-11	2,388.90	$2,296.64
May-11	365.30	$442.60
Jun-11	172.20	$260.07
Jul-11	110.70	$202.23
Aug-11	128.90	$221.73
Sep-11	247.50	$334.16
Oct-11	887.90	$935.64
TOTALS	**26,785.10**	**$31,473.79**
AVERAGE RATE:	**$1.18**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

Hillcrest Elementary School is located on 500 Franklin Boulevard in Somerset, New Jersey. The 52,122 SF elementary school was constructed in 1958 with a small classroom addition made since. The school consists of classrooms, cafeteria, library and administrative offices.

Occupancy Profile

The school is occupied for approximately 80 hours per week during the school months (September to June) and 40 hours per week in the summer months (July and August). The school has approximately 43 employees and 356 students.

Building Envelope

Exterior walls for the school are 4" brick faced with 8" concrete block interior construction. The amount of insulation within the walls could not be determined. The windows of the majority of the school are double pane, ¼" glass, aluminum frames and integral blinds. These windows are in good condition. The windows around the top of the gymnasium are a single pane, ¼" glass with an integral wire mesh to prevent shattering and un-insulated metal frames. These windows are original to the building and are in poor condition.

The roof is a flat, tar roof with a light stone covering on a steel roof deck. The amount of insulation below the roof is unknown. It was noted during the survey that there are several leaks in the existing roof. Overall, the roof is in poor condition and in need of major repair or replacement.

HVAC Systems

The elementary school system consists of hot water boilers, a single rooftop air handling unit, split system air conditioning units and classroom unit ventilators.

Heating is provided via three (3) 132 BHP Pacific Steel Firetube boilers with natural gas burners. Each boiler is rated for 3,575 MBH output with an input rating of 4,430 MBH. These boilers originally had an efficiency of approximately 80%, but are estimated to be operating around 70% due to the age and condition of the boilers. These boilers are original to the building, or 56 years old, and have well surpassed their useful service life of 25 years, as defined by ASHRAE. In addition, it was noted during the time of the survey that only one of the boilers operates at any given time, which would indicate that a three (3) 132 BHP boiler configuration for the building is grossly oversized. The heating hot water is circulated via two (2) base mounted, end suction pumps with 7-1/2 HP motors. The flow rating of these pumps could not be determined, however it was noted that both pumps run simultaneously, in parallel, during heating season.

There is a single packaged rooftop unit with D/X (Direct Expansion) cooling and gas fired heating. This unit serves the Science and Technology classroom. This unit provides 6-1/2 Tons of cooling and 120 MBH of heating. This unit is approximately 7 years old and is still within its useful service life of 15 years per ASHRAE service life estimates.

The Copy Room and adjacent office (Mrs. Levy) are each served by a ductless split system, cooling only A/C unit. The remote condensing units are located on the roof, with the interior evaporator/fan sections mounted on the wall in the spaces. These units are rated for 1 Ton of cooling each and are approximately 3 years old. These units are in good condition.

There is an additional split system installed in the Speech/ESL classroom. It was indicated at the time of the survey that this unit was installed approximately six (6) years ago, but was taken out of service shortly thereafter because the unit was not adequately sized to condition the space.

The classrooms are served by vintage Nesbitt Unit Ventilators (UVs). These units are equipped with a 2-way control valve and a wall mounted pneumatic adjustable thermostat. These units are all original to the building and are in poor condition. In addition, each classroom has a window mounted A/C unit. These units are approximately 1-1/2 Tons each. Each classroom also has ceiling fans controlled by a wall switch.

The gymnasium is served by a vintage Audivent heating and ventilating air handling unit. This unit has a hot water heating coil with three-way control valve.

The administrative offices are heated by baseboard radiation and controlled by pneumatic thermostats.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. These fans are manually operated through the pneumatic control system.

HVAC System Controls

The boilers are controlled by a Tekmar boiler control system, which was installed within the last few years. The original pneumatic boiler control system was abandoned in place. The remaining HVAC systems within the school are controlled via pneumatic controls. The individual components of the system (i.e. valves and dampers) are controlled with pneumatic actuators. The operation and status of this equipment is centrally controlled via the main pneumatic control panel located in the boiler room.

The rooftop unit over the Science Classroom is controlled by a stand-alone programmable thermostat.

Domestic Hot Water

Domestic hot water for the school restrooms is provided by a gas fired, Raypak 153 MBH hot water boiler with a separate 115 gallon Rheem hot water storage tank.

Domestic hot water for the kitchen is provided by a Rheem, 2kW 19.9 gallon electric hot water heater. This unit is mounted in the kitchen adjacent to the three compartment sink that it serves.

The nurse's bathroom has a stand alone, Vanguard, 2 kW, 6 gallon electric hot water heater, mounted on the floor. This unit provides hot water for the bathroom sink.

Lighting

Typical lighting throughout the building is fluorescent tube fixtures with 700 series T-8 lamps and electronic ballasts. These fixtures can be re-lamped with more efficient 800 series T-8 lamps without compromising the lighting levels in these spaces. It was also noted that some of the spaces were over-lit. This can be corrected by de-lamping these fixture by one, which will also reduce energy consumption. There are only a small number of older fixtures with T12 lamps and magnetic ballasts, which can be retrofitted with T8 lamps and electronic ballasts. Exterior lighting is provided with double head incandescent flood lights. It is recommended to re-lamp these fixtures with compact fluorescent lamps. A space by space breakdown of the lighting throughout the facility is provided in the **Investment Grade Lighting Appendix**.

III. MAJOR EQUIPMENT LIST

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

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

IV. ENERGY CONSERVATION MEASURES

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

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	General Lighting Upgrades	$16,071	$3,410	4.7	218.3%
ECM #2	Lighting Controls	$11,480	$3,278	3.5	328.3%
ECM #3	Condensing Boiler Installation	$225,750	$6,015	37.5	-20.1%
ECM #4	Domestic Hot Water Heater Uprade	$14,250	$838	17.0	47.0%
ECM #5	DDC System Installation	$208,848	$10,131	20.6	21.3%
ECM #6	Window AC Unit Upgrade	$74,331	$2,882	25.8	-41.8%
ECM #7	HW Pump VFD	$29,250	$2,898	10.1	48.6%
ECM #8	NEMA Premium Pump Motors	$7,074	$651	10.9	38.0%
ECM #9	Rooftop Unit Replacement	$15,775	$285	55.4	-72.9%
ECM #10	Window Replacement	$72,000	$974	73.9	-79.7%
ECM #11	Water Conservation	$24,637	$1,500	38.6	-8.7%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	258.97 KW PV Array	$1,542,842	$155,792	9.9	51.5%

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	General Lighting Upgrades	9.3	25,257	-
ECM #2	Lighting Controls	9.3	24,285	-
ECM #3	Condensing Boiler Installation	-	-	5,156
ECM #4	Domestic Hot Water Heater Uprade	-	-	848
ECM #5	DDC System Installation	-	50,849	2,768
ECM #6	Window AC Unit Upgrade	26.7	21,348	-
ECM #7	HW Pump VFD	-	21,466	-
ECM #8	NEMA Premium Pump Motors	2.2	4,821	-
ECM #9	Rooftop Unit Replacement	3.0	9,907	-
ECM #10	Window Replacement	-	-	826
ECM #11	Water Conservation	0.0	0	309
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	**DESCRIPTION**	**ANNUAL UTILITY REDUCTION**		
		ELECTRIC DEMAND (KW)	**ELECTRIC CONSUMPTION (KWH)**	**NATURAL GAS (THERMS)**
REM #1	258.97 KW PV Array	32.7	49,379	-

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
General Lighting Upgrades	$3,410	$16,071	$0	$16,071	4.7
Lighting Controls	$3,278	$12,900	$1,420	$11,480	3.5
Condensing Boiler Installation	$6,015	$231,750	$6,000	$225,750	37.5
Domestic Hot Water Heater Uprade	$838	$14,550	$300	$14,250	17.0
DDC System Installation	$10,131	$208,848	$0	$208,848	20.6
Window AC Unit Upgrade	$2,882	$79,901	$5,570	$74,331	25.8
HW Pump VFD	$2,898	$29,250	$0	$29,250	10.1
NEMA Premium Pump Motors	$651	$7,304	$230	$7,074	10.9
Rooftop Unit Replacement	$285	$16,250	$475	$15,775	55.4
Window Replacement	$974	$72,000	$0	$72,000	73.9
Water Conservation	$1,500	$57,929	$0	$57,929	38.6
Design / Construction Extras (15%)		$112,013		*$112,013*	
Total Project	**$32,862**	**$858,766**	**$13,995**	**$844,771**	**25.7**

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

ECM #1: Lighting Upgrade

Description:

The majority of the interior lighting throughout Hillcrest Elementary School is provided by fluorescent fixtures with 34W T8 lamps and electronic ballasts. CE recommends re-lamping all of the 32 W T8 fixtures with more efficient 28W T8 lamps. The ECM includes retrofit of all older fluorescent fixtures with T8 or T5 fluorescent fixtures with electronic ballasts in the building. The new, energy efficient T8 fixtures will provide adequate lighting and will save on electrical costs due to better performance of the lamp and ballasts.

This ECM also recommends de-lamping the fixtures in the auxiliary cafeteria and classroom 111, which are currently slightly over-lit. De-lamping will restore lighting comfort in these spaces and result in energy savings.

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

Energy Savings Calculations:

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

Rebates and Incentives:

There are no rebates or incentives for relamping.

Replacement and Maintenance Savings:

There is no replacement or maintenance savings for this ECM since the new lamps have the same burn-hours as the existing lamps.

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$16,071
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$16,071
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,410
Total Yearly Savings ($/Yr):	$3,410
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.7
Simple Lifetime ROI	218.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$51,150
Internal Rate of Return (IRR)	20%
Net Present Value (NPV)	$24,637.36

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

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

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

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

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

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

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

Energy Savings Calculations:

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

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

Rebates and Incentives:

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

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

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$12,900
NJ Smart Start Equipment Incentive ($):	$1,420
Net Installation Cost ($):	$11,480
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$3,278
Total Yearly Savings ($/Yr):	$3,278
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.5
Simple Lifetime ROI	328.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$49,170
Internal Rate of Return (IRR)	28%
Net Present Value (NPV)	$27,652.55

ECM #3: Condensing Boiler Installation

Description:

Space heating for the classrooms and offices in the school is provided by unit ventilators with hot water coils and hot water baseboard radiators. The source of hot water for this equipment is three (3) firetube hot water boilers with gas fired burners.

Each of the boilers is a Pacific Steel Firetube hot water boiler. These boilers are located in the boiler room and are poor condition. Each boiler is rated for 3,575 MBH output with an input rating of 4,430 MBH. These boilers originally had an efficiency of approximately 80%, but are estimated to be operating around 70% due to the age and condition of the boilers. These boilers are original to the building, or 56 years old, and have well surpassed their useful service life of 25 years, as defined by ASHRAE. In addition, it was noted during the time of the survey that only one of the boilers operates at any given time, which would indicate that a three (3) 132 BHP boiler configuration for the building is grossly oversized.

Typically, standard (non-condensing) boilers provide lower than nominal efficiency compared to condensing boilers. Standard boilers suffer further efficiency losses at part load operating conditions mainly due to limitations in the reduction of the flue gas temperature. Current average combustion efficiency of the boilers is estimated to be 70% due to standard non-condensing boiler technology, limited turn down ratio, cycling losses and outdated design and controls. New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature.

Concord Engineering recommends replacing the boilers with condensing hot water boilers to provide building with heating throughout the year. The annual average operating efficiency of the proposed boiler set is expected to be 90%, which gives the heating system a 20% increase in efficiency. This ECM is based on *variable* supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of two (2) new condensing gas fired boilers to replace the existing boilers in the mechanical room. The following is a summary of the boiler replacement recommendations.

BOILER REPLACEMENT SUMMARY		
EXISTING UNIT	**LOCATION**	**PROPOSED UNITS**
(3) 4,430 MBH Fire Tube Boilers	Boiler Room	(2) 3.0 MMBTU

The basis for this ECM is Aerco Benchmark 3.0 condensing hot water boiler or equivalent. It is not recommended to replace the total boiler plant capacity 100% since the existing boiler plant appears to be oversized. At the time of the survey, we were notified that only one boiler operates at any given time, indicating that a 4,430 MBH boiler would provide adequate capacity to serve the building. The installation of the two (2) BMK-3.0 boilers will provide an overall capacity of 6,000 MBH, or an output of 5,220 MBH, which is approximately 35% greater than the capacity of one of the boilers.

Energy Savings Calculations:

Currently, the only gas consuming equipment connected to the building gas meter is the boilers, the domestic hot water heater, a kitchen range and a single rooftop unit, located over the science classroom. Therefore, annual energy consumption of the boilers has to be estimated. In this calculation, it is assumed that the energy consumption of the boilers will be in proportion with the ratio of the total heating capacity of all of the equipment. It is also assumed that the kitchen equipment is minimal in comparison to the overall building gas consumption.

First, domestic hot water usage is estimated and subtracted from the total usage in order to estimate the net natural gas usage for space heating. The monthly domestic hot water usage was derived from the average natural gas consumption from May through September.

Current total hot water usage can be found in the table below:

ANNUAL GAS USAGE				
MONTH	**TOTAL USAGE THERMS**	**DOMESTIC HW USAGE**	**HEATING ONLY**	**COST**
Nov-10	2,865	319	2,546	$3,004
Dec-10	5,052	319	4,733	$5,585
Jan-11	6,361	319	6,042	$7,130
Feb-11	4,999	319	4,680	$5,523
Mar-11	3,207	319	2,888	$3,408
Apr-11	2,389	319	2,070	$2,442
May-11	**365**	319	46	$55
Jun-11	**172**	172	0	$0
Jul-11	**111**	111	0	$0
Aug-11	**129**	129	0	$0
Sep-11	**248**	248	0	$0
Oct-11	**888**	319	569	$671
TOTAL	**26,786**	**3,212**	**23,574**	**27,817**

Baseline Domestic Hot Water Gas Use = 3,212 Therms
Existing Natural Gas Use for Heating = 26,786 Therms – 3,212 Therms
= 23,574 Therms

$$\text{Estimated Gas Used} = \text{Heating Nat. Gas (Therm)} \times \text{Heating Eff (\%)} \times \text{Fuel Heat Value } (\frac{\text{BTU}}{\text{Therm}})$$

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

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

Below calculation is performed to estimate annual gas usage of the boilers:

Total facility heating capacity (Heating equipment input capacity, excluding domestic hot water heater):

(1) Pacific Steel Fire Tube boiler	= 4,430 MBH
(1) Gas Fired RTUs (weight room)	= 120 MBH
Total Output Capacity	**= 4,550 MMBH**

Total facility heating capacity:	4,550 MBH
Total Capacity – Cast Iron Boilers only:	4,430 MBH
Percent usage by boilers:	97.3% of Total
Estimated natural gas usage	97.3% of 23,574 Therms
Estimated natural gas usage	22,938 Therms

$$\text{Bldg Heat Required} = \text{Heating Nat. Gas (Therm)} \times \text{Heating Eff (\%)} \times \text{Fuel Heat Value } (\frac{\text{BTU}}{\text{Therm}})$$

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

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

Energy savings calculations are summarized in the table below:

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	(1) Existing Hot Water Boiler	(2) New Condensing Boilers	-
Boiler Input Capacity (MBH)	4,430	6,000	
Boiler Output Capacity (MBH)	4,575	5,400	
Existing Nat Gas (Therms)	22,938	-	-
Boiler Efficiency (%)	70%	90%	20%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	-
Building Heating Energy Usage (MMBTUs)	1,606	1,606	-
Ave. Gas Cost ($/Therm)	1.18	1.18	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	22,938	17,841	5,097
Energy Cost ($)	$27,067	$21,052	$6,015
COMMENTS:			

Project Cost, Incentives and Maintenance Savings

Estimated cost for removing the existing boilers and installing two (2) 3.0 MMBH condensing hot water boilers with advanced controls is $231,750.

From the **New Jersey Smart Start® Program Incentives Appendix**, installation of a high efficiency hot water boiler falls under the category "Gas Heating" and warrants an incentive based on efficiency at or above 84% for this type of equipment. The program incentives are calculated as follows:

GAS FIRED BOILER REBATE SUMMARY					
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/MBH**	**PROPOSED CAPACITY,**	**NUMBER OF UNITS**	**TOTAL REBATE, $**
≥ 300 MBH - 1500 MBH	84% AFUE for Hot Water boilers	$1.75	0	0	$0
>1500 - ≤ 4000 MBH	84% AFUE for Hot Water boilers	$1	3,000	2	$6,000
> 4000 MBH	84% AFUE for Hot Water boilers	$1	0	0	$0
TOTAL					**$6,000**

Maintenance savings associated with this ECM is estimated to be minimal.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$231,750
NJ Smart Start Equipment Incentive ($):	$6,000
Net Installation Cost ($):	$225,750
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,015
Total Yearly Savings ($/Yr):	$6,015
Estimated ECM Lifetime (Yr):	30
Simple Payback	37.5
Simple Lifetime ROI	-20.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$180,450
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($107,853.35)

ECM #4: High Efficiency Gas Hot Water Heater

Description:

Domestic hot water for Hillcrest Elementary School is provided to the school restrooms by a gas fired, Raypak 153 MBH hot water boiler with a separate 115 gallon Rheem hot water storage tank. The existing hot water boiler is approximately seventeen (17) years old and is operating with an estimated efficiency of 74%. The existing domestic hot water boiler is much less efficient than newer, condensing hot water boilers.

This ECM recommends replacing the existing hot water boiler and storage tank with a new, condensing hot water heater. The basis for this calculation is an A.O. Smith Cyclone BTH, 150 MBH hot water heater with 100 gallon storage capacity. It is recommended that Franklin Township Board of Education retain a professional engineer to finalize the sizing and design of the system.

Energy Savings Calculations:

The natural gas consumption of the existing domestic hot water boiler was estimated in ECM#3. The estimate is based on the average gas consumption from May through September. The estimated gas consumption of the domestic hot water boiler is estimated to be 3,212 Therms. The energy savings are summarized in the following table.

CONDENSING DOMESTIC HOT WATER HEATER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Domestic Hot Water Boiler	New Condensing Hot Water Heater	-
Input Capacity (MBH)	153	150	
Existing Nat Gas (Therms)	3,212	-	-
Water Heater Efficiency (%)	74%	95%	21%
Ave. Gas Cost ($/Therm)	1.18	1.18	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	3,212	2,502	710
Energy Cost ($)	$3,790	$2,952	$838
COMMENTS:			

Cost, Rebates and Incentives:

The total installed cost of the new hot water heater, including demolition of the old hot water boiler and storage tank, is estimated to be **$14,550.**

From the NJ Smart Start® Program appendix, the hot water heater installation falls under the category "Gas Water Heating" and warrants an incentive as follows:

Smart Start ® Incentive: $\$2/\text{MBH} \times \text{Unit Capacity, MBH}$
(Water Heaters > 50 Gallons, up to 300 MBH)

150 MBH x $2/MBH = **$300**

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$14,550
NJ Smart Start Equipment Incentive ($):	$300
Net Installation Cost ($):	$14,250
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$838
Total Yearly Savings ($/Yr):	$838
Estimated ECM Lifetime (Yr):	25
Simple Payback	17.0
Simple Lifetime ROI	47.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$20,950
Internal Rate of Return (IRR)	3%
Net Present Value (NPV)	$342.22

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

Description:

The boiler systems within the facility are controlled via a Tekmar boiler control system. The remainder of the HVAC systems within the facility is controlled via a central pneumatic system.

The unit ventilator fans throughout the spaces are manually enabled via on-board switches with the hot water control valve and outside air damper controlled by a pneumatic thermostat. The air handling unit serving the gymnasium is manually enabled via a pneumatic breaker switch in the mechanical room. The split air conditioning systems in the offices are controlled via a local digital programmable thermostat. The window air conditioners in the classrooms, offices and the library are controlled manually via on board controls or remote controllers.

Concord Engineering recommends expanding the DDC system to control the entire HVAC system in the school including the unit ventilators in the classrooms, air handling unit for the gymnasium and roof exhaust fans.

This ECM includes expansion of the existing Building Automation system to include control of the rest of the HVAC equipment in the facility. The system will include new temperature sensors and new local thermostats with limited over-ride capability, a front end computer and main controller. The system will also include central controls for lighting. With the communication between the control devices and the front end computer interface, the facility manager will be able to take advantage of scheduling for occupied and unoccupied periods based on the actual occupancy of each space in the facility. Due to the fact that the building may have diverse hours of occupancy, including evening and weekend activities, having supervisory control over all of the equipment makes sense. The DDC system will also aid in the response time to service / maintenance issues when the facility is not under normal maintenance supervision, i.e. after-hours.

The new DDC system has the potential to provide significant savings by controlling the HVAC systems as a whole and provide operating schedules and features such as space averaging, night set-back, temperature override control, etc. The U.S. Department of Energy sponsored a study to analyze energy savings achieved through various types of building system controls. The referenced savings is based on the "Advanced Sensors and Controls for Building Applications: Market Assessment and Potential R&D Pathways," document posted for public use April 2005. The study has found that commercial buildings have the potential to achieve significant energy savings through the use of building controls. The average energy savings are as follows based on the referenced report:

- Energy Management and Control System Savings: 5%-15%.

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 10% of the electricity and 10% for the gas utility in this building.

The basis for the DDC system expansion is the Automated Logic Energy Management System or similar.

Energy Savings Calculations:

Since some of the key utility consumption and cost information was not available, estimated values are used for the unit cost of natural gas, total electricity usage and unit cost of electricity.

Energy savings for each utility is calculated with the equation below.

$$\text{Energy Savings (Utility)} = \text{Current Energy Consumption} \times \text{Estimated Savings, \%}$$

Following table summarizes energy savings for this facility via implementation of an Energy Management System:

DDC ENERGY MANAGEMENT SYSYEM CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Controls w/ Local Thermostats	DDC Controls	
Existing Nat Gas Usage (Therms)	27,680	-	
Existing Electricity Usage (kWh)	508,493	-	
Energy Savings, Nat. Gas	-	10%	
Energy Savings, Electricity	-	10%	
Gas Cost ($/Therm)	*$1.18*	$1.18	
Electricity Cost ($/kWh)	*$0.135*	$0.135	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	27,680	24,912	2,768
Electricity Usage (kWh)	508,493	457,644	50,849
Natural Gas Cost ($)	$32,662	$29,396	$3,266
Electricity Cost ($)	$68,647	$61,782	$6,865
Energy Cost ($)	$101,309	$91,178	$10,131
COMMENTS:			

Demand savings due to implementation of this ECM is minimal.

The cost of a full DDC system with new field devices, controllers, computer, software, programming, etc. is approximately $4.00 per SF in accordance with recent Contractor pricing for systems of this magnitude. Savings from the implementation of this ECM will be from the reduced energy consumption currently used by the HVAC system by proper control of schedule and temperatures via the DDC system.

Cost of complete DDC System = ($4.00/SF x 52,122 SF) = $208,848

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

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$208,848
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$208,848
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$10,131
Total Yearly Savings ($/Yr):	$10,131
Estimated ECM Lifetime (Yr):	25
Simple Payback	20.6
Simple Lifetime ROI	21.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$253,275
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	($32,435.40)

ECM #6: Air Conditioning Unit Upgrades

Description:

The classrooms of the school are served by window air conditioning units. There are approximately forty seven (47) window air conditioning units throughout the school with approximately 1-1/2-ton cooling capacity each.

These units vary in age, but on average, these units are older and can be replaced with new high efficiency units for energy savings. New air conditioners provide higher full load and part load efficiencies due to advances in inverter motor technologies, heat exchangers and refrigerants.

This ECM includes one-for-one replacement of the older air conditioning units with new higher efficiency systems. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of the unit replacements for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
Window AC Units	Classrooms	47	18,000	71	Freidrich Kuhl Model
Total		**47**	**18,000**	**71**	

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity,} \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}}\right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

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

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS (S)EER**	**NEW UNITS (S)EER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
Window AC Units	18,000	800	8.5	10.7 EER	47	21,348	26.7
Total					47	21,348	26.7

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the replacement of split system AC units and unitary systems with high efficiency AC systems falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (EER/SEER). The program incentives are calculated as follows:

$$\text{Smart Start® Incentive} = (\text{Cooling Tons} \times \text{ \$/Ton Incentive})$$

UNITARY / SPLIT SYSTEM AC UNITS REBATE SUMMARY				
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/TON**	**PROPOSED CAPACITY TONS**	**TOTAL REBATE $**
≥20 to 30 tons	10.5 EER	79	0	$0
≥ 11.25 to < 20 tons	11.5 EER	79	0	$0
≥ 5.4 to < 11.25 tons	11.5 EER	73	0	$0
5.4 tons or less Unitary AC and Split System	≥14 SEER	$92	71	$6,486
TOTAL			**71**	**$6,486**

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
Replace Window AC Units	$1,700	47	$79,900	$5,570	$74,331	$2,882	26
Total		47	$79,900	$5,570	$74,331	$2,882	26

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$79,901
NJ Smart Start Equipment Incentive ($):	$5,570
Net Installation Cost ($):	$74,331
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,882
Total Yearly Savings ($/Yr):	$2,882
Estimated ECM Lifetime (Yr):	15
Simple Payback	25.8
Simple Lifetime ROI	-41.8%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$43,230
Internal Rate of Return (IRR)	-6%
Net Present Value (NPV)	($39,925.87)

ECM #7: Install HW Pump VFD's

Description:

The heating and ventilation units and the unit ventilators are utilizing a constant volume pumping design.

2-way control valves provide flow through the heat exchanger equipment only when there is a call for heating or cooling, unlike 3-way control valves that allow constant flow of the water loop. 3-way control valves require full pumping energy continuously, while 2-way control valves allow the system to reduce flow when it is not needed. This measure includes capping off the bypass port on the 3-way control valves which effectively turns the valves into "2-way" control valves. When the unit is not calling for heating, the control valve closes reducing overall flow of the system. Variable frequency drives allow the pumps to slow down in response to a reduction in overall system flow. The reduction in operating flow allows the pumps to reduce energy consumption for all hours that the heating system is not at its peak load.

This ECM includes the installation of Variable Frequency Drives on the two (2) existing hot water pumps in the main boiler room. To control flow through the system, this ECM includes piping modifications at the H&V units and unit ventilators to cap off the bypass port on the 3-way control valves, where applicable. The VFD's would be controlled by a differential pressure sensor in the water loop to measure demand for water (typical for each of the three pump sets). A 3-way control valves would be installed in furthest unit from the loop pumps to eliminate dead heading potential. CEG recommends that this ECM be implemented in conjunction with ECM#8, replacement of the existing hot water pump motors with inverter duty motors that meet NEMA Premium Efficiency Standard. Implementation of both measures will further reduce energy consumption.

Energy and cost savings calculations are based on calculation software "PumpSave v4.2," provided by ABB. The PumpSave calculation software is used to estimate the pumping energy for variable speed pump systems. The boiler water loop pumps operate approximately 2,200 Hrs per year. The pump flow, HD, and resultant energy are calculated based on the existing pump horse power installed. The calculation is based on all existing equipment to be modified to operate as 2-way control valves. Where control valves are already 2-way style, these control valves shall remain. The exact quantity of equipment with hot water coils is unknown. The operation of all equipment control valves should be verified before implementing this ECM.

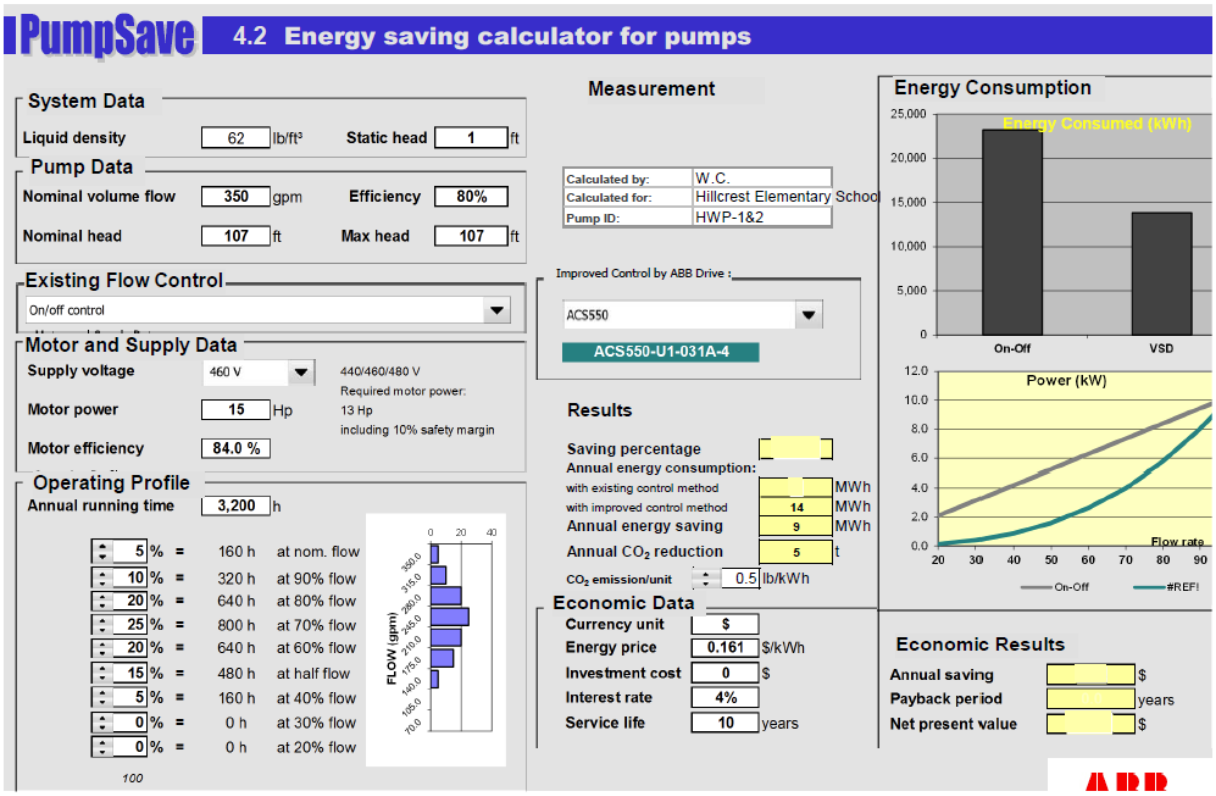
Energy Savings Calculations:

$$\text{Cons. Volume Power}(\text{HP}) = \frac{\text{Specific Gravity} \times \text{Flow Rate}\left(\frac{\text{Gal}}{\text{min}}\right) \times \text{Head}(\text{Ft})}{3960 \times \text{Pump Efficiency}\ (\%) \times \text{Motor Efficiency}\ (\%)}$$

$$\text{Energy Cons.}(\text{kWh}) = \text{Power}(\text{HP}) \times 0.746\left(\frac{\text{KW}}{\text{HP}}\right) \times \text{Operation}(\text{Hrs.})$$

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

Hot Water VFD Pumping Energy:



MAIN BOILER ROOM HOT WATER PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	CV	VFD	-
Total Flow* (GPM)	350	350	-
Head* (Ft)	107	107	-
Pump Efficiency (%)	80%	80%	-
Ave. Motor Efficiency (%)	80.0%	92.4%	12.4%
Operating Hrs	3200	3200	-
Estimated Total Horse Power	14.8	12.8	1.98
Elec Cost ($/kWh)	0.135	0.135	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	35,275	13,809	21,466
Electric Energy Cost ($)	$4,762	$1,864	$2,898
COMMENTS:	- VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output. - Hot water flow & head estimated based on pump horse power.		

Installation cost for two (2) VFDs, premium efficiency motors, piping work, re-balancing, capping of 3-way valves and controls is estimated to be $29,250.

Currently there are no **NJ Smart Start® Program Incentives** for installation of hot water pump Variable Frequency Drives.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$29,250
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$29,250
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,898
Total Yearly Savings ($/Yr):	$2,898
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.1
Simple Lifetime ROI	48.6%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$43,470
Internal Rate of Return (IRR)	5%
Net Present Value (NPV)	$5,346.14

ECM #8: 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 15 horsepower electric motors driving the 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.

Hot Water Pump Hours of Operation: 2,200 Hours/Year

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**
HWP - 1	15	90%	84.0%	92.4%	1.09	2,411	$325
HWP - 2	15	90%	84.0%	92.4%	1.09	2,411	$325
TOTAL					**2.2**	**4,821**	**$651**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
1	$50
1.5	$50
2	$60
3	$60
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	**MOTOR POWER HP**	**INSTALLED COST**	**SMART START INCENTIVE**	**NET COST**	**TOTAL SAVINGS**	**SIMPLE PAYBACK**
HWP - 1	15	$3,652	$115	$3,537	$325	10.9
HWP - 2	15	$3,652	$115	$3,537	$325	10.9
TOTAL	**Totals:**	**$7,304**	**$230**	**$7,074**	**$651**	**10.9**

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,304
NJ Smart Start Equipment Incentive ($):	$230
Net Installation Cost ($):	$7,074
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$651
Total Yearly Savings ($/Yr):	$651
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.9
Simple Lifetime ROI	38.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$9,765
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	$697.60

ECM #9: Science Classroom Rooftop Unit Upgrade

Description:

The science classroom is air conditioned by a single, packaged rooftop unit with D/X cooling and gas fired heating. This unit is in fair condition, is approximately 7 years old, and is within its useful service life as defined by ASHRAE. However, this unit is less efficient than newer units and can be replaced with a new high efficiency unit. New air conditioners provide higher full load and part load efficiencies due to advances in inverter motor technologies and heat exchangers. In addition, the existing unit utilizes R-22 refrigerant, which is currently being phased out and will no longer be available. New units utilize R-410A refrigerant.

This ECM includes one-for-one replacement of the older rooftop unit with a new higher efficiency unit. A summary of the unit replacement for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
RTU	Science Classroom	1	78,000	6.5	Carrier - Model 50TC
Total		**1**	**78,000**	**6.5**	

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity,} \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

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

ENERGY SAVINGS CALCULATIONS									
ECM INPUTS	COOLING CAPACITY, BTU/Hr	ANNUAL COOLING HOURS	EXISTING UNITS (S)EER	UPGRADED UNIT (S)EER	EXISTING UNIT NOMINAL KW	UPGRADED UNIT NOMINAL KW	# OF UNITS	ENERGY SAVINGS kWh	DEMAND SAVINGS kW
RTU	78,000	1,100	10 EER	12.2 EER	56	52.2	1	9,907	3.0
Total							1	9,907	3.0

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the replacement of split system AC units and unitary systems with high efficiency AC systems falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (EER/SEER). The program incentives are calculated as follows:

$$\text{Smart Start® Incentive} = (\text{Cooling Tons} \times \text{ \$/Ton Incentive})$$

UNITARY HVAC SYSTEM REBATE SUMMARY				
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/TON**	**PROPOSED CAPACITY TONS**	**TOTAL REBATE $**
≥ 5.4 to < 11.25 tons	11.5 EER	73	7	$475
TOTAL			**6.5**	**$475**

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
RTU	$16,250	1	$16,250	$475	$15,776	$285	55.4
Total	$16,250	1	$16,250	$475	$15,776	$285	55.4

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$16,250
NJ Smart Start Equipment Incentive ($):	$475
Net Installation Cost ($):	$15,775
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$285
Total Yearly Savings ($/Yr):	$285
Estimated ECM Lifetime (Yr):	15
Simple Payback	55.4
Simple Lifetime ROI	-72.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$4,275
Internal Rate of Return (IRR)	-13%
Net Present Value (NPV)	($12,372.69)

ECM #10: Window Replacement

Description:

The majority of the building envelope of Hillcrest Elementary School consists of newer, double pane 1/4" glass with aluminum frames and appear to be replacement windows. However, the windows around the upper portion of the gymnasium are original to the building and are single pane, 1/4" glass with un-insulated steel frames.

The windows and frames in the gymnasium are in poor condition with some maintenance required. The windows account for energy use through infiltration leakage loss and conductive loss. This style of window construction allows higher infiltration energy loss where a replacement double pane window would reduce these losses. These factors lead to increased energy use in the heating and cooling seasons. The energy loss due to single pane clear glass in addition with the energy loss due to poor seals at each operable window can be reduced with new higher efficiency replacement windows.

New double pane casement windows with argon filled low E glazing offer a substantial improvement in thermal performance in both the summer and winter months. The school is open 10 months out of the year, and requires both a heating and cooling load. It would benefit in both the cooling and heating months of the year to replace the current windows.

This ECM includes the replacement of the existing windows in in the gymnasium with double pane, argon filled low emissivity glass. The proposed windows would result in a reduction of outside air leakage. In addition the double pane structure will significantly increase the insulation value compared to the existing single pane, air filled clear window structure. The basis for this ECM is Anderson Windows at $75 per SF of window installed. This ECM assumes the heating and cooling efficiencies that are in current use, if newer units are installed per the other ECM's the final amount of energy saved will vary accordingly.

Energy Savings Calculations:

$$\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min.}}\right)=\frac{\text{Area}\left(\text{Ft}^2\right)\times\text{Ave Height}\left(\text{Ft}\right)\times\text{AirChanges Per Hour}\left(\frac{1}{\text{Hr.}}\right)}{60\left(\frac{\text{Min}}{\text{Hr.}}\right)}$$

$$\text{Heat Load}\left(\frac{\text{Btu}}{\text{Hr.}}\right)=1.1\times\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min}}\right)\times\text{Design Temperature Difference}\left(^{\circ}\text{F}\right)$$

$$\text{Cooling Load}\left(\text{Ton}\right)=\text{Infiltration}\left(\frac{\text{Ft}^3}{\text{Min}}\right)\times\frac{1\,\text{Ton Cooling}}{400\left(\frac{\text{Ft}^3}{\text{Min}}\right)}$$

$$\text{Heating Leakage Energy (Therms)} = \frac{\text{Heat Load}\left(\frac{\text{Btu}}{\text{Hr.}}\right) \times \text{HDD}(\text{Day °F}) \times 24\left(\frac{\text{Hr.}}{\text{Day}}\right) \times (0.60)}{65(\text{°F}) \times \text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \times \text{Heating Efficiency (\%)}}$$

$$\text{Cooling Leakage Energy (kWh)} = \frac{\text{Cooling Load(Ton)} \times \left(\frac{12{,}000\ \text{Btu}}{\text{Ton Hr.}}\right) \times \text{Full Load Cooling Hours}}{\frac{1000\ \text{W.h}}{\text{kWh}} \times \text{Cooling Efficiency (EER)}}$$

$$\text{Conductive Energy (Therms)} = \frac{\text{U} - \text{Value} \times \text{Area}(\text{Ft}^2) \times \text{HDD}(\text{Day °F}) \times 24\left(\frac{\text{Hr.}}{\text{Day}}\right) \times (0.60)}{65(\text{°F}) \times \text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \times \text{Heating Efficiency (\%)}}$$

$$\text{Heating Energy Cost} = \text{Total Heating Energy (Therms)} \times \text{Ave Fuel Cost}\left(\frac{\$}{\text{Therms}}\right)$$

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

Energy calculations are summarized in the table below.

Estimated cost for replacing all the windows in the gymnasium at Hillcrest Elementary School is $. This is based on an estimated cost of $75 per Square Foot of window. This was based on cost estimate of window and contractor installation costs.

Energy Savings Summary:

WINDOW REPLACEMENT CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Description:	Existing Windows	Double Pane Low-E Windows	-
Affected Bldg Area (SF)	4,260	4,260	-
Average Ceiling Height (Ft)	35	35	-
Window (SF)	960	960	-
U-Value (BTU/HR/SF*°F)	0.56	0.35	0.21
Average Leakage Rate (Air Changes per Hr)	0.75	0.5	0.25
Infiltration, CFM	1864	1243	-
Heating System Efficiency (%)	70%	70%	-
Heating Degree Days (HDD)	5,169	5,169	-
Design Day Temp Diff (°F)	60	60	-
Heating Hrs Per Day (Hrs)	12	12	-
Gas Cost ($/Therm)	1.18	1.18	-
Electric Cost ($/kWh)	0.135	0.135	-
Gas Heat Value (BTU/Therm)	100,000	100,000	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Heat Load (BTU/Hr)	123,008	82,005	41,003
Leakage Energy (Therms)	2,180	1,453	727
Conductive Energy (Therms)	264	165	99
Total Heating Energy (Therms)	2,444	1,618	826
Gas Energy Cost ($)	$2,884	$1,909	$974
Total Savings ($)	-	-	$974
Comments:	1. Proposed window U-value Based on ASHRAE 90.1 - 2007		

Energy Savings Summary:

ECM #10 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$72,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$72,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$974
Total Yearly Savings ($/Yr):	$974
Estimated ECM Lifetime (Yr):	15
Simple Payback	73.9
Simple Lifetime ROI	-79.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$14,610
Internal Rate of Return (IRR)	-15%
Net Present Value (NPV)	($60,372.45)

ECM #11: Water Conservation

Description:

The facility utilizes standard plumbing fixtures. The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the replacement of the existing sink faucets, water closets and urinals within the bathrooms of the school. The estimated usage of the plumbing fixtures is based on the total population of the facility. The number of plumbing fixtures to be replaced is based on site survey of the facilities.

The proposed retrofit includes installation of auto flow sink faucets, low flow aerators, low flow flushometer style water closets that utilize 1.28 gallons per flush and ultra-low flushometer style urinals that utilize 1/8 gallons per flush. For the basis of this calculation the LEED rating system was used to estimate the occupancy usage for students within the school. When water consumption information was not available, the GPF values were estimated for the existing fixtures.

Energy Savings Calculations:

Urinals and Toilets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Flush}}{\text{Person per Day}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Flush}}\right)$$

Faucets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Use}}{\text{Person per Day}}\right) \times \text{Use Time}\left(\frac{\text{Sec}}{\text{Use}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Min}}\right)$$

$$\text{Water Cost} = \frac{\text{Water Consumption (Gallons)} \times \text{Ave Cost}\left(\frac{\$}{1000\ \text{Gal}}\right)}{1000(\text{Gal})}$$

$$\text{Gas Cost (Therms)} = \text{Faucet Water Consumption (Gallons)} \times \frac{8.34\ \text{BTU}}{\text{Gal}} \times \frac{\text{Therm}}{100{,}000\ \text{BTU}}$$

WATER CONSERVATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Fixtures	Low Flow / Auto Flow Fixtures	-
Total Number of Students	356	356	-
% Male to Female	50%	50%	-
Estimated % Floor Area Served by Older Bathrooms	100%	100%	-
Occupied Days Per Year	252	252	-
Lavatory Uses per Day per Person	3	3	-
Sink flow time per use, sec	15	12	-
Sink Aerator Flow, GPM	1.5	0.5	-
WC Uses per Day per Person	2.0	2.0	-
Urinal Uses per Day per Person	1.0	1.0	-
Total Urinal Flushes Per Day	178	178	-
Total WC Flushes Per Day	356	356	-
Urinal Gallons Per Flush (GPF)	1.0	0.125	0.875
WC Gallons Per Flush (GPF)	1.6	1.28	0.32
**** Water Cost ($/1000 Gal)**	$8.00	$8.00	-
Gas Cost ($/Therm)	$1.18	$1.18	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption, Urinal and WC (Gal)	188,395	120,438	67,957
Water Consumption, Faucets (Gal)	100,926	26,914	74,012
Total Water Consumption, (Gal)	289,321	147,352	141,969
Water Cost ($)	$2,315	$1,179	$1,136
Gas Consumption (Therms)	421	112	309
Gas Cost ($/Year)	$497	$132	$364
COMMENTS:	*Savings are based on LEED Reference Guide for Green Building Design and Construction - 2009 Edition for WC and Urinal water usage. ** Cost of Water estimated.		

The cost for installation and materials of 34 water closets, 21 low flow urinals and 36 new auto flow sink faucets throughout the facility is estimated to be $86,196. There are no Smart Start rebates for installation of low flow plumbing fixtures.

Energy Savings Summary:

ECM #11 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$57,929
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$57,929
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,500
Total Yearly Savings ($/Yr):	$1,500
Estimated ECM Lifetime (Yr):	15
Simple Payback	38.6
Simple Lifetime ROI	-61.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$22,500
Internal Rate of Return (IRR)	-10%
Net Present Value (NPV)	($40,022.10)

REM #1: 259 kW Solar Array System

Description:

Hillcrest Elementary School has a number of suitable roof spaces for a substantial solar PV (photovoltaic) panel installation for generating on-site electricity. Following spaces are chosen for PV installation:

- Flat roof over the school building

Total installed capacity of the proposed system is 259 kW, assuming all the existing roof structures are capable of supporting the proposed arrays. The system will produce approximately kilowatt-hours annually, which will reduce the overall electric usage of the facility by 73%.

Energy Savings Calculations:

See **Renewable / Distributed Energy Measures Calculations Appendix** for detailed financial summary and proposed solar layout areas.

Energy Savings Summary:

REM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,542,842
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$1,542,842
Maintenance Savings ($/Yr):	$115,393
Energy Savings ($/Yr):	$40,399
Total Yearly Savings ($/Yr):	$155,792
Estimated ECM Lifetime (Yr):	15
Simple Payback	9.9
Simple Lifetime ROI	51.5%
Simple Lifetime Maintenance Savings	$1,730,895
Simple Lifetime Savings	$2,336,880
Internal Rate of Return (IRR)	6%
Net Present Value (NPV)	$316,992.78

V. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

E. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Franklin Township BOE - Hillcrest Elementary School

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	General Lighting Upgrades	$6,428	$9,643	$0	$16,071	$3,410	$0	$3,410	15	$51,150	$0	218.3%	4.7	19.81%	$24,637.36
ECM #2	Lighting Controls	$5,160	$7,740	$1,420	$11,480	$3,278	$0	$3,278	15	$49,170	$0	328.3%	3.5	27.84%	$27,652.55
ECM #3	Condensing Boiler Installation	$103,000	$128,750	$6,000	$225,750	$6,015	$0	$6,015	30	$180,450	$0	-20.1%	37.5	-1.39%	($107,853.35)
ECM #4	Domestic Hot Water Heater Uprade	$8,730	$5,820	$300	$14,250	$838	$0	$838	25	$20,950	$0	47.0%	17.0	3.21%	$342.22
ECM #5	DDC System Installation	$83,539	$125,309	$0	$208,848	$10,131	$0	$10,131	25	$253,275	$0	21.3%	20.6	1.54%	($32,435.40)
ECM #6	Window AC Unit Upgrade	$51,700	$28,201	$5,570	$74,331	$2,882	$0	$2,882	15	$43,230	$0	-41.8%	25.8	-6.12%	($39,925.87)
ECM #7	HW Pump VFD	$17,550	$11,700	$0	$29,250	$2,898	$0	$2,898	15	$43,470	$0	48.6%	10.1	5.42%	$5,346.14
ECM #8	NEMA Premium Pump Motors	$3,884	$3,420	$230	$7,074	$651	$0	$651	15	$9,765	$0	38.0%	10.9	4.33%	$697.60
ECM #9	Rooftop Unit Replacement	$11,250	$5,000	$475	$15,775	$285	$0	$285	15	$4,275	$0	-72.9%	55.4	-13.14%	($12,372.69)
ECM #10	Window Replacement	$54,000	$18,000	$0	$72,000	$974	$0	$974	15	$14,610	$0	-79.7%	73.9	-15.47%	($60,372.45)
ECM #11	Water Conservation	$39,392	$18,537	$0	$57,929	$1,500	$0	$1,500	15	$22,500	$0	-61.2%	38.6	0.00%	$0.00
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	258.97 KW PV Array	$1,542,842	$0	$0	$1,542,842	$40,399	$115,393	$155,792	15	$2,336,880	$1,730,895	51.5%	9.9	5.70%	$316,992.78

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

APPENDIX B

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

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

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Other Equipment Incentives

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

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Hillcrest School

Building ID: 2818063
For 12-month Period Ending: September 30, 2010[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: January 11, 2012

Facility
Hillcrest School
500 Franklin Blvd.
Somerset, NJ 08873

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 0
Gross Floor Area (ft²): 56,982

Energy Performance Rating[2] (1-100) 78

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	1,424,998
Natural Gas (kBtu)[4]	2,778,191
Total Energy (kBtu)	4,203,189

Energy Intensity[4]

Site (kBtu/ft²/yr)	74
Source (kBtu/ft²/yr)	135

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	350

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	99
National Median Source EUI	180
% Difference from National Median Source EUI	-25%
Building Type	K-12 School

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

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

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Hillcrest Elementary School

AC Units

Tag	RTU - 1	CU - 1	CU - 2
Unit Type	Rooftop Unit	Condensing Unit	Condensing Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Science Class Room	Mrs. Levy Office	Copy Room
Manufacturer	York	Sanyo	NCP
Model #	DH078N10M2HAAU	C1211	5115A-10K10
Serial #	N0H5628538	85692	-
Cooling Type	R22, DX	R22, DX	R22, DX
Cooling Capacity (Tons)	6.5	1.0	1.0
Cooling Efficiency (SEER/EER)	9.5 EER	8.4 EER	9.0 (est) EER
Heating Type	Gas	N/A	N/A
Heating Input (MBH)	120 MBH	N/A	N/A
Efficiency	80%	N/A	N/A
Fuel	Natural Gas	N/A	N/A
Approx Age	7	3	5 (est)
ASHRAE Service Life	15	15	15
Remaining Life	8	12	10
Comments			

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

AC Units

Tag	CU - 3	AC - 1	
Unit Type	Condensing Unit	Window AC Unit	
Qty	1	47	
Location	Roof	Classroom & Office Windows	
Area Served	Speech / ESL	Classrooms & Offices	
Manufacturer	EM1	Various	
Model #	SCC240F	-	
Serial #	105G471328	-	
Cooling Type	R22, DX	R22, DX	
Cooling Capacity (Tons)	2.0	1.5 (Average)	
Cooling Efficiency (SEER/EER)	8.7 EER	8.0 EER (Average)	
Heating Type	N/A	N/A	
Heating Input (MBH)	N/A	N/A	
Efficiency	N/A	N/A	
Fuel	N/A	N/A	
Approx Age	6	Varies	
ASHRAE Service Life	15	10	
Remaining Life	9	Varies	
Comments	*Out of service, not currently used. Disconnected & Abandoned	*All Rooms Except Science and Kitchen	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Hillcrest Elementary School

AHUs

Tag	AHU - 1		
Unit Type	Air Handling Unit		
Qty	1		
Location	Gym		
Area Served	Gym		
Manufacturer	Audi Vent (Vintage)		
Model #	WBWJD55338-41		
Serial #	558832		
Fan HP	3 HP		
Cooling Efficiency (SEER/EER)	-		
Heating Type	Hot Water Coil		
Heating Input (MBH)	-		
Efficiency	-		
Fuel	Hot Water		
Approx Age	23		
ASHRAE Service Life	15		
Remaining Life	(8)		
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Hillcrest Elementary School

Boilers

Tag	Boiler - 1 / 2 / 3		
Unit Type	Fire Tube Boiler		
Qty	3		
Location	Boiler Room		
Area Served	Heating Hot Water Loop		
Manufacturer	Pacific Steel		
Model #	P121A5		
Serial #	208406 / 202349 / 202350		
Input Capacity (Btu/Hr)	4,430		
Rated Output Capacity (Btu/Hr)	3,575		
Approx. Efficiency %	80.7%		
Fuel	Natural Gas		
Approx Age	56		
ASHRAE Service Life	25		
Remaining Life	(31)		
Comments	*Only 1 Boiler runs at a time to satisfy load		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Hillcrest Elementary School

Domestic Water Heaters

Tag	DHW - 1	DHW - 2	DHW - 3
Unit Type	Domestic Hot Water Boiler	Domestic Hot Water Heater	Domestic Hot Water Heater
Qty	1	1	1
Location	Boiler Room	Kitchen	Nurse Office
Area Served	Domestic Hot Water	Kitchen / Cooking Hot Water	Nurse's Bathroom
Manufacturer	Raypak	Rheem	Vanguard
Model #	-	81VP20S	6E729
Serial #	NB117192	0198305178	0897302780
Size (Gallons)	115 (Separate Tank)	20	6
Input Capacity (MBH/KW)	153 MBH	2 KW	2 KW
Recovery (Gal/Hr)	-	-	-
Efficiency %	74%	100%	100%
Fuel	Natural Gas	Electric	Electric
Approx Age	17	13	14
ASHRAE Service Life	24	12	12
Remaining Life	7	(1)	(2)
Comments	* w/ 115 Gallon Storage Tank - Rheem ST120		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Hillcrest Elementary School

Pumps

Tag	P - 1 / 2		
Unit Type	Base Mounted Boiler Pump		
Qty	2		
Location	Boiler Room		
Area Served	Boiler Pump		
Manufacturer	Baldor		
Model #	M2505		
Serial #	2788C / 5880		
Horse Power	7.5		
Motor Info	Baldor		
Electrical Power	208-230/460V		
RPM	1760 RPM		
Motor Efficiency %	84.0%		
Approx Age	15		
ASHRAE Service Life	20		
Remaining Life	5		
Comments	*Pumps Operate Simulataneously		

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

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C11035

Project: Franklin Twp **Hillcrest Elementary School** **KWH COST: $0.135**

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.11	Health	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.21	556.4	$75.11	2	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	0.20	509.6	$68.80	$28.00	$56.00	0.02	46.8	$6.32	8.86
242.211	Copy Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.21	540.8	$73.01	2	3	Remove 1 Lamp - No Ballast Change Required	86	0.17	447.2	$60.37	$22.00	$44.00	0.04	93.6	$12.64	3.48
221.31	Spec. Services	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.31	806.0	$108.81	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	$87.75	$14.00	$70.00	0.06	156	$21.06	3.32
221.31	Library 210	2600	32	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.98	5,158.4	$696.38	32	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.60	4160	$561.60	$14.00	$448.00	0.38	998.4	$134.78	3.32
221.31	Library Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$43.52	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$35.10	$14.00	$28.00	0.02	62.4	$8.42	3.32
221.31	Library Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$43.52	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	260	$35.10	$14.00	$28.00	0.02	62.4	$8.42	3.32
221.11	Storage	1200	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	74.4	$10.04	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$8.10	$14.00	$14.00	0.01	14.4	$1.94	7.20
221.31	Classroom 307	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 309	2600	16	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.99	2,579.2	$348.19	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2080	$280.80	$14.00	$224.00	0.19	499.2	$67.39	3.32
655	309 Restrooms	1200	2	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.05	62.4	$8.42	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
242.11	Classroom 311	2600	13	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.39	3,616.6	$488.24	13	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.27	3312.4	$447.17	$28.00	$364.00	0.12	304.2	$41.07	8.86
121.11	311 Restrooms	1200	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	187.2	$25.27	2	2	Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO	50	0.10	120	$16.20	$100.00	$200.00	0.06	67.2	$9.07	22.05
221.31	Classroom 314	2600	17	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.05	2,740.4	$369.95	17	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.85	2210	$298.35	$14.00	$238.00	0.20	530.4	$71.60	3.32
655	314 Restroom	2600	1	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.03	67.6	$9.13	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
655	Staff Restroom	1200	1	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.03	31.2	$4.21	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
655	Staff Restroom	1200	1	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.03	31.2	$4.21	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.31	Classroom 312	2600	17	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.05	2,740.4	$369.95	17	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.85	2210	$298.35	$14.00	$238.00	0.20	530.4	$71.60	3.32
221.14	Custodial	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.06	69.6	$9.40	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$8.10	$14.00	$14.00	0.01	9.6	$1.30	10.80
655	312 Restroom	1200	2	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.05	62.4	$8.42	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 310	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
232.22	310 Restroom	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$30.19	1	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	0.07	187.2	$25.27	$21.00	$21.00	0.01	36.4	$4.91	4.27
221.31	Classroom 301	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 302	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 303	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 304	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 305	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 306	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 307	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.11	Boy's Restroom	2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$17.55	$14.00	$14.00	0.01	31.2	$4.21	3.32
242.111		2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	0.10	270.4	$36.50	1	3	Remove 1 Lamp - No Ballast Change Required - Relamp - Sylvania Lamp FO28/841/SS/ECO	72	0.07	187.2	$25.27	$60.00	$60.00	0.03	83.2	$11.23	5.34
221.11	Girl's Restroom	2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$17.55	$14.00	$14.00	0.01	31.2	$4.21	3.32
242.111		2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	0.10	270.4	$36.50	1	3	Remove 1 Lamp - No Ballast Change Required - Relamp - Sylvania Lamp FO28/841/SS/ECO	72	0.07	187.2	$25.27	$60.00	$60.00	0.03	83.2	$11.23	5.34

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ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.11	Corridor 300	3000	23	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.43	4,278.0	$577.53	23	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	1.15	3450	$465.75	$14.00	$322.00	0.28	828	$111.78	2.88
221.11	Connector Corridor (windows)	3000	2	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	372.0	$50.22	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	300	$40.50	$14.00	$28.00	0.02	72	$9.72	2.88
221.31	Faculty Lounge	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
232.22	Classroom 205	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2,683.2	$362.23	12	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	0.86	2246.4	$303.26	$21.00	$252.00	0.17	436.8	$58.97	4.27
227.22		2600	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.17	452.4	$61.07	3	2	Sylvania Lamp FBO30/841XP/6//SS/ECO	49	0.15	382.2	$51.60	$24.00	$72.00	0.03	70.2	$9.48	7.60
242.21	Aux Cafeteria	2600	36	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	3.85	10,015.2	$1,352.05	36	3	Remove 1 Lamp - No Ballast Change Required - Relamp - Sylvania Lamp FO28/841/SS/ECO; Provide 95% Alum Ref	72	2.59	6739.2	$909.79	$120.00	$4,320.00	1.26	3276	$442.26	9.77
221.11		2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$65.29	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	$52.65	$14.00	$42.00	0.04	93.6	$12.64	3.32
362.14	MPR	2600	15	6	2x4, 6 Lamp, 54w T5HO Fixture	354	5.31	13,806.0	$1,863.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$17.55	$14.00	$14.00	0.01	31.2	$4.21	3.32
221.11	MPR Office	2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	130	$17.55	$14.00	$14.00	0.01	31.2	$4.21	3.32
200	Roof Access	1200	2	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	81.6	$11.02	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
200	Storage	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$5.51	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.11	Stage	2600	3	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.10	257.4	$34.75	3	1	Relamp - Sylvania Lamp FO28/841/SS/ECO	25	0.08	195	$26.33	$7.00	$21.00	0.02	62.4	$8.42	2.49
221.14	Boiler Room	3600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.70	2,505.6	$338.26	12	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.60	2160	$291.60	$14.00	$168.00	0.10	345.6	$46.66	3.60
612	Boiler Room Entrance	1800	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	180.0	$24.30	1	1	(1) 26w CFL Lamp	26	0.03	46.8	$6.32	$20.00	$20.00	0.07	133.2	$17.98	1.11
221.31	Classroom 201	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 203	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.11	Girl's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$65.29	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	$52.65	$14.00	$42.00	0.04	93.6	$12.64	3.32

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ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.11	Classroom 101	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3,338.4	$450.68	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$412.78	$28.00	$336.00	0.11	280.8	$37.91	8.86
242.11	Classroom 102	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3,338.4	$450.68	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$412.78	$28.00	$336.00	0.11	280.8	$37.91	8.86
242.11	Classroom 103	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3,338.4	$450.68	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$412.78	$28.00	$336.00	0.11	280.8	$37.91	8.86
242.11	Classroom 104	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3,338.4	$450.68	12	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.18	3057.6	$412.78	$28.00	$336.00	0.11	280.8	$37.91	8.86
232.22	Classroom 105	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$271.67	9	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	0.65	1684.8	$227.45	$21.00	$189.00	0.13	327.6	$44.23	4.27
221.11	Classroom 106	2600	15	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2,418.0	$326.43	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	$263.25	$14.00	$210.00	0.18	468	$63.18	3.32
232.22	Classroom 107	2600	18	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$543.35	18	3	Relamp - Sylvania Lamp FO28/841/SS/ECO	72	1.30	3369.6	$454.90	$21.00	$378.00	0.25	655.2	$88.45	4.27
221.11	CST	2600	5	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806.0	$108.81	5	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.25	650	$87.75	$14.00	$70.00	0.06	156	$21.06	3.32
200		2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	88.4	$11.93	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
241.11	Classroom 109	2600	15	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	1.56	4,056.0	$547.56	15	4	Relamp - Sylvania Lamp FO28/841/SS/ECO	98	1.47	3822	$515.97	$28.00	$420.00	0.09	234	$31.59	13.30
242.21	Classroom 111	2600	12	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.28	3,338.4	$450.68	12	3	Remove 1 Lamp - No Ballast Change Required - Relamp - Sylvania Lamp FO28/841/SS/ECO; Provide 95% Alum Ref	72	0.86	2246.4	$303.26	$120.00	$1,440.00	0.42	1092	$147.42	9.77
200	Storage A	1200	2	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	81.6	$11.02	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Book Room	1200	2	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	148.8	$20.09	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	120	$16.20	$14.00	$28.00	0.02	28.8	$3.89	7.20
200		1200	2	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	81.6	$11.02	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Classroom 108	2600	15	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2,418.0	$326.43	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	$263.25	$14.00	$210.00	0.18	468	$63.18	3.32
221.11	Classroom 110	2600	15	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2,418.0	$326.43	15	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.75	1950	$263.25	$14.00	$210.00	0.18	468	$63.18	3.32
221.11	Corridor 100	3000	17	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.05	3,162.0	$426.87	17	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.85	2550	$344.25	$14.00	$238.00	0.20	612	$82.62	2.88
200	Storage	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$5.51	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

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ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.11	Room 112	2600	6	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	$130.57	6	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.30	780	$105.30	$14.00	$84.00	0.07	187.2	$25.27	3.32
200	Staff Restroom	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$5.51	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Boy's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$65.29	3	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.15	390	$52.65	$14.00	$42.00	0.04	93.6	$12.64	3.32
221.11	Connector Corridor (windows)	3000	2	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	372.0	$50.22	2	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.10	300	$40.50	$14.00	$28.00	0.02	72	$9.72	2.88
221.31	Classroom 202	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 204	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
221.31	Classroom 206	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2,256.8	$304.67	14	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.70	1820	$245.70	$14.00	$196.00	0.17	436.8	$58.97	3.32
242.21	Lobby	3000	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642.0	$86.67	2	3	Remove 1 Lamp - No Ballast Change Required - Relamp - Sylvania Lamp FO28/841/SS/ECO; Provide 95% Alum Ref	72	0.14	432	$58.32	$120.00	$240.00	0.07	210	$28.35	8.47
221.11	Main Corridor	3000	16	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.99	2,976.0	$401.76	16	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.80	2400	$324.00	$14.00	$224.00	0.19	576	$77.76	2.88
221.31	Main Office	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.25	644.8	$87.05	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$70.20	$14.00	$56.00	0.05	124.8	$16.85	3.32
221.31	Principal's Office	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.25	644.8	$87.05	4	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.20	520	$70.20	$14.00	$56.00	0.05	124.8	$16.85	3.32
221.14	Custodial	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.06	69.6	$9.40	1	2	Relamp - Sylvania Lamp FO28/841/SS/ECO	50	0.05	60	$8.10	$14.00	$14.00	0.01	9.6	$1.30	10.80
710	Exterior	4000	10	1	100w HPS Wallpack	125	1.25	5,000.0	$675.00	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
706		4000	7	1	70w HPS Wallpack	92	0.64	2,576.0	$347.76	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
649		4000	3	1	1x1 Recessed Mount, Prismatic Lens, 26w CFL Lamp	26	0.08	312.0	$42.12	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
648		4000	4	2	1x1 Recessed Mount, Prismatic Lens, (2) 9w CFL Lamp	18	0.07	288.0	$38.88	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
725		4000	9	1	150w HPS Wallpack	188	1.69	6,768.0	$913.68	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
622		4000	5	1	Double Head Flood, (2) 90w PAR Lamps	180	0.90	3,600.0	$486.00	5	2	(2) 26w CFL PAR Lamp	52	0.26	1040	$140.40	$40.00	$200.00	0.64	2560	$345.60	0.58
	Totals		706	199				154,703	$20,885	706	158			37.8	99,986	$13,498		$16,071	9.3	25,257	$3,410	4.71

CEG Job #:
Project: Franklin Twp
Address: 0
0
Building SF: -

Hillcrest Elementary School

KWH COST: $0.135

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.11	Health	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	0.21	556.4	$75.11	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	107	0.17	20%	445.12	$60.09	$150.00	$150.00	0.04	111.28	$15.02	9.98
242.211	Copy Room	2600	2	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	104	0.21	540.8	$73.01	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	104	0.17	20%	432.64	$58.41	$150.00	$150.00	0.04	108.16	$14.60	10.27
221.31	Spec. Services	2600	5	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.31	806	$108.81	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$87.05	$150.00	$150.00	0.06	161.2	$21.76	6.89
221.31	Library 210	2600	32	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.98	5158.4	$696.38	32	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	62	1.59	20%	4126.72	$557.11	$450.00	$450.00	0.40	1031.68	$139.28	3.23
221.31	Library Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$43.52	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.10	20%	257.92	$34.82	$150.00	$150.00	0.02	64.48	$8.70	17.23
221.31	Library Office	2600	2	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.12	322.4	$43.52	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.10	20%	257.92	$34.82	$150.00	$150.00	0.02	64.48	$8.70	17.23
221.11	Storage	1200	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	74.4	$10.04	1	0	No Change	62	0.06	0%	74.4	$10.04	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 307	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 309	2600	16	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.99	2579.2	$348.19	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.79	20%	2063.36	$278.55	$300.00	$300.00	0.20	515.84	$69.64	4.31
655	309 Restrooms	1200	2	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.05	62.4	$8.42	2	0	No Change	26	0.05	0%	62.4	$8.42	$0.00	$0.00	0.00	0	$0.00	0.00
242.11	Classroom 311	2600	13	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.39	3616.6	$488.24	13	1	Dual Technology Occupancy Sensor - Remote Mnt.	107	1.11	20%	2893.28	$390.59	$300.00	$300.00	0.28	723.32	$97.65	3.07
121.11	311 Restrooms	1200	2	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.16	187.2	$25.27	2	0	No Change	78	0.16	0%	187.2	$25.27	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 314	2600	17	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.05	2740.4	$369.95	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.84	20%	2192.32	$295.96	$300.00	$300.00	0.21	548.08	$73.99	4.05
655	314 Restroom	2600	1	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.03	67.6	$9.13	1	0	No Change	26	0.03	0%	67.6	$9.13	$0.00	$0.00	0.00	0	$0.00	0.00
655	Staff Restroom	1200	1	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.03	31.2	$4.21	1	0	No Change	26	0.03	0%	31.2	$4.21	$0.00	$0.00	0.00	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
655	Staff Restroom	1200	1	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.03	31.2	$4.21	1	0	No Change	26	0.03	0%	31.2	$4.21	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 312	2600	17	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.05	2740.4	$369.95	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.84	20%	2192.32	$295.96	$300.00	$300.00	0.21	548.08	$73.99	4.05
221.14	Custodial	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.06	69.6	$9.40	1	0	No Change	58	0.06	0%	69.6	$9.40	$0.00	$0.00	0.00	0	$0.00	0.00
655	312 Restroom	1200	2	2	30" Round, Surface Mnt., White Diffuser, (2) 13w PL Quad Lamp	26	0.05	62.4	$8.42	2	0	No Change	26	0.05	0%	62.4	$8.42	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 310	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
232.22	310 Restroom	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$30.19	1	0	No Change	86	0.09	0%	223.6	$30.19	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 301	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 302	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 303	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 304	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 305	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 306	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 307	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.11	Boy's Restroom	2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	0	No Change	62	0.06	0%	161.2	$21.76	$0.00	$0.00	0.00	0	$0.00	0.00
242.111		2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	0.10	270.4	$36.50	1	0	No Change	104	0.10	0%	270.4	$36.50	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Girl's Restroom	2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	0	No Change	62	0.06	0%	161.2	$21.76	$0.00	$0.00	0.00	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
242.111	Girl's Restroom	2600	1	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	0.10	270.4	$36.50	1	0	No Change	104	0.10	0%	270.4	$36.50	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Corridor 300	3000	23	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.43	4278	$577.53	23	0	No Change	62	1.43	0%	4278	$577.53	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Connector Corridor (windows)	3000	2	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	372	$50.22	2	0	No Change	62	0.12	0%	372	$50.22	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Faculty Lounge	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
232.22	Classroom 205	2600	12	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2683.2	$362.23	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$289.79	$300.00	$300.00	0.21	536.64	$72.45	3.54
227.22		2600	3	2	2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.17	452.4	$61.07	3			58	0.14	20%	361.92	$48.86			0.03	90.48	$12.21	
242.21	Aux Cafeteria	2600	36	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	3.85	10015.2	$1,352.05	36	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	107	3.08	20%	8012.16	$1,081.64	$450.00	$450.00	0.77	2003.04	$270.41	1.66
221.11		2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$65.29	3	0	No Change	62	0.19	0%	483.6	$65.29	$0.00	$0.00	0.00	0	$0.00	0.00
362.14	MPR	2600	15	6	2x4, 6 Lamp, 54w T5HO Fixture	354	5.31	13806	$1,863.81	15	2	Dual Technology Occupancy Sensor - Remote Mnt.	354	4.25	20%	11044.8	$1,491.05	$300.00	$600.00	1.06	2761.2	$372.76	1.61
221.11		2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	0	No Change	62	0.06	0%	161.2	$21.76	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	MPR Office	2600	1	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.06	161.2	$21.76	1	0	No Change	62	0.06	0%	161.2	$21.76	$0.00	$0.00	0.00	0	$0.00	0.00
200	Roof Access	1200	2	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	81.6	$11.02	2	0	No Change	34	0.07	0%	81.6	$11.02	$0.00	$0.00	0.00	0	$0.00	0.00
200	Storage	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$5.51	1	0	No Change	34	0.03	0%	40.8	$5.51	$0.00	$0.00	0.00	0	$0.00	0.00
211.11	Stage	2600	3	1	1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	33	0.10	257.4	$34.75	3	0	No Change	33	0.10	0%	257.4	$34.75	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Boiler Room	3600	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.70	2505.6	$338.26	12	0	No Change	58	0.70	0%	2505.6	$338.26	$0.00	$0.00	0.00	0	$0.00	0.00
612	Boiler Room Entrance	1800	1	1	Pendant Mnt., 100w A19 Lamp	100	0.10	180	$24.30	1	0	No Change	100	0.10	0%	180	$24.30	$0.00	$0.00	0.00	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.31	Classroom 201	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 203	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.11	Girl's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$65.29	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$52.23	$150.00	$150.00	0.04	96.72	$13.06	11.49
242.11	Classroom 101	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3338.4	$450.68	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	107	1.03	20%	2670.72	$360.55	$300.00	$300.00	0.26	667.68	$90.14	3.33
242.11	Classroom 102	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3338.4	$450.68	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	107	1.03	20%	2670.72	$360.55	$300.00	$300.00	0.26	667.68	$90.14	3.33
242.11	Classroom 103	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3338.4	$450.68	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	107	1.03	20%	2670.72	$360.55	$300.00	$300.00	0.26	667.68	$90.14	3.33
242.11	Classroom 104	2600	12	4	2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	107	1.28	3338.4	$450.68	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	107	1.03	20%	2670.72	$360.55	$300.00	$300.00	0.26	667.68	$90.14	3.33
232.22	Classroom 105	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$271.67	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$217.34	$300.00	$300.00	0.15	402.48	$54.33	5.52
221.11	Classroom 106	2600	15	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2418	$326.43	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.74	20%	1934.4	$261.14	$300.00	$300.00	0.19	483.6	$65.29	4.60
232.22	Classroom 107	2600	18	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$543.35	18	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.24	20%	3219.84	$434.68	$300.00	$300.00	0.31	804.96	$108.67	2.76
221.11	CST	2600	5	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.31	806	$108.81	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$87.05	$150.00	$150.00	0.06	161.2	$21.76	6.89
200		2600	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	88.4	$11.93	1	0	No Change	34	0.03	0%	88.4	$11.93	$0.00	$0.00	0.00	0	$0.00	0.00
241.11	Classroom 109	2600	15	4	1x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	104	1.56	4056	$547.56	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	104	1.25	20%	3244.8	$438.05	$300.00	$300.00	0.31	811.2	$109.51	2.74
242.21	Classroom 111	2600	12	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	1.28	3338.4	$450.68	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	107	1.03	20%	2670.72	$360.55	$300.00	$300.00	0.26	667.68	$90.14	3.33
200	Storage A	1200	2	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	81.6	$11.02	2	0	No Change	34	0.07	0%	81.6	$11.02	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Book Room	1200	2	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	148.8	$20.09	2	0	No Change	62	0.12	0%	148.8	$20.09	$0.00	$0.00	0.00	0	$0.00	0.00

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
200	Book Room	1200	2	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.07	81.6	$11.02	2	0	No Change	34	0.07	0%	81.6	$11.02	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Classroom 108	2600	15	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2418	$326.43	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.74	20%	1934.4	$261.14	$300.00	$300.00	0.19	483.6	$65.29	4.60
221.11	Classroom 110	2600	15	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.93	2418	$326.43	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.74	20%	1934.4	$261.14	$300.00	$300.00	0.19	483.6	$65.29	4.60
221.11	Corridor 100	3000	17	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	1.05	3162	$426.87	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.84	20%	2529.6	$341.50	$300.00	$300.00	0.21	632.4	$85.37	3.51
200	Storage	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$5.51	1	0	No Change	34	0.03	0%	40.8	$5.51	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Room 112	2600	6	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.37	967.2	$130.57	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.30	20%	773.76	$104.46	$300.00	$300.00	0.07	193.44	$26.11	11.49
200	Staff Restroom	1200	1	2	1x2, 2 Lamp, 17w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	34	0.03	40.8	$5.51	1	0	No Change	34	0.03	0%	40.8	$5.51	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Boy's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.19	483.6	$65.29	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$52.23	$150.00	$150.00	0.04	96.72	$13.06	11.49
221.11	Connector Corridor (windows)	3000	2	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.12	372	$50.22	2	0	No Change	62	0.12	0%	372	$50.22	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Classroom 202	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 204	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
221.31	Classroom 206	2600	14	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.87	2256.8	$304.67	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.69	20%	1805.44	$243.73	$300.00	$300.00	0.17	451.36	$60.93	4.92
242.21	Lobby	3000	2	4	2x4, 4 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	107	0.21	642	$86.67	2	0	No Change	107	0.21	0%	642	$86.67	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Main Corridor	3000	16	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	62	0.99	2976	$401.76	16	0	No Change	62	0.99	0%	2976	$401.76	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Main Office	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.25	644.8	$87.05	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	515.84	$69.64	$150.00	$150.00	0.05	128.96	$17.41	8.62
221.31	Principal's Office	2600	4	2	1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.25	644.8	$87.05	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	515.84	$69.64	$150.00	$150.00	0.05	128.96	$17.41	8.62

ECM 2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.14	Custodial	1200	1	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.06	69.6	$9.40	1	0	No Change	58	0.06	0%	69.6	$9.40	$0.00	$0.00	0.00	0	$0.00	0.00
710	Exterior	4000	10	1	100w HPS Wallpack	125	1.25	5000	$675.00	10	0	No Change	125	1.25	0%	5000	$675.00	$0.00	$0.00	0.00	0	$0.00	0.00
706		4000	7	1	70w HPS Wallpack	92	0.64	2576	$347.76	7	0	No Change	92	0.64	0%	2576	$347.76	$0.00	$0.00	0.00	0	$0.00	0.00
649		4000	3	1	1x1 Recessed Mount, Prismatic Lens, 26w CFL Lamp	26	0.08	312	$42.12	3	0	No Change	26	0.08	0%	312	$42.12	$0.00	$0.00	0.00	0	$0.00	0.00
648		4000	4	2	1x1 Recessed Mount, Prismatic Lens, (2) 9w CFL Lamp	18	0.07	288	$38.88	4	0	No Change	18	0.07	0%	288	$38.88	$0.00	$0.00	0.00	0	$0.00	0.00
725		4000	9	1	150w HPS Wallpack	188	1.69	6768	$913.68	9	0	No Change	188	1.69	0%	6768	$913.68	$0.00	$0.00	0.00	0	$0.00	0.00
622		4000	5	1	Double Head Flood, (2) 90w PAR Lamps	180	0.90	3600	$486.00	5	0	No Change	180	0.90	0%	3600	$486.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		706	199			56.7	154,702.8	$20,885	706	47			47.4		130,418.2	$17,606.46		$12,900	9.31	24,285	$3,278	3.93

APPENDIX F

Location Description	Area (Sq FT)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Total KW_{AC}	Panel Weight (41.9 lbs)	W/SQFT
Hillcrest Elementary School	27,000	SHARP NU-U235F2	1102	17.5	19,330	258.97	299,252	209.8	46,174	13.40

.= Proposed PV Layout

Notes:

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

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	259.0 kW
DC to AC Derate Factor:	0.810
AC Rating:	209.8 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	16.1 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.39	15538	2501.62
2	3.17	18837	3032.76
3	4.07	26363	4244.44
4	4.83	29209	4702.65
5	5.70	34750	5594.75
6	5.94	33957	5467.08
7	5.77	33693	5424.57
8	5.38	31207	5024.33
9	4.65	26850	4322.85
10	3.61	22102	3558.42
11	2.35	14097	2269.62
12	2.01	12649	2036.49
Year	4.16	299252	48179.57

Project Name: **Franklin Township BOE**
Location: **Hillcrest Elementary School**
Description: **Photovoltaic System 100% Financing - 15 year**

Simple Payback Analysis

	Photovoltaic System 100% Financing - 15 year
Total Construction Cost	$1,542,842
Annual kWh Production	299,252
Annual Energy Cost Reduction	$40,399
Average Annual SREC Revenue	$115,393

Simple Payback: **9.90** Years

Life Cycle Cost Analysis

Analysis Period (years): 15
Discount Rate: 3%
Average Energy Cost ($/kWh) **$0.135**
Financing Rate: 6.00%
Financing %: 100%
Maintenance Escalation Rate: 3.0%
Energy Cost Escalation Rate: 3.0%
Average SREC Value ($/kWh) $0.386

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$0	0	0	0	$0	0	0	0	0
1	$0	299,252	$40,399	$0	$164,589	$90,790	$65,442	$48,755	$48,755
2	$0	297,756	$41,611	$0	$163,766	$86,754	$69,479	$49,144	$97,899
3	$0	296,267	$42,859	$0	$148,133	$82,469	$73,764	$34,760	$132,659
4	$0	294,786	$44,145	$0	$132,654	$77,919	$78,313	$20,566	$153,226
5	$0	293,312	$45,469	$3,021	$131,990	$73,089	$83,144	$18,206	$171,432
6	$0	291,845	$46,834	$3,006	$131,330	$67,961	$88,272	$18,925	$190,357
7	$0	290,386	$48,239	$2,991	$116,154	$62,516	$93,716	$5,169	$195,526
8	$0	288,934	$49,686	$2,976	$115,574	$56,736	$99,496	$6,051	$201,577
9	$0	287,489	$51,176	$2,961	$100,621	$50,599	$105,633	($7,396)	$194,181
10	$0	286,052	$52,712	$2,946	$100,118	$44,084	$112,148	($6,349)	$187,832
11	$0	284,622	$54,293	$2,932	$85,386	$37,167	$119,065	($19,485)	$168,347
12	$0	283,199	$55,922	$2,917	$84,960	$29,823	$126,409	($18,268)	$150,079
13	$0	281,783	$57,599	$2,902	$70,446	$22,027	$134,206	($31,090)	$118,989
14	$0	280,374	$59,327	$2,888	$70,093	$13,749	$142,483	($29,700)	$89,289
15	$0	278,972	$61,107	$2,873	$55,794	$4,961	$151,271	($42,204)	$47,085
Totals:		4,335,026	$751,378	$32,414	$1,671,609	$800,646	$1,542,842	$47,085	$2,147,233

Net Present Value (NPV) **$74,572**

FRANKLIN PARK ELEMENTARY SCHOOL

30 EDEN STREET
FRANKLIN PARK, NJ 08823

FACILITY ENERGY REPORT

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I. HISTORIC ENERGY CONSUMPTION/COST

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	General Lighting & Power (GLP)
Third Party Supplier:	GDF Suez

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	Hess

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

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

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider:	PSE&G		
Rate:	GLP / LPLS		
Meter No:	778008393		
Account #	4200444208		
Third Party Utility	GDF Suez		
TPS Meter / Acct No:	-		
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND KW**	**TOTAL BILL**
Oct-10	69,600	380.0	$11,866
Nov-10	65,600	356.0	$10,413
Dec-10	70,400	200.0	$10,167
Jan-11	65,219	308.0	$10,098
Feb-11	63,181	308.0	$9,815
Mar-11	62,800	324.0	$9,796
Apr-11	55,200	312.0	$8,843
May-11	68,000	292.0	$9,559
Jun-11	88,800	380.0	$15,654
Jul-11	38,334	282.2	$8,905
Aug-11	7,887	241.6	$5,700
Sep-11	40,945	251.6	$9,644
Totals	**695,966**	**380.0 Max**	**$120,458**
AVERAGE DEMAND		**303.0 KW average**	
AVERAGE RATE		**$0.173 $/kWh**	

Figure 1
Electricity Usage Profile

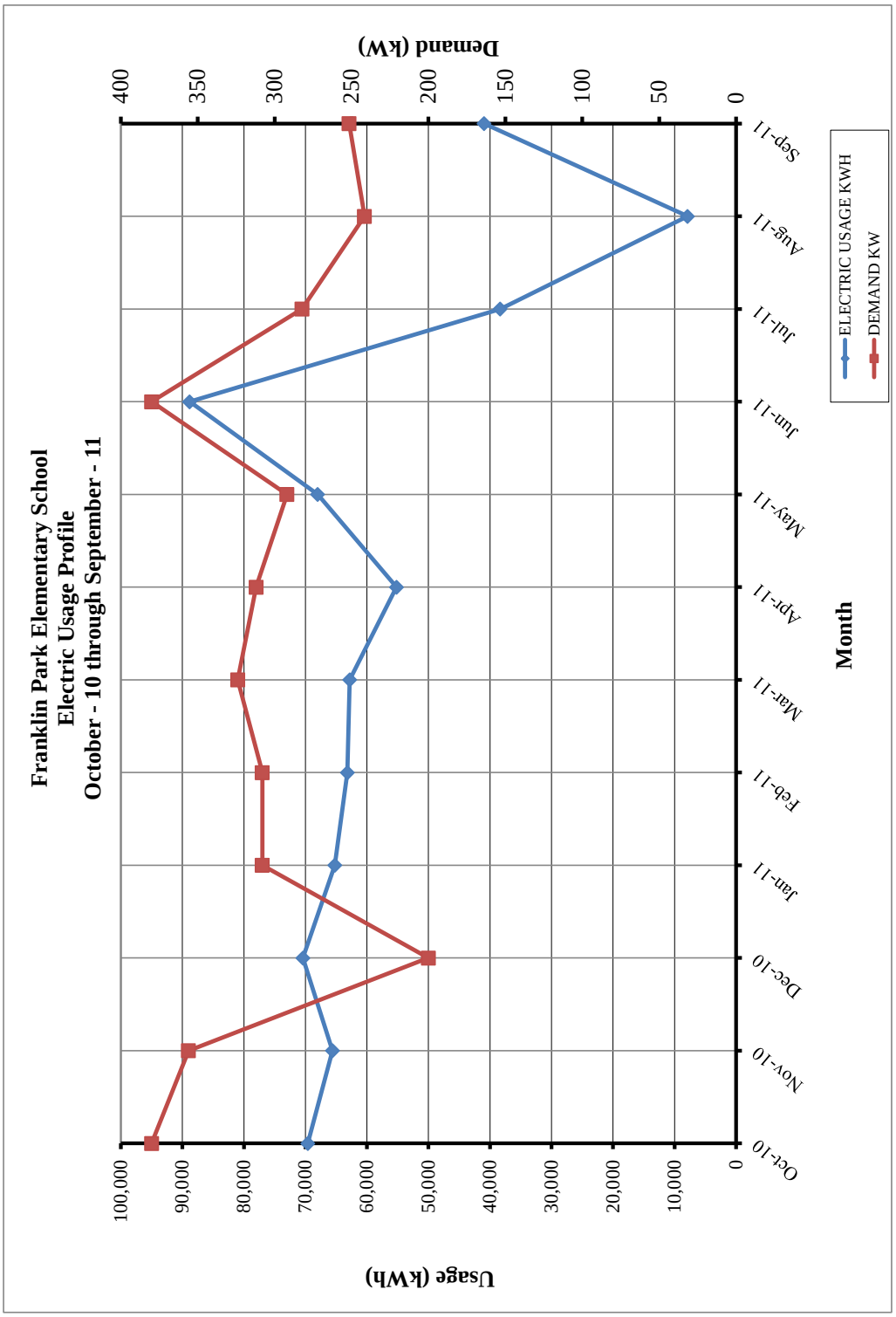
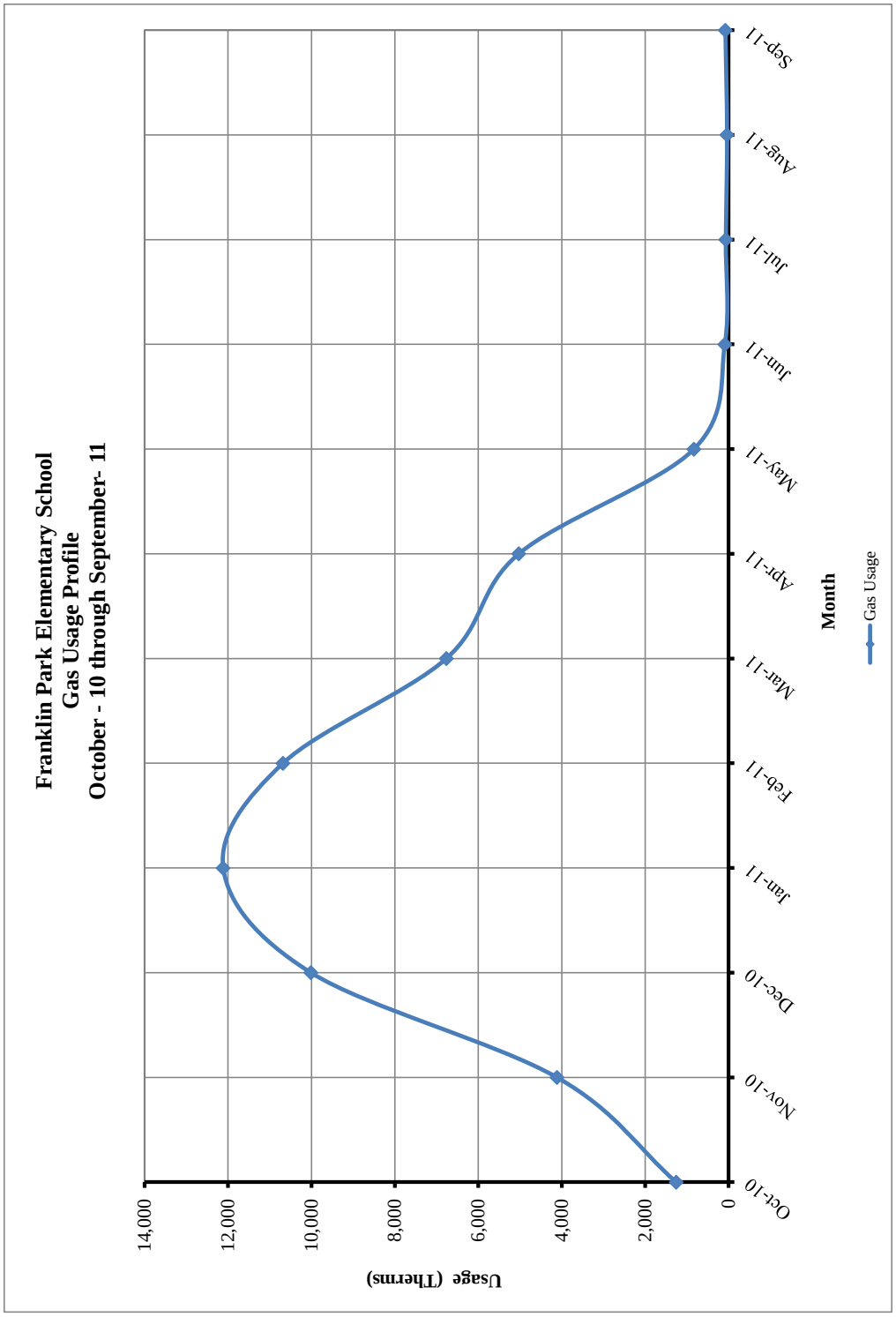


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	LVG	
Meter No:	2643821	
Point of Delivery ID:	4200444208	
Third Party Utility Provider:	Hess	
TPS Meter No:	-	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Oct-10	1,257.10	$1,398.03
Nov-10	4,113.90	$4,575.08
Dec-10	10,013.08	$11,135.58
Jan-11	12,115.69	$13,473.90
Feb-11	10,682.41	$12,169.53
Mar-11	6,766.47	$8,242.73
Apr-11	5,029.42	$4,678.63
May-11	830.22	$882.07
Jun-11	89.52	$273.08
Jul-11	66.46	$267.39
Aug-11	36.03	$238.41
Sep-11	76.49	$282.68
TOTALS	**51,076.79**	**$57,617.10**
AVERAGE RATE:	**$1.13**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

Franklin Park Elementary School is located at 30 Eden Street in Franklin Park, New Jersey. The 99,000 SF elementary school was constructed 1998 with no additions. The school is two stories consisting of classrooms, a cafetorium, a gymnasium and administrative offices.

Occupancy Profile

The school is occupied for approximately 60 hours per week during the school months (September to June). The school has approximately 175 employees and 1117 students.

Building Envelope

Exterior walls for the school are 4" face brick with an 8" concrete block construction. The amount of insulation within the walls could not be determined. The windows are all ¼" double pane with aluminum insulated frames. Blinds are also utilized throughout the facility. The blinds are valuable because they help reduce the heat loss in the winter and reduce solar heat gain in the summer. The roof is a flat, EPDM rubber roof on a steel deck. The roof is in good condition. The amount of insulation below the roofing is unknown.

HVAC Systems

The elementary school HVAC system consists of hot water boilers, air cooled chillers, a four pipe hydronic system, split system A/C units and classroom unit ventilators.

Heating is provided via two (2) H.B. Smith gas fired hot water boilers. Each boiler has an input rating of 6,300 MBH and an output of 5,014 MBH and has a boiler efficiency of approximately 80%. These boilers serve the hot water coils within the air handling equipment and classroom unit ventilators. The hot water is circulated through the building via two (2) 15-HP constant speed rated for 270 GPM each. These pumps operated in primary/standby mode, meaning only one pump runs at a time to satisfy the building load.

Cooling is provided by two (2) Trane, air cooled chillers located on the roof with remote evaporator sections, located in the mechanical room. Each chiller is rated for 150 Tons. The chiller plant serves the chilled water coils within the air handling equipment and unit ventilators throughout the school. The chilled water is circulated to the coils via three (3) 15 HP constant speed pumps. Each pump is rated for 340 GPM. Two of the pumps operate in lead/lag mode, meaning one pump runs until the load is satisfied, if additional load is required, the second pump runs simultaneously. The third pump operates as a back-up.

The school is conditioned by a total of nine (9) indoor air handling units. Each unit is equipped with a chilled water coil or D/X coil for cooling, a hot water coil for heating, constant volume supply fan and economizer. Each coil has a two way control valve to isolate flow from the coil when there is no demand. In addition, the office suites are heated via electric duct heaters. These duct heaters are controlled by the thermostat in the space(s).

The classrooms are served by unit ventilators. Each unit ventilator has a hot water coil for heating, a chilled water coil for cooling, supply fan and outside air intake with face and bypass dampers. Each coil is equipped with a two way control valve.

Exhaust System

Air is exhausted from the toilet rooms through the roof exhausters. The exhaust fans are interlocked with the air handling unit that supplies air to the space and runs when the air handling unit is energized.

HVAC System Controls

The HVAC systems within the school are controlled via DDC controls manufactured by Barber Coleman (Siebe). All of the classroom unit ventilators, penthouse air handling units, the boilers, chillers and pumps are all monitored and controlled via the DDC system. The equipment runs on a set schedule, typically from 6:30 am to 8:00 pm. In heating mode, the controls system has the space temperatures set between 68℉ and 72F during occupied hours and sets back to 60℉ during unoccupied hours.

Domestic Hot Water

Domestic hot water for the school is provided via a large domestic hot water heater located in the mechanical room. The hot water heater is a 500 MBH PVI Industries, natural gas fired heater, with 250 gallons of storage with an efficiency of 80%. The domestic hot water is supplied at 140℉, for the kitchen, and is tempered through thermostatic mixing valves to provide 110℉ hot water to the restrooms.

Lighting

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

III. MAJOR EQUIPMENT LIST

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

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

IV. ENERGY CONSERVATION MEASURES

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

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrades - Gymnasium	$4,080	$1,274	3.2	368.4%
ECM #2	Lighting Controls	$20,080	$7,428	2.7	454.9%
ECM #3	Condensing Boiler Installation	$225,750	$6,158	36.7	-18.2%
ECM #4	NEMA Premium Pump Motors	$7,074	$108	65.5	-77.1%
ECM #5	NEMA Premium AHU Motors	$7,313	$1,030	7.1	111.3%
ECM #6	HW Pump VFD	$21,500	$1,985	10.8	38.5%
ECM #7	CHW Pump VFD	$21,500	$1,691	12.7	18.0%
ECM #8	AC Unit Replacement	$107,719	$10,295	10.5	43.4%
ECM #9	Demand Controlled Ventilation	$92,000	$6,060	15.2	-1.2%
ECM #10	Water Conservation	$61,800	$5,388	11.5	30.8%
ECM #11	Computer Monitor Replacement	$1,900	$373	5.1	194.5%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.
B. Savings takes into consideration applicable maintenance savings.

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrades - Gymnasium	2.8	7,363	-
ECM #2	Lighting Controls	14.5	37,419	-
ECM #3	Condensing Boiler Installation	-	-	5,450
ECM #4	NEMA Premium Pump Motors	0.3	624	-
ECM #5	NEMA Premium AHU Motors	1.9	5,956	-
ECM #6	HW Pump VFD	-	11,474	-
ECM #7	CHW Pump VFD	-	9,773	-
ECM #8	AC Unit Replacement	16.1	59,509	-
ECM #9	Demand Controlled Ventilation	-	23,213	1,809
ECM #10	Water Conservation	-	-	1,120
ECM #11	Computer Monitor Replacement	-	-	2,155

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrades - Gymnasium	$1,274	$5,280	$1,200	$4,080	3.2
Lighting Controls	$7,428	$22,500	$2,420	$20,080	2.7
Condensing Boiler Installation	$6,158	$231,750	$6,000	$225,750	36.7
NEMA Premium Pump Motors	$108	$7,304	$230	$7,074	65.5
NEMA Premium AHU Motors	$1,030	$7,743	$430	$7,313	7.1
HW Pump VFD	$1,985	$21,500	$0	$21,500	10.8
CHW Pump VFD	$1,691	$21,500	$0	$21,500	12.7
AC Unit Replacement	$10,295	$113,000	$5,281	$107,719	10.5
Demand Controlled Ventilation	$6,060	$92,000	$0	$92,000	15.2
Water Conservation	$5,388	$61,800	$0	$61,800	11.5
Computer Monitor Replacement	$373	$1,900	$0	$1,900	5.1
Design / Construction Extras (15%)		$87,942		*$87,942*	
Total Project	**$41,790**	**$674,219**	**$15,561**	**$658,658**	**15.8**

Design / Construction Extras is shown as an additional cost for the facility project summary. This cost is included to estimate the costs associated with construction management fees for a larger combined project. Although this facility's ESIP combined project has a payback of longer than 15 years, when these projects are combined with the other ESIP projects identified in the other school reports, the overall payback is less than 15 years. Refer to the Executive Summary Report for the combined ESIP summary.

ECM #1: Lighting Upgrade - Gymnasium

Description:

The Gymnasium at Franklin Park Elementary School is currently lit via twenty four (24) HID, 250W, low bay Mercury Vapor fixtures. The space would be better served with a more efficient, fluorescent lighting system. CE recommends upgrading the lighting within the Gym to an energy-efficient T-5 lighting system that includes new lighting fixtures with high efficiency, electronic ballasts and T-5 high output (HO) lamps.

This measure replaces all the HID, 250 W HID Mercury Vapor fixtures in the Gym with a well-designed T-5 lighting system. Twenty four (24), 3-lamp T5HO low bay fixtures with reflectors and high-efficiency, electronic ballasts will be required in order to meet the mandated 50 foot-candle average within the Gym.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix – ECM#1** that outlines the proposed retrofits, costs, savings, and payback periods.

From the **Smart Start Incentive Appendix**, the replacement of a 250 W HID fixture to a T-5 or T-8 fixture warrants the following incentive: $50 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ fixtures \times\ \$100) = (24 \times \$50) = \underline{\$1{,}200}$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$5,280
NJ Smart Start Equipment Incentive ($):	$1,200
Net Installation Cost ($):	$4,080
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,274
Total Yearly Savings ($/Yr):	$1,274
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.2
Simple Lifetime ROI	368.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$19,110
Internal Rate of Return (IRR)	31%
Net Present Value (NPV)	$11,128.93

ECM #2: Lighting Controls Upgrade – Occupancy Sensors

Description:

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

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

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

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

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

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

Energy Savings Calculations:

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

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

Rebates and Incentives:

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

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

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$22,500
NJ Smart Start Equipment Incentive ($):	$2,420
Net Installation Cost ($):	$20,080
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$7,428
Total Yearly Savings ($/Yr):	$7,428
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.7
Simple Lifetime ROI	454.9%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$111,420
Internal Rate of Return (IRR)	37%
Net Present Value (NPV)	$68,594.98

ECM #3: Condensing Boiler Installation

Description:

Space heating for the classrooms and offices in the school is provided by unit ventilators with hot water coils and hot water baseboard radiators. Heating is provided via two (2) H.B. Smith gas fired hot water boilers. Each boiler has an input rating of 6,300 MBH and an output of 5,014 MBH and having a boiler efficiency of approximately 80%. These boilers are 14 years old and are still within their useful service life, as defined by ASHRAE. However, significant energy savings could be achieved with the installation of newer, more efficiency condensing boilers.

Typically, standard (non-condensing) boilers provide lower than nominal efficiency compared to condensing boilers. Standard boilers suffer further efficiency losses at part load operating conditions mainly due to limitations in the reduction of the flue gas temperature. Current average combustion efficiency of the boilers is estimated to be 80% due to standard non-condensing boiler technology, limited turn down ratio, cycling losses and outdated design and controls. New condensing boilers could substantially improve the operating efficiency of the heating system of the building. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature.

Concord Engineering recommends replacing the boilers with condensing hot water boilers to provide building with heating throughout the year. The annual average operating efficiency of the proposed boiler set is expected to be 90%, which gives the heating system a 10% increase in efficiency. This ECM is based on *variable* supply water temperature adjusted based on outdoor temperature.

This ECM includes installation of two (2) new condensing gas fired boilers to replace one of the existing boilers in the mechanical room. The following is a summary of the boiler replacement recommendations.

BOILER REPLACEMENT SUMMARY		
EXISTING UNIT	**LOCATION**	**PROPOSED UNITS**
(1) 6,300 MBH Cast Iron Boiler	Boiler Room	(2) 3.0 MMBTU

The basis for this ECM is Aerco Benchmark 3.0 condensing hot water boiler or equivalent. The installation of the two (2) BMK-3.0 boilers will provide an overall capacity of 6,000 MBH, or an output of 5,220 MBH. One of the existing boilers would remain as a backup.

Energy Savings Calculations:

Currently, the only gas consuming equipment connected to the building gas meter is the boilers, the domestic hot water heater and a kitchen range. Therefore, annual energy consumption of the boilers has to be estimated. In this calculation, it is assumed that the energy consumption of the boilers will be the total consumption of the facility minus the estimated usage for domestic hot water heating. It is also assumed that the kitchen equipment is minimal in comparison to the overall building gas consumption.

First, domestic hot water usage is estimated and subtracted from the total usage in order to estimate the net natural gas usage for space heating. The monthly domestic hot water usage was derived from the average natural gas consumption from May through September.

Current total hot water usage can be found in the table below:

ANNUAL GAS USAGE				
MONTH	**TOTAL USAGE THERMS**	**DOMESTIC HW USAGE**	**HEATING ONLY**	**COST**
Oct-09	1,257	220	1,037	$1,172
Nov-09	4,114	220	3,894	$4,400
Dec-09	10,013	220	9,793	$11,066
Jan-10	12,116	220	11,896	$13,442
Feb-10	10,682	220	10,462	$11,823
Mar-10	6,766	220	6,546	$7,398
Apr-10	5,029	220	4,809	$5,435
May-10	**830**	220	610	$690
Jun-10	**90**	90	0	$0
Jul-10	**66**	66	0	$0
Aug-10	**36**	36	0	$0
Sep-10	**76**	76	0	$0
TOTAL	**51,077**	**2,028**	**49,049**	**55,425**

Baseline Domestic Hot Water Gas Use = 2,028 Therms
Existing Natural Gas Use for Heating = 51,077 Therms – 2,028 Therms
= 49,049 Therms

$$\text{Estimated Gas Used} = \text{Heating Nat. Gas (Therm)} \times \text{Heating Eff (\%)} \times \text{Fuel Heat Value } (\frac{\text{BTU}}{\text{Therm}})$$

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

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

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

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

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

Energy savings calculations are summarized in the table below:

CONDENSING BOILER CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	(1) Existing Hot Water Boiler	(2) New Condensing Boilers	-
Boiler Input Capacity (MBH)	6,300	6,000	
Boiler Output Capacity (MBH)	5,014	5,400	
Existing Nat Gas (Therms)	49,049	-	-
Boiler Efficiency (%)	80%	90%	10%
Nat Gas Heat Value (BTU/Therm)	100,000	100,000	-
Building Heating Energy Usage (MMBTUs)	3,924	3,924	-
Ave. Gas Cost ($/Therm)	1.13	1.13	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	49,049	43,599	5,450
Energy Cost ($)	$55,425	$49,267	$6,158
COMMENTS:			

Project Cost, Incentives and Maintenance Savings

Estimated cost for removing the existing boilers and installing two (2) 3.0 MMBH condensing hot water boilers with advanced controls is $231,750.

From the **New Jersey Smart Start® Program Incentives Appendix**, installation of a high efficiency hot water boiler falls under the category "Gas Heating" and warrants an incentive based on efficiency at or above 84% for this type of equipment. The program incentives are calculated as follows:

GAS FIRED BOILER REBATE SUMMARY					
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/MBH**	**PROPOSED CAPACITY,**	**NUMBER OF UNITS**	**TOTAL REBATE, $**
≥ 300 MBH - 1500 MBH	84% AFUE for Hot Water boilers	$1.75	0	0	$0
>1500 - ≤ 4000 MBH	84% AFUE for Hot Water boilers	$1	3,000	2	$6,000
> 4000 MBH	84% AFUE for Hot Water boilers	$1	0	0	$0
TOTAL					**$6,000**

Maintenance savings associated with this ECM is estimated to be minimal.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$231,750
NJ Smart Start Equipment Incentive ($):	$6,000
Net Installation Cost ($):	$225,750
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,158
Total Yearly Savings ($/Yr):	$6,158
Estimated ECM Lifetime (Yr):	30
Simple Payback	36.7
Simple Lifetime ROI	-18.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$184,740
Internal Rate of Return (IRR)	-1%
Net Present Value (NPV)	($105,050.48)

ECM #4: 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 15 horsepower electric motors driving the hot water pumps and the chilled 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.

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**
HWP - 1&2	15	90%	91.0%	92.4%	0.17	371	$64
CHWP - 1&2	15	90%	91.0%	92.4%	0.17	253	$44
TOTAL					**0.3**	**624**	**$108**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
1	$50
1.5	$50
2	$60
3	$60
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	**MOTOR POWER HP**	**INSTALLED COST**	**SMART START INCENTIVE**	**NET COST**	**TOTAL SAVINGS**	**SIMPLE PAYBACK**
HWP - 1&2	15	$3,652	$115	$3,537	$64	55.1
CHWP - 1&2	15	$3,652	$115	$3,537	$44	80.9
TOTAL	**Totals:**	**$7,304**	**$230**	**$7,074**	**$108**	**65.6**

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,304
NJ Smart Start Equipment Incentive ($):	$230
Net Installation Cost ($):	$7,074
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$108
Total Yearly Savings ($/Yr):	$108
Estimated ECM Lifetime (Yr):	15
Simple Payback	65.5
Simple Lifetime ROI	-77.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$1,620
Internal Rate of Return (IRR)	-15%
Net Present Value (NPV)	($5,784.70)

ECM #5: Install NEMA Premium® Efficiency Motors AHU's

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. Due to the fact that many motors in air handling units operate continuously 24 hours a day, even small increases in efficiency can yield substantial energy and dollar savings.

The school has a number of air handling unit motors that are candidates to be replaced with NEMA Premium® efficiency motors. The motors are connected to the eight air handling units throughout the building. The units are located in four separate penthouse areas of the school, which provide warm and cool air to the spaces they serve. The current motors operate with efficiencies below 90%, and most are approaching the end of their useful service life.

This energy conservation measure replaces the existing lower efficiency electric motors in the air handling units with NEMA Premium® efficiency motors. NEMA Premium® is the most efficient motor designation in the marketplace today. The energy savings and payback are subject to change based on the pool filtration usage during the year. An implementation summary of the motor is provided below.

IMPLEMENTATION SUMMARY					
EQMT ID	FUNCTION	MOTOR HP	HOURS OF OPERATION	EXISTING EFFICIENCY	NEMA PREMIUM EFFICIENCY
AHU-1	Air Handling Unit Motor	3	3,150	81.0%	89.5%
AHU-2	Air Handling Unit Motor	3	3,150	81.0%	89.5%
AHU-3	Air Handling Unit Motor	3	3,150	81.0%	89.5%
AHU-4	Air Handling Unit Motor	7.5	3,150	81.0%	91.7%
AHU-5	Air Handling Unit Motor	3	3,150	81.0%	89.5%
AHU-6	Air Handling Unit Motor	1.5	3,150	81.0%	88.5%
AHU-7	Air Handling Unit Motor	1.5	3,150	81.0%	88.5%

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

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

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

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**
AHU-1	3	90%	81.0%	89.5%	0.24	748	$129
AHU-2	3	90%	81.0%	89.5%	0.24	748	$129
AHU-3	3	90%	81.0%	89.5%	0.24	748	$129
AHU-4	7.5	90%	81.0%	91.7%	0.73	2,297	$397
AHU-5	3	90%	81.0%	89.5%	0.24	748	$129
AHU-6	1.5	90%	81.0%	88.5%	0.11	334	$58
AHU-7	1.5	90%	81.0%	88.5%	0.11	334	$58
TOTAL					**1.9**	**5,956**	**$1,030**

Equipment Cost and Incentives

Below is a summary of SmartStart Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
1	$50
1.5	$50
2	$60
3	$60
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130
30	$150
40	$180

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	MOTOR POWER HP	INSTALLED COST	SMART START INCENTIVE	NET COST	TOTAL SAVINGS	SIMPLE PAYBACK
AHU-1	3	$1,049	$60	$989	$129	7.6
AHU-2	3	$1,049	$60	$989	$129	7.6
AHU-3	3	$1,049	$60	$989	$129	7.6
AHU-4	7.5	$1,971	$90	$1,881	$397	4.7
AHU-5	3	$1,049	$60	$989	$129	7.6
AHU-6	1.5	$788	$50	$738	$58	12.8
AHU-7	1.5	$788	$50	$738	$58	12.8
TOTAL		**$7,743**	**$430**	**$7,313**	**$1,030**	**7.1**

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,743
NJ Smart Start Equipment Incentive ($):	$430
Net Installation Cost ($):	$7,313
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,030
Total Yearly Savings ($/Yr):	$1,030
Estimated ECM Lifetime (Yr):	15
Simple Payback	7.1
Simple Lifetime ROI	111.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$15,450
Internal Rate of Return (IRR)	11%
Net Present Value (NPV)	$4,983.07

ECM #6: Install HW Pump VFD's

Description:

The heating and ventilation units and the unit ventilators are utilizing a constant volume pumping design. The existing hot water system has a 3-way by pass valve located in the boiler room. This valve modulates open as the 2-way control valves throughout the system close.

2-way control valves provide flow through the heat exchanger equipment only when there is a call for heating or cooling, unlike 3-way control valves that allow constant flow of the water loop. 3-way control valves require full pumping energy continuously, while 2-way control valves allow the system to reduce flow when it is not needed. This measure includes capping off the bypass port on the 3-way control valve in the boiler room and installing differential pressure sensors in the hot water system. Variable frequency drives allow the pumps to slow down in response to a reduction in overall system flow. The reduction in operating flow allows the pumps to reduce energy consumption for all hours that the heating system is not at its peak load.

This ECM includes the installation of Variable Frequency Drives on one (1) of the two (2) existing hot water pumps in the main boiler room. The second pump will remain as a constant speed pump and will be used as a backup. The VFD's would be controlled by a differential pressure sensor in the water loop to measure demand for water (typical for each of the three pump sets). A 3-way control valve would be installed in furthest unit from the loop pumps to eliminate dead heading potential. CEG recommends that this ECM be implemented in conjunction with ECM#4, replacement of the existing hot water pump motors with inverter duty motors that meet NEMA Premium Efficiency Standard. Implementation of both measures will further reduce energy consumption.

Energy and cost savings calculations are based on calculation software "PumpSave v4.2," provided by ABB. The PumpSave calculation software is used to estimate the pumping energy for variable speed pump systems. The boiler water loop pumps operate approximately 2,200 Hrs per year. The pump flow, HD, and resultant energy are calculated based on the existing pump horse power installed. The calculation is based on all existing equipment to be modified to operate as 2-way control valves. Where control valves are already 2-way style, these control valves shall remain. The exact quantity of equipment with hot water coils is unknown. The operation of all equipment control valves should be verified before implementing this ECM.

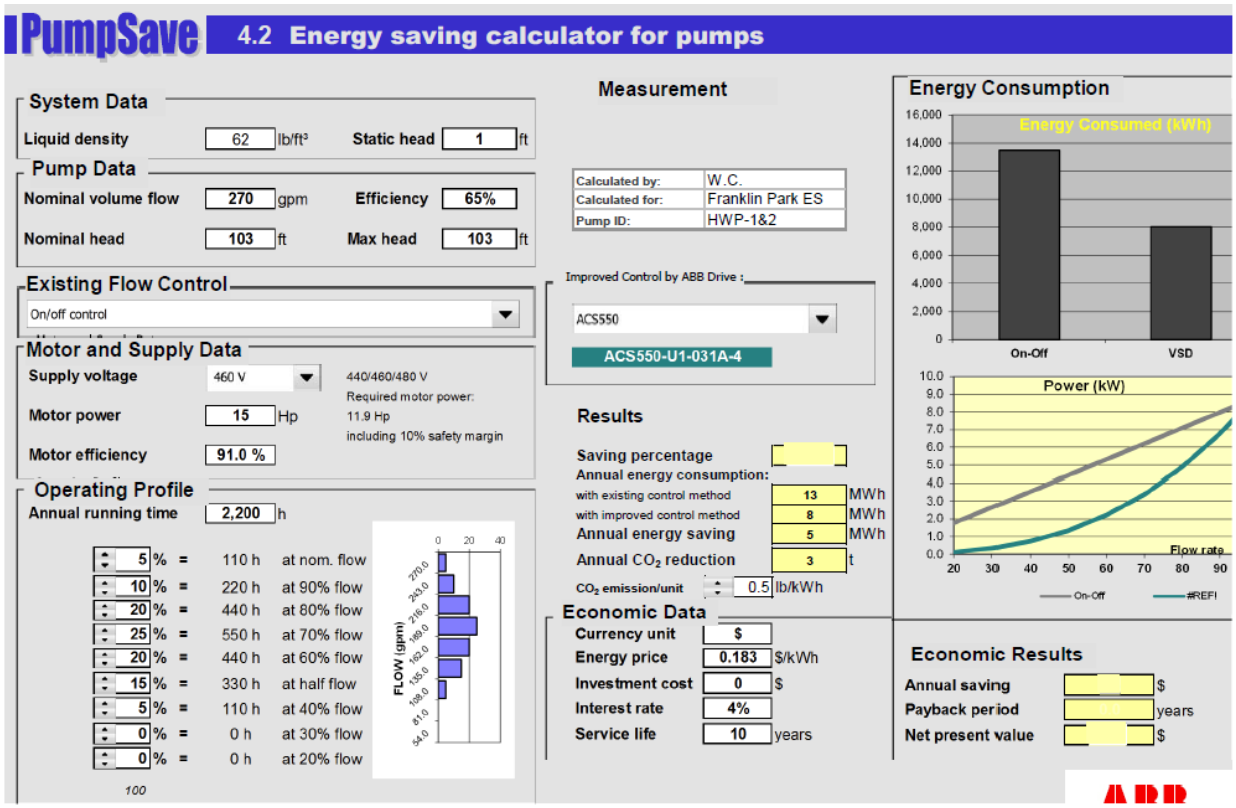
Energy Savings Calculations:

$$\text{Cons. Volume Power}(\text{HP}) = \frac{\text{Specific Gravity} \times \text{Flow Rate}\left(\frac{\text{Gal}}{\text{min}}\right) \times \text{Head}(\text{Ft})}{3960 \times \text{Pump Efficiency}\ (\%) \times \text{Motor Efficiency}\ (\%)}$$

$$\text{Energy Cons.}(\text{kWh}) = \text{Power}(\text{HP}) \times 0.746\left(\frac{\text{KW}}{\text{HP}}\right) \times \text{Operation}(\text{Hrs.})$$

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

Hot Water VFD Pumping Energy:



MAIN BOILER ROOM HOT WATER PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	CV	VFD	-
Total Flow* (GPM)	270	270	-
Head* (Ft)	103	103	-
Pump Efficiency (%)	65%	65%	-
Ave. Motor Efficiency (%)	91.0%	92.4%	1.4%
Operating Hrs	2200	2200	-
Estimated Total Horse Power	11.9	11.7	0.18
Elec Cost ($/kWh)	0.173	0.173	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	19,486	8,012	11,474
Electric Energy Cost ($)	$3,371	$1,386	$1,985
COMMENTS:	- VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output. - Hot water flow & head are actual scheduled values		

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Installation cost for a single VFD, piping work, re-balancing, capping of the 3-way valves and additional controls is estimated to be $21,500.

Currently there are no **NJ Smart Start® Program Incentives** for installation of hot water pump Variable Frequency Drives.

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$21,500
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$21,500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,985
Total Yearly Savings ($/Yr):	$1,985
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.8
Simple Lifetime ROI	38.5%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$29,775
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	$2,196.80

ECM #7: Install CHW Pump VFD's

Description:

The chilled water system utilizes a constant volume pumping design. The existing chilled water system has a 3-way by pass valve located in the boiler room. This valve modulates open as the 2-way control valves throughout the system close.

2-way control valves provide flow through the coils only when there is a call for cooling, unlike 3-way control valves that allow constant flow of the water loop. 3-way control valves require full pumping energy continuously, while 2-way control valves allow the system to reduce flow when it is not needed. This measure includes capping off the bypass port on the 3-way control valve in the boiler room and installing differential pressure sensors in the hot water system. Variable frequency drives allow the pumps to slow down in response to a reduction in overall system flow. The reduction in operating flow allows the pumps to reduce energy consumption for all hours that the heating system is not at its peak load.

This ECM includes the installation of Variable Frequency Drives on one (1) of the three (3) existing chilled water pumps in the main boiler room. The other pumps will remain as constant speed pumps and will be used as backup. The VFD's would be controlled by a differential pressure sensor in the water loop to measure demand for water (typical for each of the three pump sets). A 3-way control valves would be installed in furthest unit from the loop pumps to eliminate dead heading potential. CEG recommends that this ECM be implemented in conjunction with ECM#4, replacement of the existing chilled water pump motors with inverter duty motors that meet NEMA Premium Efficiency Standard. Implementation of both measures will further reduce energy consumption.

Energy and cost savings calculations are based on calculation software "PumpSave v4.2," provided by ABB. The PumpSave calculation software is used to estimate the pumping energy for variable speed pump systems. The boiler water loop pumps operate approximately 2,200 Hrs per year. The pump flow, HD, and resultant energy are calculated based on the existing pump horse power installed. The calculation is based on all existing equipment to be modified to operate as 2-way control valves. Where control valves are already 2-way style, these control valves shall remain. The exact quantity of equipment with hot water coils is unknown. The operation of all equipment control valves should be verified before implementing this ECM.

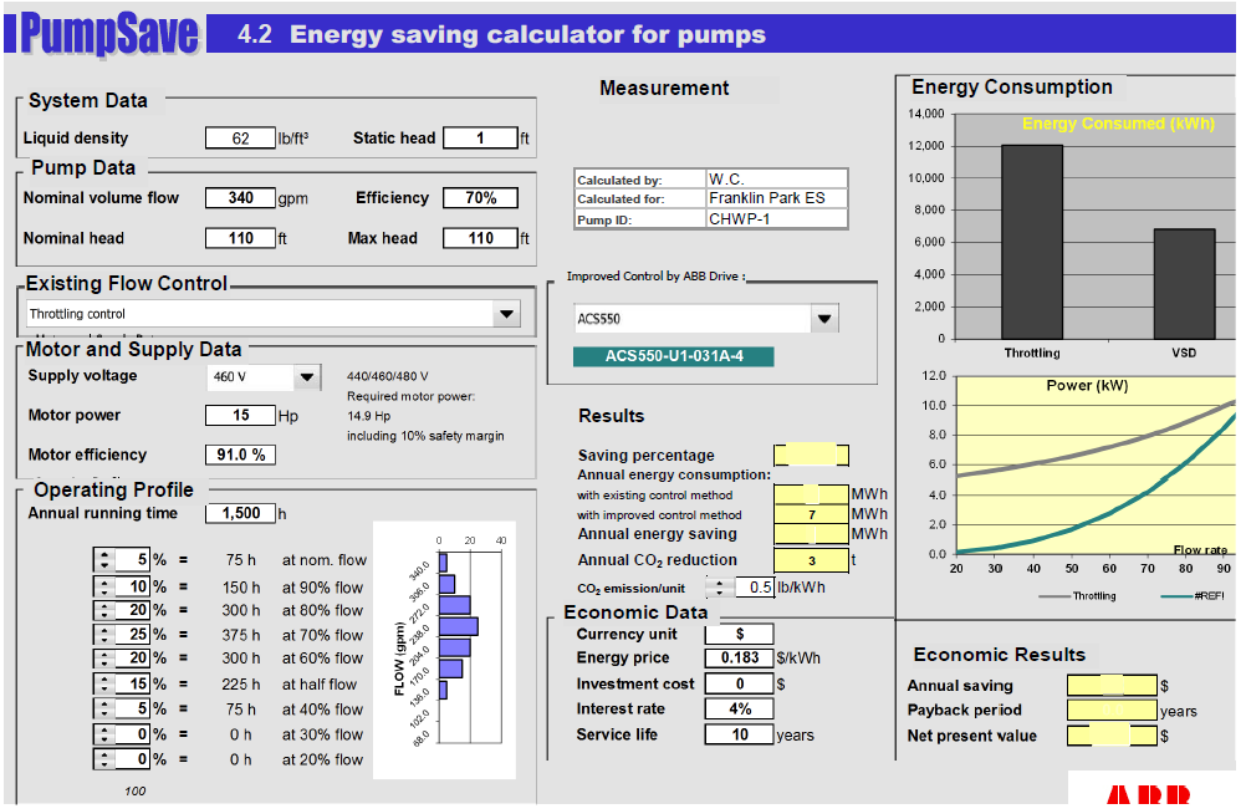
Energy Savings Calculations:

$$\text{Cons. Volume Power}(\text{HP}) = \frac{\text{Specific Gravity} \times \text{Flow Rate}\left(\frac{\text{Gal}}{\text{min}}\right) \times \text{Head}(\text{Ft})}{3960 \times \text{Pump Efficiency}\ (\%) \times \text{Motor Efficiency}\ (\%)}$$

$$\text{Energy Cons.}(\text{kWh}) = \text{Power}(\text{HP}) \times 0.746\left(\frac{\text{KW}}{\text{HP}}\right) \times \text{Operation}(\text{Hrs.})$$

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

Hot Water VFD Pumping Energy:



MAIN BOILER ROOM CHILLED WATER PUMPS VFD CALULATION			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CV Pumps	VFD Pumps	
Flow Control	CV	VFD	-
Total Flow* (GPM)	340	340	-
Head* (Ft)	110	110	-
Pump Efficiency (%)	70%	70%	-
Ave. Motor Efficiency (%)	91.0%	92.4%	1.4%
Operating Hrs	1500	1500	-
Estimated Total Horse Power	14.8	14.6	0.22
Elec Cost ($/kWh)	0.173	0.173	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Energy (kWh)	16,591	6,818	9,773
Electric Energy Cost ($)	$2,870	$1,180	$1,691
COMMENTS:	- VFD pump energy is based on ABB energy savings calculator for pumps, "Pump Save," version 4.2. Flow rate for VFD Pump calculation is summarized in the operating profile shown in the Pump Save output. - Hot water flow & head are actual scheduled values		

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Installation cost for a single VFD, piping work, re-balancing, capping of the 3-way valves and additional controls is estimated to be $21,500.

Currently there are no **NJ Smart Start® Program Incentives** for installation of hot water pump Variable Frequency Drives.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$21,500
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$21,500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,691
Total Yearly Savings ($/Yr):	$1,691
Estimated ECM Lifetime (Yr):	15
Simple Payback	12.7
Simple Lifetime ROI	18.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$25,365
Internal Rate of Return (IRR)	2%
Net Present Value (NPV)	($1,312.95)

ECM #8: AC Unit Upgrade

Description:

Portions of the building are air conditioned by air handling units with D/X coils and remote condensing units. These remote units are in fair condition, are approximately 14 years old, and are approaching the end of their useful service life as defined by ASHRAE. These units are less efficient than newer units and can be replaced with new high efficiency units. New condensing units provide higher full load and part load efficiencies due to advances in inverter motor technologies and heat exchangers. In addition, the existing units utilize R-22 refrigerant, which is currently being phased out and will no longer be available. New units utilize R-410A refrigerant.

This ECM includes one-for-one replacement of the older remote condensing units with new higher efficiency units. A summary of the unit replacement for this ECM can be found in the table below:

IMPLEMENTATION SUMMARY					
ECM INPUTS	**SERVICE FOR**	**NUMBER OF UNITS**	**COOLING CAPACITY, BTU/HR**	**TOTAL CAPACITY, TONS**	**REPLACE UNIT WITH**
SS	AHU-1	2	192,000	8.0	Trane Model 4TTA048
SS	AHU-2	2	192,000	8.0	Trane Model 4TTA048
SS	AHU-3	1	120,000	10.0	Trane Model TTA120
SS	UV-35	1	48,000	4.0	Trane Model 4TTA048
SS	UV-36	1	48,000	4.0	Trane Model 4TTA048
SS	AHU-8	1	24,000	2.0	Trane Model 4TTA024
SS	AHU-9	1	24,000	2.0	Trane Model 4TTA024
SS	AHU-5	2	600,000	25.0	Trane Model TTA150
Total		**11**	**1,248,000**	**63**	

Energy Savings Calculations:

Cooling Energy Savings:

Seasonal energy consumption of the air conditioners at the cooling mode is calculated with the equation below:

$$\text{Energy Savings, kWh} = \text{Cooling Capacity,} \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{SEER}_{\text{Old}}} - \frac{1}{\text{SEER}_{\text{New}}} \right) \times \frac{\text{Operation Hours}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Demand Savings, kW} = \frac{\text{Energy Savings (kWh)}}{\text{Hours of Cooling}}$$

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

ENERGY SAVINGS CALCULATIONS							
ECM INPUTS	**COOLING CAPACITY, BTU/Hr**	**ANNUAL COOLING HOURS**	**EXISTING UNITS (S)EER**	**UPGRADED UNIT (S)EER**	**# OF UNITS**	**ENERGY SAVINGS kWh**	**DEMAND SAVINGS kW**
SS	192,000	1,500	10 EER	11.2 EER	2	6,171	1.7
SS	192,000	1,500	10 EER	11.2 EER	2	6,171	1.7
SS	120,000	1,500	8.9 EER	12.2 EER	1	5,471	1.5
SS	48,000	1,500	10 EER	11.2 EER	1	771	0.2
SS	48,000	1,500	10 EER	11.2 EER	1	771	0.2
SS	24,000	1,500	10 EER	11 EER	1	327	0.1
SS	24,000	1,500	10.6 EER	11 EER	1	123	0.0
SS	600,000	1,500	9.3 EER	11.7 EER	2	39,702	10.7
Total					11	59,509	16

Project Cost, Incentives and Maintenance Savings

From the NJ Smart Start® Program appendix, the replacement of split system AC units and unitary systems with high efficiency AC systems falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (EER/SEER). The program incentives are calculated as follows:

$$\text{Smart Start® Incentive} = (\text{Cooling Tons} \times \text{ \$/Ton Incentive})$$

UNITARY HVAC SYSTEM REBATE SUMMARY				
UNIT DESCRIPTION	**UNIT EFFICIENCY**	**REBATE $/TON**	**PROPOSED CAPACITY TONS**	**TOTAL REBATE $**
≥20 to 30 tons	10.5 EER	79	0	$0
≥ 11.25 to < 20 tons	11.5 EER	79	25	$1,975
≥ 5.4 to < 11.25 tons	11.5 EER	73	10	$730
5.4 tons or less Unitary AC and Split System	≥14 SEER	$92	28.0	$2,576
TOTAL			**63**	**$5,281**

Summary of cost, savings and payback for this ECM is below.

COST & SAVINGS SUMMARY							
ECM INPUTS	**INSTALLED COST**	**# OF UNITS**	**TOTAL COST**	**REBATES**	**NET COST**	**ENERGY SAVING**	**PAY BACK YEARS**
SS	$8,000	2	$16,000	$736	$15,264	$1,067.66	14.3
SS	$8,000	2	$16,000	$736	$15,264	$1,067.66	14.3
SS	$17,000	1	$17,000	$730	$16,270	$946.42	17.2
SS	$8,000	1	$8,000	$368	$7,632	$133.46	57.2
SS	$8,000	1	$8,000	$368	$7,632	$133.46	57.2
SS	$6,000	1	$6,000	$184	$5,816	$56.62	102.7
SS	$6,000	1	$6,000	$184	$5,816	$21.37	272.2
SS	$18,000	2	$36,000	$1,975	$34,025	$6,868.49	5.0
Total	$79,000	$11	$113,000	$5,281	$107,719	$10,295	10.5

There is no significant maintenance savings due to implementation of this ECM.

Energy Savings Summary:

ECM #8 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$113,000
NJ Smart Start Equipment Incentive ($):	$5,281
Net Installation Cost ($):	$107,719
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$10,295
Total Yearly Savings ($/Yr):	$10,295
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.5
Simple Lifetime ROI	43.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$154,425
Internal Rate of Return (IRR)	5%
Net Present Value (NPV)	$15,182.04

ECM #9: Demand Controlled Ventilation – Gymnasium and Auditorium

Demand Controlled Ventilation (DCV) is a means to provide active, zone level control of ventilation for spaces within a facility. The basic premise behind DCV is monitoring indoor CO2 levels versus outdoor CO2 levels in order to provide proper ventilation to the spaces within the facility as well as saving costly dollars treating unconditioned ventilation air. Carbon dioxide ventilation control or demand controlled ventilation (DCV) allows for the measurement and control of outside air ventilation levels to a target cfm/person ventilation rate in the space (i.e., 15 cfm/person) based on the number of people in the space. It is a direct measure of ventilation effectiveness and is a method whereby buildings can regain active and automatic zone level ventilation control, without having to open windows. The fixed ventilation approach depends on a set-it-and-forget-it methodology that is completely unresponsive to changes in the way spaces are utilized/occupied or how equipment is maintained. A DCV system utilizes various control algorithms to maintain a base ventilation rate. The system monitors space CO2 levels and the algorithm automatically adjusts the outdoor and return air dampers to provide the quantity of outdoor air to maintain the required CO2 level in the space. System designs are normally designed for maximum occupancy and the ventilation rates are designed for this (maximum) occupancy. In areas where occupancy swings are prevalent there is ample opportunity to reduce outdoor air quantity to satisfy the needs of the actual number of occupants present. By installing the DCV controls, energy savings are realized by the reduced quantities of outdoor air that do not require heating and cooling energy from the steam and chilled water plants.

There are a total of none (9) air handling units that provide conditioned air to various areas throughout the school. When operating, these units provide the minimum amount of outside air to the space. The outside air volume is typically based on the maximum occupancy of the space conditioned. When a given space is not fully occupied the outside air quantity delivered to the space is greater than the amount needed for adequate ventilation.

This ECM includes the installation of CO_2 sensors integrated into a demand control ventilation system, for the units mentioned above. This system allows the air handling unit to respond to changes in occupancy and therefore reduce the amount of outside air that has to be conditioned. Outside air accounts for a large portion of the energy consumption in the HVAC system, especially in high occupancy spaces.

The components required for the demand control ventilation system installation include damper actuators, CO2 sensors, wiring, Energy Management System equipment expansion and programming. Each occupied zone would require minimum one CO_2 sensor installed to monitor occupancy levels.

Often heating and air conditioning units switch to occupied mode several hours before the actual occupancy in order to provide pre-heating or pre-cooling of the space. Energy savings achieved through “Demand Control Ventilation” is calculated based on actual occupancy of the spaces and the hours the units are in occupied mode.

Energy Savings Calculations:

Following table summarizes the estimated occupancy characteristics of the spaces and the HVAC equipment at this school.

ENERGY SAVINGS	
ECM INPUTS	**DCV**
Average Full Occupancy Hours	8:00 AM - 3:00 PM
Full Occupancy Hours per Day	7
HVAC Eqp. On Occupied Mode	7:00 AM - 5:00 PM
Occupied Hours per day	10
HVAC occupied / spaces not occupied	3
Est. Conditioned outside air savings	30%

Following is a list of HVAC equipment and corresponding spaces identified for Demand Controlled Ventilation.

IMPLEMENTATION SUMMARY							
INPUTS	**Service**	**# of CO2 SENSORS**	**HVAC Unit Type**	**Total Cooling Capacity, Tons**	**Total Heating Capaity, Mbh**	**Outside Air Cooling, Tons**	**Outside Air Heating, MBH**
DCV-1	Admin	1	AHU	8.0	136	1.3	23
DCV-2	Nurses Office	1	AHU	7.4	65	1.0	9
DCV-3	Computer Rm 302	1	AHU	9.7	92	1.1	11
DCV-4	Cafetorium	1	AHU	67.8	918	67.8	918
DCV-5	Library	1	AHU	11.4	160	2.1	29
DCV-6	Gym North	1	AHU	11.0	149	2.8	38
DCV-7	Gym South	1	AHU	11.0	149	2.8	38
DCV-8	Rm B208	1	AHU	1.4	0	0.2	0
DCV-9	Rm C130	1	AHU	1.9	0	0.2	0
Total		**9**				**79**	**1,065**

$$\text{Cooling Energy Usage} = \frac{\text{Cooling(Tons)} \times 12{,}000 \left(\frac{\text{Btu}}{\text{Ton hr}}\right) \times \text{Annual Full Load Cooling Hrs.}}{1000 \left(\frac{\text{Wh}}{\text{kWh}}\right) \times \text{EER}\left(\frac{\text{Btu}}{\text{Wh}}\right)}$$

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

$$\text{Heating Energy (Therms)} = \frac{\text{Outside Air Heating Capacity}\left(\frac{\text{Btu}}{\text{Hr.}}\right) \times \text{HDD}(\text{Day °F}) \times 12\left(\frac{\text{Hr.}}{\text{Day}}\right) \times (0.60)}{65(\text{°F}) \times \text{Fuel Heat Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \times \text{Heating Efficiency (\%)}}$$

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

DEMAND CONTROLLED VENTILATION	
ECM INPUTS	**DCV**
Equipment	Indoor Air Handling Units
OA Cooling Capacity, Tons	79
Average Efficiency (EER)	9.85
Annual Full Load Cooling Hours	800
OA Heating Capacity, MBh	1065
Net Heating Efficiency (Gas)	75%
Heating Degree Days (65°F)	4599
Occupied Hours per day	10
Heating Energy Saving	30%
A/C Energy Savings	30%
Elec Cost ($/kWh)	$0.173
Natural Gas Cost ($/Therm)	$1.13
ENERGY SAVINGS	
ECM RESULTS	**DCV**
Cooling Energy Cnsmption, kWh	77,378
Heating Energy (Therms)	6,030
Cooling Energy Savings kWh	23,213
Heating Energy Savings (Therms)	1,809
Electric Energy Cost Savings ($)	$4,016
Total Gas Cost Savings ($)	$2,044
Total Cost Savings ($)	$6,060
COMMENTS:	HDD estimated based on Newark Liberty Airport OA: Outside Air

Cost and Incentives:

Estimated installed cost for demand controlled ventilation is $92,000. Estimated cost includes CO2 sensors, control wiring, electrical wiring, control system equipment expansion and programming.

There are currently no Smart Start ® incentives available for a Demand Control Ventilation System.

Energy Savings Summary:

ECM #9 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$92,000
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$92,000
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$6,060
Total Yearly Savings ($/Yr):	$6,060
Estimated ECM Lifetime (Yr):	15
Simple Payback	15.2
Simple Lifetime ROI	-1.2%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$90,900
Internal Rate of Return (IRR)	0%
Net Present Value (NPV)	($19,656.11)

ECM #10: Water Conservation

Description:

The facility utilizes standard plumbing fixtures. The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the replacement of the existing sink faucets, water closets and urinals within the bathrooms of the school. The estimated usage of the plumbing fixtures is based on the total population of the facility. The number of plumbing fixtures to be replaced is based on site survey of the facilities.

The proposed retrofit includes installation of auto flow sink faucets, low flow aerators, low flow flushometer style water closets that utilize 1.28 gallons per flush and ultra-low flushometer style urinals that utilize 1/8 gallons per flush. For the basis of this calculation the LEED rating system was used to estimate the occupancy usage for students within the school. When water consumption information was not available, the GPF values were estimated for the existing fixtures.

Energy Savings Calculations:

Urinals and Toilets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Flush}}{\text{Person per Day}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Flush}}\right)$$

Faucets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Use}}{\text{Person per Day}}\right) \times \text{Use Time}\left(\frac{\text{Sec}}{\text{Use}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Min}}\right)$$

$$\text{Water Cost} = \frac{\text{Water Consumption (Gallons)} \times \text{Ave Cost}\left(\frac{\$}{1000\ \text{Gal}}\right)}{1000(\text{Gal})}$$

$$\text{Gas Cost (Therms)} = \text{Faucet Water Consumption (Gallons)} \times \frac{8.34\ \text{BTU}}{\text{Gal}} \times \frac{\text{Therm}}{100{,}000\ \text{BTU}}$$

WATER CONSERVATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Fixtures	Low Flow / Auto Flow Fixtures	-
Total Number of Students	1,292	1,292	-
% Male to Female	50%	50%	-
Estimated % Floor Area Served by Older Bathrooms	100%	100%	-
Occupied Days Per Year	252	252	-
Lavatory Uses per Day per Person	3	3	-
Sink flow time per use, sec	15	12	-
Sink Aerator Flow, GPM	1.5	0.5	-
WC Uses per Day per Person	2.0	2.0	-
Urinal Uses per Day per Person	1.0	1.0	-
Total Urinal Flushes Per Day	646	646	-
Total WC Flushes Per Day	1,292	1,292	-
Urinal Gallons Per Flush (GPF)	1.0	0.125	0.875
WC Gallons Per Flush (GPF)	1.6	1.28	0.32
**** Water Cost ($/1000 Gal)**	$8.00	$8.00	-
Gas Cost ($/Therm)	$1.13	$1.13	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption, Urinal and WC (Gal)	683,726	437,097	246,630
Water Consumption, Faucets (Gal)	366,282	97,675	268,607
Total Water Consumption, (Gal)	1,050,008	534,772	515,237
Water Cost ($)	$8,400	$4,278	$4,122
Gas Consumption (Therms)	1,527	407	1,120
Gas Cost ($/Year)	$1,726	$460	$1,266
COMMENTS:	*Savings are based on LEED Reference Guide for Green Building Design and Construction - 2009 Edition for WC and Urinal water usage. ** Cost of Water estimated.		

The cost for installation and materials of 48 water closets, 12 low flow urinals and 37 new auto flow sink faucets throughout the facility is estimated to be $61,800. There are no Smart Start rebates for installation of low flow plumbing fixtures.

Energy Savings Summary:

ECM #10 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$61,800
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$61,800
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$5,388
Total Yearly Savings ($/Yr):	$5,388
Estimated ECM Lifetime (Yr):	15
Simple Payback	11.5
Simple Lifetime ROI	30.8%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$80,820
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	$2,521.59

V. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

E. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Franklin Township BOE - Franklin Park Elementary School

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrades - Gymnasium	$2,112	$3,168	$1,200	$4,080	$1,274	$0	$1,274	15	$19,110	$0	368.4%	3.2	30.66%	$11,128.93
ECM #2	Lighting Controls	$9,720	$12,780	$2,420	$20,080	$7,428	$0	$7,428	15	$111,420	$0	454.9%	2.7	36.65%	$68,594.98
ECM #3	Condensing Boiler Installation	$103,000	$128,750	$6,000	$225,750	$6,158	$0	$6,158	30	$184,740	$0	-18.2%	36.7	-1.25%	($105,050.48)
ECM #4	NEMA Premium Pump Motors	$3,884	$3,420	$230	$7,074	$108	$0	$108	15	$1,620	$0	-77.1%	65.5	-14.51%	($5,784.70)
ECM #5	NEMA Premium AHU Motors	$5,178	$2,565	$430	$7,313	$1,030	$0	$1,030	15	$15,450	$0	111.3%	7.1	11.23%	$4,983.07
ECM #6	HW Pump VFD	$10,750	$10,750	$0	$21,500	$1,985	$0	$1,985	15	$29,775	$0	38.5%	10.8	4.38%	$2,196.80
ECM #7	CHW Pump VFD	$10,750	$10,750	$0	$21,500	$1,691	$0	$1,691	15	$25,365	$0	18.0%	12.7	2.14%	($1,312.95)
ECM #8	AC Unit Replacement	$56,500	$56,500	$5,281	$107,719	$10,295	$0	$10,295	15	$154,425	$0	43.4%	10.5	4.88%	$15,182.04
ECM #9	Demand Controlled Ventilation	$36,800	$55,200	$0	$92,000	$6,060	$0	$6,060	15	$90,900	$0	-1.2%	15.2	-0.15%	($19,656.11)
ECM #10	Water Conservation	$40,000	$21,800	$0	$61,800	$5,388	$0	$5,388	15	$80,820	$0	30.8%	11.5	3.56%	$2,521.59
ECM #11	Computer Monitor Replacement	$1,900	$0	$0	$1,900	$373	$0	$373	15	$5,595	$0	194.5%	5.1	252159.42%	$0.00

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

APPENDIX B

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

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

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Other Equipment Incentives

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

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Franklin Park School

Building ID: 2818089
For 12-month Period Ending: September 30, 2011[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: January 11, 2012

Facility
Franklin Park School
30 Eden St.
Franklin Park, NJ 08823

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 0
Gross Floor Area (ft²): 99,000

Energy Performance Rating[2] (1-100) 69

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	2,339,463
Electricity - On-Site Solar(kBtu)	303,795
Natural Gas (kBtu)[4]	5,100,017
Total Energy (kBtu)	7,743,275

Energy Intensity[4]

Site (kBtu/ft²/yr)	78
Source (kBtu/ft²/yr)	136

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	646

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	94
National Median Source EUI	164
% Difference from National Median Source EUI	-17%
Building Type	K-12 School

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

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

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

AC Units

Tag	CU-1	CU-2	CU-3
Unit Type	Remote Condenting Unit	Remote Condenting Unit	Remote Condenting Unit
Qty	2	2	1
Location	Roof	Roof	Roof
Area Served	AHU-1	AHU-2	AHU-3
Manufacturer	Trane	Trane	Trane
Model #	TTA048C400A0	TTA048C400A0	TTA120B400BC
Serial #	M395L57BF & M395MHEBF	M395MEKBF & M395MDHBF	M3953E0AH
Cooling Type	D/X, R-22	D/X, R-22	D/X, R-22
Cooling Capacity (Tons)	4.0	4.0	10.0
Cooling Efficiency (SEER/EER)	10	10	8.9
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	14	14	14
ASHRAE Service Life	15	15	15
Remaining Life	1	1	1
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

AC Units

Tag	CU-4	CU-5	CU-6
Unit Type	Remote Condenting Unit	Remote Condenting Unit	Remote Condenting Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	UV-35	UV-36	AHU-8
Manufacturer	Trane	Trane	Trane
Model #	TTB0048A1000AA	TTR048C100A3	TTR025C100A2
Serial #	5275NNPF	M304J49BF	M065TPGAF
Cooling Type	D/X, R-22	D/X, R-22	D/X, R-22
Cooling Capacity (Tons)	4	4.0	2.0
Cooling Efficiency (SEER/EER)	10.0	10.0	10.0
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	6	14	14
ASHRAE Service Life	15	15	15
Remaining Life	9	1	1
Comments			

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

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

AC Units

Tag	CU-7	CU-8	CU-9
Unit Type	Remote Condenting Unit	Remote Condenting Unit	Remote Condenting Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	AHU-9	AHU-5	Ductless SS, SSAC-1
Manufacturer	Trane	Trane	Mitsubishi
Model #	TTB024C100A2	TTA150B400BC	MU09EW
Serial #	Z203W1XBF	M393Y9WAH	-
Cooling Type	D/X, R-22	D/X, R-22	D/X, R-22
Cooling Capacity (Tons)	2.0	12.5	8.8 MBH
Cooling Efficiency (SEER/EER)	10.6	9.3	10.6
Heating Type	N/A	N/A	N/A
Heating Input (MBH)	N/A	N/A	N/A
Efficiency	N/A	N/A	N/A
Fuel	N/A	N/A	N/A
Approx Age	10	14	14
ASHRAE Service Life	15	15	15
Remaining Life	5	1	1
Comments			

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

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

AHUs

Tag	AHU - 1	AHU-2	AHU-3
Unit Type	Indoor air handling unit	Indoor air handling unit	Indoor air handling unit
Qty	1	1	1
Location	Penthouse	Penthouse	Penthouse
Area Served	Admin	Nurses Office	Computer Rm 302
Manufacturer	Trane	Trane	Trane
Model #	MCCA006	MCCA006	MCCA008
Serial #	K97K25510A	K97K25525A	K97K25436A
Fan HP	3	3	3
Cooling Type	D/X	D/X	D/X
Cooling Capacity (MBH)	96.0	89	116
Heating Type	Hot Water	Hot Water	Hot Water
Heating Input (MBH)	136	65	92
Approx Age	14	14	14
ASHRAE Service Life	15	15	15
Remaining Life	1	1	1
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

AHUs

Tag	AHU-4	AHU-5	AHU-6
Unit Type	Indoor air handling unit	Indoor air handling unit	Indoor air handling unit
Qty	1	1	1
Location	Penthouse	Penthouse	Penthouse
Area Served	Cafetorium	Library	Gym North
Manufacturer	Trane	Trane	Trane
Model #	MCCA021	MCCA008	MCCA010
Serial #	K97K24995A	K97K25455A	K97L26154A
Fan HP	7.5	3	1.5
Cooling Type	Chilled Water	D/X	Chilled Water
Cooling Capacity (MBH)	813.0	136.8	132.5
Heating Type	Hot Water	Hot Water	Hot Water
Heating Input (MBH)	918	160	149
Approx Age	14	14	14
ASHRAE Service Life	15	15	15
Remaining Life	1	1	1
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

AHUs

Tag	AHU-7	AHU-8	AHU-9
Unit Type	Indoor air handling unit	Indoor air handling unit	Indoor air handling unit
Qty	1	1	1
Location	Penthouse	Penthouse	Penthouse
Area Served	Gym South	Rm B208	Rm C130
Manufacturer	Trane	Trane	Trane
Model #	MCCA010	TWH018	TWH024B14
Serial #	K97L96167A	-	-
Fan HP	1.5	1/8	1/4
Cooling Type	Chilled Water	D/X	D/X
Cooling Capacity (MBH)	133	17.3	22.6
Heating Type	Hot Water	N/A	N/A
Heating Input (MBH)	149	N/A	N/A
Approx Age	14	14	14
ASHRAE Service Life	15	15	15
Remaining Life	1	1	1
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

Boilers

Tag	Boiler - 1 / 2		
Unit Type	Cast Iron Sectional Boiler		
Qty	2		
Location	Boiler Room		
Area Served	Heating Hot Water Loop		
Manufacturer	H.B Smith		
Model #	GL04500-W-15		
Serial #	-		
Input Capacity (Btu/Hr)	6,300		
Rated Output Capacity (Btu/Hr)	5,014		
Approx. Efficiency %	79.6%		
Fuel	Natural Gas		
Approx Age	14		
ASHRAE Service Life	25		
Remaining Life	11		
Comments	*Boilers operate lead/lag		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

Domestic Water Heaters

Tag	DHW - 1		
Unit Type	Domestic Hot Water Boiler		
Qty	1		
Location	Boiler Room		
Area Served	Domestic Hot Water		
Manufacturer	PVI Industries		
Model #	500 P 250A-TP		
Serial #	49894512		
Size (Gallons)	250		
Input Capacity (MBH/KW)	400 MBH		
Recovery (Gal/Hr)	500		
Efficiency %	83%		
Fuel	Natural Gas		
Approx Age	17		
ASHRAE Service Life	24		
Remaining Life	7		
Comments	Hot water heater is in good condition		

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin Park Elementary School

Pumps

Tag	P - 1 / 2	P - 3/4/5	
Unit Type	Base Mounted Pump	Base Mounted Pump	
Qty	2	3	
Location	Boiler Room	Boiler Room	
Area Served	Heating Hot Water Loop	Chilled Water Loop	
Manufacturer	Armstrong	Armstrong	
Model #	4X3X11.5 4030	4X3X11.5 4030	
Serial #	-	-	
Horse Power	15.0	15.0	
Motor Info	US Electric Motor	US Electric Motor	
Electrical Power	480V/3Ph	480V/3Ph	
RPM	1770	1770	
Motor Efficiency %	91.0%	91.0%	
Approx Age	14	14	
ASHRAE Service Life	20	20	
Remaining Life	6	6	
Comments	*Pumps are constant speed; operate primary/standby	*Pumps are constant speed; Pumps 3&4 are Lead/Lag, P-5 is standby	

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franlin Park Elementary School

Chillers

Tag	CH-1 & 2		
Unit Type	Rotary Air Cooled Chiller w/remote evaporator		
Qty	2		
Location	Roof		
Area Served	Chilled Water Loop		
Manufacturer	Trane		
Model #	RTAA1554XN01A3		
Serial #	U97K06003 & U97K06004		
Refrigerant	R-22		
Cooling Capacity (Tons)	149.5		
Cooling Efficiency (EER)	9.4		
Volts / Phase / Hz	460/3/60		
IPLV	11.5		
Chilled Water GPM	333		
Condenser Water GPM / ΔT	N/A		
Approx Age	14		
ASHRAE Service Life	20		
Remaining Life	6		
Comments	Chillers are in good condition		

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C11035

Project: Franklin Twp. Schools **Franklin Park ES** **KWH COST: $0.173**

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.34	M300A	2600	5	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.29	754.0	$130.44	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 302	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.72	4,472.0	$773.66	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Room 303	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$232.10	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 304	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$232.10	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 305	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$464.19	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 306	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$232.10	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 307	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 308	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 309	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	Classroom 310	2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 311	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 312	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 313	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 314	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Work Room 315	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Boy's Restroom	2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Girl's Restroom	2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Stair 1	3000	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558.0	$96.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		3000	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	558.0	$96.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Stair 2	3000	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558.0	$96.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		3000	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	558.0	$96.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Stair 3	3000	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558.0	$96.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		3000	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	558.0	$96.53	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 401	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$464.19	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S400A	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S400B	1200	4	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	297.6	$51.48	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	VP Office	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1,565.2	$270.78	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	VP Office	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1,565.2	$270.78	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Corridor 300-400	3000	42	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	2.60	7,812.0	$1,351.48	42	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 402	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Restroom 402	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	69.6	$12.04	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 404	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 403	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 403	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	Classroom 405	2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 406	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 407	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 409	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 411	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 413	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 408	2600	11	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.95	2,459.6	$425.51	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	4	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.24	634.4	$109.75	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S400D	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 410	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$464.19	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 207	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 213	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 214	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 215	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 211	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	VP 212	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$232.10	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 210	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.38	3,577.6	$618.92	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 209B	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$464.19	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 208	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 206	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 205	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200D	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.41	Bathroom	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	69.6	$12.04	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Women's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200C	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200B	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 203	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$232.10	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Comms	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$139.44	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Custodial	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200A	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 201	2600	11	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.95	2,459.6	$425.51	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Boy's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Girl's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 111	2600	14	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.20	3,130.4	$541.56	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 109	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.46	3,801.2	$657.61	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 101	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 102	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 103	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 104	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 105	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 106	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 108	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2,012.4	$348.15	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	Classroom 110	2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Speech 107	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$232.10	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 630	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.38	3,577.6	$618.92	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 640	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1,118.0	$193.41	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S650	1200	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	148.8	$25.74	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 510	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$464.19	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Boy's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Girl's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 600	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2,683.2	$464.19	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S830	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	M840	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial	1200	1	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$12.04	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Women's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Men's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	500 Media Center	2600	43	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	3.70	9,614.8	$1,663.36	43	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	6	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.37	951.6	$164.63	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	520 Office	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$154.73	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Stage C117	2600	17	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.05	2,740.4	$474.09	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Cafetorium	2600	2	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.12	317.2	$54.88	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
745		2600	25	1	2x2 250w MH Recessed w/Prismatic Lens	295	7.38	19,175.0	$3,317.28	25	3	2x4 54w T5HO 3 Lamp, Clear Lens	177	4.43	11505	$1,990.37	$220.00	$5,500.00	2.95	7670	$1,326.91	4.14
558		2600	36	1	Recessed Down Light, 90w PAR38 Flood Lamp	90	3.24	8,424.0	$1,457.35	36	1	16w LED PAR38 Dimmable Flood Lamp	16	0.58	1497.6	$259.08	$115.00	$4,140.00	2.66	6926.4	$1,198.27	3.45
221.11	S700	1200	4	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	278.4	$48.16	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Kitchen	2600	19	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.63	4,248.4	$734.97	19	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
617		2600	4	1	Hood Light w/Globe & Cage, 100w A Lamp	100	0.40	1,040.0	$179.92	4	1	26w CFL Lamp	26	0.10	270.4	$46.78	$20.00	$80.00	0.30	769.6	$133.14	0.60
221.31	Boiler Room	3000	15	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2,790.0	$482.67	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	710C Office	2600	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$27.89	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial	1200	1	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$12.04	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Lockers	2600	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$27.89	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	Faculty Dining	2600	6	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.35	904.8	$156.53	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	900 Shipping/Rec.	2600	13	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.81	2,095.6	$362.54	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	920 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$77.37	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	910 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$77.37	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
746	Gym	2600	24	1	250w MV LoBay w/Prismatic Lens	295	7.08	18,408.0	$3,184.58	24	3	2x4 54w T5HO 3 Lamp, Clear Lens	177	4.25	11044.8	$1,910.75	$220.00	$5,280.00	2.83	7363.2	$1,273.83	4.14
221.31	Elec. Room	1200	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.50	595.2	$102.97	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Gen. Room	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.25	297.6	$51.48	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Corridors	3000	94	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	5.83	17,484.0	$3,024.73	94	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
2		2600	34	1	Cove Light, 31w U Lamp, No Lens	33	1.12	2,917.2	$504.68	34	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	Lobby	2600	9	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.55	1,427.4	$246.94	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Nurse	2600	12	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.73	1,903.2	$329.25	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Attendance (3)	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1,565.2	$270.78	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Principal's Office	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$154.73	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	Conf. Room	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.17	452.4	$78.27	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Men's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Women's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Main Office Hall	2600	4	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.24	634.4	$109.75	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	Work Room	2600	4	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.23	603.2	$104.35	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	Main Office	2600	8	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.46	1,206.4	$208.71	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	2	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.12	317.2	$54.88	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Vestibule	3000	2	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.12	366.0	$63.32	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
741	Exterior	4000	4	1	250w HPS Wallpack	295	1.18	4,720.0	$816.56	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
760		4000	10	1	400w MH Pulse Start "Shoebox" Area Light	465	4.65	18,600.0	$3,217.80	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		1,223	421				287,806	$49,791	1,223	8			9.4	24,318	$4,207		$15,000	8.7	22,729	$3,932	3.81

CEG Job #: 9C11035
Project: Franklin Twp. Schools — Franklin Park ES — **KWH COST:** $0.173

Building SF: -

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.34	M300A	2600	5	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.29	754	$130.44	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.23	20%	603.2	$104.35	$150.00	$150.00	0.06	150.8	$26.09	5.75
232.21	Classroom 302	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.72	4472	$773.66	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.38	20%	3577.6	$618.92	$450.00	$450.00	0.34	894.4	$154.73	2.91
232.21	Room 303	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$232.10	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$185.68	$150.00	$150.00	0.10	268.32	$46.42	3.23
232.21	Classroom 304	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$232.10	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$185.68	$150.00	$150.00	0.10	268.32	$46.42	2.89
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 305	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2683.2	$464.19	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$371.35	$300.00	$300.00	0.21	536.64	$92.84	2.74
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 306	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$232.10	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$185.68	$150.00	$150.00	0.10	268.32	$46.42	2.89
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 307	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 308	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 309	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 310	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 311	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 312	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 313	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 314	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Work Room 315	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.99
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
221.41	Boy's Restroom	2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	58	0.17	0%	452.4	$78.27	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	no change	62	0.19	0%	483.6	$83.66	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Girl's Restroom	2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	58	0.17	0%	452.4	$78.27	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	no change	62	0.19	0%	483.6	$83.66	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Stair 1	3000	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558	$96.53	3	0	no change	62	0.19	0%	558	$96.53	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		3000	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	558	$96.53	3	0	no change	62	0.19	0%	558	$96.53	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Stair 2	3000	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558	$96.53	3	0	no change	62	0.19	0%	558	$96.53	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		3000	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	558	$96.53	3	0	no change	62	0.19	0%	558	$96.53	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Stair 3	3000	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558	$96.53	3	0	no change	62	0.19	0%	558	$96.53	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		3000	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.19	558	$96.53	3	0	no change	62	0.19	0%	558	$96.53	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 401	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2683.2	$464.19	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$371.35	$300.00	$300.00	0.21	536.64	$92.84	2.74
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
222.21	S400A	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S400B	1200	4	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.25	297.6	$51.48	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	238.08	$41.19	$150.00	$150.00	0.05	59.52	$10.30	14.57
232.22	VP Office	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1565.2	$270.78	7	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.48	20%	1252.16	$216.62	$150.00	$150.00	0.12	313.04	$54.16	2.77
232.22	VP Office	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1565.2	$270.78	7	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.48	20%	1252.16	$216.62	$150.00	$150.00	0.12	313.04	$54.16	2.77
221.21	Corridor 300-400	3000	42	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	2.60	7812	$1,351.48	42	0	no change	62	2.60	0%	7812	$1,351.48	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 402	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.99
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
221.41	Restroom 402	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	69.6	$12.04	1	0	No Change	58	0.06	0%	69.6	$12.04	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 404	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.99
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 403	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 403	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 405	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 406	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 407	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 409	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 411	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 413	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 408	2600	11	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.95	2459.6	$425.51	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.76	20%	1967.68	$340.41	$300.00	$300.00	0.19	491.92	$85.10	2.80
227.213		2600	4	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.24	634.4	$109.75	4			61	0.20	20%	507.52	$87.80			0.05	126.88	$21.95	
222.21	S400D	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 410	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2683.2	$464.19	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$371.35	$300.00	$300.00	0.21	536.64	$92.84	2.74
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 207	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 213	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 214	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 215	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 211	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	Classroom 211	2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3	1	Sensor - Remote Mnt.	61	0.15	20%	380.64	$65.85	$300.00	$300.00	0.04	95.16	$16.46	3.46
232.21	VP 212	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$232.10	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$185.68	$150.00	$150.00	0.10	268.32	$46.42	3.23
232.21	Classroom 210	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.38	3577.6	$618.92	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	2862.08	$495.14	$300.00	$300.00	0.28	715.52	$123.78	2.32
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 209B	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2683.2	$464.19	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$371.35	$300.00	$300.00	0.21	536.64	$92.84	3.23
232.21	Classroom 208	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	4.01
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1			58	0.05	20%	120.64	$20.87			0.01	30.16	$5.22	
232.21	Classroom 206	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	4.01
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1			58	0.05	20%	120.64	$20.87			0.01	30.16	$5.22	
232.21	Classroom 205	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	4.01
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1			58	0.05	20%	120.64	$20.87			0.01	30.16	$5.22	
222.21	S200D	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Bathroom	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	69.6	$12.04	1	0	No Change	58	0.06	0%	69.6	$12.04	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Women's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	58	0.06	0%	150.8	$26.09	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200C	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200B	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 203	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$232.10	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$185.68	$300.00	$300.00	0.10	268.32	$46.42	5.78
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
222.21	Comms	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$139.44	5	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.25	20%	644.8	$111.55	$300.00	$300.00	0.06	161.2	$27.89	8.99
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
222.21	Custodial	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	S200A	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 201	2600	11	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.95	2459.6	$425.51	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.76	20%	1967.68	$340.41	$300.00	$300.00	0.19	491.92	$85.10	3.13
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1			58	0.05	20%	120.64	$20.87			0.01	30.16	$5.22	
222.21	Boy's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	no change	62	0.19	0%	483.6	$83.66	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	58	0.17	0%	452.4	$78.27	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Girl's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	no change	62	0.19	0%	483.6	$83.66	$0.00	$0.00	0.00	0	$0.00	0.00
221.41		2600	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	452.4	$78.27	3	0	No Change	58	0.17	0%	452.4	$78.27	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 111	2600	14	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.20	3130.4	$541.56	14	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.96	20%	2504.32	$433.25	$300.00	$300.00	0.24	626.08	$108.31	2.64
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
221.41		2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	58	0.06	0%	150.8	$26.09	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 109	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.46	3801.2	$657.61	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.17	20%	3040.96	$526.09	$300.00	$300.00	0.29	760.24	$131.52	2.19
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 101	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 102	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 103	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 104	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 105	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 106	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Classroom 108	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Classroom 110	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.77	2012.4	$348.15	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$278.52	$300.00	$300.00	0.15	402.48	$69.63	3.48
227.213		2600	3	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.18	475.8	$82.31	3			61	0.15	20%	380.64	$65.85			0.04	95.16	$16.46	
232.21	Speech 107	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$232.10	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$185.68	$300.00	$300.00	0.10	268.32	$46.42	5.78
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 630	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.38	3577.6	$618.92	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	2862.08	$495.14	$300.00	$300.00	0.28	715.52	$123.78	2.32
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
232.21	Classroom 640	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1118	$193.41	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.34	20%	894.4	$154.73	$150.00	$150.00	0.09	223.6	$38.68	3.40
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$27.44	1			61	0.05	20%	126.88	$21.95			0.01	31.72	$5.49	
222.21	S650	1200	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	148.8	$25.74	2	0	No Change	62	0.12	0%	148.8	$25.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 510	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2683.2	$464.19	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$371.35	$300.00	$300.00	0.21	536.64	$92.84	3.23
222.21	Boy's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	no change	62	0.19	0%	483.6	$83.66	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Girl's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$83.66	3	0	no change	62	0.19	0%	483.6	$83.66	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom 600	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.03	2683.2	$464.19	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.83	20%	2146.56	$371.35	$300.00	$300.00	0.21	536.64	$92.84	3.23
222.21	S830	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	M840	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$12.87	1	0	No Change	62	0.06	0%	74.4	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial	1200	1	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$12.04	1	0	No Change	58	0.06	0%	69.6	$12.04	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.41	Women's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	58	0.06	0%	150.8	$26.09	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Men's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	58	0.06	0%	150.8	$26.09	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	500 Media Center	2600	43	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	3.70	9614.8	$1,663.36	43	2	Dual Technology Occupancy Sensor - Remote Mnt.	86	2.96	20%	7691.84	$1,330.69	$300.00	$600.00	0.74	1922.96	$332.67	1.80
227.213		2600	6	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.37	951.6	$164.63	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	61	0.29	20%	761.28	$131.70	$300.00	$300.00	0.07	190.32	$32.93	9.11
232.22	520 Office	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$154.73	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$123.78	$150.00	$150.00	0.07	178.88	$30.95	4.85
221.31	Stage C117	2600	17	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	1.05	2740.4	$474.09	17	0	no change	62	1.05	0%	2740.4	$474.09	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Cafetorium	2600	2	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.12	317.2	$54.88	2	0	No Change	61	0.12	0%	317.2	$54.88	$0.00	$0.00	0.00	0	$0.00	0.00
745		2600	25	1	2x2 250w MH Recessed w/Prismatic Lens	295	7.38	19175	$3,317.28	25	2	Dual Technology Occupancy Sensor - Remote Mnt.	295	5.90	20%	15340	$2,653.82	$300.00	$600.00	1.48	3835	$663.46	0.90
558		2600	36	1	Recessed Down Light, 90w PAR38 Flood Lamp	90	3.24	8424	$1,457.35	36	2	Dual Technology Occupancy Sensor - Remote Mnt.	90	2.59	20%	6739.2	$1,165.88	$300.00	$600.00	0.65	1684.8	$291.47	2.06
221.11	S700	1200	4	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.23	278.4	$48.16	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	222.72	$38.53	$150.00	$150.00	0.05	55.68	$9.63	15.57
232.21	Kitchen	2600	19	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.63	4248.4	$734.97	19	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.31	20%	3398.72	$587.98	$300.00	$300.00	0.33	849.68	$146.99	2.04
617		2600	4	1	Hood Light w/Globe & Cage, 100w A Lamp	100	0.40	1040	$179.92	4	0	no change	100	0.40	0%	1040	$179.92	$0.00	$0.00	0.00	0	$0.00	0.00
221.31	Boiler Room	3000	15	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.93	2790	$482.67	15	0	no change	62	0.93	0%	2790	$482.67	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	710C Office	2600	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$27.89	1	0	No Change	62	0.06	0%	161.2	$27.89	$0.00	$0.00	0.00	0	$0.00	0.00
221.11	Custodial	1200	1	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.06	69.6	$12.04	1	0	No Change	58	0.06	0%	69.6	$12.04	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Lockers	2600	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	161.2	$27.89	1	0	No Change	62	0.06	0%	161.2	$27.89	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.22	Faculty Dining	2600	6	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.35	904.8	$156.53	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.28	20%	723.84	$125.22	$150.00	$150.00	0.07	180.96	$31.31	4.79
221.31	900 Shipping/Rec.	2600	13	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.81	2095.6	$362.54	13	1	Dual Technology Occupancy Sensor - Remote Mnt.	62	0.64	20%	1676.48	$290.03	$300.00	$300.00	0.16	419.12	$72.51	4.14
232.21	920 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$77.37	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.14	20%	357.76	$61.89	$150.00	$150.00	0.03	89.44	$15.47	9.69
232.21	910 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$77.37	2	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.14	20%	357.76	$61.89	$150.00	$150.00	0.03	89.44	$15.47	9.69
746	Gym	2600	24	1	250w MV LoBay w/Prismatic Lens	295	7.08	18408	$3,184.58	24	3	Dual Technology Occupancy Sensor - Remote Mnt.	295	5.66	20%	14726.4	$2,547.67	$300.00	$900.00	1.42	3681.6	$636.92	1.41
221.31	Elec. Room	1200	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.50	595.2	$102.97	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.40	20%	476.16	$82.38	$150.00	$150.00	0.10	119.04	$20.59	7.28
221.31	Gen. Room	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	62	0.25	297.6	$51.48	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.20	20%	238.08	$41.19	$150.00	$150.00	0.05	59.52	$10.30	14.57
222.21	Corridors	3000	94	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	5.83	17484	$3,024.73	94	0	no change	62	5.83	0%	17484	$3,024.73	$0.00	$0.00	0.00	0	$0.00	0.00
2	Lobby	2600	34	1	Cove Light, 31w U Lamp, No Lens	33	1.12	2917.2	$504.68	34	0	no change	33	1.12	0%	2917.2	$504.68	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	9	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.55	1427.4	$246.94	9	0	no change	61	0.55	0%	1427.4	$246.94	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Nurse	2600	12	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.73	1903.2	$329.25	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	61	0.59	20%	1522.56	$263.40	$300.00	$300.00	0.15	380.64	$65.85	4.56
232.22	Attendance (3)	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1565.2	$270.78	7	0	no change	86	0.60	0%	1565.2	$270.78	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Principal's Office	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$154.73	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$123.78	$150.00	$150.00	0.07	178.88	$30.95	4.85
222.22	Conf. Room	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.17	452.4	$78.27	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.14	20%	361.92	$62.61	$150.00	$150.00	0.03	90.48	$15.65	9.58
221.41	Men's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	58	0.06	0%	150.8	$26.09	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Women's Restroom	2600	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.06	150.8	$26.09	1	0	No Change	58	0.06	0%	150.8	$26.09	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #2: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	Main Office Hall	2600	4	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.24	634.4	$109.75	4	0	no change	61	0.24	0%	634.4	$109.75	$0.00	$0.00	0.00	0	$0.00	0.00
222.22	Work Room	2600	4	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.23	603.2	$104.35	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$83.48	$150.00	$150.00	0.05	120.64	$20.87	7.19
222.22	Main Office	2600	8	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	58	0.46	1206.4	$208.71	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.37	20%	965.12	$166.97	$300.00	$300.00	0.09	241.28	$41.74	7.19
227.213		2600	2	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.12	317.2	$54.88	2	0	No Change	61	0.12	0%	317.2	$54.88	$0.00	$0.00	0.00	0	$0.00	0.00
227.213	Vestibule	3000	2	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.12	366	$63.32	2	0	No Change	61	0.12	0%	366	$63.32	$0.00	$0.00	0.00	0	$0.00	0.00
741	Exterior	4000	4	1	250w HPS Wallpack	295	1.18	4720	$816.56	4	0	no change	295	1.18	0%	4720	$816.56	$0.00	$0.00	0.00	0	$0.00	0.00
760		4000	10	1	400w MH Pulse Start "Shoebox" Area Light	465	4.65	18600	$3,217.80	10	0	no change	465	4.65	0%	18600	$3,217.80	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		1,223	421			107.1	287,806.4	$49,791	1,223	84			90.4		244,868.0	$42,362.16		$22,500	16.65	42,938	$7,428	3.03

FRANKLIN HIGH SCHOOL

500 ELIZABETH AVENUE
SOMERSET, NJ 08873

FACILITY ENERGY REPORT

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I. HISTORIC ENERGY CONSUMPTION/COST

The energy usage for the facility has been tabulated and plotted in graph form as depicted within this section. Each energy source has been identified and monthly consumption and cost noted per the information provided by the Owner.

Electric Utility Provider:	Public Service Electric & Gas
Electric Utility Rate Structure:	General Lighting & Power (GLP)
Third Party Supplier:	GDF Suez

Natural Gas Utility Provider:	Public Service Electric & Gas
Utility Rate Structure:	Large Volume Gas (LVG)
Third Party Supplier:	Hess

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

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

Table 1
Electricity Billing Data

ELECTRIC USAGE SUMMARY

Utility Provider: PSE&G
Rate: GLP
Meter No: 778018643
Account # 4200869004
Third Party Utility GDF Suez
TPS Meter / Acct No: -

MONTH OF USE	CONSUMPTION KWH	DEMAND KW	TOTAL BILL
Aug-10	377,079	1434.0	$67,000
Sep-10	395,071	1475.9	$57,875
Oct-10	323,739	1020.6	$46,798
Nov-10	332,072	758.0	$47,095
Dec-10	371,200	819.5	$53,407
Jan-11	345,160	819.5	$48,311
Feb-11	365,557	815.3	$50,964
Mar-11	337,191	789.5	$47,245
Apr-11	295,814	982.0	$39,382
May-11	356,402	1610.0	$61,937
Jun-11	413,140	1693.3	$69,876
Jul-11	389,453	1299.6	$63,666
Totals	**4,301,878**	**1693.3 Max**	**$653,557**

AVERAGE DEMAND 1126.4 KW average

AVERAGE RATE $0.152 $/kWh

Figure 1
Electricity Usage Profile

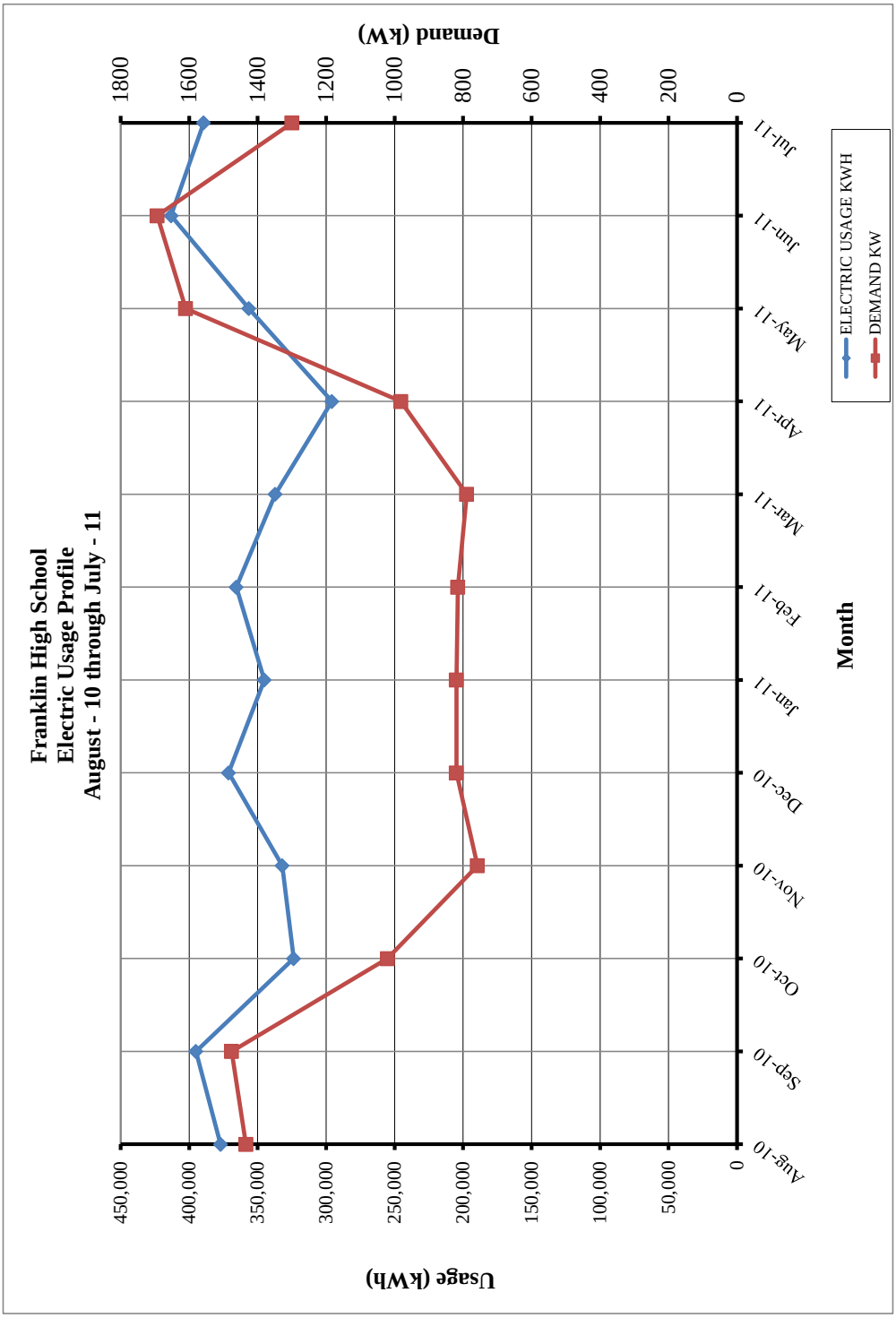
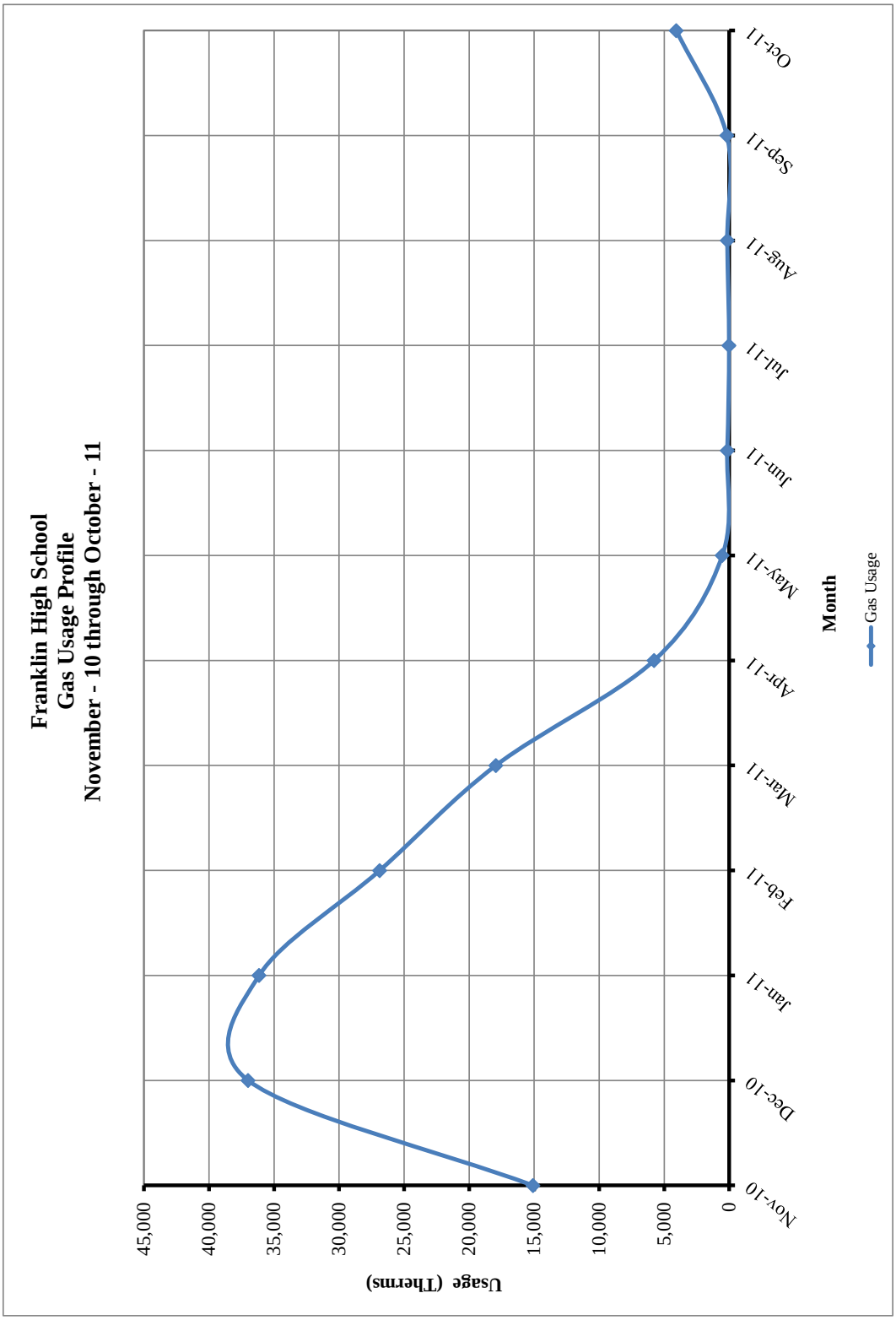


Table 2
Natural Gas Billing Data

NATURAL GAS USAGE SUMMARY		
Utility Provider:	PSE&G	
Rate:	BGSS	
Meter No:	2809039	
Point of Delivery ID:	4200869004	
Third Party Utility Provider:	Hess	
TPS Meter No:	-	
MONTH OF USE	**CONSUMPTION (THERMS)**	**TOTAL BILL**
Nov-10	15,087.80	$17,023.15
Dec-10	36,983.60	$41,195.29
Jan-11	36,140.50	$40,911.07
Feb-11	26,873.10	$31,615.20
Mar-11	17,943.10	$16,402.34
Apr-11	5,774.90	$5,344.53
May-11	530.40	$599.48
Jun-11	147.90	$237.13
Jul-11	8.40	$106.11
Aug-11	147.90	$239.76
Sep-11	180.90	$271.00
Oct-11	4,070.80	$8,824.01
TOTALS	**143,889.30**	**$162,769.07**
AVERAGE RATE:	**$1.13**	**$/THERM**

Figure 2
Natural Gas Usage Profile



II. FACILITY DESCRIPTION

Franklin High School is located at 500 Elizabeth Avenue in Somerset, New Jersey. The 343,000 SF high school was constructed in 2005 with no additions. The school is three stories consisting of classrooms, cafeteria, gymnasium, auditorium, library, laboratories and administrative offices.

Occupancy Profile

The school is occupied for approximately 60 hours per week during the school months (September to June). The school has approximately 350 employees and approximately 2050 students.

Building Envelope

Exterior walls for the school are 4" brick face with an 8" concrete block construction. The amount of insulation within the walls could not be determined. The windows are clear ¼" double pane with aluminum insulated frames. Blinds are also utilized throughout the facility. The blinds are valuable because they help reduce the heat loss in the winter and reduce solar heat gain in the summer. The roof is a flat, EPDM rubber roof on a steel deck. The roof is in good condition. The amount of insulation below the roofing is unknown.

HVAC Systems

The high school HVAC system consists of hot water boilers, air cooled chillers, a two pipe hydronic system that is used for both heating to cooling, packaged rooftop air handling units and classroom unit ventilators.

Heating is provided via four (4) Fulton Pulse PHW2000 condensing boilers. Each boiler, as noted on the boiler certificate, has an input rating of 1,800 MBH and an output of 1,086 MBH. Based on recent combustion testing, these boilers are operating with an efficiency of approximately 88.2%. These boilers serve the hot water coils in the classroom unit ventilators. The hot water is circulated through the building via two (2) 50-HP constant speed pumps rated for 1200 GPM each. These pumps operate in primary/standby mode, meaning only one pump runs at a time to satisfy the building load. These pumps are also equipped with variable frequency drives (VFD) to vary the flow of the pump based on actual building load.

Cooling is provided by two Aaon, outdoor air cooled chillers located at grade adjacent to the school. Each chiller is rated for 255 Tons. These chillers serve the chilled water coils within the classroom unit ventilators throughout the school. The chilled water is circulated to the coils via the same pumps that circulate the heating hot water. There is a freeze protection pump that is connected to the chillers that circulates water through the evaporator when the outside air temperature drops below 40 degrees.

There are a total of twenty one (21) packaged rooftop air conditioning units, manufactured by Aaon. These units are all equipped with natural gas fired heating sections and D/X cooling, with the exception of the unit that serves the Locker Rooms. The units serve the following spaces: the Auditorium, Stage and Orchestra Pit, Main Gymnasium, Locker Rooms, Cafeteria, Event Lobby,

Weight Room, Wrestling Gym, Auxiliary Gym, Library/Media Center, Main offices, Kitchen Offices, P.E. Offices and all corridors and toilet rooms.

Eight (8) of the rooftop units are equipped with heat pipe energy recovery sections. The areas that utilize energy recovery are the Auditorium, Main Gymnasium, Locker Rooms, Cafeteria and the Event Lobby. These units utilize the heat, or energy, recovered from the exhaust air to preheat the incoming outdoor air during heating season and use the conditioned indoor air that is being exhausted to remove heat from the outdoor air during cooling season.

The classrooms are served by Trane unit ventilators. Each unit ventilator has a single hydronic coil that is used for both heating and cooling. Each unit is equipped with a supply fan, face and bypass dampers and 2-way control valve.

The entry areas and stair wells of the building are heated via ceiling and wall mounted hot water cabinet unit heaters.

Exhaust System

Air is exhausted from the toilet rooms, labs, janitor's closets and electrical closets through roof exhausters. The exhaust fans are interlocked with the air handling unit/unit ventilator that supplies air to the space and run when the corresponding unit is energized.

HVAC System Controls

The HVAC systems within the school are controlled via DDC controls. All of the classroom unit ventilators, penthouse air handling units, the boilers, chillers and pumps are all monitored and controlled via the DDC system. The equipment runs on a set schedule, typically from 6:30 am to 8:00 pm.

Domestic Hot Water

Domestic hot water for the school is provided by two (2) Fulton Pulse condensing boilers. These boilers have the same capacity as the four (4) heating boilers. Domestic hot water is then generated by a plate and frame heat exchanger, located in the mechanical room. The domestic hot water is circulated throughout the building via two (2) 2 HP base mounted pumps.

Lighting

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

III. MAJOR EQUIPMENT LIST

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

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

IV. ENERGY CONSERVATION MEASURES

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

Table 1
ECM Financial Summary

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Lighting Upgrades - Gym Areas	$6,008	$2,896	2.1	623.0%
ECM #2	Lighting Upgrades - Cafeteria	$2,336	$877	2.7	463.1%
ECM #3	Lighting Upgrades - Auditorium	$8,460	$1,903	4.4	237.4%
ECM #4	Lighting Controls	$59,555	$18,833	3.2	374.3%
ECM #5	NEMA Premium Pump Motors	$20,921	$329	63.6	-76.4%
ECM #6	Retro Commissioning	$102,900	$43,436	2.4	533.2%
ECM #7	Water Conservation	$107,736	$10,008	10.8	39.3%
ECM #8	Computer Monitor Replacement	$28,100	$4,844	5.8	158.6%

Notes: A. Cost takes into consideration applicable NJ Smart StartTM incentives.
B. Savings takes into consideration applicable maintenance savings.

Table 2
ECM Energy Summary

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Lighting Upgrades - Gym Areas	7.3	19,053	-
ECM #2	Lighting Upgrades - Cafeteria	2.2	5,772	-
ECM #3	Lighting Upgrades - Auditorium	7.0	12,521	-
ECM #4	Lighting Controls	48.0	123,898	-
ECM #5	NEMA Premium Pump Motors	1.3	2,165	-
ECM #6	Retro Commissioning	-	232,570	7,155
ECM #7	Water Conservation	-	-	2,081
ECM #8	Computer Monitor Replacement	-	31,865	-

Table 3
Facility Project Summary

ENERGY SAVINGS IMPROVEMENT PROGRAM - POTENTIAL PROJECT					
ENERGY CONSERVATION MEASURES	**ANNUAL ENERGY SAVINGS ($)**	**PROJECT COST ($)**	**SMART START INCENTIVES**	**CUSTOMER COST**	**SIMPLE PAYBACK**
Lighting Upgrades - Gym Areas	$2,896	$7,608	$1,600	$6,008	2.1
Lighting Upgrades - Cafeteria	$877	$3,300	$964	$2,336	2.7
Lighting Upgrades - Auditorium	$1,903	$10,340	$1,880	$8,460	4.4
Lighting Controls	$18,833	$66,000	$6,445	$59,555	3.2
NEMA Premium Pump Motors	$329	$21,461	$540	$20,921	63.6
Retro Commissioning	$43,436	$102,900	$0	$102,900	2.4
Water Conservation	$10,008	$107,736	$0	$107,736	10.8
Computer Monitor Replacement	$4,844	$28,100	$0	$28,100	5.8
Design / Construction Extras (15%)		$52,117		*$52,117*	
Total Project	**$83,126**	**$399,562**	**$11,429**	**$388,133**	**4.7**

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

ECM #1: Lighting Upgrade - Gymnasium

Description:

The Auxiliary Gymnasium, Weight Room and Wrestling Gym at Franklin High School are currently lit via thirty two (32) HID, 400W, Metal Halide fixtures. The spaces would be better served with a more efficient, fluorescent lighting system. Concord recommends upgrading the lighting to an energy-efficient T-5 lighting system that includes new lighting fixtures with high efficiency, electronic ballasts and T-5 high output (HO) lamps.

This measure replaces all the HID, 400 W HID MH fixtures with a well-designed T-5 lighting system. Thirty Two (32), 4-lamp T5HO high bay fixtures with reflectors and high-efficiency, electronic ballasts will be required in order to meet the mandated 50 foot-candle average within the spaces.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix – ECM#1** that outlines the proposed retrofits, costs, savings, and payback periods.

From the **Smart Start Incentive Appendix**, the replacement of a 400 W HID fixture to a T-5 or T-8 fixture warrants the following incentive: $50 per fixture.

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ fixtures \times\ \$50) = (32 \times \$50) = \underline{\$1{,}600}$$

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$7,608
NJ Smart Start Equipment Incentive ($):	$1,600
Net Installation Cost ($):	$6,008
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$2,896
Total Yearly Savings ($/Yr):	$2,896
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.1
Simple Lifetime ROI	623.0%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$43,440
Internal Rate of Return (IRR)	48%
Net Present Value (NPV)	$28,564.26

ECM #2: Lighting Upgrade - Cafeteria

Description:

The Cafeteria at Franklin High School is currently lit via fifty two (52), pendant mounted 100 W A19 incandescent lamps and thirty (30) recessed, 90 W PAR38 incandescent lamps. Concord recommends upgrading the lighting to an energy-efficient system that includes new high efficiency lamps.

This measure replaces all of the 100 W A19 lamps with 26 W Compact Fluorescent lamps (CFL). This measure also replaces all of the 90 W PAR38 lamps with a 16 W LED, dimmable PAR38 lamp.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix – ECM#1** that outlines the proposed retrofits, costs, savings, and payback periods.

From the **Smart Start Incentive Appendix**, the replacement of an incandescent bulb with a PAR38 CFL bulb: $7 per bulb.

$$\text{Smart Start®}\ \textit{Incentive} = (\#\ \textit{of lamps} \times\ \$7) = (52 \times \$7) = \underline{\$364}$$

From the **Smart Start Incentive Appendix**, the replacement of an incandescent PAR38 incandescent bulb with a PAR38 LED bulb: $20 per bulb

$$\text{Smart Start®}\ \textit{Incentive} = (\#\ \textit{of lamps} \times\ \$20) = (30 \times \$20) = \underline{\$600}$$

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$3,300
NJ Smart Start Equipment Incentive ($):	$964
Net Installation Cost ($):	$2,336
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$877
Total Yearly Savings ($/Yr):	$877
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.7
Simple Lifetime ROI	463.1%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$13,155
Internal Rate of Return (IRR)	37%
Net Present Value (NPV)	$8,133.57

ECM #3: Lighting Upgrade - Auditorium

Description:

The Auditorium at Franklin High School is currently lit via ninety four (94) recessed 90 W PAR38 incandescent flood lamps. The space would be better served with more efficient, dimmable LED lights. Concord recommends upgrading the lighting to an energy-efficient system that includes new high efficiency lamps.

This measure replaces all of the 90 W PAR38 incandescent flood lamps with a 16 W LED, dimmable PAR38 lamps.

Energy Savings Calculations:

A detailed Investment Grade Lighting Audit can be found in **Investment Grade Lighting Audit Appendix – ECM#1** that outlines the proposed retrofits, costs, savings, and payback periods.

From the **Smart Start Incentive Appendix**, the replacement of an incandescent PAR38 incandescent bulb with a PAR38 LED bulb: $20 per bulb

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ lamps \times\ \$20) = (94 \times \$20) = \underline{\$1{,}880}$$

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$10,340
NJ Smart Start Equipment Incentive ($):	$1,880
Net Installation Cost ($):	$8,460
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,903
Total Yearly Savings ($/Yr):	$1,903
Estimated ECM Lifetime (Yr):	15
Simple Payback	4.4
Simple Lifetime ROI	237.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$28,545
Internal Rate of Return (IRR)	21%
Net Present Value (NPV)	$14,257.89

ECM #4: Lighting Controls Upgrade – Occupancy Sensors

Description:

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

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

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

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

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

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

Energy Savings Calculations:

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

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

Rebates and Incentives:

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

Smart Start Incentive
$= (\#\ \text{Wall mount sensors} \times \$20\ \text{per sensor})$
$+ (\#\ \text{Ceiling mount sensors} \times \$35\ \text{per sensor})$

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$66,000
NJ Smart Start Equipment Incentive ($):	$6,445
Net Installation Cost ($):	$59,555
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$18,833
Total Yearly Savings ($/Yr):	$18,833
Estimated ECM Lifetime (Yr):	15
Simple Payback	3.2
Simple Lifetime ROI	374.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$282,495
Internal Rate of Return (IRR)	31%
Net Present Value (NPV)	$165,272.13

ECM #5: 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 50 horsepower electric motors driving the main system pumps, the two (2) 2 horsepower electric motors that drive the domestic hot water pumps and the 3 horsepower electrical motor that drives the chiller freeze protection pump are ideal candidates for replacement with NEMA 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**
C&HWP-1	Chilled and Hot Water Loop	50	1,600	93.0%	94.5%
C&HWP-2	Chilled and Hot Water Loop	50	1,600	93.0%	94.5%
DHWP-1	Domestic Hot Water Pumps	2	1,600	84.0%	86.5%
DHWP-2	Domestic Hot Water Pumps	2	1,600	84.0%	86.5%
FP-1	Chiller Freeze Protection	3	2,200	86.5%	89.5%

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**
C&HWP-1	50	90%	93.0%	94.5%	0.57	922	$140
C&HWP-2	50	90%	93.0%	94.5%	0.57	922	$140
DHWP-1	2	90%	84.0%	86.5%	0.05	74	$11
DHWP-2	2	90%	84.0%	86.5%	0.05	74	$11
FP-1	3	90%	86.5%	89.5%	0.08	173	$26
TOTAL					**1.3**	**2,164.6**	**$329.0**

Equipment Cost and Incentives

Below is a summary of Smart Start Building® incentives for premium efficiency motors:

INCENTIVES	
HORSE POWER	**NJ SMART START INCENTIVE**
1	$50
1.5	$50
2	$60
3	$60
5	$60
7.5	$90
10	$100
15	$115
20	$125
25	$130

The following table outlines the summary of motor replacement costs and incentives:

MOTOR REPLACEMENT SUMMARY						
EQMT ID	**MOTOR POWER HP**	**INSTALLED COST**	**SMART START INCENTIVE**	**NET COST**	**TOTAL SAVINGS**	**SIMPLE PAYBACK**
C&HWP-1	50	$9,338	$180	$9,158	$140	65.4
C&HWP-2	50	$9,338	$180	$9,158	$140	65.4
DHWP-1	2	$868	$60	$808	$11	71.5
DHWP-2	2	$868	$60	$808	$11	71.5
FP-1	3	$1,049	$60	$989	$26	37.7
TOTAL	**Totals:**	**$21,461**	**$540**	**$20,921**	**$329**	**63.6**

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$21,461
NJ Smart Start Equipment Incentive ($):	$540
Net Installation Cost ($):	$20,921
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$329
Total Yearly Savings ($/Yr):	$329
Estimated ECM Lifetime (Yr):	15
Simple Payback	63.6
Simple Lifetime ROI	-76.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$4,935
Internal Rate of Return (IRR)	-14%
Net Present Value (NPV)	($16,993.42)

ECM #6: Retro Commissioning

Description:

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

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

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

Energy Savings Calculations:

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

RETRO COMMISSIONING CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing System Operation	Improved Operation from Retro Cx	
Energy Savings, Nat. Gas	-	5%	
Energy Savings, Electricity	-	5%	
Gas Cost ($/Therm)	*$1.13*	*$1.13*	
Electricity Cost ($/kWh)	*$0.152*	*$0.152*	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Natural Gas Usage (Therms)	143,102	135,947	7,155
Electricity Usage (kWh)	4,651,400	4,418,830	232,570
Natural Gas Cost ($)	$161,705	$153,620	$8,085
Electricity Cost ($)	$707,013	$671,662	$35,351
Total Energy Cost ($)	$868,718	$825,282	$43,436
COMMENTS:			

Estimated Cost of Retro-Commissioning = $0.30 x 343,000 SF = $102,900

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

Energy Savings Summary:

ECM #6 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$102,900
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$102,900
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$43,436
Total Yearly Savings ($/Yr):	$43,436
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.4
Simple Lifetime ROI	533.2%
Simple Lifetime Maintenance Savings	0
Simple Lifetime Savings	$651,540
Internal Rate of Return (IRR)	42%
Net Present Value (NPV)	$415,636.15

ECM #7: Water Conservation

Description:

The facility utilizes standard plumbing fixtures. The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

This ECM includes the replacement of the existing sink faucets, water closets and urinals within the bathrooms of the school. The estimated usage of the plumbing fixtures is based on the total population of the facility. The number of plumbing fixtures to be replaced is based on site survey of the facilities.

The proposed retrofit includes installation of auto flow sink faucets, low flow aerators, low flow flushometer style water closets that utilize 1.28 gallons per flush and ultra-low flushometer style urinals that utilize 1/8 gallons per flush. For the basis of this calculation the LEED rating system was used to estimate the occupancy usage for students within the school. When water consumption information was not available, the GPF values were estimated for the existing fixtures.

Energy Savings Calculations:

Urinals and Toilets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Flush}}{\text{Person per Day}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Flush}}\right)$$

Faucets:

$$\text{Water Consumption} = \text{Occupancy}\left(\frac{\text{Days}}{\text{Yr}}\right) \times \text{Use}\left(\frac{\text{Use}}{\text{Person per Day}}\right) \times \text{Use Time}\left(\frac{\text{Sec}}{\text{Use}}\right) \times \text{Fixture}\left(\frac{\text{Gal}}{\text{Min}}\right)$$

$$\text{Water Cost} = \frac{\text{Water Consumption (Gallons)} \times \text{Ave Cost}\left(\frac{\$}{1000\ \text{Gal}}\right)}{1000(\text{Gal})}$$

$$\text{Gas Cost (Therms)} = \text{Faucet Water Consumption (Gallons)} \times \frac{8.34\ \text{BTU}}{\text{Gal}} \times \frac{\text{Therm}}{100{,}000\ \text{BTU}}$$

WATER CONSERVATION CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	Existing Fixtures	Low Flow / Auto Flow Fixtures	-
Total Number of Students	2,400	2,400	-
% Male to Female	50%	50%	-
Estimated % Floor Area Served by Older Bathrooms	100%	100%	-
Occupied Days Per Year	252	252	-
Lavatory Uses per Day per Person	3	3	-
Sink flow time per use, sec	15	12	-
Sink Aerator Flow, GPM	1.5	0.5	-
WC Uses per Day per Person	2.0	2.0	-
Urinal Uses per Day per Person	1.0	1.0	-
Total Urinal Flushes Per Day	1,200	1,200	-
Total WC Flushes Per Day	2,400	2,400	-
Urinal Gallons Per Flush (GPF)	1.0	0.125	0.875
WC Gallons Per Flush (GPF)	1.6	1.28	0.32
**** Water Cost ($/1000 Gal)**	$8.00	$8.00	-
Gas Cost ($/Therm)	$1.13	$1.13	-
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Water Consumption, Urinal and WC (Gal)	1,270,080	811,944	458,136
Water Consumption, Faucets (Gal)	680,400	181,440	498,960
Total Water Consumption, (Gal)	1,950,480	993,384	957,096
Water Cost ($)	$15,604	$7,947	$7,657
Gas Consumption (Therms)	2,837	757	2,081
Gas Cost ($/Year)	$3,206	$855	$2,351
COMMENTS:	*Savings are based on LEED Reference Guide for Green Building Design and Construction - 2009 Edition for WC and Urinal water usage. ** Cost of Water estimated.		

The cost for installation and materials of 70 water closets, 20 low flow urinals and 40 new auto flow sink faucets throughout the facility is estimated to be $107,736. There are no Smart Start rebates for installation of low flow plumbing fixtures.

Energy Savings Summary:

ECM #7 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$107,736
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$107,736
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$10,008
Total Yearly Savings ($/Yr):	$10,008
Estimated ECM Lifetime (Yr):	15
Simple Payback	10.8
Simple Lifetime ROI	39.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$150,120
Internal Rate of Return (IRR)	4%
Net Present Value (NPV)	$11,738.85

V. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output.

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

E. Turn off computers when not in use. Ensure computers are not running in screen saver mode which saves the monitor screen not energy.

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

APPENDIX A

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Franklin Township BOE - Franklin High School

ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM #1	Lighting Upgrades - Gym Areas	$3,000	$4,608	$1,600	$6,008	$2,896	$0	$2,896	15	$43,440	$0	623.0%	2.1	48.07%	$28,564.26
ECM #2	Lighting Upgrades - Cafeteria	$1,320	$1,980	$964	$2,336	$877	$0	$877	15	$13,155	$0	463.1%	2.7	37.22%	$8,133.57
ECM #3	Lighting Upgrades - Auditorium	$4,136	$6,204	$1,880	$8,460	$1,903	$0	$1,903	15	$28,545	$0	237.4%	4.4	21.24%	$14,257.89
ECM #4	Lighting Controls	$26,400	$39,600	$6,445	$59,555	$18,833	$0	$18,833	15	$282,495	$0	374.3%	3.2	31.08%	$165,272.13
ECM #5	NEMA Premium Pump Motors	$11,543	$9,918	$540	$20,921	$329	$0	$329	15	$4,935	$0	-76.4%	63.6	-14.27%	($16,993.42)
ECM #6	Retro Commissioning	$0	$102,900	$0	$102,900	$43,436	$0	$43,436	15	$651,540	$0	533.2%	2.4	41.99%	$415,636.15
ECM #7	Water Conservation	$64,642	$43,094	$0	$107,736	$10,008	$0	$10,008	15	$150,120	$0	39.3%	10.8	4.47%	$11,738.85
ECM #8	Computer Monitor Replacement	$28,100	$0	$0	$28,100	$4,844	$0	$4,844	15	$72,660	$0	158.6%	5.8	15.17%	$29,727.36

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

APPENDIX B

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

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

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Gas Heating

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

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2007

Variable Frequency Drives

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

Natural Gas Water Heating

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

Prescriptive Lighting

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

Prescriptive Lighting - LED

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

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Premium Motors

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

Other Equipment Incentives

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

APPENDIX C

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Franklin High School

Building ID: 2818088
For 12-month Period Ending: August 31, 2011[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: January 13, 2012

Facility
Franklin High School
500 Elizabeh Ave.
Somerset, NJ 08873

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 0
Gross Floor Area (ft²): 343,000

Energy Performance Rating[2] (1-100) 50

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	14,156,669
Electricity - On-Site Solar(kBtu)	309,516
Natural Gas (kBtu)[4]	14,448,082
Total Energy (kBtu)	28,914,267

Energy Intensity[4]

Site (kBtu/ft²/yr)	84
Source (kBtu/ft²/yr)	183

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	2,817

Electric Distribution Utility
Public Service Electric & Gas Co

National Median Comparison

National Median Site EUI	85
National Median Source EUI	184
% Difference from National Median Source EUI	-1%
Building Type	K-12 School

Stamp of Certifying Professional

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

Certifying Professional
N/A

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

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

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

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

APPENDIX D

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

Boilers

Tag	Boiler - 1 / 2 / 3 / 4 / 5		
Unit Type	Condensing Boiler		
Qty	5		
Location	Boiler Room		
Area Served	Heating Hot Water Loop		
Manufacturer	Fulton		
Model #	PulsePak PHW-2000		
Serial #	NB97742 through 7746		
Input Capacity (Btu/Hr)	1,800		
Rated Output Capacity (Btu/Hr)	1,086		
Approx. Efficiency %	88.2%		
Fuel	Natural Gas		
Approx Age	6		
ASHRAE Service Life	25		
Remaining Life	19		
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

Chillers

Tag	CH-1 & 2		
Unit Type	Scroll Air Cooled Chiller		
Qty	2		
Location	Grade		
Area Served	Chilled Water Loop		
Manufacturer	Aaon		
Model #	LL-275-3		
Serial #	200408-BABV00065&6		
Refrigerant	R-22		
Cooling Capacity (Tons)	275.0		
Cooling Efficiency (EER)	10		
Volts / Phase / Hz	460/3/60		
NPLV	12.6		
Chilled Water GPM	611		
Condenser Water GPM / ΔT	N/A		
Approx Age	8		
ASHRAE Service Life	20		
Remaining Life	12		
Comments	Chillers are in good condition		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

Pumps

Tag	P - 1 / 2	P-3 / 4	P-5
Unit Type	Base Mounted Boiler Pump	Base Mounted Boiler Pump	Base Mounted Boiler Pump
Qty	2	1	1
Location	Boiler Room	Boiler Room	Boiler Room
Area Served	Boiler/Chiller	Domestic Hot Water	Chiller Freeze Protection
Manufacturer	Taco	Taco	Taco
Model #	1510-6E	1510-2 1/2	1510-3
Flow (GPM)	1200	121	300
Horse Power	50.0	2	3
Motor Info	Baldor	Baldor	Baldor
Electrical Power	460V/ 3Ph	230/460V 3ph	230/460V 3ph
RPM	1760	1725	1725
Motor Efficiency %	93.0%	84.0%	86.5%
Approx Age	8	8	8
ASHRAE Service Life	20	21	22
Remaining Life	12	13	14
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU - 1	RTU-2&3	RTU-4, 5,&6
Unit Type	Rooftop Unit	Rooftop Unit	Rooftop Unit
Qty	1	2	3
Location	Roof	Roof	Roof
Area Served	Stage/Orchestra Pit	Auditorium	Main Gym
Manufacturer	Aaon	Aaon	Aaon
Model #	RN-050-3-0	RN-050-3-0	RN-060-3-0
Serial #	200408-ANGW00482	200408-ANGW00497&6	200408-AMGR10976
Cooling Type	R22, DX	R22, DX	R22, DX
Cooling Capacity (MBH)	525.2	439.0	684.7
Cooling Efficiency (SEER/EER)			
Heating Type	Gas	Gas	Gas
Heating Input (MBH)	540	780	780
Efficiency	81%	81%	81%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU-7	RTU-8	RTU-9
Unit Type	Rooftop Unit	Rooftop Unit	Rooftop Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Locker Rooms	Cafeteria	Event Lobby
Manufacturer	Aaon	Aaon	Aaon
Model #	RM-016-3-0	RN-050-3-0	RM-050-3-0
Serial #	200408-AMGR10979	200408-ANGW00486	200408-ANGW
Cooling Type	N/A	R22, DX	R22, DX
Cooling Capacity (MBH)	N/A	431.1	504.7
Cooling Efficiency (SEER/EER)			
Heating Type	Gas	Gas	Gas
Heating Input (MBH)	480	780	780
Efficiency	81%	81%	81%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU-10	RTU-11	RTU-12
Unit Type	Rooftop Unit	Rooftop Unit	Rooftop Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Weight Room	Auxiliary Gym	Auxiliary Gym
Manufacturer	Aaon	Aaon	Aaon
Model #	RN-010-3-0	RM-008-03-0	RM-008-03-0
Serial #	200407-AMGH	200407-AMGH10931	200407-AMGH10932
Cooling Type	R22, DX	R22, DX	R22, DX
Cooling Capacity (MBH)	129.5	102.2	75.2
Cooling Efficiency (SEER/EER)			
Heating Type	Gas	Gas	Gas
Heating Input (MBH)	180	180	90
Efficiency	81%	81%	81%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU-13	RTU-14	RTU-15
Unit Type	Rooftop Unit	Rooftop Unit	Rooftop Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Offices	Corridors	Library
Manufacturer	Aaon	Aaon	Aaon
Model #	RM-025-3-0	RM-025-3-0	RN-040-3-0
Serial #	200408-AMGR10980	200408-AMGR10981	200408-ANGV00488
Cooling Type	R22, DX	R22, DX	R22, DX
Cooling Capacity (MBH)	293.5	286.5	435.4
Cooling Efficiency (SEER/EER)			
Heating Type	Gas	Gas	Gas
Heating Input (MBH)	390	390	540
Efficiency	81%	81%	81%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU-16	RTU-17	RTU-18
Unit Type	Rooftop Unit	Rooftop Unit	Rooftop Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Block E Corridors	Block E Corridors	Block F Corridors
Manufacturer	Aaon	Aaon	Aaon
Model #	RN-050-3-0	RN-060-3-0	RN-060-3-0
Serial #	200408-ANGW00489	200408-ANGX00490	200408-ANGX00491
Cooling Type	R22, DX	R22, DX	R22, DX
Cooling Capacity (MBH)	534.2	603.3	611.7
Cooling Efficiency (SEER/EER)			
Heating Type	Gas	Gas	Gas
Heating Input (MBH)	780	780	780
Efficiency	81%	81%	81%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU-19	RTU-23	RTU-24
Unit Type	Rooftop Unit	Rooftop Unit	Rooftop Unit
Qty	1	1	1
Location	Roof	Roof	Roof
Area Served	Block G Corridors	Kitchen Offices	Phys Ed Offices
Manufacturer	Aaon	Aaon	Aaon
Model #	RN-060-3-0	RM-007-3-0	RM-008-03-0
Serial #	200408-ANGX00492	200408-AMGG10966	200407-AMGH10934
Cooling Type	R22, DX	R22, DX	R22, DX
Cooling Capacity (MBH)	610.4		103.8
Cooling Efficiency (SEER/EER)			
Heating Type	Gas	Gas	Gas
Heating Input (MBH)	780	180	180
Efficiency	81%	81%	81%
Fuel	Natural Gas	Natural Gas	Natural Gas
Approx Age	6	6	6
ASHRAE Service Life	15	15	15
Remaining Life	9	9	9
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

AC Units

Tag	RTU-32		
Unit Type	Rooftop Unit		
Qty	1		
Location	Roof		
Area Served			
Manufacturer	Aaon		
Model #	RM-016-3-0		
Serial #	200408-AMG10982		
Cooling Type	R22, DX		
Cooling Capacity (MBH)	610.4		
Cooling Efficiency (SEER/EER)			
Heating Type	Gas		
Heating Input (MBH)	780		
Efficiency	81%		
Fuel	Natural Gas		
Approx Age	6		
ASHRAE Service Life	15		
Remaining Life	9		
Comments			

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

MAJOR EQUIPMENT LIST

Concord Engineering Group

Franklin High School

Domestic Water Heaters

Tag	B - 6 &7	HX	
Unit Type	Condensing Boiler	Plate and Fram HX	
Qty	2	1	
Location	Boiler Room	Boiler Room	
Area Served	HX	Domestic Hot Water	
Manufacturer	Fulton	Triangle Tube	
Model #	PulsePak PHW-2000	HX6-MDFG-45	
Serial #	NB9774 & NB97747	30105-71904	
Input Capacity (Btu/Hr)	1,800	N/A	
Rated Output Capacity (Btu/Hr)	1,086	N/A	
Approx. Efficiency %	88.2%	N/A	
Fuel	Natural Gas	N/A	
Approx Age	6	6	
ASHRAE Service Life	25	25	
Remaining Life	19	19	
Comments			
Comments			

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

APPENDIX E

Investment Grade Lighting Audit

CEG Job #: 9C11035

Project: Franklin Twp. **Franklin High School** **KWH COST: $0.152**

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Men's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Women's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	302 Prep	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 333	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.41	Greenhouse	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 330	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	328 Book Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 326	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 322	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Elec. Room	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 318	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 300	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 301	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 302	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom 303	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 304	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 305	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 312	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 314	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 316	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	308 Elec. Room	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	B 306 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4,066.4	$618.09	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	306-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1,435.2	$218.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	306-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1,913.6	$290.87	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	306-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Staff Restroom	1200	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	103.2	$15.69	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,032.0	$156.86	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3,588.0	$545.38	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1,248.0	$189.70	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	1200	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	372.0	$56.54	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	IDF	800	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	49.6	$7.54	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 319	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 321	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 323	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468.0	$71.14	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1,104.0	$167.81	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372.0	$56.54	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 301A	2600	24	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	2.06	5,366.4	$815.69	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 303A	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Dark Room	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 305A	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.74	1,913.6	$290.87	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	305 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 307A	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	307 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468.0	$71.14	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1,104.0	$167.81	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372.0	$56.54	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	327 Cust Clos	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 300 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 301 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 302 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 303 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 304 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 305 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 312 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 314 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 316 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 318 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 319 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 321 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 323 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 325 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22		3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,032.0	$156.86	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.22	Security Area	3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3,588.0	$545.38	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1,248.0	$189.70	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C309 Cust Clos	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	C 306 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4,066.4	$618.09	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	306-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1,435.2	$218.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	306-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1,913.6	$290.87	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	306-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 308 Elec	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 318 Elec. Clos.	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 322	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Kiln	1200	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	206.4	$31.37	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	322.-1 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22		2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.21	Classroom C 324	2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 328	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Chem Storage C 335	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 333	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468.0	$71.14	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1,104.0	$167.81	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372.0	$56.54	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Faculty Work C 225	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Conf. Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Conf. Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Faculty Work C 221	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,032.0	$156.86	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3,588.0	$545.38	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1,248.0	$189.70	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 200	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 201	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 202	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1,341.6	$203.92	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 203	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 204	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1,341.6	$203.92	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 205	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 206	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Elec. Clos.	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 212	2600	13	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.12	2,906.8	$441.83	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 214	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3,354.0	$509.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office C 216	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office C 216-3	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Office C 216-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Work Room C 216-1	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 218	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 220	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 222	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3,354.0	$509.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		2600	2	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	301.6	$45.84	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
617		800	12	1	Hood Light w/Globe & Cage, 100w A Lamp	100	1.20	960.0	$145.92	12	1	26w CFL Lamp	26	0.31	249.6	$37.94	$20.00	$240.00	0.89	710.4	$107.98	2.22
232.21		2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom C 224	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom C 228	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	TAG C 237	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	SAC	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 2	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.21	Classroom 208 A	2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 206 A	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-1	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-3	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-4	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-5	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-7	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 204 A	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 231 A	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	B 229 Elev Mech Room	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	B 233 SAC	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.43	1,118.0	$169.94	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 232	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4,472.0	$679.74	20	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	B 230 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 228	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3,354.0	$509.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING								SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 224	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3,354.0	$509.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468.0	$71.14	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1,104.0	$167.81	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372.0	$56.54	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 222	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 214	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Conf Room B 220	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 218	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 216	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 212	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	212-1 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	210 Elec.	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	208 Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 206	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 200	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 201	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 202	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1,341.6	$203.92	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 203	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 204	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1,341.6	$203.92	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 205	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,032.0	$156.86	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3,588.0	$545.38	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1,248.0	$189.70	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Faculty Work Room	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Faculty Work Room B 223	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4,024.8	$611.77	18	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Conf. Room B 221	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1,788.8	$271.90	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage A 201-1	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom A 201	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Mech A 203	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage A 205	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom A 209	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom A 207	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468.0	$71.14	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1,104.0	$167.81	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372.0	$56.54	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 127 Cust. Clos.	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 119	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 121	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 123	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 125	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,032.0	$156.86	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3,588.0	$545.38	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1,248.0	$189.70	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 100	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 101	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 102	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 103	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom C 104	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 105	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	C 106 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4,066.4	$618.09	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	106-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1,435.2	$218.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	106-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1,913.6	$290.87	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	106-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 108 Elec Rm	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 112	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 114	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 116	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 118	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 120 Elec Rm	800	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	92.8	$14.11	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 122	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 122-3 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	C 122-2 Kitchen	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 122-1 Observation	400	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	68.8	$10.46	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22		2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.21	Classroom C 124	2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 128	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3,577.6	$543.80	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 130 Studio*	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1,565.2	$237.91	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 130-2	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3,354.0	$509.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 130-5*	1800	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	309.6	$47.06	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 103-3*	1200	9	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.52	626.4	$95.21	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 119	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 121	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 123	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 125	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,032.0	$156.86	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3,588.0	$545.38	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1,248.0	$189.70	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806.0	$122.51	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 100	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 101	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 102	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 103	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 104	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 105	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 112	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 114	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 116	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 118	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	B 106 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4,066.4	$618.09	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	106-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1,435.2	$218.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	106-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1,913.6	$290.87	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	106-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	B 108 Elec. Clos.	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	B 120 Elec. Clos.	800	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	92.8	$14.11	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 122	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.46	3,801.2	$577.78	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 126	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.46	3,801.2	$577.78	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	B 128 ROTC	2600	24	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	2.06	5,366.4	$815.69	24	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	128 Offices (4)	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1,788.8	$271.90	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Men's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Women's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	MDF	2600	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	603.2	$91.69	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Security Office	4500	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1,548.0	$235.30	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom A 100	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2,683.2	$407.85	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Library A 102	2600	10	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.86	2,236.0	$339.87	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	96	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	8.83	22,963.2	$3,490.41	96	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	A 102-1	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1,788.8	$271.90	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	A 102-2	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	A 102-3	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	A 102-4	1200	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.46	556.8	$84.63	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	A 102-5	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,341.6	$203.92	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Staff Restroom	1200	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	372.0	$56.54	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	372.0	$56.54	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Nurse C 129	1800	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	2,476.8	$376.47	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		1800	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	154.8	$23.53	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
766	Aux Gym	2600	8	1	2x2 400w MH, Prismatic Lens	465	3.72	9,672.0	$1,470.14	8	4	2x4 54w T5HO 4 Lamp w/Prismatic Lens	236	1.89	4908.8	$746.14	$240.00	$1,920.00	1.83	4763.2	$724.01	2.65
221.34	D 109 Cust Clos	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Boy's Locker Room	2600	22	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.89	4,919.2	$747.72	22	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Showers	1200	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	619.2	$94.12	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Team Room	2600	14	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.20	3,130.4	$475.82	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	D 104 PE Office	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$305.88	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
766	Weight Room	2600	12	1	2x2 400w MH, Prismatic Lens	465	5.58	14,508.0	$2,205.22	12	4	2x4 54w T5HO 4 Lamp w/Prismatic Lens	236	2.83	7363.2	$1,119.21	$240.00	$2,880.00	2.75	7144.8	$1,086.01	2.65
362.34	Gym	2600	66	6	2x4, 6 Lamp, 54w T5HO Fixture w/Occupancy Sensor	354	23.36	60,746.4	$9,233.45	66	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Mezzanine	800	48	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	2.78	2,227.2	$338.53	48	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
766	Wrestling Gym	2600	12	1	2x2 400w MH, Prismatic Lens	465	5.58	14,508.0	$2,205.22	12	4	2x4 54w T5HO 4 Lamp w/Prismatic Lens	236	2.83	7363.2	$1,119.21	$240.00	$2,880.00	2.75	7144.8	$1,086.01	2.65
232.22	Classroom D 109	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1,788.8	$271.90	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		2600	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	956.8	$145.43	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Classroom D 127	2600	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	1.20	3,109.6	$472.66	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	26	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	2.39	7,176.0	$1,090.75	26	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.221	Gym/Aud Lobby	3000	10	3	2x2, 3 Lamp (2 lamps not operational), 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	30	0.30	900.0	$136.80	10	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.222		3000	13	3	2x2, 3 Lamp (1 lamp not operational), 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.79	2,379.0	$361.61	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
650		3000	7	2	Wall Sconce, (2) 13w PL Quad Lamp	26	0.18	546.0	$82.99	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	38	1	Recessed Down Light, 26w CFL Lamp	26	0.99	2,964.0	$450.53	38	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	D 121 AD	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1,565.2	$237.91	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	121.2 Work Room	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	121.1 Office	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Vestibule	3000	7	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.64	1,932.0	$293.66	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Ticket Office	600	3	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.28	165.6	$25.17	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Women's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Control Room	600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	206.4	$31.37	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
560	Auditorium	1800	14	1	Recessed Down Light, 26w CFL Lamp	26	0.36	655.2	$99.59	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
558		1800	94	1	Recessed Down Light, 90w PAR38 Flood Lamp	90	8.46	15,228.0	$2,314.66	94	1	16w LED PAR38 Dimmable Flood Lamp	16	1.50	2707.2	$411.49	$110.00	$10,340.00	6.96	12520.8	$1,903.16	5.43
211.41	Stage	1200	16	1	1x4, 1 Lamp, 30w T8, Elect. Ballast, Wall MNt., Prismatic Lens	28	0.45	537.6	$81.72	16	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.32	F 119 Dance	2600	25	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	2.15	5,590.0	$849.68	25	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.32	F 117 Instrumental	2600	45	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	3.87	10,062.0	$1,529.42	45	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.32	Storage	1200	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	0.34	412.8	$62.75	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	F 113 Orchestra	2600	37	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	2.15	5,579.6	$848.10	37	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.32	Office	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	0.52	1,341.6	$203.92	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	F 113-2	2600	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.46	1,206.4	$183.37	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.32	F 118 Music	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	1.29	3,354.0	$509.81	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Restroom	1200	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	103.2	$15.69	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		1200	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	73.2	$11.13	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 111 Music Library	1800	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.26	464.4	$70.59	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 109 Choral	2600	37	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	3.18	8,273.2	$1,257.53	37	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	F 107 Storage	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	F 105 Receiving	2600	11	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.64	1,658.8	$252.14	11	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Freight Elevator	3000	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558.0	$84.82	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.41	Basement Stairs	3000	3	1	1x4, 1 Lamp, 30w T8, Elect. Ballast, Wall MNt., Prismatic Lens	28	0.08	252.0	$38.30	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Basement	2600	83	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	4.81	12,516.4	$1,902.49	83	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Electrical Room	1200	5	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.29	348.0	$52.90	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Fire Pump	800	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.46	371.2	$56.42	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Break Room	3000	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1,548.0	$235.30	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Recording	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 106 Practice	1200	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	206.4	$31.37	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 108 Practice	1200	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	206.4	$31.37	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Piano	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2,683.2	$407.85	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Women's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Men's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Practice 123, 126, 128, 130, 132	1200	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.69	825.6	$125.49	8	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	G 100 Faculty Dining	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2,683.2	$407.85	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
612	Cafeteria	2600	52	1	Pendant Mnt., 100w A19 Lamp	100	5.20	13,520.0	$2,055.04	52	1	(1) 26w CFL Lamp	26	1.35	3515.2	$534.31	$20.00	$1,040.00	3.85	10004.8	$1,520.73	0.68
558		2600	30	1	Recessed Down Light, 90w PAR38 Flood Lamp	90	2.70	7,020.0	$1,067.04	30	1	16w LED PAR38 Dimmable Flood Lamp	16	0.48	1248	$189.70	$110.00	$3,300.00	2.22	5772	$877.34	3.76
232.21	Serving	2600	28	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.41	6,260.8	$951.64	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Kitchen	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.46	3,801.2	$577.78	17	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Kitchen Lockers	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G108 Custodial	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G107 Storage	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G102 IDF	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G103 Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	A 101-5 Conf. Room	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1,435.2	$218.15	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	A 101-4 Principal	2160	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1,192.3	$181.23	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	A 101-3 Sec.	2160	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.37	794.9	$120.82	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Main Office Hall	2600	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.37	956.8	$145.43	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Main Office	2600	15	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.38	3,588.0	$545.38	15	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	101-2 Snacks	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$24.11	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	101-1 Work Room	2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$24.11	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	101 Restroom	1200	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	148.8	$22.62	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	A103 CST	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1,565.2	$237.91	7	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	CST Hall	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1,118.0	$169.94	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	103.4 Work Room	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	103.1 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	103.2 Work/File Room	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.43	1,118.0	$169.94	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	103 Restroom	1200	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	103.2	$15.69	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.5	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.7	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.8	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.9	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.10	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.11	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Front Lobby	3000	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.55	1,656.0	$251.71	6	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21		3000	13	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.12	3,354.0	$509.81	13	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Vestibule	3000	5	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.46	1,380.0	$209.76	5	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Corridors	3000	339	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	29.15	87,462.0	$13,294.22	339	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
772	Exterior	4000	2	1	1000w Pulse Start MH Flood	1095	2.19	8,760.0	$1,331.52	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
730		4000	52	1	175w MH Wallpack	195	10.14	40,560.0	$6,165.12	52	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

ECM #1 ,2 & 3: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING									SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
211.41	Stairwells (8)	3000	48	1	1x4, 1 Lamp, 30w T8, Elect. Ballast, Wall MNt., Prismatic Lens	28	1.34	4,032.0	$612.86	48	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		3,834	1109		35189	343.41	896,843	$136,320	3,834	16			11.2	27,355	$4,158		$22,600	21.2	48,061	$7,305	3.09

CEG Job #:
Project: Franklin Twp.
Address: 0
0
Building SF: -

Franklin High School

KWH COST: $0.152

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Men's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	no change	86	0.26	0%	670.8	$101.96	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Women's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	no change	86	0.26	0%	670.8	$101.96	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	302 Prep	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	Classroom 333	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.38	20%	3577.6	$543.80	$300.00	$300.00	0.34	894.4	$135.95	2.21
221.41	Greenhouse	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Wall Mnt., Prismatic	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 330	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$300.00	$300.00	0.28	715.52	$108.76	2.76
221.34	328 Book Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 326	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.24	20%	3219.84	$489.42	$300.00	$300.00	0.31	804.96	$122.35	2.45
237.22		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 322	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.24	20%	3219.84	$489.42	$300.00	$300.00	0.31	804.96	$122.35	2.45
237.22		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
221.34	Elec. Room	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 318	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.21		2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom 300	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 301	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 302	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 303	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 304	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 305	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 312	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 314	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 316	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
221.34	308 Elec. Room	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	B 306 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4066.4	$618.09	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	1.25	20%	3253.12	$494.47	$300.00	$300.00	0.31	813.28	$123.62	2.43
237.22	306-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1435.2	$218.15	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.44	20%	1148.16	$174.52	$150.00	$150.00	0.11	287.04	$43.63	3.44
232.22	306-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	306-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1913.6	$290.87	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.59	20%	1530.88	$232.69	$150.00	$150.00	0.15	382.72	$58.17	2.58
232.22	306-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	306-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	306-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Staff Restroom	1200	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	103.2	$15.69	1	0	No Change	86	0.09	0%	103.2	$15.69	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1032	$156.86	4	0	no change	86	0.34	0%	1032	$156.86	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3588	$545.38	13	0	no change	92	1.20	0%	3588	$545.38	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1248	$189.70	16	0	no change	26	0.42	0%	1248	$189.70	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	1200	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	372	$56.54	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	297.6	$45.24	$150.00	$150.00	0.06	74.4	$11.31	13.26
222.21	IDF	800	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	49.6	$7.54	1	0	No Change	62	0.06	0%	49.6	$7.54	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 319	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 321	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 323	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
221.34	Cust Closet	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468	$71.14	6	0	No Change	26	0.16	0%	468	$71.14	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Security Area	3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1104	$167.81	4	0	no change	92	0.37	0%	1104	$167.81	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372	$56.54	2	0	No Change	62	0.12	0%	372	$56.54	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 301A	2600	24	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	2.06	5366.4	$815.69	24	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.65	20%	4293.12	$652.55	$450.00	$450.00	0.41	1073.28	$163.14	2.76

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom 303A	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.38	20%	3577.6	$543.80	$450.00	$450.00	0.34	894.4	$135.95	3.31
237.21		2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	92	0.09	0%	239.2	$36.36	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Dark Room	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	0	no change	86	0.26	0%	670.8	$101.96	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 305A	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$300.00	$300.00	0.28	715.52	$108.76	2.76
237.21		2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.74	1913.6	$290.87	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	0.59	20%	1530.88	$232.69	$300.00	$300.00	0.15	382.72	$58.17	5.16
232.21		2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	305 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 307A	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$300.00	$300.00	0.28	715.52	$108.76	2.76
237.22		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	307 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468	$71.14	6	0	No Change	26	0.16	0%	468	$71.14	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1104	$167.81	4	0	no change	92	0.37	0%	1104	$167.81	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372	$56.54	2	0	No Change	62	0.12	0%	372	$56.54	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	327 Cust Clos	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 300 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom 301 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 302 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 303 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 304 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 305 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 312 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 314 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 316 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 318 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 319 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 321 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 323 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom 325 C	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
232.22		3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1032	$156.86	4	0	no change	86	0.34	0%	1032	$156.86	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.22	Security Area	3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3588	$545.38	13	0	no change	92	1.20	0%	3588	$545.38	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1248	$189.70	16	0	no change	26	0.42	0%	1248	$189.70	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
221.34	C309 Cust Clos	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	C 306 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4066.4	$618.09	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	1.25	20%	3253.12	$494.47	$300.00	$300.00	0.31	813.28	$123.62	2.43
237.22	306-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1435.2	$218.15	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.44	20%	1148.16	$174.52	$150.00	$150.00	0.11	287.04	$43.63	3.44
232.22	306-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	306-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1913.6	$290.87	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.59	20%	1530.88	$232.69	$150.00	$150.00	0.15	382.72	$58.17	2.58
232.22	306-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	306-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	306-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 308 Elec	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 318 Elec. Clos.	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 322	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Kiln	1200	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	206.4	$31.37	2	0	No Change	86	0.17	0%	206.4	$31.37	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	322.-1 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 324	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 328	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
221.34	Chem Storage C 335	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	222.72	$33.85	$150.00	$150.00	0.05	55.68	$8.46	17.72
232.22	Classroom C 333	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.38	20%	3577.6	$543.80	$450.00	$450.00	0.34	894.4	$135.95	3.31
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468	$71.14	6	0	No Change	26	0.16	0%	468	$71.14	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1104	$167.81	4	0	no change	92	0.37	0%	1104	$167.81	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372	$56.54	2	0	No Change	62	0.12	0%	372	$56.54	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Faculty Work C 225	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
232.22	Conf. Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	Conf. Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	Faculty Work C 221	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1032	$156.86	4	0	no change	86	0.34	0%	1032	$156.86	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3588	$545.38	13	0	no change	92	1.20	0%	3588	$545.38	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1248	$189.70	16	0	no change	26	0.42	0%	1248	$189.70	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	no change	58	0.23	0%	278.4	$42.32	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 200	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 201	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom C 202	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1341.6	$203.92	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$163.14	$300.00	$300.00	0.10	268.32	$40.78	7.36
232.22	Classroom C 203	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 204	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1341.6	$203.92	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$163.14	$300.00	$300.00	0.10	268.32	$40.78	7.36
232.22	Classroom C 205	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 206	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
221.34	Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Elec. Clos.	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 212	2600	13	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.12	2906.8	$441.83	13	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.89	20%	2325.44	$353.47	$300.00	$300.00	0.22	581.36	$88.37	3.39
221.34	Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 214	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3354	$509.81	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.03	20%	2683.2	$407.85	$300.00	$300.00	0.26	670.8	$101.96	2.94
232.22	Office C 216	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	Office C 216-3	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office C 216-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Work Room C 216-1	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 218	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 220	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$300.00	$300.00	0.28	715.52	$108.76	2.76

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom C 222	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3354	$509.81	15	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.03	20%	2683.2	$407.85	$300.00	$300.00	0.26	670.8	$101.96	2.94
221.11		2600	2	2	1x4, 2 Lamp, 30w 800 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.12	301.6	$45.84	2	0	No Change	58	0.12	0%	301.6	$45.84	$0.00	$0.00	0.00	0	$0.00	0.00
617		800	12	1	Hood Light w/Globe & Cage, 100w A Lamp	100	1.20	960	$145.92	12	1	Dual Technology Occupancy Sensor - Remote Mnt.	100	0.96	20%	768	$116.74	$300.00	$300.00	0.24	192	$29.18	10.28
232.21		2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom C 224	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Classroom C 228	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.21	TAG C 237	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	SAC	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 2	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.38	20%	3577.6	$543.80	$450.00	$450.00	0.34	894.4	$135.95	3.31
222.21	Women's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
222.21	Men's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.21	Classroom 208 A	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
237.21	Classroom 206 A	2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	92	0.09	0%	239.2	$36.36	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 206 A	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	206-1	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-3	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-4	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-5	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	206-7	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom 204 A	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.38	20%	3577.6	$543.80	$450.00	$450.00	0.34	894.4	$135.95	3.31
232.22	Classroom 231 A	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.38	20%	3577.6	$543.80	$450.00	$450.00	0.34	894.4	$135.95	3.31
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
222.21	Men's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
221.34	B 229 Elev Mech Room	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	B 233 SAC	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.43	1118	$169.94	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.34	20%	894.4	$135.95	$150.00	$150.00	0.09	223.6	$33.99	4.41
221.34	Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 232	2600	20	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.72	4472	$679.74	20	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.38	20%	3577.6	$543.80	$450.00	$450.00	0.34	894.4	$135.95	3.31
221.34	B 230 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 228	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3354	$509.81	15	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.03	20%	2683.2	$407.85	$450.00	$450.00	0.26	670.8	$101.96	4.41
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 224	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3354	$509.81	15	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.03	20%	2683.2	$407.85	$450.00	$450.00	0.26	670.8	$101.96	4.41
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468	$71.14	6	0	No Change	26	0.16	0%	468	$71.14	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1104	$167.81	4	0	no change	92	0.37	0%	1104	$167.81	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372	$56.54	2	0	No Change	62	0.12	0%	372	$56.54	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 222	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
232.22	Classroom B 214	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
232.22	Conf Room B 220	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 218	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 216	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 212	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.34	212-1 Storage	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	210 Elec.	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	208 Storage	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 206	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 200	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 201	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 202	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1341.6	$203.92	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$163.14	$300.00	$300.00	0.10	268.32	$40.78	7.36
232.22	Classroom B 203	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 204	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.52	1341.6	$203.92	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.41	20%	1073.28	$163.14	$300.00	$300.00	0.10	268.32	$40.78	7.36
232.22	Classroom B 205	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1032	$156.86	4	0	no change	86	0.34	0%	1032	$156.86	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3588	$545.38	13	0	no change	92	1.20	0%	3588	$545.38	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1248	$189.70	16	0	no change	26	0.42	0%	1248	$189.70	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Faculty Work Room	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
232.22	Faculty Work Room B 223	2600	18	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.55	4024.8	$611.77	18	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.24	20%	3219.84	$489.42	$450.00	$450.00	0.31	804.96	$122.35	3.68
232.22	Conf. Room B 221	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1788.8	$271.90	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.55	20%	1431.04	$217.52	$150.00	$150.00	0.14	357.76	$54.38	2.76
221.34	Cust Closet	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage A 201-1	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom A 201	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
221.34	Mech A 203	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	no change	58	0.23	0%	278.4	$42.32	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Storage A 205	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	no change	58	0.23	0%	278.4	$42.32	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom A 209	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
232.22	Classroom A 207	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
560	Security Area	3000	6	1	Recessed Down Light, 26w CFL Lamp	26	0.16	468	$71.14	6	0	No Change	26	0.16	0%	468	$71.14	$0.00	$0.00	0.00	0	$0.00	0.00
237.21		3000	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	1104	$167.81	4	0	no change	92	0.37	0%	1104	$167.81	$0.00	$0.00	0.00	0	$0.00	0.00
222.21		3000	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	372	$56.54	2	0	No Change	62	0.12	0%	372	$56.54	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.34	C 127 Cust. Clos.	1200	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	139.2	$21.16	2	0	No Change	58	0.12	0%	139.2	$21.16	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 119	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 121	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 123	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 125	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1032	$156.86	4	0	no change	86	0.34	0%	1032	$156.86	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3588	$545.38	13	0	no change	92	1.20	0%	3588	$545.38	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1248	$189.70	16	0	no change	26	0.42	0%	1248	$189.70	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 100	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 101	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom C 102	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 103	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 104	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 105	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
237.22	C 106 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4066.4	$618.09	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	1.25	20%	3253.12	$494.47	$300.00	$300.00	0.31	813.28	$123.62	2.43
237.22	106-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1435.2	$218.15	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.44	20%	1148.16	$174.52	$150.00	$150.00	0.11	287.04	$43.63	3.44
232.22	106-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	106-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1913.6	$290.87	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.59	20%	1530.88	$232.69	$150.00	$150.00	0.15	382.72	$58.17	2.58
232.22	106-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	106-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 108 Elec Rm	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 112	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 114	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 116	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom C 118	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.34	C 120 Elec Rm	800	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	92.8	$14.11	2	0	No Change	58	0.12	0%	92.8	$14.11	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 122	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
232.22	C 122-3 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	C 122-2 Kitchen	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 122-1 Observation	400	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	68.8	$10.46	2	0	No Change	86	0.17	0%	68.8	$10.46	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 124	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom C 128	2600	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	3577.6	$543.80	16	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.10	20%	2862.08	$435.04	$450.00	$450.00	0.28	715.52	$108.76	4.14
237.21		2600	2	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.18	478.4	$72.72	2	0	no change	92	0.18	0%	478.4	$72.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	C 130 Studio*	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1565.2	$237.91	7	0	no change	86	0.60	0%	1565.2	$237.91	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 130-2	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.29	3354	$509.81	15	0	no change	86	1.29	0%	3354	$509.81	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	C 130-5*	1800	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	309.6	$47.06	2	0	No Change	86	0.17	0%	309.6	$47.06	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	C 103-3*	1200	9	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.52	626.4	$95.21	9	0	no change	58	0.52	0%	626.4	$95.21	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 119	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 121	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 123	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 125	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Women's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
232.22	Security Area	3000	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1032	$156.86	4	0	no change	86	0.34	0%	1032	$156.86	$0.00	$0.00	0.00	0	$0.00	0.00
237.22		3000	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.20	3588	$545.38	13	0	no change	92	1.20	0%	3588	$545.38	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	16	1	Recessed Down Light, 26w CFL Lamp	26	0.42	1248	$189.70	16	0	no change	26	0.42	0%	1248	$189.70	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	806	$122.51	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	644.8	$98.01	$150.00	$150.00	0.06	161.2	$24.50	6.12
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Staff Restroom	1200	1	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.06	74.4	$11.31	1	0	No Change	62	0.06	0%	74.4	$11.31	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 100	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 101	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 102	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 103	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 104	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 105	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 112	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 114	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 116	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
232.22	Classroom B 118	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.62	20%	1609.92	$244.71	$300.00	$300.00	0.15	402.48	$61.18	4.90
237.22	B 106 Reception	2600	17	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.56	4066.4	$618.09	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	1.25	20%	3253.12	$494.47	$300.00	$300.00	0.31	813.28	$123.62	2.43
237.22	106-1	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1435.2	$218.15	6	1	Dual Technology Occupancy Sensor - Remote Mnt.	92	0.44	20%	1148.16	$174.52	$300.00	$300.00	0.11	287.04	$43.63	6.88
232.22	106-2	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	106-3	2600	8	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.74	1913.6	$290.87	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.59	20%	1530.88	$232.69	$150.00	$150.00	0.15	382.72	$58.17	2.58
232.22	106-4	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	106-5	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	106-6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	B 108 Elec. Clos.	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	B 120 Elec. Clos.	800	2	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.12	92.8	$14.11	2	0	No Change	58	0.12	0%	92.8	$14.11	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Classroom B 122	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.46	3801.2	$577.78	17	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.17	20%	3040.96	$462.23	$450.00	$450.00	0.29	760.24	$115.56	3.89
237.21		2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	92	0.09	0%	239.2	$36.36	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.22	Classroom B 126	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.46	3801.2	$577.78	17	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.17	20%	3040.96	$462.23	$450.00	$450.00	0.29	760.24	$115.56	3.89
237.21		2600	1	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.09	239.2	$36.36	1	0	No Change	92	0.09	0%	239.2	$36.36	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Prep Room	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
232.22	B 128 ROTC	2600	24	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	2.06	5366.4	$815.69	24	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.65	20%	4293.12	$652.55	$450.00	$450.00	0.41	1073.28	$163.14	2.76
232.22	128 Offices (4)	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1788.8	$271.90	8	0	no change	86	0.69	0%	1788.8	$271.90	$0.00	$0.00	0.00	0	$0.00	0.00
221.21	Men's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
221.21	Women's Restroom	2600	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
221.34	MDF	2600	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	603.2	$91.69	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.19	20%	482.56	$73.35	$150.00	$150.00	0.05	120.64	$18.34	8.18
232.22	Security Office	4500	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	1548	$235.30	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	1238.4	$188.24	$150.00	$150.00	0.07	309.6	$47.06	3.19
232.22	Classroom A 100	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2683.2	$407.85	12	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	0.83	20%	2146.56	$326.28	$450.00	$450.00	0.21	536.64	$81.57	5.52
232.22	Library A 102	2600	10	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.86	2236	$339.87	10	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	0.69	20%	1788.8	$271.90	$450.00	$450.00	0.17	447.2	$67.97	6.62
237.21		2600	96	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	8.83	22963.2	$3,490.41	96	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	92	7.07	20%	18370.56	$2,792.33	$450.00	$900.00	1.77	4592.64	$698.08	1.29
232.22	A 102-1	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1788.8	$271.90	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.55	20%	1431.04	$217.52	$150.00	$150.00	0.14	357.76	$54.38	2.76
221.34	A 102-2	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	A 102-3	1200	3	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.17	208.8	$31.74	3	0	No Change	58	0.17	0%	208.8	$31.74	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	A 102-4	1200	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.46	556.8	$84.63	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.37	20%	445.44	$67.71	$150.00	$150.00	0.09	111.36	$16.93	8.86

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	A 102-5	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1341.6	$203.92	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$163.14	$150.00	$150.00	0.10	268.32	$40.78	3.68
222.21	Staff Restroom	1200	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	372	$56.54	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	297.6	$45.24	$150.00	$150.00	0.06	74.4	$11.31	13.26
222.21	Staff Restroom	1200	5	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.31	372	$56.54	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.25	20%	297.6	$45.24	$150.00	$150.00	0.06	74.4	$11.31	13.26
232.22	Nurse C 129	1800	16	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.38	2476.8	$376.47	16	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.10	20%	1981.44	$301.18	$300.00	$300.00	0.28	495.36	$75.29	3.98
232.21		1800	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	154.8	$23.53	1	0	No Change	86	0.09	0%	154.8	$23.53	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Men's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
222.21	Women's Restroom	2600	3	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	483.6	$73.51	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	62	0.15	20%	386.88	$58.81	$150.00	$150.00	0.04	96.72	$14.70	10.20
766	Aux Gym	2600	8	1	2x2 400w MH, Prismatic Lens	465	3.72	9672	$1,470.14	8	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	465	2.98	20%	7737.6	$1,176.12	$450.00	$450.00	0.74	1934.4	$294.03	1.53
221.34	D 109 Cust Clos	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Boy's Locker Room	2600	22	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.89	4919.2	$747.72	22	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.51	20%	3935.36	$598.17	$450.00	$450.00	0.38	983.84	$149.54	3.01
232.21	Showers	1200	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	619.2	$94.12	6	0	no change	86	0.52	0%	619.2	$94.12	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Team Room	2600	14	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.20	3130.4	$475.82	14	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	0.96	20%	2504.32	$380.66	$450.00	$450.00	0.24	626.08	$95.16	4.73
232.22	D 104 PE Office	2600	9	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$305.88	9	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.62	20%	1609.92	$244.71	$150.00	$150.00	0.15	402.48	$61.18	2.45
766	Weight Room	2600	12	1	2x2 400w MH, Prismatic Lens	465	5.58	14508	$2,205.22	12	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	465	4.46	20%	11606.4	$1,764.17	$450.00	$450.00	1.12	2901.6	$441.04	1.02
362.34	Gym	2600	66	6	2x4, 6 Lamp, 54w T5HO Fixture w/Occupancy Sensor	354	23.36	60746.4	$9,233.45	66	3	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	354	18.69	20%	48597.12	$7,386.76	$450.00	$1,350.00	4.67	12149.28	$1,846.69	0.73
221.34	Mezzanine	800	48	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	2.78	2227.2	$338.53	48	0	no change	58	2.78	0%	2227.2	$338.53	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
766	Wrestling Gym	2600	12	1	2x2 400w MH, Prismatic Lens	465	5.58	14508	$2,205.22	12	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	465	4.46	20%	11606.4	$1,764.17	$450.00	$450.00	1.12	2901.6	$441.04	1.02
232.22	Classroom D 109	2600	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.69	1788.8	$271.90	8	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	0.55	20%	1431.04	$217.52	$300.00	$300.00	0.14	357.76	$54.38	3.59
237.21		2600	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.37	956.8	$145.43	4			92	0.29	20%	765.44	$116.35			0.07	191.36	$29.09	
237.21	Classroom D 127	2600	13	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	1.20	3109.6	$472.66	13	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack Remote Mnt.	92	0.96	20%	2487.68	$378.13	$450.00	$450.00	0.24	621.92	$94.53	4.76
237.22	Gym/Aud Lobby	3000	26	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	2.39	7176	$1,090.75	26	0	no change	92	2.39	0%	7176	$1,090.75	$0.00	$0.00	0.00	0	$0.00	0.00
237.221		3000	10	3	2x2, 3 Lamp (2 lamps not operational), 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	30	0.30	900	$136.80	10	0	no change	30	0.30	0%	900	$136.80	$0.00	$0.00	0.00	0	$0.00	0.00
237.222		3000	13	3	2x2, 3 Lamp (1 lamp not operational), 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.79	2379	$361.61	13	0	no change	61	0.79	0%	2379	$361.61	$0.00	$0.00	0.00	0	$0.00	0.00
650		3000	7	2	Wall Sconce, (2) 13w PL Quad Lamp	26	0.18	546	$82.99	7	0	no change	26	0.18	0%	546	$82.99	$0.00	$0.00	0.00	0	$0.00	0.00
560		3000	38	1	Recessed Down Light, 26w CFL Lamp	26	0.99	2964	$450.53	38	0	no change	26	0.99	0%	2964	$450.53	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	D 121 AD	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1565.2	$237.91	7	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.48	20%	1252.16	$190.33	$150.00	$150.00	0.12	313.04	$47.58	3.15
232.22	121.2 Work Room	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	121.1 Office	2600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	894.4	$135.95	4	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.28	20%	715.52	$108.76	$150.00	$150.00	0.07	178.88	$27.19	5.52
237.22	Vestibule	3000	7	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.64	1932	$293.66	7	0	no change	92	0.64	0%	1932	$293.66	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Ticket Office	600	3	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.28	165.6	$25.17	3	0	no change	92	0.28	0%	165.6	$25.17	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Women's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.21	20%	536.64	$81.57	$150.00	$150.00	0.05	134.16	$20.39	7.36
232.22	Control Room	600	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.34	206.4	$31.37	4	0	no change	86	0.34	0%	206.4	$31.37	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
560	Auditorium	1800	14	1	Recessed Down Light, 26w CFL Lamp	26	0.36	655.2	$99.59	14	0	no change	26	0.36	0%	655.2	$99.59	$0.00	$0.00	0.00	0	$0.00	0.00
558		1800	94	1	Recessed Down Light, 90w PAR38 Flood Lamp	90	8.46	15228	$2,314.66	94	0	no change	90	8.46	0%	15228	$2,314.66	$0.00	$0.00	0.00	0	$0.00	0.00
211.41	Stage	1200	16	1	1x4, 1 Lamp, 30w T8, Elect. Ballast, Wall MNt., Prismatic Lens	28	0.45	537.6	$81.72	16	0	no change	28	0.45	0%	537.6	$81.72	$0.00	$0.00	0.00	0	$0.00	0.00
232.32	F 119 Dance	2600	25	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	2.15	5590	$849.68	25	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.72	20%	4472	$679.74	$450.00	$450.00	0.43	1118	$169.94	2.65
232.32	F 117 Instrumental	2600	45	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	3.87	10062	$1,529.42	45	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	3.10	20%	8049.6	$1,223.54	$450.00	$900.00	0.77	2012.4	$305.88	2.94
232.32	Storage	1200	4	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	0.34	412.8	$62.75	4	0	no change	86	0.34	0%	412.8	$62.75	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	F 113 Orchestra	2600	37	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	2.15	5579.6	$848.10	37	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	58	1.72	20%	4463.68	$678.48	$450.00	$900.00	0.43	1115.92	$169.62	5.31
232.32	Office	2600	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	0.52	1341.6	$203.92	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1073.28	$163.14	$150.00	$150.00	0.10	268.32	$40.78	3.68
221.34	F 113-2	2600	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.46	1206.4	$183.37	8	1	Dual Technology Occupancy Sensor - Switch Mnt.	58	0.37	20%	965.12	$146.70	$150.00	$150.00	0.09	241.28	$36.67	4.09
232.32	F 118 Music	2600	15	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens	86	1.29	3354	$509.81	15	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	1.03	20%	2683.2	$407.85	$450.00	$450.00	0.26	670.8	$101.96	4.41
232.21	Restroom	1200	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	103.2	$15.69	1	0	No Change	86	0.09	0%	103.2	$15.69	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		1200	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	73.2	$11.13	1	0	No Change	61	0.06	0%	73.2	$11.13	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 111 Music Library	1800	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.26	464.4	$70.59	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.21	20%	371.52	$56.47	$150.00	$150.00	0.05	92.88	$14.12	10.62
232.22	F 109 Choral	2600	37	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	3.18	8273.2	$1,257.53	37	2	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	2.55	20%	6618.56	$1,006.02	$450.00	$900.00	0.64	1654.64	$251.51	3.58
221.34	F 107 Storage	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	no change	58	0.23	0%	278.4	$42.32	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	F 105 Receiving	2600	11	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.64	1658.8	$252.14	11	1	Dual Technology Occupancy Sensor - Remote Mnt.	58	0.51	20%	1327.04	$201.71	$300.00	$300.00	0.13	331.76	$50.43	5.95

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
221.21	Freight Elevator	3000	3	2	1x4, 2 Lamp, 32w 800 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.19	558	$84.82	3	0	no change	62	0.19	0%	558	$84.82	$0.00	$0.00	0.00	0	$0.00	0.00
211.41	Basement Stairs	3000	3	1	1x4, 1 Lamp, 30w T8, Elect. Ballast, Wall MNt., Prismatic Lens	28	0.08	252	$38.30	3	0	No Change	28	0.08	0%	252	$38.30	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Basement	2600	83	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	4.81	12516.4	$1,902.49	83	4	Dual Technology Occupancy Sensor - Remote Mnt.	58	3.85	20%	10013.12	$1,521.99	$300.00	$1,200.00	0.96	2503.28	$380.50	3.15
221.34	Electrical Room	1200	5	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.29	348	$52.90	5	0	no change	58	0.29	0%	348	$52.90	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	Fire Pump	800	8	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.46	371.2	$56.42	8	0	no change	58	0.46	0%	371.2	$56.42	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Break Room	3000	6	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.52	1548	$235.30	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.41	20%	1238.4	$188.24	$150.00	$150.00	0.10	309.6	$47.06	3.19
232.22	Recording	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.26	670.8	$101.96	3	0	no change	86	0.26	0%	670.8	$101.96	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 106 Practice	1200	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	206.4	$31.37	2	0	No Change	86	0.17	0%	206.4	$31.37	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	F 108 Practice	1200	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	206.4	$31.37	2	0	No Change	86	0.17	0%	206.4	$31.37	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	IDF	800	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	46.4	$7.05	1	0	No Change	58	0.06	0%	46.4	$7.05	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Piano	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2683.2	$407.85	12	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	0.83	20%	2146.56	$326.28	$450.00	$450.00	0.21	536.64	$81.57	5.52
232.21	Women's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.21	20%	536.64	$81.57	$150.00	$150.00	0.05	134.16	$20.39	7.36
232.21	Men's Restroom	2600	3	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.26	670.8	$101.96	3	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.21	20%	536.64	$81.57	$150.00	$150.00	0.05	134.16	$20.39	7.36
232.21	Practice 123, 126, 128, 130, 132	1200	8	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.69	825.6	$125.49	8	0	no change	86	0.69	0%	825.6	$125.49	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	G 100 Faculty Dining	2600	12	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	1.03	2683.2	$407.85	12	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	86	0.83	20%	2146.56	$326.28	$450.00	$450.00	0.21	536.64	$81.57	5.52
612	Cafeteria	2600	52	1	Pendant Mnt., 100w A19 Lamp	100	5.20	13520	$2,055.04	52	3	Dual Technology Occupancy Sensor - Remote Mnt.	100	4.16	20%	10816	$1,644.03	$300.00	$900.00	1.04	2704	$411.01	2.19

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
558	Cafeteria	2600	30	1	Recessed Down Light, 90w PAR38 Flood Lamp	90	2.70	7020	$1,067.04	30	2	Dual Technology Occupancy Sensor - Remote Mnt.	90	2.16	20%	5616	$853.63	$300.00	$600.00	0.54	1404	$213.41	2.81
232.21	Serving	2600	28	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	2.41	6260.8	$951.64	28	2	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.93	20%	5008.64	$761.31	$300.00	$600.00	0.48	1252.16	$190.33	3.15
232.21	Kitchen	2600	17	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.46	3801.2	$577.78	17	1	Dual Technology Occupancy Sensor - Remote Mnt.	86	1.17	20%	3040.96	$462.23	$300.00	$300.00	0.29	760.24	$115.56	2.60
232.21	Kitchen Lockers	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G108 Custodial	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G107 Storage	1200	4	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.23	278.4	$42.32	4	0	no change	58	0.23	0%	278.4	$42.32	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G102 IDF	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
221.34	G103 Cust Closet	1200	1	2	1x4, 2 Lamp, 30w T8, Elect. Ballast, Pendant Mnt., No Lens	58	0.06	69.6	$10.58	1	0	No Change	58	0.06	0%	69.6	$10.58	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	A 101-5 Conf. Room	2600	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1435.2	$218.15	6	1	Dual Technology Occupancy Sensor - Switch Mnt.	92	0.44	20%	1148.16	$174.52	$150.00	$150.00	0.11	287.04	$43.63	3.44
237.22	A 101-4 Principal	2160	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.55	1192.32	$181.23	6	0	no change	92	0.55	0%	1192.32	$181.23	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	A 101-3 Sec.	2160	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.37	794.88	$120.82	4	0	no change	92	0.37	0%	794.88	$120.82	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Main Office Hall	2600	4	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	0.37	956.8	$145.43	4	0	no change	92	0.37	0%	956.8	$145.43	$0.00	$0.00	0.00	0	$0.00	0.00
237.22	Main Office	2600	15	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Parabolic Lens	92	1.38	3588	$545.38	15	1	Dual Tech. Occupancy Sensor w/2 Pole Powerpack - Remote Mnt.	92	1.10	20%	2870.4	$436.30	$450.00	$450.00	0.28	717.6	$109.08	4.13
232.21	101-2 Snacks	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00
227.213		2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$24.11	1	0	No Change	61	0.06	0%	158.6	$24.11	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	101-1 Work Room	2600	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	223.6	$33.99	1	0	No Change	86	0.09	0%	223.6	$33.99	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
227.213	101-1 Work Room	2600	1	2	2x2, 2 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	61	0.06	158.6	$24.11	1	0	No Change	61	0.06	0%	158.6	$24.11	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	101 Restroom	1200	2	2	2x4, 2 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	62	0.12	148.8	$22.62	2	0	No Change	62	0.12	0%	148.8	$22.62	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	A103 CST	2600	7	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.60	1565.2	$237.91	7	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.48	20%	1252.16	$190.33	$150.00	$150.00	0.12	313.04	$47.58	3.15
232.21	CST Hall	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.43	1118	$169.94	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.34	20%	894.4	$135.95	$150.00	$150.00	0.09	223.6	$33.99	4.41
232.22	103.4 Work Room	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	103.1 Office	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	103.2 Work/File Room	2600	5	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.43	1118	$169.94	5	1	Dual Technology Occupancy Sensor - Switch Mnt.	86	0.34	20%	894.4	$135.95	$150.00	$150.00	0.09	223.6	$33.99	4.41
232.21	103 Restroom	1200	1	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.09	103.2	$15.69	1	0	No Change	86	0.09	0%	103.2	$15.69	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.5	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.6	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.7	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.8	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.9	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.10	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office 103.11	2600	2	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$67.97	2	0	No Change	86	0.17	0%	447.2	$67.97	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Front Lobby	3000	6	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.55	1656	$251.71	6	0	no change	92	0.55	0%	1656	$251.71	$0.00	$0.00	0.00	0	$0.00	0.00

ECM #4: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
232.21	Front Lobby	3000	13	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	1.12	3354	$509.81	13	0	no change	86	1.12	0%	3354	$509.81	$0.00	$0.00	0.00	0	$0.00	0.00
237.21	Vestibule	3000	5	3	2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens	92	0.46	1380	$209.76	5	0	no change	92	0.46	0%	1380	$209.76	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Corridors	3000	339	3	2x4, 3 Lamp, 30w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	29.15	87462	$13,294.22	339	0	no change	86	29.15	0%	87462	$13,294.22	$0.00	$0.00	0.00	0	$0.00	0.00
772	Exterior	4000	2	1	1000w Pulse Start MH Flood	1095	2.19	8760	$1,331.52	2	0	no change	1095	2.19	0%	8760	$1,331.52	$0.00	$0.00	0.00	0	$0.00	0.00
730		4000	52	1	175w MH Wallpack	195	10.14	40560	$6,165.12	52	0	no change	195	10.14	0%	40560	$6,165.12	$0.00	$0.00	0.00	0	$0.00	0.00
211.41	Stairwells (8)	3000	48	1	1x4, 1 Lamp, 30w T8, Elect. Ballast, Wall MNt., Prismatic Lens	28	1.34	4032	$612.86	48	0	no change	28	1.34	0%	4032	$612.86	$0.00	$0.00	0.00	0	$0.00	0.00
	Totals		3,834	1109			343.4	896,842.6	$136,320	3,834	225			295.4		772,944.4	$117,487.55		$66,000	48.03	123,898	$18,833	3.50