# LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

**PREPARED FOR:** **MT. OLIVE TWP. SCHOOL DISTRICT**
**MOUNT OLIVE MIDDLE SCHOOL**

**160 WOLFE ROAD**
**BUDD LAKE, NJ, 07828**

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## I. EXECUTIVE SUMMARY

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

Mount Olive Township School District
Mount Olive Middle School
160 Wolfe Road,
Budd Lake, NJ, 07828

Municipal Contact Person: Mr. Thomas Scerbo

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.

The annual energy costs at this facility are as follows:

| | |
|---|---|
| Electricity | $362,427 |
| Natural Gas | $110,241 |
| Total | $472,669 |

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. 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.

**Table 1**
**Financial Summary Table**

| ENERGY CONSERVATION MEASURES (ECM's) | | | | | |
|---|---|---|---|---|---|
| **ECM NO.** | **DESCRIPTION** | **NET INSTALLATION COST[A]** | **ANNUAL SAVINGS[B]** | **SIMPLE PAYBACK (Yrs)** | **SIMPLE LIFETIME ROI** |
| ECM #1 | Lighting Upgrade - Delamping | $26,978 | $12,254 | 2.2 | 581.4% |
| ECM #2 | Lighting Upgrade - Metal Halides | $7,515 | $5,789 | 1.3 | 1055.4% |
| ECM #3 | Lighting Occupancy & Daylight Sensors | $22,110 | $8,190 | 2.7 | 455.6% |
| ECM #4 | CRT Monitor Replacement | $1,500 | $303 | 5.0 | 202.8% |
| ECM #5 | Water Cooled Chiller Plant | $1,322,600 | $68,565 | 19.3 | -22.2% |
| ECM #6 | Solar Thermal Hot Water Heating System | $129,000 | $9,630 | 13.4 | 12.0% |
| ECM #7 | Kitchen Exhaust Hood Controls | $30,639 | $1,905 | 16.1 | -6.8% |
| ECM #8 | Premium Efficiency Motors | $42,890 | $1,618 | 26.5 | -43.4% |
| **RENEWABLE ENERGY MEASURES (REM's)** | | | | | |
| **ECM NO.** | **DESCRIPTION** | **NET INSTALLATION COST** | **ANNUAL SAVINGS** | **SIMPLE PAYBACK (Yrs)** | **SIMPLE LIFETIME ROI** |
| REM #1 | Solar Photovoltaic Panels | $1,968,570 | $143,507 | 13.7 | 82.2% |

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

The estimated demand and energy savings for each ECM and REM is shown below in Table 2. The descriptions in this table correspond to the ECM's and REM's listed in Table 1.

**Table 2**
**Estimated Energy Savings Summary Table**

| ENERGY CONSERVATION MEASURES (ECM's) | | | | |
|---|---|---|---|---|
| **ECM NO.** | **DESCRIPTION** | **ANNUAL UTILITY REDUCTION** | | |
| | | **ELECTRIC DEMAND (KW)** | **ELECTRIC CONSUMPTION (KWH)** | **NATURAL GAS (THERMS)** |
| ECM #1 | Lighting Upgrade - Delamping | 26.7 | 68,845 | 0 |
| ECM #2 | Lighting Upgrade - Metal Halides | 10.0 | 32,520 | 0 |
| ECM #3 | Lighting Occupancy & Daylight Sensors | 17.6 | 46,010 | 0 |
| ECM #4 | CRT Monitor Replacement | 0 | 1,701 | 0 |
| ECM #5 | Water Cooled Chiller Plant | 616.2 | 492,960 | 0 |
| ECM #6 | Solar Thermal Hot Water Heating System | 0 | 0 | 7,465 |
| ECM #7 | Kitchen Exhaust Hood Controls | 0 | 7,798 | 401 |
| ECM #8 | Premium Efficiency Motors | 3.2 | 9,091 | 0 |
| **RENEWABLE ENERGY MEASURES (REM's)** | | | | |
| **ECM NO.** | **DESCRIPTION** | **ANNUAL UTILITY REDUCTION** | | |
| | | **ELECTRIC DEMAND (KW)** | **ELECTRIC CONSUMPTION (KWH)** | **NATURAL GAS (THERMS)** |
| REM #1 | Solar Photovoltaic Panels | 175 | 271,793 | 0 |

Concord Engineering Group (CEG) recommends proceeding with the implementation of all ECM's that provide a calculated simple payback at or under ten (10) years. The following Energy Conservation Measures are recommended for the facility:

- **ECM #1** Lighting Upgrade – De-lamping
- **ECM #2** Lighting Upgrade - Metal Halides
- **ECM #3** Lighting Occupancy & Daylight Sensors
- **ECM #4** CRT Monitor Replacement

**ECM #1 Lighting Upgrade – De-lamping**

Majority of the lighting in the facility is primarily made up of fluorescent fixtures with modern T-8 lamps and electronic ballasts. However, there are several locations in the middle school where the lighting provided for these areas are in excess of normal lighting levels. Therefore, this ECM will de-lamp the fixtures in the over lit areas. This ECM has a 2.2 years payback.

**ECM #2 Lighting Upgrade - Metal Halides**

The main gymnasium, auxiliary gymnasium and some of the utility rooms utilize older style, probe start metal halide fixtures. These fixtures have direct replacements that save considerable energy. The lighting retrofit includes new high bay T-5 high output fluorescent fixtures to replace the metal halide fixtures. Advantages include extended life, instant lamp start and superior light quality, making this ECM financially and aesthetically beneficial. The fluorescent fixtures selected will provide equivalent light compared to the average light output of the existing metal halide fixtures. The bulb replacement cost for T-5 HO lamps compared to the existing metal halide lamps were found to be approximately equal and therefore not included in the savings calculations. This ECM has a simple payback of 1.3 years making it highly recommended for the facility.

**ECM #3 Lighting Occupancy & Daylight Sensors**

Lighting controls provide a simple and effective solution to the problem of lights being unnecessarily left on. Occupancy sensors alone provide fast payback since there is no retrofit needed for the existing lighting. Daylight Sensors were included in this ECM to show the relative effect of daylight harvesting in addition to occupancy sensors. The combination of both options still pays back in 2.7 years and therefore is recommended to be installed.

**ECM #4 CRT Monitor Replacements**

Some of the computers in the building utilize CRT computer monitors. This type of monitors are outdated and have several disadvantages such as; significantly increased higher energy consumption, large amount of desk space usage, poor picture quality, distortions and flickering image, secular glare problems, and high weight, and electromagnetic emissions. Many of the

drawbacks are difficult to quantify except for the energy use. CRT monitors use considerably more energy than an alternative flat panel LCD monitor. Replacement of the existing CRT monitors with LCD monitors saves considerable energy as well as provides other ergonomic benefits as well. This ECM has a simple payback in 5 years and it is recommended for the building.

**Renewable Energy Analysis**

Renewable Energy Measures (REMs) were also reviewed for implementation at the Mount Olive Middle School. CEG utilized a parking lot canopy mounted solar array to house a substantial PV system. The recommended 218.8 kW PV system will produce approximately 271,800 kWh of electricity annually and will reduce the schools electrical consumption from the grid by 13.3%. The system's calculated simple payback of 13.7 years is past the standard 10 year simple payback threshold; however, with alternative funding this payback could be lessened. CEG recommends the Owner review all funding options before deciding to not implement this renewable energy measure.

**Operation and Maintenance Considerations**

In addition to the ECMs, 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:

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 entrance 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. Maintain insulation on the hot and chilled water pipes.
6. Check and confirm occupied and unoccupied temperature settings for each air conditioning unit and remove any overrides.
7. Confirm that outside air economizers on the rooftop air handling units are functioning properly to take advantage of free cooling and avoid excess outside air during occupied periods.

**Retro-commissioning**

In addition to the above recommendations, based on the review of the facility's energy bills and discussions with the School District, the energy audit team recommends Retro-Commissioning of this facility to meet the following objectives:

- Bring existing HVAC equipment to its proper operational state including air and water distribution systems
- Reduce energy use and energy costs
- Improve indoor air quality
- Verify the installation and performance of identified system upgrades
- Address overall building energy use and demand and identify areas of highest energy use and demand
- Identify the location of the most comfort problems or trouble spots in the building
- Review current O&M practices

Through the implementation of a Retro-Commissioning Plan, the School District will be able to continue with their vision of reducing energy usage and operating efficient facilities.

**Other Recommendations**

To provide assistance to small public entities in the effort to implement valuable ECMs, the NJ Clean Energy program in combination with the BPU has initiated the "Direct Install Program". This program provides extremely large incentives to facilities such as the Chester M. Stephens Elementary School building, to jump start energy projects. The direct install program offers incentives up to 60% of the installation costs through the services of pre-approved contractors. The program is directed towards one for one replacement projects that save energy and provide valuable upgrades for the facility for only 40% of the installation cost. Moreover, the program currently has a 200 kW maximum demand limit for applicability. This demand limit is capable of being waived if the School District is able to receive a portion of their respective Township Local Government's American Recovery and Reinvestment Act (ARRA) funding towards energy efficiency improvements. Therefore, for facilities over the 200 kW maximum demand limit, such as Mountain View Elementary School, the School District will need to coordinate Direct Install efforts with the Township's Local Government.

**Conclusion**

Overall, the Mount Olive Middle School appears to be operating at an efficiency lower than the other schools in the region. With the implementation of the above recommended measures the Mount Olive BOE will realize further energy savings at the Mount Olive Middle School.

## II. INTRODUCTION

The comprehensive energy audit covers the 201,934 square foot Middle School, which includes: classrooms, offices, computer rooms, science laboratories, two gymnasium, auditorium, cafeteria, kitchen, maintenance areas and storage areas.

Electrical and natural gas utility information is collected and analyzed for one full year's energy use of the 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

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. If multiple ECM's are recommended to be implemented, the combined savings is calculated and identified appropriately.

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:

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

$$\text{Simple Lifetime Savings} = (\text{Yearly Savings} \times \text{ECM Lifetime})$$

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

$$\text{Lifetime Maintnance Savings} = (\text{Yearly Maintenance Savings} \times \text{ECM Lifetime})$$

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

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

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

# IV. HISTORIC ENERGY CONSUMPTION/COST

## A. Energy Usage / Tariffs

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.

The electric usage profile represents the actual electrical usage for the facility. Jersey Central Power and Light (JCP&L) provides electricity to the facility under their General Service Secondary Three-Phase rate structure. 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 shows the actual natural gas energy usage for the facility. Elizabethtown Gas Company provides natural gas to the facility under the General Delivery Service (GDS) rate structure. 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.

The third party commodity provider Pepco is responsible for providing the supply of gas to the buildings. Commodity (Supply) and delivery is billed separately for each respective utility service.

The overall cost for utilities is calculated by dividing the total cost by the total usage. Based on the utility history provided, the average cost for utilities for the campus is as follows:

| Description | Average |
|---|---|
| Electricity | 17.8¢ / kWh |
| Natural Gas | $1.29 / Therm |

**Table 3**
**Electricity Billing Data**

**ELECTRIC USAGE SUMMARY**

Utility Provider: Jersey Central Power & Light (JCPL)
Rate: General Service Secondary 3 Phase
Meter No: G16650008
Customer ID No: 100033263086
Third Party Utility Provider: -
TPS Meter / Acct No: -

| MONTH OF USE | CONSUMPTION | DEMAND | TOTAL BILL |
|---|---|---|---|
| Sep-09 | 199,200 | 826.8 | $36,251 |
| Oct-09 | 194,800 | 839.6 | $32,764 |
| Nov-09 | 193,200 | 718.4 | $31,805 |
| Dec-09 | 187,600 | 618.0 | $31,296 |
| Jan-10 | 143,600 | 735.2 | $32,012 |
| Feb-10 | 180,800 | 496.4 | $29,593 |
| Mar-10 | 177,200 | 570.8 | $29,319 |
| Apr-10 | 186,000 | 734.4 | $31,592 |
| May-10 | 193,200 | 871.2 | $33,514 |
| Jun-10 | 216,000 | 760.8 | $38,074 |
| Jul-10 | 148,000 | 915.6 | $28,674 |
| Aug-10 | 18,000 | 685.6 | $7,533 |
| **Totals** | **2,037,600** | **915.6 Max** | **$362,427** |

**AVERAGE DEMAND** **731.1 KW average**
**AVERAGE RATE** **$0.178** **$/kWh**

**Figure 1**
**Electricity Usage Profile**
Mt. Olive BOE Middle School
Sep-09 through Jul-10

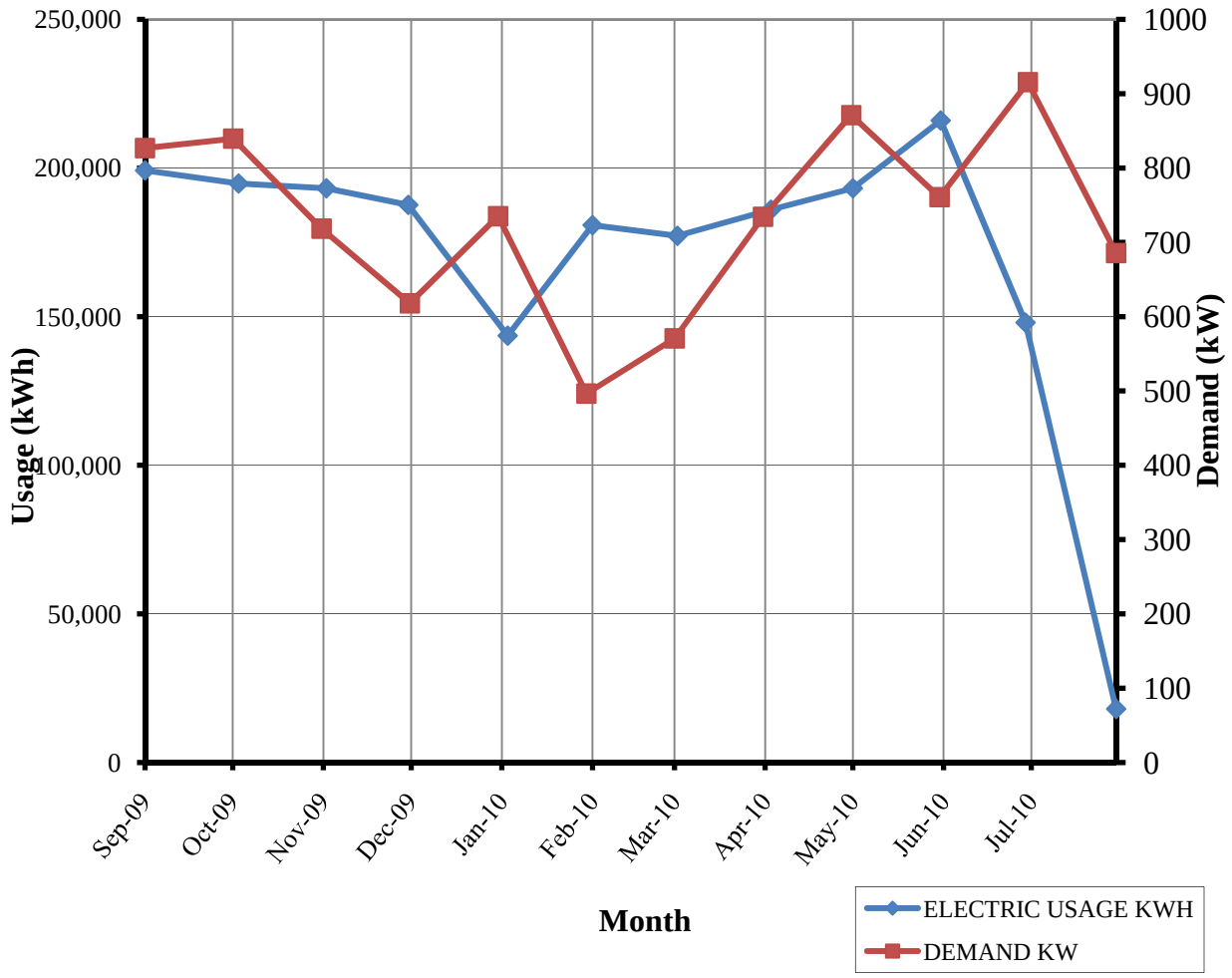
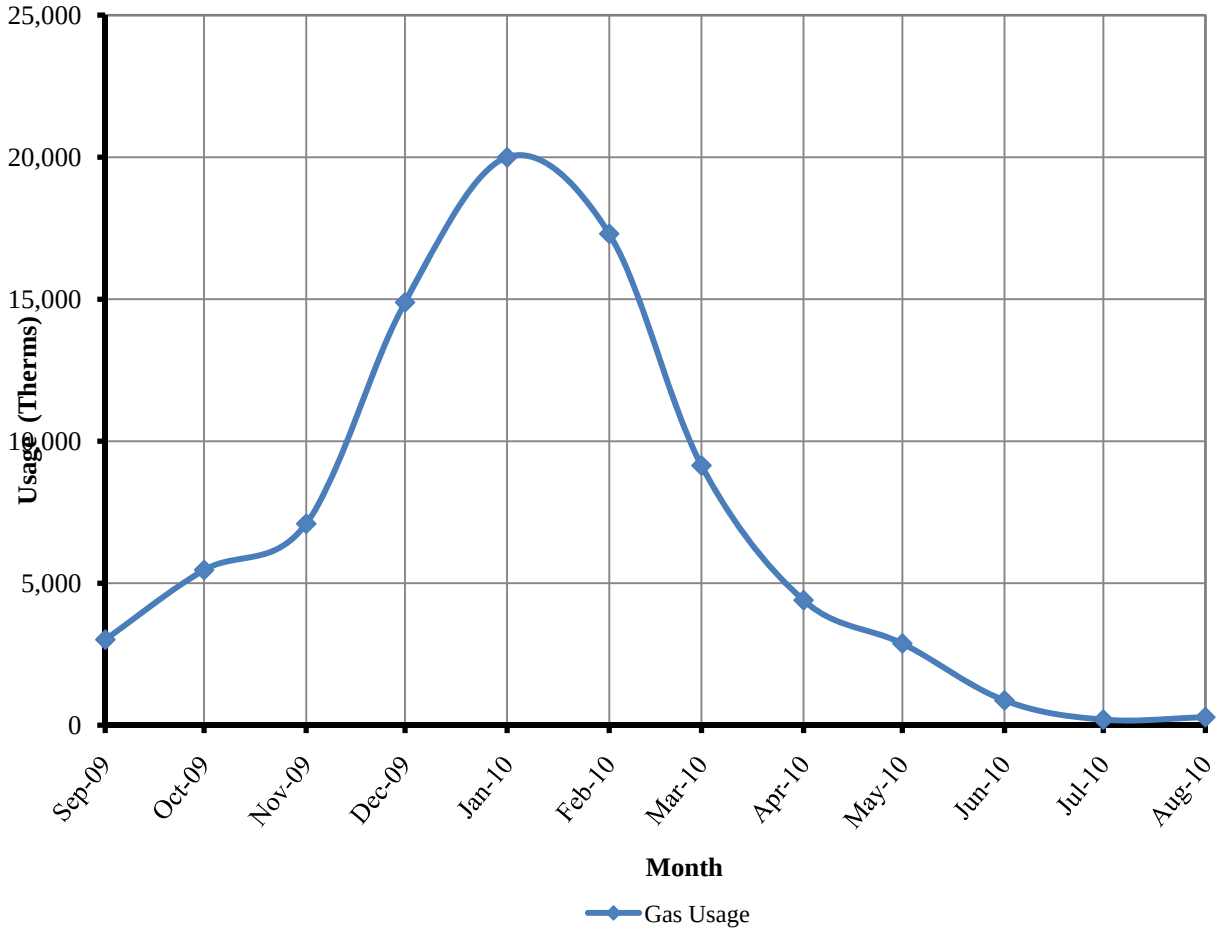


**Table 4**
**Natural Gas Billing Data**

| NATURAL GAS USAGE SUMMARY | | |
|---|---|---|
| Utility Provider: | Elizabethtown Gas | |
| Rate: | General Delivery Service | |
| Meter No: | 09739062 | |
| Point of Delivery ID: | - | |
| Third Party Utility Provider: | Pepco, HESS | |
| TPS Account No: | 8110411711, 446646/447323 | |
| **MONTH OF USE** | **CONSUMPTION (THERMS)** | **TOTAL BILL** |
| Sep-09 | 3,013.20 | $4,400.18 |
| Oct-09 | 5,465.10 | $8,176.83 |
| Nov-09 | 7,093.20 | $9,287.01 |
| Dec-09 | 14,889.60 | $18,130.57 |
| Jan-10 | 19,996.70 | $24,083.95 |
| Feb-10 | 17,304.00 | $20,974.71 |
| Mar-10 | 9,145.00 | $11,553.62 |
| Apr-10 | 4,402.40 | $6,077.41 |
| May-10 | 2,877.40 | $4,316.50 |
| Jun-10 | 874.70 | $828.69 |
| Jul-10 | 196.30 | $1,161.71 |
| Aug-10 | 280.80 | $1,250.12 |
| **TOTALS** | **85,538.40** | **$110,241.30** |
| **AVERAGE RATE:** | **$1.29** | **$/THERM** |

**Figure 2**
**Natural Gas Usage Profile**
Mt. Olive BOE, Middle School
Sep-09 through Jul-10



**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 this facility is calculated as follows:

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

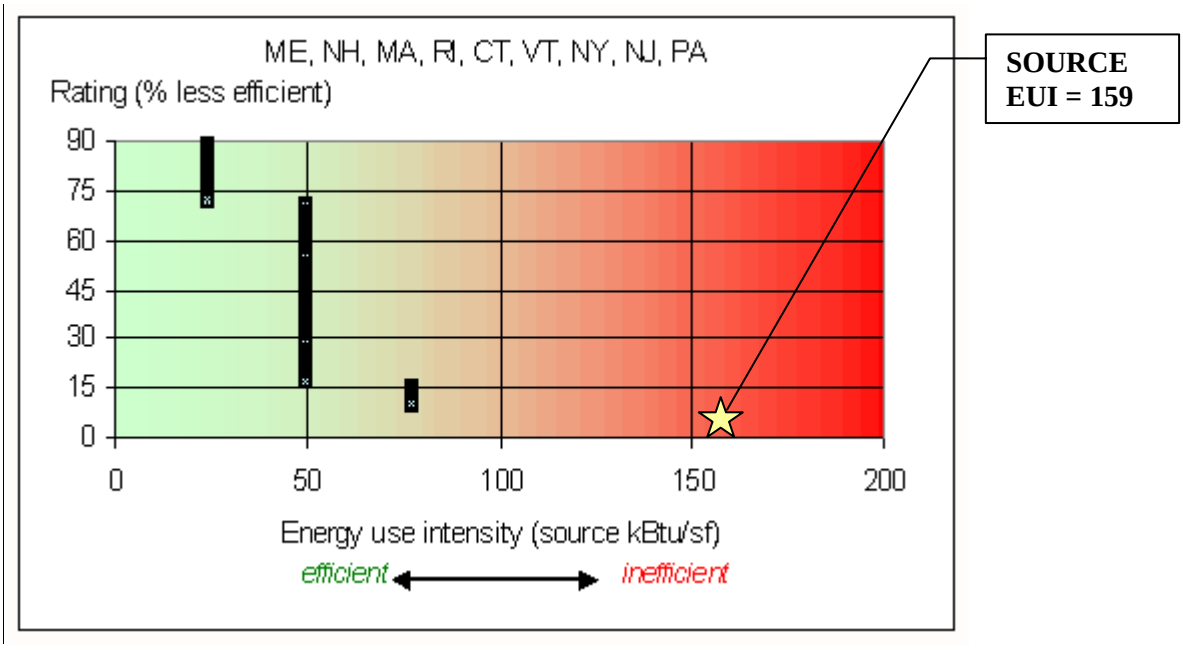
$$\text{Building Source EUI} = \frac{(\text{Electric Usage in kBtu X SS Ratio} + \text{Gas Usage in kBtu X SS Ratio})}{\text{Building Square Footage}}$$

**Table 5**
**Facility Energy Use Index (EUI) Calculation**

| ENERGY USE INTENSITY CALCULATION | | | | | | |
|---|---|---|---|---|---|---|
| **ENERGY TYPE** | **BUILDING USE** | | | **SITE ENERGY** | **SITE-SOURCE RATIO** | **SOURCE ENERGY** |
| | **kWh** | **Therms** | **Gallons** | **kBtu** | | **kBtu** |
| ELECTRIC | 2,037,600 | | | 6,956,366 | 3.340 | 23,234,264 |
| NATURAL GAS | | 85,538 | | 8,553,840 | 1.047 | 8,955,870 |
| TOTAL | | | | 15,510,206 | | 32,190,134 |
| *Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007. | | | | | | |
| **BUILDING AREA** | | 201,934 | SQUARE FEET | | | |
| **BUILDING SITE EUI** | | 76.81 | kBtu/SF/YR | | | |
| **BUILDING SOURCE EUI** | | 159.41 | kBtu/SF/YR | | | |

Figure 3 below depicts a national EUI grading for the source use of High Schools. The High School chart is used due to the large area of the school.

**Figure 3**
**Source Energy Use Intensity Distributions: High Schools**




Source Energy Use Intensities are not available for Middle Schools; therefore data for High Schools was used as a basis for comparison.

## 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.

In accordance with the Local Government Energy Audit Program, CEG has created an ENERGY STAR account for the municipality to access and monitoring the facility's yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

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

User Name: mtoliveschools
Password: lgeaceg2010

Security Question: What city were you born in?
Security Answer: Mount Olive

The utility bills and other information gathered during the energy audit process are entered into the Portfolio Manager. The following is a summary of the results for the facility:

**Table 6**
**ENERGY STAR Performance Rating**

| ENERGY STAR PERFORMANCE RATING | | |
|---|---|---|
| **FACILITY DESCRIPTION** | **ENERGY PERFORMANCE RATING** | **NATIONAL AVERAGE** |
| Mt. Olive Middle School | 35 | 50 |

Refer to **Statement of Energy Performance Appendix** for the detailed energy summary.

## V. FACILITY DESCRIPTION

The 201,934 SF Middle School is a partially two story facility comprised of classrooms, offices, computer rooms, gymnasium, auditorium, cafeteria, kitchen, maintenance areas and storage areas. The building was built in 2000 with no additions added since the original construction. The school hours of operation are typical for a school; between 7:00AM and 3:00 PM. The gymnasium and auditorium are used after hours for sports and other events during the weekdays and weekends. The school population is approximately 1250 including the staff.

The building exterior is comprised of concrete block wall construction with a combination of brick and architectural stone façade. Estimated amount of insulation between the block wall and the façade is 1 inch. The roof is built up flat with estimated 3" rigid foam insulation below the rubber membrane. The flat roof is covered with tar and gravel. Majority of the HVAC equipment is installed on the roof. The windows throughout the facility are a combination of fixed pane windows and small operable windows for ventilation. The windows are double pane with slightly tinted glass. Overall the envelope for the building is in good condition with the exception of slight water leaks through the roof lines as stated by the operations personnel.

The school houses a commercial kitchen. The kitchen includes gas cooking range, oven, commercial dishwasher, a walk-in refrigerator and a freezer. The walk-in units appear to be in good condition. There are four (4) vending machines in the building. Two (2) of the machines are refrigerated soda machines that operate year round.

HVAC Systems

The central heating system consists of six (6) Aerco Benchmark 2,0 fire tube, gas fired, condensing hot water boilers with a total capacity of 12,000 MBH. The boilers are used to generate heating hot water. The boiler water is pumped throughout the building by three (3) constant volume 25 HP base mounted end suction pumps (two operating / one standby) made by Armstrong. The pumps are coupled with NEMA premium efficiency motors.

The central cooling system consists of six (6) packaged air cooled chillers. The air cooled chillers are 128 Ton chillers made by Carrier. Chilled water is distributed throughout the building to the classroom unit ventilators and the packaged roof top air conditioning units via three variable volume 40 HP base mounted end suction pumps. The chilled water pumping capacities are modulated via variable frequency drives made by Square-D. All three pumps are driven by premium efficiency motors made by US Electrical. All of the central cooling system equipment is in good condition and maintained well.

The air side systems include unit ventilators and fan coil units for the classrooms, rooftop air handling units for spaces such as the gymnasium, auditorium, cafeteria and office areas and make up air units for the kitchen and the woodshop. The unit ventilators, fan coil units and air handling units provide heating and cooling to the building year round with the exception of the unit ventilators which only provides cooling when students are present. All of the air side equipments including the unit ventilators, fan coil units and air handling units utilize 3-way control valves for both the heating and cooling coils. Ventilation air for the classrooms is

provided by outside air dampers at each unit ventilator. The majority of the air handling unit supply and return fans are equipped with high efficiency motors.

The air handling units #1,2,3 & 8 feeding the music room, library and media center, synergistics and computer rooms includes downstream VAV boxes for individual space temperature control. The VAV boxes include hot water preheat / reheat coils with 3-way valves for supply air temperature controls. The air handling units are equipped with Variable Frequency Drives for supply air volume modulation. Remaining air handling units provide constant volume to the corresponding spaces through ceiling diffusers. All of the remaining air handling units are equipped with air side economizer functionality.

The make-up air for the kitchen and the wood shop is provided with two (2) make up air units made by Reznor and Greenheck. The make-up air units are equipped with heating coils only.

HVAC Controls

The HVAC system includes a central control system made by Andover Controls. The system integrates into the majority of the equipment including boilers, chillers, air handling units and the unit ventilators. The system includes all electronic controls for actuators and control valves. The front end controller has the capability to monitor and control all schedules, thermostat temperatures and set points. The control system also automates the on / off control and temperature setbacks based on occupancy schedules.

Exhaust System

The air is exhausted from the classrooms, hallways, meeting and dining halls and corridors via dedicated exhaust fans located on the roof. The toilet rooms have dedicated roof exhausters as well. The kitchen includes a total of four (4) commercial exhaust hoods, which provides exhaust for cooking equipment and the dishwasher. Two (2) of the hoods are 4ft x 14ft and the two (2) of the hoods is 4ft x 8 ft. The kitchen hoods are manually controlled with a wall switch.

Domestic Water

Domestic hot water for the restrooms, kitchen, and various sinks throughout the school is provided by two (2) gas fired commercial hot water heaters. Each hot water heater has a capacity of 85 gallons and input rating of 365 MBH made by A.O. Smith. An auxiliary storage tank is coupled with the domestic hot water heaters for extra storage capacity. The domestic hot water is circulated throughout the building by fractional horse power hot water circulation pumps. The circulation pumps are controlled by aqua stat. The domestic hot water tank and piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with modern T-8 lamps and electronic ballasts. Lighting measurements indicate that some of the classrooms, offices and meeting areas are overlit and has a potential for de-lamping. Storage rooms and closets lit with a mixture of incandescent lamps and compact fluorescent lamps. The gymnasium lighting is

provided with 400W metal halide fixtures. The building exterior is lit with wall mount fixtures with high pressure sodium lamps.

## VI. 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.

# VII. ENERGY CONSERVATION MEASURES

## ECM #1: LIGHTING UPGRADES

**Description:**

The lighting in the facility is primarily made up of fluorescent fixtures with T-8 lamps and electronic ballasts; and some remaining Metal Halide lamps. These metal halide lamps consume a large amount of power while on and can be replaced with a much more energy efficient fixture. Refer to ECM #2 for the metal halide upgrade.

There are several locations in the middle school that have efficient T8 fluorescent lighting with electronic ballasts. The lighting provided for these areas are in excess of normal lighting levels. Therefore, this ECM will de-lamp the fixtures in the over lit areas. There is no ballast change required and the removal of only 1 lamp will save a substantial amount of energy.

**Energy Savings Calculations:**

The detailed **Investment Grade Lighting Audit Appendix** outlines the proposed retrofits, costs, savings, and payback periods.

**Energy Savings Summary:**

Interior Spaces

The lighting throughout the Mt. Olive Middle School building is provided with modern fixtures with T8 lamps and electronic ballasts. There are several spaces where lighting is excessive and should be de-lamped.

**Rebates and Incentives:**

NJ Smart Start® Program Incentives are calculated as follows:

From the **Smart Start Incentive Appendix**, the following incentives are warranted:

De-lamping without changing the ballast does not qualify for an incentive.

There is no significant replacement and Maintenance Savings generated by this replacement.

**Energy Savings Summary:**

| ECM #1 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $26,978 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $26,978 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $12,254 |
| **Total Yearly Savings ($/Yr):** | $12,254 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 2.2 |
| **Simple Lifetime ROI** | 581.4% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $183,816 |
| **Internal Rate of Return (IRR)** | 45% |
| **Net Present Value (NPV)** | $119,314.23 |

## ECM #2: Lighting Upgrade – Metal Halide Upgrade

**Description:**

The Main Gymnasium and Auxiliary Gymnasium at the Middle School utilize 400W metal halide fixtures for its lighting. The Electrical Room A115 and Boiler Room utilize 250W metal halide fixtures for its lighting. Metal halide bulbs provide a reasonably efficient option for bay lighting however a few draw-backs that are common. Metal halide fixtures often have poor overall efficacy which limits the amount of light actually leaving the fixture. Also metal halide bulbs require a significant warm-up period and even longer cool down period eliminating the potential for occupancy sensors frequent switching. This symptom encourages the gymnasium lighting to be left on continuously during the day. Another drawback is the reduced lumen output (Lumen Maintenance) of the metal halide bulb over its life time. Average bulb output or "mean lumens," is approximately 25% less than the bulb's initial lumens for typical metal halide lamps. In addition the most rapid rate of light output decline is during the beginning of its life, approximately 15-20% light loss within the first 20% of its rated life. It is important to note that the light loss has no savings in energy used; therefore the overall light efficiency is continuously decreasing with age. The final drawback is the light quality or Color Rendering Index (CRI). Typical values for metal halide bulbs is 65, which is a measure of how close the light is to true "full spectrum" light produced by sunlight or incandescent lighting. Metal halide bulbs also show noticeable color shifting when the bulb is reaching the end of its life.

Utilizing fluorescent fixtures in low and high bay spaces is a superior option over metal halide fixtures in all areas described above. Although metal halide fixtures provide light very efficiently at the start of the bulb life, the average efficiency over the life is below that of fluorescent fixtures.

This ECM includes replacement of each of the existing main and auxiliary gymnasium high bay metal halide light fixtures and the electrical room and boiler room LoBay metal halide light fixtures with T5HO fixtures with reflective lenses. The retrofit for the metal halide fixtures includes a one for one fixture replacement. The fluorescent fixtures selected will provide equivalent light compared to the average light output of the existing metal halide fixtures. The bulb replacement cost for T-5 HO lamps compared to the existing metal halide lamps were found to be approximately equal and therefore not included in the savings calculations.

<u>Hours of Operation</u>

| | |
|---|---|
| Main Gymnasium: | 3,000 Hours/Yr |
| Auxiliary Gymnasium: | 3,000 Hours/Yr |
| Electrical room: | 4,400 Hours/Yr |
| Boiler room: | 4,400 Hours/Yr |

**Energy Savings Calculations:**

The **Investment Grade Lighting Audit Appendix E-1** outlines the proposed retrofits, costs, savings, and payback periods.

NJ Smart Start® Program Incentives are calculated as follows:

From the **Smart Start Incentive Appendix**, the following incentives are warranted:

For replacement of HID (400-999W) with new T-5 or T-8 fixtures = $100/Fixture

$$\text{Smart Start ® Incentive} = (\#\text{ of 400W Metal Halide Fixture Replaced} \times \$100)$$

$$\text{Smart Start ® Incentive} = (36 \times \$100) = \$3{,}600$$

For replacement of HID (250-399W) with new T-5 or T-8 fixtures = $50/Fixture

$$\text{Smart Start ® Incentive} = (\#\text{ of 250W Metal Halide Fixture Replaced} \times \$50)$$

$$\text{Smart Start ® Incentive} = (15 \times \$50) = \$750$$

There is no significant replacement or maintenance savings generated with this ECM.

**Energy Savings Summary:**

| ECM #2 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $11,865 |
| **NJ Smart Start Equipment Incentive ($):** | $4,350 |
| **Net Installation Cost ($):** | $7,515 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $5,789 |
| **Total Yearly Savings ($/Yr):** | $5,789 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 1.3 |
| **Simple Lifetime ROI** | 1055.4% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $86,828 |
| **Internal Rate of Return (IRR)** | 77% |
| **Net Present Value (NPV)** | $61,588.45 |

## ECM #3: Lighting Controls Upgrade

**Description:**

Some of the lights in the school building 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 10% 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 type 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:**

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

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

**Cost and Incentives:**

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) are as follows:

| | |
|---|---|
| Dual Technology Occupancy switch Mounted Sensor | $75 per installation |
| Dual Technology Occupancy Remote Mounted Sensor | $160 per installation |
| 2 Pole Power Pack w/Dual Tech. Occupancy Sensor | $225 per installation |
| Daylight Sensor | $160 per installation |

Cost includes material and labor.

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

Occupancy Sensor Wall Mounted (existing facility only) = $20 per sensor
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor
Daylight sensor: Does not qualify for an incentive.

$$\text{Smart Start® Incentive} = (\#\ \text{of wall mount} \times \$\ 20) + (\#\ \text{of ceiling mount} \times \$35)$$
$$\text{Smart Start® Incentive} = (40\ \text{wall mount} \times \$\ 20) + (99\ \text{ceiling mount} \times \$35) = \$4{,}265$$

**Energy Savings Summary:**

| ECM #3 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $26,375 |
| **NJ Smart Start Equipment Incentive ($):** | $4,265 |
| **Net Installation Cost ($):** | $22,110 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $8,190 |
| **Total Yearly Savings ($/Yr):** | $8,190 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 2.7 |
| **Simple Lifetime ROI** | 455.6% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $122,850 |
| **Internal Rate of Return (IRR)** | 37% |
| **Net Present Value (NPV)** | $75,661.69 |

## ECM #4: Computer Monitor Replacement

**Description:**

Fifteen (15) computers in the classrooms and offices utilize CRT computer monitors. These computer monitors are outdated and have several disadvantages such as; significantly increased higher energy consumption, uses large amount of desk space, poor picture quality, distortions and flickering image, secular glare problems, and high weight, and electromagnetic emissions. Many of the drawbacks are difficult to quantify except for the energy use. CRT monitors use considerably more energy than an alternative flat panel LCD monitor. Replacement of the existing CRT monitors with LCD monitors saves considerable energy as well as provides other ergonomic benefits as well.

Based on the site survey it was noted that a number of the computers were left on and allowed to run 24 / 7. The majority of the monitors were left in screen saver mode, which is deceiving since this mode only saves the computer screen from image burn in, however it does not save on energy consumption. The average operating hours for all computers and monitors is estimated based on the site survey observations. Energy consumption of computer monitors is based on manufacture's specifications.

This ECM includes replacement of all existing CRT monitors with LCD flat panel monitors throughout the building. Installation costs were neglected for this ECM with the intention that this ECM would be replaced by the facility IT technicians. The calculations are based on the following operating assumptions:

**Energy Savings Calculations:**

| | |
|---|---|
| # of Computers: | 15 |
| Run Time %: | 90% |
| Weeks per Yr: | 42 |
| Hrs per Week: | 60 |

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

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

| COMPUTER MONITOR CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CRT Monitors | LCD Monitor | - |
| **# of Computers** | 15 | 15 | - |
| **Monitor Power Cons. (W)** | 75 | 25 | - |
| **Run Time %** | 90% | 90% | - |
| **Operating Hrs per Week** | 60 | 60 | - |
| **Operating Weeks per Yr** | 42 | 42 | - |
| **Elec Cost ($/kWh)** | 0.178 | 0.178 | - |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Electric Usage (kWh)** | 2,552 | 851 | 1,701 |
| **Energy Cost ($)** | $454 | $151 | $303 |
| **COMMENTS:** | | | |

Installation cost of new monitors is estimated based on current pricing for a 17" LCD monitor on the market today. No labor costs were included for replacing the existing monitors with the new monitors. No incentives are available for installation of computer monitors. Net cost per monitor was estimated to be $100. Cost of installation is summarized in the table below.

| COST & SAVINGS SUMMARY | | | |
|---|---|---|---|
| **ECM INPUT** | **# OF UNITS** | **UNIT COST** | **TOTAL COST** |
| **CRT MONITORS** | 15 | $100 | $1,500 |
| **Total** | 15 | | $1,500 |

**Energy Savings Summary:**

| ECM #4 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $1,500 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $1,500 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $303 |
| **Total Yearly Savings ($/Yr):** | $303 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 5.0 |
| **Simple Lifetime ROI** | 202.8% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $4,542 |
| **Internal Rate of Return (IRR)** | 19% |
| **Net Present Value (NPV)** | $2,114.54 |

## ECM #5: Water Cooled Chiller Installation

**Description:**

The major source of cooling for the Mt. Olive Middle School is a set of six (6) 130 ton air cooled chillers designed to run in an operating and standby fashion. The air cooled chillers are approximately 11 years old and in good condition. However the units are far less efficient compared to water cooled chillers.

Water cooled chillers provide significant energy savings over air cooled chillers due to the efficiency increase. The efficiency of the existing water cooled chillers is 1.24 KW/Ton. The efficiency of a water cooled chiller is approximately 0.38 KW/Ton (IPLV). The ancillary pumping energy and cooling tower fan energy is approximately 0.14 KW/Ton. Cooling tower make-up water requirements is estimated to be 2.5 Gal/Ton-Hr.

This ECM includes the installation of two new water cooled chiller to replace the air cooled chillers. The equipment includes an outdoor water-cooled chiller package with condenser water pumps and a cooling tower. The installation also includes all associated piping, labor, and controls. The ECM is based on two 400 Ton McQuay model number WMC 400D Magnitude™ Water-Cooled Frictionless Centrifugal Chillers or equivalent. Sizing indicated within the calculation of this ECM is based on a one for one replacement of the existing equipment capacity. The owner should have a Professional Engineer verify heating and cooling loads to verify actual building cooling requirements.

Parameters:

| | |
|---|---|
| Full Load Cooling Hrs. | = 800 hrs/yr. |
| Average Cost of Electricity | = $0.147/kWh |
| Total Cooling Capacity | = 780 Tons |
| | |
| Existing Unit Eff. | = 1.24 KW/Ton |
| New Unit Eff.* | = 0.45 KW/Ton |

*Eff including ancillary equipment energy

**Energy Savings Calculations:**

Cooling Energy:

$$Cooling\ Energy = Cooling(Tons) \times Eff. \left(\frac{kW}{Ton}\right) \times Full\ Load\ Hrs.$$

$$Demand\ Savings = \frac{Energy\ Savings\ (kWh)}{Full\ Load\ Hrs}$$

$$Water\ Usage = Make-up\ water \left(\frac{gal}{Ton\ Hr}\right) \times Cooling\ Capacity(Tons) \times Full\ Load\ Hrs$$

$$Water\ Cost = water\ consumption(gal) \times Ave\ Water\ Cost\left(\frac{\$}{Gal}\right)$$

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

Energy savings calculations are summarized in the table below.

| WATER COOLED CHILLER CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Existing Air Cooled Chillers | Water Cooled Chiller & Cooling Tower | - |
| **Operating Capacity (Tons)** | 780 | 780 | - |
| **Total System Efficiency (KW/Ton)** | 1.24 | 0.45 | - |
| **Full Load Cooling Hrs (Est.)** | 800 | 800 | - |
| **Make-Up Water Use (Gal/Ton Hr)** | 0 | 2.5 | - |
| **Cooling Energy (kWh)** | 773,760 | 280,800 | - |
| **Water Cost ($/Gallon)** | 0.0025 | 0.0025 | - |
| **Elec Cost ($/kWh)** | 0.147 | 0.147 | - |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Water Usage (Gallons)** | 0.0 | 1,560,000 | (1,560,000) |
| **Electric Energy (kWh)** | 773,760 | 280,800 | 492,960 |
| **Electric Demand (KW)** | 967.2 | 351 | 616 |
| **Water Cost ($)** | $0 | 3,900 | (3,900) |
| **Electric Energy Cost ($)** | $113,743 | $41,278 | $72,465 |
| **Total Energy Cost ($)** | $113,743 | $45,178 | $68,565 |
| **COMMENTS:** | New chiller efficiency based on water cooled, centrifugal, magnetic bearing chillers | | |

**Installation cost and Equipment Incentives**

Installation cost for the packaged water cooled chiller, condenser water pumps, cooling tower and controls is estimated to be $1,365,000.

From the NJ Smart Start® Program appendix, the unit falls under the category "Electric Chiller" and warrants an incentive based on part load efficiency (EER) at 0.38 KW/Ton. The program incentives are calculated as follows:

$$\text{Smart Start® Incentive} = (\text{Cooling Tons} \times \text{ \$/Ton Incentive})$$
$$= 2 \times (400 \text{ Tons} \times \$53/\text{Ton}) = \$42{,}400$$

**Energy Savings Summary:**

| ECM #5 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $1,365,000 |
| **NJ Smart Start Equipment Incentive ($):** | $42,400 |
| **Net Installation Cost ($):** | $1,322,600 |
| **Maintenance Savings ($/Yr):** | ($3,900) |
| **Energy Savings ($/Yr):** | $72,465 |
| **Total Yearly Savings ($/Yr):** | $68,565 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 19.3 |
| **Simple Lifetime ROI** | -22.2% |
| **Simple Lifetime Maintenance Savings** | ($58,500) |
| **Simple Lifetime Savings** | $1,028,477 |
| **Internal Rate of Return (IRR)** | -3% |
| **Net Present Value (NPV)** | ($504,074.05) |

## ECM #6: Solar Domestic Hot Water System

**Description:**

Mt. Olive Middle School operates with a nearly year round demand for hot water production. The hot water is supplied by gas fired domestic hot water heaters. The efficiency of the existing hot water heating system is based on the efficiency of the existing hot water heaters.

This ECM includes the installation of a solar thermal system to produce domestic hot water. The system includes thermal panels mounted over the roof of the existing boiler plant, piping distribution to the domestic hot water tanks, a pre-heat hot water heat exchanger, solar PV panels and pumps for glycol distribution, and controls. The system features a pre-heat tank with the existing tanks still in place as a back-up means for hot water production to ensure no loss of hot water production. The calculations are based on Viesmann Flat Plat collectors model VITOSOL 200F or equivalent.

**Energy Savings Calculations:**

$$\text{DHW Load} = \left( \text{Summer Energy Usage}\left(\frac{\text{Therms}}{\text{Month}}\right) \times 12(\text{Months}) \times \text{Eff}(\%) \times \text{Heating Value}\left(\frac{\text{Btu}}{\text{Therms}}\right) \right)$$

$$\text{Solar Sys Heat}\,\% = \frac{\text{Solar Heat}(\text{kBtu})}{\text{DHW Load}(\text{kBtu})}$$

$$\text{Gas Usage Reduction} = \text{Summer Gas Usage}\left(\frac{\text{Therms}}{\text{Month}}\right) \times 12(\text{Months}) \times \text{Domestic HW Heater Efficiency},\%$$

$$\text{Savings} = \text{Gas Usage Reduction} \times \text{Ave Cost}\left(\frac{\$}{\text{Therms}}\right)$$

Below is the average domestic hot water usage calculation table with the solar domestic hot water heating calculation tables.

Existing Domestic Hot Water Parameters:

Ave Gas Cost = $1.29/Therm
Estimated Domestic Water Heating Efficiency = 80%
Estimated non-space heating gas usage (Dom HW) = 1091 Therms*
(*Averaged from Jun - Sep gas usage)

Solar Thermal System Parameters:
Refer to **Solar Domestic Hot Water Heater Appendix** for detailed calculations.

Solar Thermal System Production: 597,188 kBtu/Yr

| ANNUAL GAS USAGE | | |
|---|---|---|
| MONTH | TOTAL USAGE | DOMESTIC HW USAGE |
| Sep-09 | 3,013 | 1,091 |
| Oct-09 | 5,465 | 1,091 |
| Nov-09 | 7,093 | 1,091 |
| Dec-09 | 14,890 | 1,091 |
| Jan-10 | 19,997 | 1,091 |
| Feb-10 | 17,304 | 1,091 |
| Mar-10 | 9,145 | 1,091 |
| Apr-10 | 4,402 | 1,091 |
| May-10 | 2,877 | 1,091 |
| Jun-10 | 875 | 1,091 |
| Jul-10 | 196 | 1,091 |
| Aug-10 | 281 | 1,091 |
| **TOTAL** | **85,538** | **13,095** |

| SOLAR THERMAL CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | HW Heaters | Solar Thermal Sys w/ HW Heaters | |
| **Ave Monthly Gas Usage for DHW (Therms)** | 1,091 | | |
| **Hot Water Heater Efficiency (%)** | 80% | 80% | |
| **Gas Heat Value (BTU/Therm)** | 100,000 | 100,000 | |
| **DHW Load (MMBTUs)** | 1,048 | 1,048 | |
| **Solar Thermal Sys. Production (MMBTUs)** | 0.0 | 597 | 597 |
| **Solar Thermal Sys. Heat % of Baseline (MMBTUs)** | 0.0 | 57.0% | 1 |
| **Gas Cost ($/Therm)** | 1.29 | 1.29 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Natural Gas Usage (Therms)** | 13,095 | 5,630 | 7,465 |
| **Energy Cost ($)** | $16,893 | $7,263 | $9,630 |
| **COMMENTS:** | This ECM is based on solar thermal hot water production from the solar thermal hot water calucation appendix. | | |

Installed cost of the solar thermal system including panels, piping, equipment, heat exchanger, pumps, and controls is estimated to be $129,000.

**Energy Savings Summary:**

| ECM #6 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $129,000 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $129,000 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $9,630 |
| **Total Yearly Savings ($/Yr):** | $9,630 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 13.4 |
| **Simple Lifetime ROI** | 12.0% |
| **Simple Lifetime Maintenance Savings** | 0 |
| **Simple Lifetime Savings** | $144,445 |
| **Internal Rate of Return (IRR)** | 1% |
| **Net Present Value (NPV)** | ($14,041.81) |

## ECM #7: Commercial Kitchen Exhaust Hood Controls

**Description:**

The kitchen in this facility is equipped with two (2) large commercial kitchen exhaust hoods providing exhaust for the cooking equipment. The total kitchen exhaust from the hoods is approximately 9,800 CFM powered by a total 10 HP of exhaust fans. The make-up air unit (approximately 10,000 CFM) provides conditioned air to replace all the air exhausted through the exhaust hoods. This system operates based on manual switches located in the kitchen. Currently the facility provides 1 meal per day. The installation of kitchen exhaust controls would significantly reduce the total kitchen exhaust and make-up air quantity. The conditioned make up air and exhausted air savings are achieved by monitoring the exhaust hoods and exhaust based on the actual use of the kitchen equipment. Temperature sensors and optical lasers monitor the heat and smoke production at each exhaust hood to reduce the exhaust and make-up airflow based on the need of the kitchen equipment.

This ECM includes installation of kitchen exhaust controls for the kitchen exhaust hoods and VFD's for the constant volume exhaust fans. The hoods would be retrofitted with temperature and laser sensors to monitor the activity of each of all equipment installed below the hoods. The work involves installing a Melink Kitchen Hood Variable Air Volume Controller; variable frequency drive on the kitchen hood exhaust fan; and turn off all the kitchen hood exhaust systems when the kitchen is closed. When the cooking appliances are turned on, the hood exhaust fan speed will increase based on the hood exhaust temperature. During heavy cooking, the kitchen hood exhaust fan increases to 100% speed until the smoke/vapor is removed. Energy savings are also realized when the kitchen equipment is operating at less than full load due to minimal cooking operations. During these times the fan speed decreases, removing only the necessary amount of air, saving exhaust fan energy and make up air conditioning energy.

**Energy Calculations Summary:**

Detailed calculations for the proposed kitchen hood control system can be found in the **Kitchen Exhaust Calculations Appendix.** It is pertinent to note that the calculation assumes the exhaust fans and make-up air unit are manually turned off for approximately 8 hours per day.

Installed cost of the kitchen hood control system is $32,189. The calculated energy savings equals approximately $1,905 per year.

From the Smart Start Incentive appendix, the retrofit of fan motors with VFDs warrants the following incentive:

5 to <10HP = $155 per HP
10 to <20HP = $120 per HP

$$\text{SmartStart® Incentive} = (\text{Total HP} \times \$155/\text{HP}) + (\text{Total HP} \times \$120/\text{HP}) + (\text{Total HP} \times \$65/\text{HP})$$

$$\text{SmartStart® Incentive} = (2 \times 5\text{HP} \times \$155/\text{HP})$$

$$\text{Smart Start® Incentive} = \underline{\$1{,}550}$$

A summary of energy savings can be seen in the table below:

| KITCHEN EXHAUST CONTROLS CALCULATION | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Manually Controlled Kitchen Exhaust | MELINK Kitchen Exhaust Controls | |
| **Fan Power Usage (kWh)** | 9,191 | 3,454 | 5,737 |
| **Gas Usage (Therms)** | 1,252 | 851 | 401 |
| **Cooling Energy (kWh)** | 6,440 | 4,380 | 2,061 |
| **Average Gas Cost ($/Therm)** | 1.29 | 1.29 | |
| **Electric Cost ($/KWH)** | 0.178 | 0.178 | |
| **SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Gas Energy Cost ($)** | $1,615 | $1,098 | $517 |
| **Electric Energy Cost ($)** | $2,782 | $1,394 | $1,388 |
| **Total Energy Cost ($)** | $4,397 | $2,492 | $1,905 |
| **COMMENTS:** | *ECM is based on calculations using spreadsheets privded by MELINK Intelli-hood controls manufacturer. | | |

**Energy Savings Summary:**

| ECM #7 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $32,189 |
| **NJ Smart Start Equipment Incentive ($):** | $1,550 |
| **Net Installation Cost ($):** | $30,639 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $1,905 |
| **Total Yearly Savings ($/Yr):** | $1,905 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 16.1 |
| **Simple Lifetime ROI** | -6.8% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $28,570 |
| **Internal Rate of Return (IRR)** | -1% |
| **Net Present Value (NPV)** | ($7,900.73) |

## 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.

Some of the existing electric motors driving the primary hot water pumps and the supply air fans in some of the air handling units 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 electric motors over 5 HP or more 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** |
| AHU-1 | Supply Fan | 10 | 3,000 | 89.5% | 92.4% |
| AHU-2 | Supply Fan | 7.5 | 3,000 | 88.5% | 91.7% |
| AHU-3 | Supply Fan | 5 | 3,000 | 87.5% | 90.2% |
| AHU-6 | Supply Fan | 7.5 | 3,000 | 87.5% | 91.7% |
| AHU-7 | Supply Fan | 7.5 | 3,000 | 87.5% | 91.7% |
| AHU-8 | Supply Fan | 10 | 3,000 | 89.5% | 92.4% |
| AHU-10 | Supply Fan | 20 | 3,000 | 91.0% | 93.0% |
| AHU-11 | Supply Fan | 5 | 3,000 | 87.5% | 90.2% |
| AHU-12 | Supply Fan | 7.5 | 3,000 | 88.5% | 91.7% |
| AHU-13 | Supply Fan | 5 | 3,000 | 87.5% | 90.2% |
| MAU #1 | Supply Fan | 7.5 | 3,000 | 87.5% | 91.7% |
| MAU #2 | Supply Fan | 5 | 3,000 | 85.0% | 90.2% |
| P10 | HW Pump | 25 | 3,600 | 92.4% | 93.6% |
| P11 | HW Pump | 25 | 1,200 | 92.4% | 93.6% |
| P12 | HW Pump | 25 | 1,200 | 92.4% | 93.6% |

**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 |
|---|---|---|---|---|---|---|---|
| AHU-1 | 10 | 90% | 89.5% | 92.4% | 0.24 | 710 | $126 |
| AHU-2 | 7.5 | 90% | 88.5% | 91.7% | 0.20 | 599 | $107 |
| AHU-3 | 5 | 90% | 87.5% | 90.2% | 0.11 | 346 | $62 |
| AHU-6 | 7.5 | 90% | 87.5% | 91.7% | 0.26 | 795 | $142 |
| AHU-7 | 7.5 | 90% | 87.5% | 91.7% | 0.26 | 795 | $142 |
| AHU-8 | 10 | 90% | 89.5% | 92.4% | 0.24 | 710 | $126 |
| AHU-10 | 20 | 90% | 91.0% | 93.0% | 0.32 | 957 | $170 |
| AHU-11 | 5 | 90% | 87.5% | 90.2% | 0.11 | 346 | $62 |
| AHU-12 | 7.5 | 90% | 88.5% | 91.7% | 0.20 | 599 | $107 |
| AHU-13 | 5 | 90% | 87.5% | 90.2% | 0.11 | 346 | $62 |
| MAU #1 | 7.5 | 90% | 87.5% | 91.7% | 0.26 | 795 | $142 |
| MAU #2 | 5 | 90% | 85.0% | 90.2% | 0.23 | 687 | $122 |
| P10 | 25 | 90% | 92.4% | 93.6% | 0.23 | 843 | $150 |
| P11 | 25 | 90% | 92.4% | 93.6% | 0.23 | 281 | $50 |
| P12 | 25 | 90% | 92.4% | 93.6% | 0.23 | 281 | $50 |
| **TOTAL** | | | | | **3.2** | **9,091** | **$1,618** |

**Equipment Cost and Incentives**

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

| INCENTIVES | |
|---|---|
| **HORSE POWER** | **NJ SMART START INCENTIVES** |
| 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 | 10 | $2,608 | $100 | $2,508 | $126 | 19.8 |
| AHU-2 | 7.5 | $2,007 | $90 | $1,917 | $107 | 18.0 |
| AHU-3 | 5 | $1,543 | $60 | $1,483 | $62 | 24.0 |
| AHU-6 | 7.5 | $2,007 | $90 | $1,917 | $142 | 13.5 |
| AHU-7 | 7.5 | $2,007 | $90 | $1,917 | $142 | 13.5 |
| AHU-8 | 10 | $2,608 | $100 | $2,508 | $126 | 19.8 |
| AHU-10 | 20 | $4,730 | $125 | $4,605 | $170 | 27.0 |
| AHU-11 | 5 | $1,543 | $60 | $1,483 | $62 | 24.0 |
| AHU-12 | 7.5 | $2,007 | $90 | $1,917 | $107 | 18.0 |
| AHU-13 | 5 | $1,543 | $60 | $1,483 | $62 | 24.0 |
| MAU #1 | 7.5 | $2,007 | $90 | $1,917 | $142 | 13.5 |
| MAU #2 | 5 | $1,543 | $60 | $1,483 | $122 | 12.1 |
| P10 | 25 | $6,049 | $130 | $5,919 | $150 | 39.4 |
| P11 | 25 | $6,049 | $130 | $5,919 | $50 | 118.3 |
| P12 | 25 | $6,049 | $130 | $5,919 | $50 | 118.3 |
| **TOTAL** | **Totals:** | **$44,295** | **$1,405** | **$42,890** | **$1,618** | **26.5** |

**Energy Savings Summary:**

| ECM #8 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $44,295 |
| **NJ Smart Start Equipment Incentive ($):** | $1,405 |
| **Net Installation Cost ($):** | $42,890 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $1,618 |
| **Total Yearly Savings ($/Yr):** | $1,618 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 26.5 |
| **Simple Lifetime ROI** | -43.4% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $24,272 |
| **Internal Rate of Return (IRR)** | -6% |
| **Net Present Value (NPV)** | ($23,573.12) |

## VIII. 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. CEG has assessed the feasibility of installing renewable energy measures (REM) for the municipality utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be 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). 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 average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof and the parking lot area of the building being audited for the purposes of determining a potential for a photovoltaic system. Since majority of the existing HVAC systems are on the roof limiting the space for a roof mounted PV system, a parking lot area of 15,525 S.F. can be utilized for a parking lot canopy mounted PV system. A depiction of the area utilized is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 219 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 271,800 KWh annually, reducing the overall utility bill by approximately 13.3% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power 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 on available space on the existing facility. Estimated solar array generation was then 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 the owner paying for 100% of the total project cost upfront via 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. Based on our calculations the following is the payback period:

**Table 7**
**Financial Summary – Photovoltaic System**

| FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM | | |
|---|---|---|
| **PAYMENT TYPE** | **SIMPLE PAYBACK** | **INTERNAL RATE OF RETURN** |
| Direct Purchase | 13.7 Years | 6.0% |

*The solar energy measure is shown for reference in the executive summary Renewable Energy Measure (REM) table

Given the large amount of capital required by the Owner to invest in a solar system through a Direct Purchase CEG does not recommend the Owner pursue this route. It would be more

advantageous for the Owner 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 Solar Arrays to the Owner at a reduced rate compared to their existing electric rate.

In addition to the Solar Analysis, CEG 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 CEG's review of the applicability of wind energy, it was determined that the average wind speed is not adequate for the facility. Therefore, wind energy is not a viable option to implement.

## IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's 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 typical cooling load profile for school facilities that have occupancy during the summer months. Historical usage is relatively steady throughout the year with an average monthly usage of 183,600 kWh and an average monthly demand of 731kW. Largest consumption months were September – December and April – June.

The historical usage profile is beneficial and will allow for more competitive energy prices when shopping for alternative suppliers mainly due to the relatively flat load profile and reduction of summer load. 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 JCP&L's BGS-FP default rate are recommended.

Natural Gas:

The Natural Gas Usage Profile demonstrates a very typical natural gas (heat load) profile. The summer months June - August have very little consumption. The average winter (Nov-Mar) consumption is 13,686 therms and the average summer (Apr-Oct) consumption is 2,444 therms. The largest consumption month was January at 19,997 therms.

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 the 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. Third Party Supplier (TPS) natural gas commodity contracts that offer product structures that include either a firm, fixed price or market based rate with basis lock in for 100% of the facilities natural gas requirements are recommended due to current low market pricing.

**Tariff Analysis:**

Electricity:

This facility receives electrical service through Jersey Central Power & Light (JCP&L) on a GS-Sec (General Service Secondary) rate. Service classification GS-Sec is available for general service purposes on secondary voltages not included under Service Classifications RS, RT, RGT or GST. This facility's rate is a single or three phase service at secondary voltages. This facility has not contracted a Third Party Supplier (TPS) to provide electric commodity service. For electric supply (generation) service, the client has a choice to either use JCP&L'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 facility's current BGS-FP average price to compare for GS-Sec rate is $0.1180/kWh.

The utility, JCP&L 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.

JCP&L's Delivery Service rate includes the following charges: Customer Charge, Supplemental Customer Charge, Distribution Charge (kW Demand), kWh Charge, Non-utility Generation Charge, TEFA, SBC, SCC, Standby Fee and RGGI.

Natural Gas:

This facility currently receives natural gas distribution service through Elizabethtown Gas (ETown) on rate schedule GDS (General Delivery Service) and has contracted a Third Party Supplier (TPS) to provide natural gas commodity service.

ETown 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

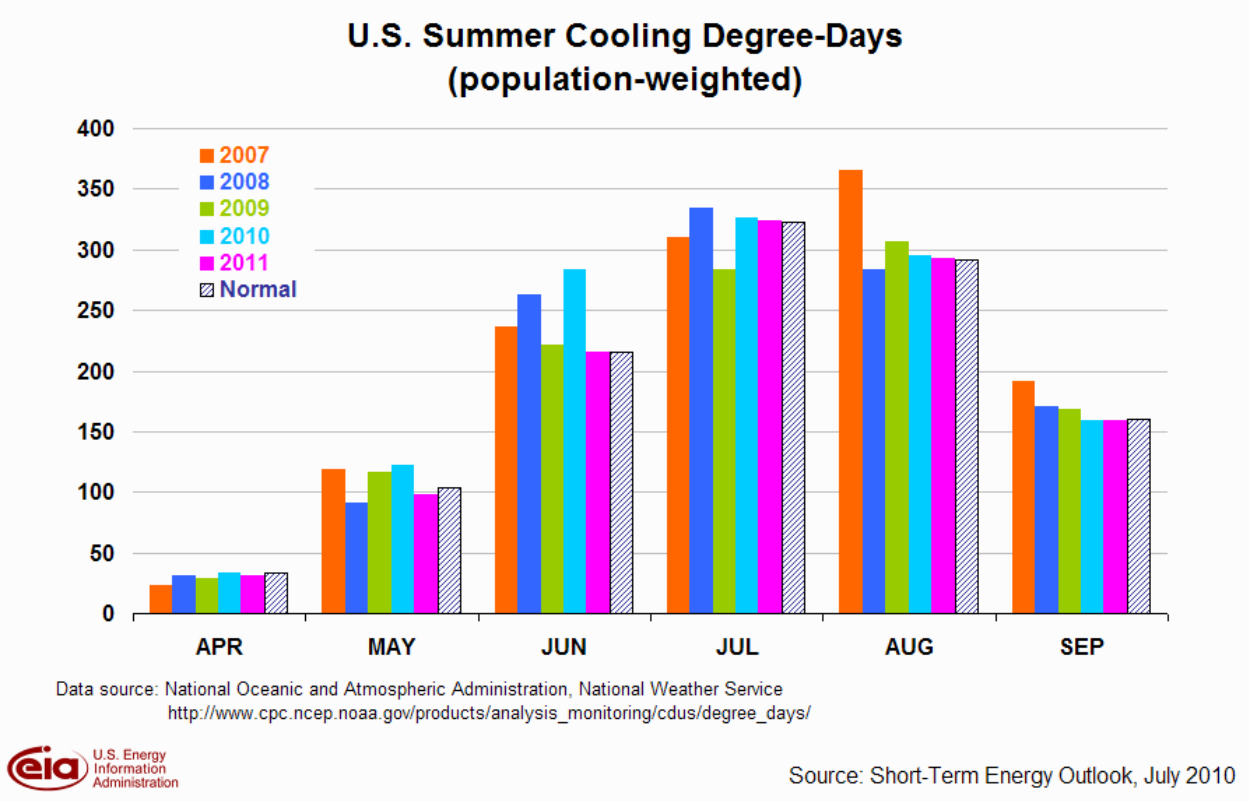
defaults or fails to provide commodity service. Please refer to the link below for a recap of natural gas BGSS charges from Elizabethtown Gas for rate schedule GDS. http://www.elizabethtowngas.com/Universal/RatesandTariff/BGSSRateHistory.aspx

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

**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 2010, 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 (10/13/2010):***

***U.S. Natural Gas Prices.*** *The Henry Hub spot price averaged $3.89 per MMBtu in September, $0.43 per MMBtu lower than the average spot price in August. Prices are expected to remain below $4 per MMBtu in October but rise to $4.68 per MMBtu by January as space-heating demand increases this winter. EIA has revised its projections for natural gas prices downward through 2011. Expectations are now for a price of $4.16 per MMBtu for the last quarter of 2010, $0.27 per MMBtu (6 percent) lower than last month's Outlook, based on several weeks of strong inventory builds. Price expectations for 2011 are $4.58 per MMBtu, which is $0.18 per MMBtu (4 percent) lower than last month's forecast, primarily due to a stronger domestic production forecast.*

*Uncertainty over future natural gas prices is lower this year compared with last year at this time. Natural gas futures for December 2010 delivery for the 5-day period ending October 7 averaged $4.07 per MMBtu, and the average implied volatility over the same period was 39 percent. This produced lower and upper bounds for the 95-percent confidence interval of $3.09 per MMBtu and $5.37 per MMBtu, respectively. At this time last year, the natural gas December 2009 futures contract averaged $5.59 per MMBtu and implied volatility averaged 56 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.70 per MMBtu and $8.50 per MMBtu.*

***U.S. Electricity Retail Prices.*** *Although the average U.S. residential retail price of electricity fell by nearly 1 percent during the first half of 2010 compared with the same period last year, prices are expected to increase by 1.5 percent year-over-year during the second half of 2010. Higher generation*

*fuel costs this year are expected to be passed through to retail consumers during 2011, pushing up residential prices by 1.4 percent next year*

**Recommendations:**

CEG recommends an aggregated approach for 3rd party commodity supply procurement strategies for electric supply service. Aggregating all school facilities for electricity supply service would allow this facility to achieve a reduction in electric supply costs. Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. This facility could realize up to a 20% reduction in electricity supply costs, if it were to aggregate usage with the other school facilities and take advantage of these current market prices quickly, before energy increases.

Overall, after review of the utility consumption, billing, and current commodity pricing outlook, CEG recommends that the facility in conjunction with the other school facilities utilize the advisement of 3rd party unbiased Energy Consulting Firm experienced in the aggregation of facilities and procurement of retail electricity commodity. The Energy Consulting Firm should incorporate a rational, defensible strategy for purchasing commodity in volatile markets based upon the following:

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

## X. 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:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par 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.

ii. *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.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for 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.

iv. *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%.

v. *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 200 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 80% 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.

CEG 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.

## XI. 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. Maintain insulation on the hot and chilled water pipes.

F. Check and confirm occupied and unoccupied temperature settings for each air conditioning unit and remove any overrides.

G. Confirm that outside air economizers on the rooftop units are functioning properly to take advantage of free cooling and avoid excess outside air during occupied periods.

In addition to the recommendations above, implementing Retro-Commissioning would be beneficial for this facility. Retro-Commissioning is a means to verify your current equipment is operating at its designed efficiency, capacity, airflow, and overall performance. Retro-Commissioning provides valuable insight into systems or components not performing correctly or efficiently. The commissioning process defines the original system design parameters and recommends revisions to the current system operating characteristics.

## XII. 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.

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.

# ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

**Mount Olive Middle 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 ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY** | | | | | | | | | | | | | | | |
| ECM #1 | Lighting Upgrade - Delamping | $26,978 | $0 | $0 | $26,978 | $12,254 | $0 | $12,254 | 15 | $183,816 | $0 | 581.4% | 2.2 | 45.26% | $119,314.23 |
| ECM #2 | Lighting Upgrade - Metal Halides | $11,865 | $0 | $4,350 | $7,515 | $5,789 | $0 | $5,789 | 15 | $86,828 | $0 | 1055.4% | 1.3 | 77.01% | $61,588.45 |
| ECM #3 | Lighting Occupancy & Daylight Sensors | $26,375 | $0 | $4,265 | $22,110 | $8,190 | $0 | $8,190 | 15 | $122,850 | $0 | 455.6% | 2.7 | 36.70% | $75,661.69 |
| ECM #4 | CRT Monitor Replacement | $1,500 | $0 | $0 | $1,500 | $303 | $0 | $303 | 15 | $4,542 | $0 | 202.8% | 5.0 | 18.63% | $2,114.54 |
| ECM #5 | Water Cooled Chiller Plant | $1,365,000 | $0 | $42,400 | $1,322,600 | $72,465 | ($3,900) | $68,565 | 15 | $1,028,477 | -$58,500 | -22.2% | 19.3 | -2.99% | ($504,074.05) |
| ECM #6 | Solar Thermal Hot Water Heating System | $129,000 | $0 | $0 | $129,000 | $9,630 | $0 | $9,630 | 15 | $144,445 | $0 | 12.0% | 13.4 | 1.45% | ($14,041.81) |
| ECM #7 | Kitchen Exhaust Hood Controls | $32,189 | $0 | $1,550 | $30,639 | $1,905 | $0 | $1,905 | 15 | $28,570 | $0 | -6.8% | 16.1 | -0.86% | ($7,900.73) |
| ECM #8 | Premium Efficiency Motors | $44,295 | $0 | $1,405 | $42,890 | $1,618 | $0 | $1,618 | 15 | $24,272 | $0 | -43.4% | 26.5 | -6.40% | ($23,573.12) |
| **REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY** | | | | | | | | | | | | | | | |
| REM #1 | Solar Photovoltaic Panels | $1,968,570 | $0 | $0 | $1,968,570 | $48,379 | $95,128 | $143,507 | 25 | $3,587,668 | $2,378,189 | 82.2% | 13.7 | 5.27% | $530,333.43 |

**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* .

# 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, 2010:

### Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

### 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 - $93 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 90.1-2004

### Ground Source Heat Pumps

| | |
|---|---|
| Closed Loop & Open Loop | $450 per ton, EER ≥ 16<br>$600 per ton, EER ≥ 18<br>$750 per ton, EER ≥ 20 |

Energy Efficiency must comply with ASHRAE 90.1-2004

## 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% |

## Variable Frequency Drives

| | |
|---|---|
| Variable Air Volume | $65 - $155 per hp |
| Chilled-Water Pumps | $60 per hp |
| Compressors | $5,250 to $12,500 per drive |

## Natural Gas Water Heating

| | |
|---|---|
| Gas Water Heaters ≤ 50 gallons | $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 (1-2 lamps)<br>$30 per fixture (3-4 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 | $25 per fixture |
| LED Exit Signs | $10 - $20 per fixture |
| T-5 and T-8 High Bay Fixtures | $16 - $284 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 |
| LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case | $42 per 5 foot<br>$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<br>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 90.1-2004 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% |

# STATEMENT OF ENERGY PERFORMANCE
# Middle School

**Building ID:** 2404045
**For 12-month Period Ending:** July 31, 2010[1]
**Date SEP becomes ineligible:** N/A

**Date SEP Generated:** October 05, 2010

**Facility**
Middle School
160 Wolfe Road
Budd Lake, NJ 07828

**Facility Owner**
Public Schools of Mt. Olive
89 Route 46
Budd Lake, NH 07828

**Primary Contact for this Facility**
Thomas Scerbo
89 Route 46
Budd Lake, NJ 07828

**Year Built:** 2004
**Gross Floor Area (ft²):** 201,934

**Energy Performance Rating**[2] (1-100) 35

**Site Energy Use Summary**[3]

| | |
|---|---|
| Electricity - Grid Purchase(kBtu) | 7,112,894 |
| Natural Gas (kBtu)[4] | 8,830,725 |
| Total Energy (kBtu) | 15,943,619 |

**Energy Intensity**[5]

| | |
|---|---|
| Site (kBtu/ft²/yr) | 79 |
| Source (kBtu/ft²/yr) | 163 |

**Emissions** (based on site energy use)

| | |
|---|---|
| Greenhouse Gas Emissions ($MtCO_2e$/year) | 1,553 |

**Electric Distribution Utility**
FirstEnergy - Jersey Central Power & Lt Co

**National Average Comparison**

| | |
|---|---|
| National Average Site EUI | 70 |
| National Average Source EUI | 144 |
| % Difference from National Average Source EUI | 13% |
| Building Type | K-12 School |

Stamp of Certifying Professional

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

**Meets Industry Standards**[6] **for Indoor Environmental Conditions:**

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

**Certifying Professional**
Michael Fischette
520 S. Burnt Mill Rd.
Voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

# ENERGY STAR® Data Checklist for Commercial Buildings

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

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

| CRITERION | VALUE AS ENTERED IN PORTFOLIO MANAGER | VERIFICATION QUESTIONS | NOTES | ☑ |
|---|---|---|---|---|
| **Building Name** | Middle School | Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings? | | ☐ |
| **Type** | K-12 School | Is this an accurate description of the space in question? | | ☐ |
| **Location** | 160 Wolfe Road, Budd Lake, NJ 07828 | Is this address accurate and complete? Correct weather normalization requires an accurate zip code. | | ☐ |
| **Single Structure** | Single Facility | Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building | | ☐ |
| School Building (K-12 School) | | | | |
| **CRITERION** | **VALUE AS ENTERED IN PORTFOLIO MANAGER** | **VERIFICATION QUESTIONS** | **NOTES** | ☑ |
| **Gross Floor Area** | 201,934 Sq. Ft. | Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area. | | ☐ |
| **Open Weekends?** | Yes | Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days. | | ☐ |
| **Number of PCs** | 219 | Is this the number of personal computers in the K12 School? | | ☐ |
| **Number of walk-in refrigeration/freezer units** | 2 | Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas. | | ☐ |
| **Presence of cooking facilities** | Yes | Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no". | | ☐ |
| **Percent Cooled** | 100 % | Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment? | | ☐ |
| **Percent Heated** | 100 % | Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment? | | ☐ |
| **Months** | 9(Optional) | Is this school in operation for at least 8 months of the year? | | ☐ |

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

# ENERGY STAR® Data Checklist for Commercial Buildings

## *Energy Consumption*

***Power Generation Plant or Distribution Utility:*** FirstEnergy - Jersey Central Power & Lt Co

**Fuel Type: Electricity**

**Meter: Electric Meter - G16650008 (kWh (thousand Watt-hours))**
**Space(s):** Entire Facility
**Generation Method:** Grid Purchase

| Start Date | End Date | Energy Use (kWh (thousand Watt-hours)) |
|---|---|---|
| 06/24/2010 | 07/22/2010 | 148,000.00 |
| 05/25/2010 | 06/23/2010 | 216,000.00 |
| 04/25/2010 | 05/24/2010 | 193,200.00 |
| 03/25/2010 | 04/24/2010 | 186,000.00 |
| 02/25/2010 | 03/24/2010 | 177,200.00 |
| 01/25/2010 | 02/24/2010 | 180,800.00 |
| 12/25/2009 | 01/24/2010 | 187,600.00 |
| 11/25/2009 | 12/24/2009 | 187,600.00 |
| 10/25/2009 | 11/24/2009 | 193,200.00 |
| 09/25/2009 | 10/24/2009 | 194,800.00 |
| 08/25/2009 | 09/24/2009 | 199,200.00 |
| **Electric Meter - G16650008 Consumption (kWh (thousand Watt-hours))** | | **2,063,600.00** |
| **Electric Meter - G16650008 Consumption (kBtu (thousand Btu))** | | **7,041,003.20** |
| **Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))** | | **7,041,003.20** |
| **Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?** | | ☐ |

**Fuel Type: Natural Gas**

**Meter: Gas Meter - 09739062 (therms)**
**Space(s):** Entire Facility

| Start Date | End Date | Energy Use (therms) |
|---|---|---|
| 07/01/2010 | 07/31/2010 | 196.30 |
| 06/01/2010 | 06/30/2010 | 874.70 |
| 05/01/2010 | 05/31/2010 | 2,877.40 |
| 04/01/2010 | 04/30/2010 | 4,402.40 |
| 03/01/2010 | 03/31/2010 | 9,145.00 |
| 02/01/2010 | 02/28/2010 | 17,304.00 |
| 01/01/2010 | 01/31/2010 | 19,996.70 |
| 12/01/2009 | 12/31/2009 | 14,889.60 |
| 11/01/2009 | 11/30/2009 | 7,093.20 |
| 10/01/2009 | 10/31/2009 | 5,465.10 |
| 09/10/2009 | 09/30/2009 | 3,013.20 |

| | | |
|---|---|---|
| 08/11/2009 | 09/09/2009 | 630.27 |
| **Gas Meter - 09739062 Consumption (therms)** | | **85,887.87** |
| **Gas Meter - 09739062 Consumption (kBtu (thousand Btu))** | | **8,588,787.00** |
| **Total Natural Gas Consumption (kBtu (thousand Btu))** | | **8,588,787.00** |
| **Is this the total Natural Gas consumption at this building including all Natural Gas meters?** | | ☐ |

| **Additional Fuels** | |
|---|---|
| Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility. | ☐ |

| **On-Site Solar and Wind Energy** | |
|---|---|
| Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported. | ☐ |

## Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

# FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.



Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

**Facility**
Middle School
160 Wolfe Road
Budd Lake, NJ 07828

**Facility Owner**
Public Schools of Mt. Olive
89 Route 46
Budd Lake, NH 07828

**Primary Contact for this Facility**
Thomas Scerbo
89 Route 46
Budd Lake, NJ 07828

## General Information

| Middle School | |
|---|---|
| Gross Floor Area Excluding Parking: ($ft^2$) | 201,934 |
| Year Built | 2004 |
| For 12-month Evaluation Period Ending Date: | July 31, 2010 |

## Facility Space Use Summary

| School Building | |
|---|---|
| Space Type | K-12 School |
| Gross Floor Area($ft^2$) | 201,934 |
| Open Weekends? | Yes |
| Number of PCs | 219 |
| Number of walk-in refrigeration/freezer units | 2 |
| Presence of cooking facilities | Yes |
| Percent Cooled | 100 |
| Percent Heated | 100 |
| Months[o] | 9 |
| High School? | No |
| School District[o] | Mt. Olive |

## Energy Performance Comparison

| | Evaluation Periods | | Comparisons | | |
|---|---|---|---|---|---|
| **Performance Metrics** | **Current** (Ending Date 07/31/2010) | **Baseline** (Ending Date 07/31/2010) | **Rating of 75** | **Target** | **National Average** |
| Energy Performance Rating | 35 | 35 | 75 | N/A | 50 |
| Energy Intensity | | | | | |
| *Site ($kBtu/ft^2$)* | 79 | 79 | 54 | N/A | 70 |
| *Source ($kBtu/ft^2$)* | 163 | 163 | 113 | N/A | 144 |
| Energy Cost | | | | | |
| *$/year* | N/A | N/A | N/A | N/A | N/A |
| *$/$ft^2$/year* | N/A | N/A | N/A | N/A | N/A |
| Greenhouse Gas Emissions | | | | | |
| $MtCO_2e$/year | 1,553 | 1,553 | 1,071 | N/A | 1,370 |
| $kgCO_2e/ft^2$/year | 8 | 8 | 6 | N/A | 7 |

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

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

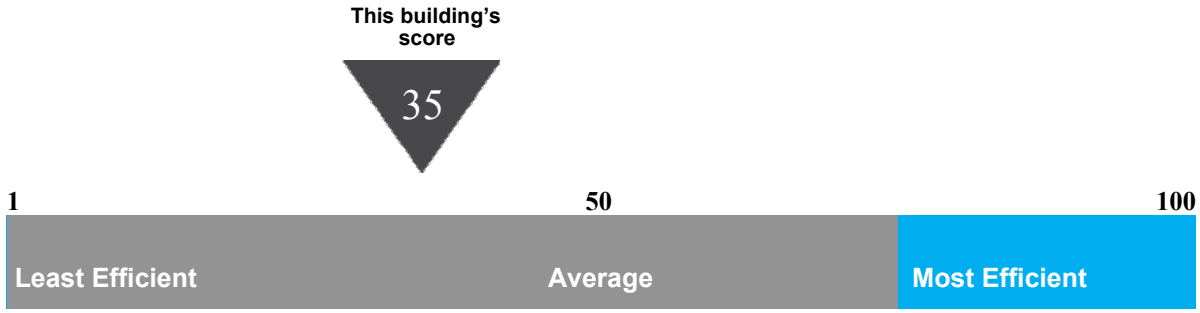
# Statement of Energy Performance

## 2010

Middle School
160 Wolfe Road
Budd Lake, NJ 07828

Portfolio Manager Building ID: 2404045

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.




This building uses 163 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2010

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 10/05/2010

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Boilers

| **Tag** | **Boiler-1 & 6** | **-** |
|---|---|---|
| **Unit Type** | Condensing Hot Water Boilers | - |
| **Qty** | 6 | - |
| **Location** | Boiler Room | - |
| **Area Served** | Unit Ventilators, Fan coil units, Air Handling Units | - |
| **Manufacturer** | Aerco | - |
| **Model #** | Benchmark 2.0 | - |
| **Serial #** | 33105 - - - - | - |
| **Input Capacity** | 2000 MBH | - |
| **Rated Output Capacity (MBH)** | 1860 MBH | - |
| **Approx. Efficiency %** | 93% | - |
| **Fuel** | Natural Gas | - |
| **Approx Age** | 11 | - |
| **Ashrae Service Life** | 30 | - |
| **Remaining Life** | 19 | - |
| **Burner** | Built-in | - |
| **Type** | Variable Speed | - |
| **Firing Rate** | 5% - 100% | - |
| **Comments** | - | - |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Domestic Hot Water Heaters

| Tag | HWH 1 & 2 | HW Tank | - |
|---|---|---|---|
| **Unit Type** | Standard Gas Fired Hot Water Heater | Auxilalary Hot Water Storage Tank | - |
| **Qty** | 2 | 1 | - |
| **Location** | Boiler Room | Boiler Room | - |
| **Area Served** | Faucets, sinks etc. | Faucets, sinks etc. | - |
| **Manufacturer** | AO Smith | - | - |
| **Model #** | Master Fit BTR 365 104 | - | - |
| **Serial #** | MJ990872162 | - | - |
| **Size (Gallons)** | 85 | ~150 | - |
| **Input Capacity (MBH/KW)** | 365 MBH | 0 | - |
| **Recovery (Gal/Hr)** | 354 | 0 | - |
| **Efficiency %** | 80% | - | - |
| **Fuel** | Natural Gas | - | - |
| **Approx Age** | 11 | 11 | - |
| **Ashrae Service Life** | 12 | 12 | - |
| **Remaining Life** | 1 | 10 | - |
| **Comments** | Hot water is circulated in the facility via a pipe mounted circulation pump with a fractional horse power motor. | | |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Pumps

| Tag | P-10, 11, 12 | P-7, 8, 9 | P-1,2,3,4,5,6 |
|---|---|---|---|
| **Unit Type** | Base Mounted - End Suction | Base Mounted - End Suction | Base Mounted - End Suction |
| **Qty** | 3 | 3 | 6 |
| **Location** | Boiler Room | Boiler Room | Pump Room |
| **Area Served** | Unit ventilators, fan coil units, Air Handling Units | Secondary Chilled Water Loop<br>Unit ventilators, fan coil units, Air Handling Units | Primary Chilled Water Loop |
| **Manufacturer** | Armstrong | - | - |
| **Horse Power** | 25 | 40 | 5 |
| **Flow, GPM** | 480 | 900 | 300 |
| **Pump Head, FT** | 130 | 130 | 35 |
| **Motor Info** | Marathon Electric | US Motors | - |
| **Electrical Power** | 460V / 3 Phase | 460V / 3 Phase | 460V / 3 Phase |
| **Frame** | 284T | 324T | - |
| **RPM** | 1770 | 1780 | 1760 |
| **Motor Efficiency %** | 92.4% | 94.5% | - |
| **Approx Age** | 10 | 10 | 10 |
| **Ashrae Service Life** | 20 | 20 | 15 |
| **Remaining Life** | 10 | 10 | 5 |
| **Comments** | High Efficiency Motors.<br>1 motor standby | Variable Frequency Drives<br>Premium Efficiency Motors.<br>1 motor standby<br>Glycol Loop | - |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Chillers

| Tag | ACH - 1,2,3,4,5,6 |
|---|---|
| Unit Type | Air Cooled Chiller |
| Qty | 6 |
| Location | Ground |
| Area Served | Entire facility |
| Manufacturer | Carrier |
| Model # | Ecologic<br>30GX-136-Y-630HA |
| Serial # | 3399F42897, 3399F42905, 3399F42906, 3399F42908, 3399F42909, 3399F42910 |
| Refrigerant | R134A |
| Cooling Capacity (Tons) | 6 x 128.2 Tons |
| Cooling Efficiency (KW/Ton) | 1.24 kW/Ton, 9.7 EER |
| Volts / Phase / Hz | 460 -3 Phase |
| Fuel | Electric |
| Chilled Water GPM / ΔT | 300 GPM / 10°F each |
| Condenser CFM / ΔT | 91,000 CFM each |
| Approx Age | 11 |
| Ashrae Service Life | 20 |
| Remaining Life | 9 |
| Comments | |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Packaged Air Handling Units

| Tag | AHU - 1 | AHU - 2 | AHU - 3 |
|---|---|---|---|
| **Unit Type** | 2 - Pipe AHU Cooling Only | 2 - Pipe AHU Cooling Only | 2 - Pipe AHU Cooling Only |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Library Media Center | Synergetics | Computer Lab |
| **Manufacturer** | Carrier | Carrier | Carrier |
| **Model #** | 39NC17 | 39NC13 | 39NC13 |
| **Serial #** | 3899V92961 | 3899V92971 | 3799V92981 |
| **Cooling Type** | Chilled Water Coil | Chilled Water Coil | Chilled Water Coil |
| **Heating Type** | None | None | None |
| **Total Flow, CFM** | 8000 | 6750 | 6000 |
| **Minimum Outdoor Air Flow, CFM** | 2000 | 1750 | 1200 |
| **Supply Fan HP** | 10 | 7.5 | 5 |
| **Supply Fan Motor Eff** | 89.5% | 88.5% | 87.5% |
| **Return Fan HP** | None | None | None |
| **Return Fan Motor Eff** | - | - | - |
| **Voltage / Phase** | 460 / 3- Phase | 460 / 3- Phase | 460 / 3- Phase |
| **Approx Age** | 11 | 11 | 11 |
| **Ashrae Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 4 | 4 | 4 |
| **Comments** | VAV Systems w/ VFD 100% OA Econmizer | VAV Systems w/ VFD 100% OA Econmizer | VAV Systems w/ VFD 100% OA Econmizer |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Packaged Air Handling Units

| Tag | AHU - 4 | AHU - 5 | AHU - 6 |
|---|---|---|---|
| **Unit Type** | 4 - Pipe AHU | 4 - Pipe AHU | 4 - Pipe AHU |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Auxiliary Gym | Auxiliary Gym | Gym |
| **Manufacturer** | Carrier | Carrier | Carrier |
| **Model #** | 39NC07 | 39NC07 | 39NC21 |
| **Serial #** | - | 3899V93001 | 3899V93011 |
| **Cooling Type** | Chilled Water Coil | Chilled Water Coil | Chilled Water Coil |
| **Heating Type** | Hot Water Coil | Hot Water Coil | Hot Water Coil |
| **Total Flow, CFM** | 3500 | 3500 | 9000 |
| **Minimum Outdoor Air Flow, CFM** | 875 | 875 | 1800 |
| **Supply Fan HP** | 3 | 3.0 | 8 |
| **Supply Fan Motor Eff** | 87.5% | 87.5% | 87.5% |
| **Return Fan HP** | None | None | None |
| **Return Fan Motor Eff** | - | - | - |
| **Voltage / Phase** | 460 / 3- Phase | 460 / 3- Phase | 460 / 3- Phase |
| **Approx Age** | 11 | 11 | 11 |
| **Ashrae Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 4 | 4 | 4 |
| **Comments** | Constant Volume System 100% OA Economizer | Constant Volume System 100% OA Economizer | Constant Volume System 100% OA Economizer |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Packaged Air Handling Units

| Tag | AHU - 7 | AHU - 8 | AHU - 9 |
|---|---|---|---|
| **Unit Type** | 4 - Pipe AHU | 2 - Pipe AHU Cooling Only | 4 - Pipe AHU |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Gym | Music Area | Auditorium |
| **Manufacturer** | Carrier | Carrier | Carrier |
| **Model #** | 39NC21 | 39NC21 | 39NC49 |
| **Serial #** | 3899V93021 | 3899V93031 | 3799V93041 |
| **Cooling Type** | Chilled Water Coil | Chilled Water Coil | Chilled Water Coil |
| **Heating Type** | Hot Water Coil | None | Hot Water Coil |
| **Total Flow, CFM** | 9000 | 10000 | 24000 |
| **Minimum Outdoor Air Flow, CFM** | 1800 | 3000 | 8500 |
| **Supply Fan HP** | 8 | 10.0 | 25 |
| **Supply Fan Motor Eff** | 87.5% (Est) | 89.5% | 94.1% |
| **Return Fan HP** | None | None | 20 |
| **Return Fan Motor Eff** | - | - | 91.0% |
| **Voltage / Phase** | 460 / 3- Phase | 460 / 3- Phase | 460 / 3- Phase |
| **Approx Age** | 11 | 11 | 11 |
| **Ashrae Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 4 | 4 | 4 |
| **Comments** | Constant Volume System 100% OA Economizer | VAV Systems w/ VFD 100% OA Econmizer | Constant Volume System 100% OA Economizer |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Packaged Air Handling Units

| Tag | AHU - 10 | AHU - 11 | AHU - 12 |
|---|---|---|---|
| **Unit Type** | 4 - Pipe AHU | 4 - Pipe AHU | 4 - Pipe AHU |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Cafeteria | Nurses Office | Faculty Lounge |
| **Manufacturer** | Carrier | Carrier | Carrier |
| **Model #** | 39NC32 | 39NC07 | 39NC11 |
| **Serial #** | 3899V93051 | 3799V93061 | 3799V93071 |
| **Cooling Type** | Chilled Water Coil | Chilled Water Coil | Chilled Water Coil |
| **Heating Type** | Hot Water Coil | Hot Water Coil | Hot Water Coil |
| **Total Flow, CFM** | 17000 | 3500 | 3500 |
| **Minimum Outdoor Air Flow, CFM** | 6500 | 1050 | 2100 |
| **Supply Fan HP** | 20 | 5.0 | 8 |
| **Supply Fan Motor Eff** | 91.0% | 87.5% | 88.5% |
| **Return Fan HP** | None | None | None |
| **Return Fan Motor Eff** | - | - | - |
| **Voltage / Phase** | 460 / 3- Phase | 460 / 3- Phase | 460 / 3- Phase |
| **Approx Age** | 11 | 11 | 11 |
| **Ashrae Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 4 | 4 | 4 |
| **Comments** | Constant Volume System 100% OA Economizer | Constant Volume System 100% OA Economizer | Constant Volume System 100% OA Economizer |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Packaged Air Handling Units

| Tag | AHU - 13 | MAU #1 | MAU #2 |
|---|---|---|---|
| **Unit Type** | 4 - Pipe AHU | 2 Pipe Heating Only | 2 Pipe Heating Only |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Woodshop | Greenheck | Woodshop |
| **Manufacturer** | Carrier | Reznor | Reznor |
| **Model #** | - | KSI-120-H30-DBC | RPBL800-8-S-MV |
| **Serial #** | - | 99I14506 | 3AYH578JF09 |
| **Cooling Type** | Chilled Water Coil | None | None |
| **Heating Type** | Hot Water Coil | Hot Water Coil | Hot Water Coil |
| **Total Flow, CFM** | 3500 | 9640 | 6500 |
| **Minimum Outdoor Air Flow, CFM** | 1050 | 9640 | 6500 |
| **Supply Fan HP** | 5 | 7.5 | 5 |
| **Supply Fan Motor Eff** | 87.5% | 87.5% (est) | 85% (Est) |
| **Return Fan HP** | None | Exhaust Fan 7.5 HP | - |
| **Return Fan Motor Eff** | - | 87.5% (est) | - |
| **Voltage / Phase** | 460 / 3- Phase | 460 / 3- Phase | 460 / 3- Phase |
| **Approx Age** | 11 | 11 | 11 |
| **Ashrae Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 4 | 4 | 4 |
| **Comments** | Constant Volume System 100% OA Economizer | Constant Volume, 100% OA | Constant Volume, 100% OA |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Mount Olive Middle School

## Unit Ventilators

| Tag | UV | UV |
|---|---|---|
| **Unit Type** | Floor Type<br>Heating and Cooling | Celing type UV<br>Heating and Cooling |
| **Qty** | 65 | 57 |
| **Location** | Classrooms, hallways, perimeter offices | Science labs, adjacent rooms, back hallways, locker rooms |
| **Manufacturer** | Trane | Trane |
| **Model #** | VUVB075, VUVB1100, VUVB125 | - |
| **Serial #** | - | - |
| **Flow Capacity** | 4 - 8 GPM | 4 - 8 GPM |
| **Cooling Type** | Chilled Water | Chilled Water |
| **Cooling Capacity (MBH)** | 25 to 50 MBH | 25 to 50 MBH |
| **Estimated Cooling Efficiency (EER)** | - | - |
| **Heating Type** | Hot Water | Hot Water |
| **Heating Input (MBH)** | 48 to 78 | 48 to 78 |
| **Approx Age** | 11 | 11 |
| **Ashrae Service Life** | 15 | 15 |
| **Remaining Life** | 4 | 4 |
| **Comments** | UV's in good condition | UV's in good condition |

# Investment Grade Lighting Audit

**CEG Job #:** 9C10050
**Project:** Mount Olive MS
160 Wolfe Road
Budd Lake, NJ 07828
**Bldg. Sq. Ft.** 201,934

Mount Olive MS

**KWH COST:** $0.178

## ECM #1 & 2: Lighting Upgrade - Delamping and ECM #2: Lighting Upgrade - Metal Halaide

| 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 |
| 242.211 | E132 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E131 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E130 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E129 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F123 Storage | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | F122 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F121 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F120 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F119 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 222.21 | F102 Stair #4 | 4400 | 10 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.58 | 2,552.0 | $454.26 | 10 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | F118 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F117 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.50 | 6,489.6 | $1,155.15 | 24 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 2.06 | 5366.4 | $955.22 | $22.00 | $528.00 | 0.43 | 1123.2 | $199.93 | 2.64 |
| 242.211 | F114 Prep Room | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 1,622.4 | $288.79 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 1341.6 | $238.80 | $22.00 | $132.00 | 0.11 | 280.8 | $49.98 | 2.64 |
| 242.211 | F113 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.50 | 6,489.6 | $1,155.15 | 24 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 2.06 | 5366.4 | $955.22 | $22.00 | $528.00 | 0.43 | 1123.2 | $199.93 | 2.64 |
| 242.211 | F112 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F111 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F110 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |

# Investment Grade Lighting Audit

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242.211 | F109 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | F108 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 222.21 | F107 Storage / Electrical Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.23 | 278.4 | $49.56 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E111 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E110 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E109 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E108 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 222.21 | E101 Stairway #2 | 4400 | 10 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.58 | 2,552.0 | $454.26 | 10 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E140 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E139 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.50 | 6,489.6 | $1,155.15 | 24 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 2.06 | 5366.4 | $955.22 | $22.00 | $528.00 | 0.43 | 1123.2 | $199.93 | 2.64 |
| 222.21 | E136 Electrical Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.06 | 69.6 | $12.39 | 1 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E135 Technical Equipment | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.10 | 270.4 | $48.13 | 1 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.09 | 223.6 | $39.80 | $22.00 | $22.00 | 0.02 | 46.8 | $8.33 | 2.64 |
| 221.16 | E138 Greenhouse | 1200 | 15 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens | 58 | 0.87 | 1,044.0 | $185.83 | 15 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E137 Prep Room | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 1,622.4 | $288.79 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 1341.6 | $238.80 | $22.00 | $132.00 | 0.11 | 280.8 | $49.98 | 2.64 |
| 242.211 | E134 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.50 | 6,489.6 | $1,155.15 | 24 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 2.06 | 5366.4 | $955.22 | $22.00 | $528.00 | 0.43 | 1123.2 | $199.93 | 2.64 |
| 242.211 | E133 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | E128 Custodian Closet | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.23 | 278.4 | $49.56 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | F124 Classroom | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 1,622.4 | $288.79 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 1341.6 | $238.80 | $22.00 | $132.00 | 0.11 | 280.8 | $49.98 | 2.64 |
| 242.211 | F125 Classroom | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 1,622.4 | $288.79 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 1341.6 | $238.80 | $22.00 | $132.00 | 0.11 | 280.8 | $49.98 | 2.64 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | R133 Faculty Work Room | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.66 | 4,326.4 | $770.10 | 16 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.38 | 3577.6 | $636.81 | $22.00 | $352.00 | 0.29 | 748.8 | $133.29 | 2.64 |
| 242.211 | F132 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | F137 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 222.21 | F135 Electric Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.06 | 69.6 | $12.39 | 1 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | F138 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | F139 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.21 | F140 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | F142 Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | F143 Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | F144 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | F147 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | F148 office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | F149 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | F145 Office | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 222.21 | Storage / Electric Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.23 | 278.4 | $49.56 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 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

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242.211 | E116 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E117 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | E118 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | E119 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | E120 Classroom | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.66 | 4,326.4 | $770.10 | 16 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.38 | 3577.6 | $636.81 | $22.00 | $352.00 | 0.29 | 748.8 | $133.29 | 2.64 |
| 242.211 | E121 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | 2nd Floor Corridors | 4400 | 78 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 4.52 | 19,905.6 | $3,543.20 | 78 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | E102 Stair #3 | 4400 | 14 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.81 | 3,572.8 | $635.96 | 14 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | C149 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 237.211 | C135 Office | 2600 | 9 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.83 | 2,152.8 | $383.20 | 9 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.55 | 1427.4 | $254.08 | $22.00 | $198.00 | 0.28 | 725.4 | $129.12 | 1.53 |
| 242.211 | C133 Resource Room | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.66 | 4,326.4 | $770.10 | 16 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.38 | 3577.6 | $636.81 | $22.00 | $352.00 | 0.29 | 748.8 | $133.29 | 2.64 |
| 222.21 | D123 Storage / Electric Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.23 | 278.4 | $49.56 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D122 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D121 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D120 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D119 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D118 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D117 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.50 | 6,489.6 | $1,155.15 | 24 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 2.06 | 5366.4 | $955.22 | $22.00 | $528.00 | 0.43 | 1123.2 | $199.93 | 2.64 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242.211 | Prep. Room | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 1,622.4 | $288.79 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 1341.6 | $238.80 | $22.00 | $132.00 | 0.11 | 280.8 | $49.98 | 2.64 |
| 242.211 | D116 Technical Equipment Room | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.10 | 270.4 | $48.13 | 1 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.09 | 223.6 | $39.80 | $22.00 | $22.00 | 0.02 | 46.8 | $8.33 | 2.64 |
| 222.21 | Electric Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.06 | 69.6 | $12.39 | 1 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D112 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.50 | 6,489.6 | $1,155.15 | 24 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 2.06 | 5366.4 | $955.22 | $22.00 | $528.00 | 0.43 | 1123.2 | $199.93 | 2.64 |
| 242.211 | D111 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D110 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D109 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D108 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D107 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 222.21 | D106 Storage/Electrical Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.06 | 69.6 | $12.39 | 1 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | C112 Classroom | 2600 | 11 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.14 | 2,974.4 | $529.44 | 11 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.95 | 2459.6 | $437.81 | $22.00 | $242.00 | 0.20 | 514.8 | $91.63 | 2.64 |
| 242.211 | C113 Observation | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.10 | 270.4 | $48.13 | 1 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.09 | 223.6 | $39.80 | $22.00 | $22.00 | 0.02 | 46.8 | $8.33 | 2.64 |
| 242.211 | C111 Classroom | 2600 | 11 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.14 | 2,974.4 | $529.44 | 11 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.95 | 2459.6 | $437.81 | $22.00 | $242.00 | 0.20 | 514.8 | $91.63 | 2.64 |
| 242.211 | Girls' Rest Room | 3200 | 5 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.52 | 1,664.0 | $296.19 | 5 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.43 | 1376 | $244.93 | $22.00 | $110.00 | 0.09 | 288 | $51.26 | 2.15 |
| 222.21 | D150 Reception | 2600 | 3 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.17 | 452.4 | $80.53 | 3 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D149 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | D148 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | D147 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | D145 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 222.21 | Custodian Closet | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.06 | 69.6 | $12.39 | 1 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 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

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242.211 | D141 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D140 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 242.211 | D136 SGI | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | D135 SGI | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | D134 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | Faculty Work Room | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.66 | 4,326.4 | $770.10 | 16 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.38 | 3577.6 | $636.81 | $22.00 | $352.00 | 0.29 | 748.8 | $133.29 | 2.64 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D125 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | D124 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 222.21 | Corridor D | 4400 | 64 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 3.71 | 16,332.8 | $2,907.24 | 64 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | C125 EMR | 2600 | 10 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.04 | 2,704.0 | $481.31 | 10 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.86 | 2236 | $398.01 | $22.00 | $220.00 | 0.18 | 468 | $83.30 | 2.64 |
| 242.21 | C124 Art | 2600 | 17 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.77 | 4,596.8 | $818.23 | 17 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.41 | | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.21 | C118 Art | 2600 | 17 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.77 | 4,596.8 | $818.23 | 17 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.41 | | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 706 | Courtyard | 4400 | 12 | 1 | 70w HPS Wallpack | 92 | 1.10 | 4,857.6 | $864.65 | 12 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | C121 Storage | 1200 | 3 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.17 | 208.8 | $37.17 | 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

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242.211 | C117 Computer Room | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.25 | 3,244.8 | $577.57 | 12 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.03 | 2683.2 | $477.61 | $22.00 | $264.00 | 0.22 | 561.6 | $99.96 | 2.64 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | C158 Electrical Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.23 | 278.4 | $49.56 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Media Center | 2600 | 50 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 1.30 | 3,380.0 | $601.64 | 50 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.21 | | 2600 | 90 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 8.28 | 21,528.0 | $3,831.98 | 90 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 231.37 | | 2600 | 8 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 0.69 | 1,788.8 | $318.41 | 8 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | Library Office | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 1,622.4 | $288.79 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 1341.6 | $238.80 | $22.00 | $132.00 | 0.11 | 280.8 | $49.98 | 2.64 |
| 242.211 | C153 ISS | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | C154 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 231.37 | C159 Classroom | 2600 | 20 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 1.72 | 4,472.0 | $796.02 | 20 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 231.37 | C160 Classroom | 2600 | 20 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 1.72 | 4,472.0 | $796.02 | 20 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | C108 Classroom | 2600 | 10 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.04 | 2,704.0 | $481.31 | 10 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.86 | 2236 | $398.01 | $22.00 | $220.00 | 0.18 | 468 | $83.30 | 2.64 |
| 242.211 | C107 Classroom | 2600 | 10 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.04 | 2,704.0 | $481.31 | 10 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.86 | 2236 | $398.01 | $22.00 | $220.00 | 0.18 | 468 | $83.30 | 2.64 |
| 242.211 | C109 Classroom | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | C110 Classroom | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.42 | 1,081.6 | $192.52 | 4 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.34 | 894.4 | $159.20 | $22.00 | $88.00 | 0.07 | 187.2 | $33.32 | 2.64 |
| 242.211 | B148 OT/PT | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.211 | B134 | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.83 | 2,163.2 | $385.05 | 8 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.69 | 1788.8 | $318.41 | $22.00 | $176.00 | 0.14 | 374.4 | $66.64 | 2.64 |
| 242.21 | B138 Nurse | 2600 | 9 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.94 | 2,433.6 | $433.18 | 9 | 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 | $170.31 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | B140 Waiting Room | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.10 | 270.4 | $48.13 | 1 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.09 | 223.6 | $39.80 | $22.00 | $22.00 | 0.02 | 46.8 | $8.33 | 2.64 |
| 242.211 | B137 Electric Room | 1200 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.10 | 124.8 | $22.21 | 1 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.09 | 103.2 | $18.37 | $22.00 | $22.00 | 0.02 | 21.6 | $3.84 | 5.72 |
| 766 | Main Gym | 3000 | 24 | 1 | 400w MH, Prismatic Lens | 465 | 11.16 | 33,480.0 | $5,959.44 | 24 | 4 | 2x4 54w T5HO 4 Lamp w/Reflective Lens, Wire Cage | 236 | 5.66 | 16992 | $3,024.58 | $240.00 | $5,760.00 | 5.50 | 16488 | $2,934.86 | 1.96 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222.21 | B116 Boys' Locker Room | 2600 | 18 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 1.04 | 2,714.4 | $483.16 | 18 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Gym Storage | 1200 | 12 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.70 | 835.2 | $148.67 | 12 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 766 | Auxiliary Gym | 3000 | 12 | 1 | 400w MH, Prismatic Lens | 465 | 5.58 | 16,740.0 | $2,979.72 | 12 | 4 | 2x4 54w T5HO 4 Lamp w/Reflective Lens, Wire Cage | 236 | 2.83 | 8496 | $1,512.29 | $240.00 | $2,880.00 | 2.75 | 8244 | $1,467.43 | 1.96 |
| 222.21 | B126 Gym Storage | 1200 | 12 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.70 | 835.2 | $148.67 | 12 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | B129 Girls' Locker Room | 2600 | 18 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 1.04 | 2,714.4 | $483.16 | 18 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | B108 Custodial Closet | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928.0 | $165.18 | 5 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.21 | B142 Classroom | 2600 | 56 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 5.15 | 13,395.2 | $2,384.35 | 56 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | Faculty Dining Room | 2600 | 24 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 2.21 | 5,740.8 | $1,021.86 | 24 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 1.46 | 3806.4 | $677.54 | $22.00 | $528.00 | 0.74 | 1934.4 | $344.32 | 1.53 |
| 237.211 | B151 Student Dining | 2600 | 162 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 14.90 | 38,750.4 | $6,897.57 | 162 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 9.88 | 25693.2 | $4,573.39 | $22.00 | $3,564.00 | 5.02 | 13057.2 | $2,324.18 | 1.53 |
| 237.211 | B152 Servery | 2600 | 49 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 4.51 | 11,720.8 | $2,086.30 | 49 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 2.99 | 7771.4 | $1,383.31 | $22.00 | $1,078.00 | 1.52 | 3949.4 | $702.99 | 1.53 |
| 237.21 | Kitchen | 2600 | 28 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 2.58 | 6,697.6 | $1,192.17 | 28 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 617 | | 2600 | 8 | 1 | Hood Light w/Globe & Cage, 100w A19 Lamp | 100 | 0.80 | 2,080.0 | $370.24 | 8 | 1 | (1) 26w CFL Lamp | 26 | 0.21 | 540.8 | $96.26 | $20.00 | $160.00 | 0.59 | 1539.2 | $273.98 | 0.58 |
| 237.21 | Dish Washer Room | 2600 | 9 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.83 | 2,152.8 | $383.20 | 9 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | Kitchen Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 222.21 | Women's Locker Room | 2600 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 301.6 | $53.68 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Men's Locker Room | 2600 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 301.6 | $53.68 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | A118 Custodial Closet | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.12 | 139.2 | $24.78 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | A117 Custodial Office | 1200 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.62 | 748.8 | $133.29 | 6 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.52 | 619.2 | $110.22 | $22.00 | $132.00 | 0.11 | 129.6 | $23.07 | 5.72 |

# Investment Grade Lighting Audit

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222.21 | Custodial Supply | 1200 | 9 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.52 | 626.4 | $111.50 | 9 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.32 | A116 Maintenance Shop | 4400 | 6 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens | 58 | 0.35 | 1,531.2 | $272.55 | 6 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 228.34 | A115 Electrical Room | 4400 | 2 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens | 58 | 0.12 | 510.4 | $90.85 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 746 | | 4400 | 3 | 1 | 250w MH LoBay w/Prismatic Lens | 295 | 0.89 | 3,894.0 | $693.13 | 3 | 3 | 1x4, 3 Lamp, 54w T5HO Fixture | 177 | 0.53 | 2336.4 | $415.88 | $215.00 | $645.00 | 0.35 | 1557.6 | $277.25 | 2.33 |
| 746 | Boiler Room | 4400 | 12 | 1 | 250w MH LoBay w/Prismatic Lens | 295 | 3.54 | 15,576.0 | $2,772.53 | 12 | 3 | 1x4, 3 Lamp, 54w T5HO Fixture | 177 | 2.12 | 9345.6 | $1,663.52 | $215.00 | $2,580.00 | 1.42 | 6230.4 | $1,109.01 | 2.33 |
| 222.21 | Men's Rest Room | 1200 | 6 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.35 | 417.6 | $74.33 | 6 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Custodial Closet | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.06 | 69.6 | $12.39 | 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 Rest Room | 1200 | 6 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.35 | 417.6 | $74.33 | 6 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.21 | A134 Music Room | 2600 | 54 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 4.97 | 12,916.8 | $2,299.19 | 54 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.21 | A136 Practice Room | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | A135 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 242.211 | Locker Area | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.21 | 540.8 | $96.26 | 2 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 0.17 | 447.2 | $79.60 | $22.00 | $44.00 | 0.04 | 93.6 | $16.66 | 2.64 |
| 237.21 | A140 Vocal | 2600 | 40 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 3.68 | 9,568.0 | $1,703.10 | 40 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | A112 Storage | 1200 | 4 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.23 | 278.4 | $49.56 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | A111 Mechanical Room / Storage | 1200 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.66 | 1,996.8 | $355.43 | 16 | 3 | Remove 1 Lamp - No Ballast Change Required | 86 | 1.38 | 1651.2 | $293.91 | $22.00 | $352.00 | 0.29 | 345.6 | $61.52 | 5.72 |
| 242.11 | Stage | 2600 | 28 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 104 | 2.91 | 7,571.2 | $1,347.67 | 28 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | Lobby | 4400 | 18 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 1.04 | 4,593.6 | $817.66 | 18 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | A108 Control Room | 2600 | 3 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.17 | 452.4 | $80.53 | 3 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Lobby | 4400 | 22 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 0.57 | 2,516.8 | $447.99 | 22 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Vestibule | 4400 | 6 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 0.16 | 686.4 | $122.18 | 6 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | | 4400 | 8 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.46 | 2,041.6 | $363.40 | 8 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Storage | 1200 | 10 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.58 | 696.0 | $123.89 | 10 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

# Investment Grade Lighting Audit

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 237.211 | C136 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 237.211 | C137 office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 237.211 | C138 Conference Room | 2600 | 8 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.74 | 1,913.6 | $340.62 | 8 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.49 | 1268.8 | $225.85 | $22.00 | $176.00 | 0.25 | 644.8 | $114.77 | 1.53 |
| 237.211 | C140 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 227.21 | Main Office Hall | 2600 | 7 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.41 | 1,055.6 | $187.90 | 7 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | C141 Conference Room | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 237.211 | C142 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.55 | 1,435.2 | $255.47 | 6 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 0.37 | 951.6 | $169.38 | $22.00 | $132.00 | 0.19 | 483.6 | $86.08 | 1.53 |
| 237.211 | Main Office | 2600 | 25 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 2.30 | 5,980.0 | $1,064.44 | 25 | 2 | Remove 1 Lamp - No Ballast Change Required | 61 | 1.53 | 3965 | $705.77 | $22.00 | $550.00 | 0.78 | 2015 | $358.67 | 1.53 |
| 231.37 | C151 Classroom | 2600 | 42 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 3.61 | 9,391.2 | $1,671.63 | 42 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Corridors | 4400 | 130 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 7.54 | 33,176.0 | $5,905.33 | 130 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | | 4400 | 62 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 3.60 | 15,822.4 | $2,816.39 | 62 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Front Canopy | 2000 | 20 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 0.52 | 1,040.0 | $185.12 | 20 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Exterior | 2000 | 75 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 1.95 | 3,900.0 | $694.20 | 75 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 680 | | 4400 | 45 | 1 | Wallpack, (1) 26w PL Quad Lamp | 26 | 1.17 | 5,148.0 | $916.34 | 45 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 750 | | 2000 | 37 | 1 | 250w HPS, "Shoe Box" Area Light | 295 | 10.92 | 21,830.0 | $3,885.74 | 37 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| | **Totals** | | 2,672 | 623 | | | 244.32 | 679,163 | $120,891 | 2,460 | 323 | | | 108.2 | 287,033 | $51,092 | | $38,843 | 36.7 | 101,365 | $18,043 | 2.15 |

**NOTES:** 1. Simple Payback noted in this spreadsheet does not include Maintenance Savings and NJ Smart Start Incentives.

2. Lamp totals only include T-12 tube replacement calculations

**CEG Job #:** 9C10050
**Project:** Mount Olive MS
**Address:** 160 Wolfe Road
Budd Lake, NJ 07828
**Building SF:** 201,934

**Mount Olive MS**

**KWH COST:** $0.178

## ECM #3: 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 |
| 242.211 | E132 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E131 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E130 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E129 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F123 Storage | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | F122 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F121 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F120 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F119 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | F102 Stair #4 | 4400 | 10 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.58 | 2552 | $454.26 | 10 | 0 | No Change | 58 | 0.58 | 0% | 2552 | $454.26 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | F118 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F117 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.496 | 6489.6 | $1,155.15 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 2.25 | 10% | 5840.64 | $1,039.63 | $225.00 | $225.00 | 0.25 | 648.96 | $115.51 | 1.95 |
| 242.211 | F114 Prep Room | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 1622.4 | $288.79 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 1460.16 | $259.91 | $75.00 | $75.00 | 0.06 | 162.24 | $28.88 | 2.60 |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 242.211 | F113 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.496 | 6489.6 | $1,155.15 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 2.25 | 10% | 5840.64 | $1,039.63 | $225.00 | $225.00 | 0.25 | 648.96 | $115.51 | 1.95 |
| 242.211 | F112 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F111 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F110 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F109 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | F108 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | F107 Storage / Electrical Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.232 | 278.4 | $49.56 | 4 | 0 | No Change | 58 | 0.23 | 0% | 278.4 | $49.56 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E111 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E110 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E109 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E108 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | E101 Stairway #2 | 4400 | 10 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.58 | 2552 | $454.26 | 10 | 0 | No Change | 58 | 0.58 | 0% | 2552 | $454.26 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E140 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E139 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.496 | 6489.6 | $1,155.15 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 2.25 | 10% | 5840.64 | $1,039.63 | $225.00 | $225.00 | 0.25 | 648.96 | $115.51 | 1.95 |
| 222.21 | E136 Electrical Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.058 | 69.6 | $12.39 | 1 | 0 | No Change | 58 | 0.06 | 0% | 69.6 | $12.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E135 Technical Equipment | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.104 | 270.4 | $48.13 | 1 | 0 | No Change | 104 | 0.10 | 0% | 270.4 | $48.13 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.16 | E138 Greenhouse | 1200 | 15 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens | 58 | 0.87 | 1044 | $185.83 | 15 | 0 | No Change | 58 | 0.87 | 0% | 1044 | $185.83 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | E137 Prep Room | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 1622.4 | $288.79 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 1460.16 | $259.91 | $75.00 | $75.00 | 0.06 | 162.24 | $28.88 | 2.60 |
| 242.211 | E134 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.496 | 6489.6 | $1,155.15 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 2.25 | 10% | 5840.64 | $1,039.63 | $225.00 | $225.00 | 0.25 | 648.96 | $115.51 | 1.95 |
| 242.211 | E133 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | E128 Custodian Closet | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.232 | 278.4 | $49.56 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 58 | 0.21 | 10% | 250.56 | $44.60 | $75.00 | $75.00 | 0.02 | 27.84 | $4.96 | 15.13 |
| 242.211 | F124 Classroom | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 1622.4 | $288.79 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 1460.16 | $259.91 | $75.00 | $75.00 | 0.06 | 162.24 | $28.88 | 2.60 |
| 242.211 | F125 Classroom | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 1622.4 | $288.79 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 1460.16 | $259.91 | $75.00 | $75.00 | 0.06 | 162.24 | $28.88 | 2.60 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | R133 Faculty Work Room | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.664 | 4326.4 | $770.10 | 16 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.50 | 10% | 3893.76 | $693.09 | $225.00 | $225.00 | 0.17 | 432.64 | $77.01 | 2.92 |
| 242.211 | F132 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | F137 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 222.21 | F135 Electric Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.058 | 69.6 | $12.39 | 1 | 0 | No Change | 58 | 0.06 | 0% | 69.6 | $12.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | F138 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | F139 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.21 | F140 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | F142 Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |

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| 222.21 | F143 Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 242.211 | F144 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | F147 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | F148 office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | F149 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | F145 Office | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 222.21 | Storage / Electric Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.232 | 278.4 | $49.56 | 4 | 0 | No Change | 58 | 0.23 | 0% | 278.4 | $49.56 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 242.211 | E116 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E117 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | E118 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | E119 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | E120 Classroom | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.664 | 4326.4 | $770.10 | 16 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.50 | 10% | 3893.76 | $693.09 | $225.00 | $225.00 | 0.17 | 432.64 | $77.01 | 2.92 |
| 242.211 | E121 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | 2nd Floor Corridors | 4400 | 78 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 4.524 | 19905.6 | $3,543.20 | 78 | 0 | No Change | 58 | 4.52 | 0% | 19905.6 | $3,543.20 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | E102 Stair #3 | 4400 | 14 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.812 | 3572.8 | $635.96 | 14 | 0 | No Change | 58 | 0.81 | 0% | 3572.8 | $635.96 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | C149 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 237.211 | C135 Office | 2600 | 9 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.828 | 2152.8 | $383.20 | 9 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 92 | 0.75 | 10% | 1937.52 | $344.88 | $160.00 | $160.00 | 0.08 | 215.28 | $38.32 | 4.18 |

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| 242.211 | C133 Resource Room | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.664 | 4326.4 | $770.10 | 16 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.50 | 10% | 3893.76 | $693.09 | $225.00 | $225.00 | 0.17 | 432.64 | $77.01 | 2.92 |
| 222.21 | D123 Storage / Electric Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.232 | 278.4 | $49.56 | 4 | 0 | No Change | 58 | 0.23 | 0% | 278.4 | $49.56 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D122 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D121 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D120 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D119 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D118 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D117 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.496 | 6489.6 | $1,155.15 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 2.25 | 10% | 5840.64 | $1,039.63 | $225.00 | $225.00 | 0.25 | 648.96 | $115.51 | 1.95 |
| 242.211 | Prep. Room | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 1622.4 | $288.79 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 1460.16 | $259.91 | $75.00 | $75.00 | 0.06 | 162.24 | $28.88 | 2.60 |
| 242.211 | D116 Technical Equipment Room | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.104 | 270.4 | $48.13 | 1 | 0 | No Change | 104 | 0.10 | 0% | 270.4 | $48.13 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Electric Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.058 | 69.6 | $12.39 | 1 | 0 | No Change | 58 | 0.06 | 0% | 69.6 | $12.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D112 Classroom | 2600 | 24 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 2.496 | 6489.6 | $1,155.15 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 2.25 | 10% | 5840.64 | $1,039.63 | $225.00 | $225.00 | 0.25 | 648.96 | $115.51 | 1.95 |
| 242.211 | D111 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D110 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D109 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D108 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |

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| 242.211 | D107 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | D106 Storage/Electrical Room | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.058 | 69.6 | $12.39 | 1 | 0 | No Change | 58 | 0.06 | 0% | 69.6 | $12.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | C112 Classroom | 2600 | 11 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.144 | 2974.4 | $529.44 | 11 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.03 | 10% | 2676.96 | $476.50 | $225.00 | $225.00 | 0.11 | 297.44 | $52.94 | 4.25 |
| 242.211 | C113 Observation | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.104 | 270.4 | $48.13 | 1 | 0 | No Change | 104 | 0.10 | 0% | 270.4 | $48.13 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | C111 Classroom | 2600 | 11 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.144 | 2974.4 | $529.44 | 11 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.03 | 10% | 2676.96 | $476.50 | $225.00 | $225.00 | 0.11 | 297.44 | $52.94 | 4.25 |
| 242.211 | Girls' Rest Room | 3200 | 5 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.52 | 1664 | $296.19 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.47 | 10% | 1497.6 | $266.57 | $160.00 | $160.00 | 0.05 | 166.4 | $29.62 | 5.40 |
| 222.21 | D150 Reception | 2600 | 3 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.174 | 452.4 | $80.53 | 3 | 0 | No Change | 58 | 0.17 | 0% | 452.4 | $80.53 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | D149 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | D148 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | D147 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | D145 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 222.21 | Custodian Closet | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.058 | 69.6 | $12.39 | 1 | 0 | No Change | 58 | 0.06 | 0% | 69.6 | $12.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 242.211 | D141 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D140 Classroom | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 242.211 | D136 SGI | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | D135 SGI | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | D134 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | Faculty Work Room | 2600 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.664 | 4326.4 | $770.10 | 16 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.50 | 10% | 3893.76 | $693.09 | $225.00 | $225.00 | 0.17 | 432.64 | $77.01 | 2.92 |

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| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 242.211 | D125 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | D124 Classroom | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 222.21 | Corridor D | 4400 | 64 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 3.712 | 16332.8 | $2,907.24 | 64 | 0 | No Change | 58 | 3.71 | 0% | 16332.8 | $2,907.24 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 242.211 | C125 EMR | 2600 | 10 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.04 | 2704 | $481.31 | 10 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 0.94 | 10% | 2433.6 | $433.18 | $225.00 | $225.00 | 0.10 | 270.4 | $48.13 | 4.67 |
| 242.21 | C124 Art | 2600 | 17 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.768 | 4596.8 | $818.23 | 17 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.59 | 10% | 4137.12 | $736.41 | $225.00 | $225.00 | 0.18 | 459.68 | $81.82 | 2.75 |
| 242.41 | | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal) | 104 | 0.31 | 25% | 811.2 | $144.39 | $160.00 | $160.00 | 0.10 | 270.4 | $48.13 | 3.32 |
| 242.21 | C118 Art | 2600 | 17 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.768 | 4596.8 | $818.23 | 17 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.59 | 10% | 4137.12 | $736.41 | $225.00 | $225.00 | 0.18 | 459.68 | $81.82 | 2.75 |
| 242.41 | | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Direct/Indirect | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal) | 104 | 0.31 | 25% | 811.2 | $144.39 | $160.00 | $160.00 | 0.10 | 270.4 | $48.13 | 3.32 |
| 706 | Courtyard | 4400 | 12 | 1 | 70w HPS Wallpack | 92 | 1.104 | 4857.6 | $864.65 | 12 | 0 | No Change | 92 | 1.10 | 0% | 4857.6 | $864.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | C121 Storage | 1200 | 3 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.174 | 208.8 | $37.17 | 3 | 0 | No Change | 58 | 0.17 | 0% | 208.8 | $37.17 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | C117 Computer Room | 2600 | 12 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.248 | 3244.8 | $577.57 | 12 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 1.12 | 10% | 2920.32 | $519.82 | $225.00 | $225.00 | 0.12 | 324.48 | $57.76 | 3.90 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | C158 Electrical Room | 1200 | 4 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.232 | 278.4 | $49.56 | 4 | 0 | No Change | 58 | 0.23 | 0% | 278.4 | $49.56 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Media Center | 2600 | 50 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 1.3 | 3380 | $601.64 | 50 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 26 | 1.17 | 10% | 3042 | $541.48 | $225.00 | $225.00 | 0.13 | 338 | $60.16 | 3.74 |
| 237.21 | | 2600 | 90 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 8.28 | 21528 | $3,831.98 | 90 | 4 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 92 | 7.45 | 10% | 19375.2 | $3,448.79 | $225.00 | $900.00 | 0.83 | 2152.8 | $383.20 | 2.35 |

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| 231.37 | | 2600 | 8 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 0.688 | 1788.8 | $318.41 | 8 | 0 | No Change | 86 | 0.69 | 0% | 1788.8 | $318.41 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | Library Office | 2600 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 1622.4 | $288.79 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 1460.16 | $259.91 | $75.00 | $75.00 | 0.06 | 162.24 | $28.88 | 2.60 |
| 242.211 | C153 ISS | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | C154 Conference Room | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 231.37 | C159 Classroom | 2600 | 20 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 1.72 | 4472 | $796.02 | 20 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 86 | 1.55 | 10% | 4024.8 | $716.41 | $225.00 | $225.00 | 0.17 | 447.2 | $79.60 | 2.83 |
| 231.37 | C160 Classroom | 2600 | 20 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 1.72 | 4472 | $796.02 | 20 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 86 | 1.55 | 10% | 4024.8 | $716.41 | $225.00 | $225.00 | 0.17 | 447.2 | $79.60 | 2.83 |
| 242.211 | C108 Classroom | 2600 | 10 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.04 | 2704 | $481.31 | 10 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 0.94 | 10% | 2433.6 | $433.18 | $225.00 | $225.00 | 0.10 | 270.4 | $48.13 | 4.67 |
| 242.211 | C107 Classroom | 2600 | 10 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.04 | 2704 | $481.31 | 10 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 104 | 0.94 | 10% | 2433.6 | $433.18 | $225.00 | $225.00 | 0.10 | 270.4 | $48.13 | 4.67 |
| 242.211 | C109 Classroom | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | C110 Classroom | 2600 | 4 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.416 | 1081.6 | $192.52 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.37 | 10% | 973.44 | $173.27 | $75.00 | $75.00 | 0.04 | 108.16 | $19.25 | 3.90 |
| 242.211 | B148 OT/PT | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.211 | B134 | 2600 | 8 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.832 | 2163.2 | $385.05 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 104 | 0.75 | 10% | 1946.88 | $346.54 | $160.00 | $160.00 | 0.08 | 216.32 | $38.50 | 4.16 |
| 242.21 | B138 Nurse | 2600 | 9 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.936 | 2433.6 | $433.18 | 9 | 0 | No Change | 104 | 0.94 | 0% | 2433.6 | $433.18 | $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 | 0.368 | 956.8 | $170.31 | 4 | 0 | No Change | 92 | 0.37 | 0% | 956.8 | $170.31 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | B140 Waiting Room | 2600 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.104 | 270.4 | $48.13 | 1 | 0 | No Change | 104 | 0.10 | 0% | 270.4 | $48.13 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | B137 Electric Room | 1200 | 1 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.104 | 124.8 | $22.21 | 1 | 0 | No Change | 104 | 0.10 | 0% | 124.8 | $22.21 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 766 | Main Gym | 3000 | 24 | 1 | 400w MH, Prismatic Lens | 465 | 11.16 | 33480 | $5,959.44 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 465 | 10.04 | 10% | 30132 | $5,363.50 | $225.00 | $225.00 | 1.12 | 3348 | $595.94 | 0.38 |
| 222.21 | B116 Boys' Locker Room | 2600 | 18 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 1.044 | 2714.4 | $483.16 | 18 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 58 | 0.94 | 10% | 2442.96 | $434.85 | $225.00 | $225.00 | 0.10 | 271.44 | $48.32 | 4.66 |
| 222.21 | Gym Storage | 1200 | 12 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.696 | 835.2 | $148.67 | 12 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.63 | 10% | 751.68 | $133.80 | $160.00 | $160.00 | 0.07 | 83.52 | $14.87 | 10.76 |
| 766 | Auxiliary Gym | 3000 | 12 | 1 | 400w MH, Prismatic Lens | 465 | 5.58 | 16740 | $2,979.72 | 12 | 0 | No Change | 465 | 5.58 | 0% | 16740 | $2,979.72 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222.21 | B126 Gym Storage | 1200 | 12 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.696 | 835.2 | $148.67 | 12 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.63 | 10% | 751.68 | $133.80 | $160.00 | $160.00 | 0.07 | 83.52 | $14.87 | 10.76 |
| 222.21 | B129 Girls' Locker Room | 2600 | 18 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 1.044 | 2714.4 | $483.16 | 18 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 58 | 0.94 | 10% | 2442.96 | $434.85 | $225.00 | $225.00 | 0.10 | 271.44 | $48.32 | 4.66 |
| 222.21 | Girls' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 222.21 | B108 Custodial Closet | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Boys' Rest Room | 3200 | 5 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.29 | 928 | $165.18 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 58 | 0.26 | 10% | 835.2 | $148.67 | $160.00 | $160.00 | 0.03 | 92.8 | $16.52 | 9.69 |
| 237.21 | B142 Classroom | 2600 | 56 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 5.152 | 13395.2 | $2,384.35 | 56 | 2 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 92 | 4.64 | 10% | 12055.68 | $2,145.91 | $225.00 | $450.00 | 0.52 | 1339.52 | $238.43 | 1.89 |
| 222.21 | Men's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | Faculty Dining Room | 2600 | 24 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 2.208 | 5740.8 | $1,021.86 | 24 | 1 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 92 | 1.99 | 10% | 5166.72 | $919.68 | $225.00 | $225.00 | 0.22 | 574.08 | $102.19 | 2.20 |
| 237.211 | B151 Student Dining | 2600 | 162 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 14.904 | 38750.4 | $6,897.57 | 162 | 6 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 92 | 13.41 | 10% | 34875.36 | $6,207.81 | $225.00 | $1,350.00 | 1.49 | 3875.04 | $689.76 | 1.96 |
| 237.211 | B152 Servery | 2600 | 49 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 4.508 | 11720.8 | $2,086.30 | 49 | 0 | No Change | 92 | 4.51 | 0% | 11720.8 | $2,086.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.21 | Kitchen | 2600 | 28 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 2.576 | 6697.6 | $1,192.17 | 28 | 0 | No Change | 92 | 2.58 | 0% | 6697.6 | $1,192.17 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 617 | | 2600 | 8 | 1 | Hood Light w/Globe & Cage, 100w A19 Lamp | 100 | 0.8 | 2080 | $370.24 | 8 | 0 | No Change | 100 | 0.80 | 0% | 2080 | $370.24 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.21 | Dish Washer Room | 2600 | 9 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.828 | 2152.8 | $383.20 | 9 | 0 | No Change | 92 | 0.83 | 0% | 2152.8 | $383.20 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | Kitchen Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 222.21 | Women's Locker Room | 2600 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 301.6 | $53.68 | 2 | 0 | No Change | 58 | 0.12 | 0% | 301.6 | $53.68 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Men's Locker Room | 2600 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 301.6 | $53.68 | 2 | 0 | No Change | 58 | 0.12 | 0% | 301.6 | $53.68 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | A118 Custodial Closet | 1200 | 2 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.116 | 139.2 | $24.78 | 2 | 0 | No Change | 58 | 0.12 | 0% | 139.2 | $24.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.211 | A117 Custodial Office | 1200 | 6 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.624 | 748.8 | $133.29 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.56 | 10% | 673.92 | $119.96 | $75.00 | $75.00 | 0.06 | 74.88 | $13.33 | 5.63 |
| 222.21 | Custodial Supply | 1200 | 9 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.522 | 626.4 | $111.50 | 9 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 58 | 0.47 | 10% | 563.76 | $100.35 | $75.00 | $75.00 | 0.05 | 62.64 | $11.15 | 6.73 |
| 221.32 | A116 Maintenance Shop | 4400 | 6 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Parabolic Lens | 58 | 0.348 | 1531.2 | $272.55 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 58 | 0.31 | 10% | 1378.08 | $245.30 | $75.00 | $75.00 | 0.03 | 153.12 | $27.26 | 2.75 |

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| 228.34 | A115 Electrical Room | 4400 | 2 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens | 58 | 0.116 | 510.4 | $90.85 | 2 | 0 | No Change | 58 | 0.12 | 0% | 510.4 | $90.85 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 746 | | 4400 | 3 | 1 | 250w MH LoBay w/Prismatic Lens | 295 | 0.885 | 3894 | $693.13 | 3 | 0 | No Change | 295 | 0.89 | 0% | 3894 | $693.13 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 746 | Boiler Room | 4400 | 12 | 1 | 250w MH LoBay w/Prismatic Lens | 295 | 3.54 | 15576 | $2,772.53 | 12 | 0 | No Change | 295 | 3.54 | 0% | 15576 | $2,772.53 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Men's Rest Room | 1200 | 6 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.348 | 417.6 | $74.33 | 6 | 0 | No Change | 58 | 0.35 | 0% | 417.6 | $74.33 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Custodial Closet | 1200 | 1 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.058 | 69.6 | $12.39 | 1 | 0 | No Change | 58 | 0.06 | 0% | 69.6 | $12.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Women's Rest Room | 1200 | 6 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.348 | 417.6 | $74.33 | 6 | 0 | No Change | 58 | 0.35 | 0% | 417.6 | $74.33 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.21 | A134 Music Room | 2600 | 54 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 4.968 | 12916.8 | $2,299.19 | 54 | 2 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 92 | 4.47 | 10% | 11625.12 | $2,069.27 | $225.00 | $450.00 | 0.50 | 1291.68 | $229.92 | 1.96 |
| 242.21 | A136 Practice Room | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | A135 Office | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 242.211 | Locker Area | 2600 | 2 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 0.208 | 540.8 | $96.26 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 0.19 | 10% | 486.72 | $86.64 | $75.00 | $75.00 | 0.02 | 54.08 | $9.63 | 7.79 |
| 237.21 | A140 Vocal | 2600 | 40 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 3.68 | 9568 | $1,703.10 | 40 | 2 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 92 | 3.31 | 10% | 8611.2 | $1,532.79 | $225.00 | $450.00 | 0.37 | 956.8 | $170.31 | 2.64 |
| 227.21 | A112 Storage | 1200 | 4 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.232 | 278.4 | $49.56 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 58 | 0.21 | 10% | 250.56 | $44.60 | $75.00 | $75.00 | 0.02 | 27.84 | $4.96 | 15.13 |
| 242.211 | A111 Mechanical Room / Storage | 1200 | 16 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 104 | 1.664 | 1996.8 | $355.43 | 16 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 104 | 1.50 | 10% | 1797.12 | $319.89 | $75.00 | $75.00 | 0.17 | 199.68 | $35.54 | 2.11 |
| 242.11 | Stage | 2600 | 28 | 4 | 2x4, 4 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 104 | 2.912 | 7571.2 | $1,347.67 | 28 | 0 | No Change | 104 | 2.91 | 0% | 7571.2 | $1,347.67 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | Lobby | 4400 | 18 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 1.044 | 4593.6 | $817.66 | 18 | 0 | No Change | 58 | 1.04 | 0% | 4593.6 | $817.66 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | A108 Control Room | 2600 | 3 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.174 | 452.4 | $80.53 | 3 | 0 | No Change | 58 | 0.17 | 0% | 452.4 | $80.53 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Lobby | 4400 | 22 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 0.572 | 2516.8 | $447.99 | 22 | 0 | No Change | 26 | 0.57 | 0% | 2516.8 | $447.99 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Vestibule | 4400 | 6 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 0.156 | 686.4 | $122.18 | 6 | 0 | No Change | 26 | 0.16 | 0% | 686.4 | $122.18 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | | 4400 | 8 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.464 | 2041.6 | $363.40 | 8 | 1 | Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal) | 58 | 0.35 | 25% | 1531.2 | $272.55 | $160.00 | $160.00 | 0.12 | 510.4 | $90.85 | 1.76 |
| 222.21 | Storage | 1200 | 10 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.58 | 696 | $123.89 | 10 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 58 | 0.52 | 10% | 626.4 | $111.50 | $75.00 | $75.00 | 0.06 | 69.6 | $12.39 | 6.05 |
| 237.211 | C136 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 237.211 | C137 office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 237.211 | C138 Conference Room | 2600 | 8 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.736 | 1913.6 | $340.62 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | 92 | 0.66 | 10% | 1722.24 | $306.56 | $160.00 | $160.00 | 0.07 | 191.36 | $34.06 | 4.70 |

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| 237.211 | C140 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 227.21 | Main Office Hall | 2600 | 7 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 0.406 | 1055.6 | $187.90 | 7 | 0 | No Change | 58 | 0.41 | 0% | 1055.6 | $187.90 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 237.211 | C141 Conference Room | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 237.211 | C142 Office | 2600 | 6 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 0.552 | 1435.2 | $255.47 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | 92 | 0.50 | 10% | 1291.68 | $229.92 | $75.00 | $75.00 | 0.06 | 143.52 | $25.55 | 2.94 |
| 237.211 | Main Office | 2600 | 25 | 3 | 2x2, 3 Lamp, 31w T8 Ulamp, Elect. Ballast, Recessed Mnt., Prismatic Lens | 92 | 2.3 | 5980 | $1,064.44 | 25 | 0 | No Change | 92 | 2.30 | 0% | 5980 | $1,064.44 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 231.37 | C151 Classroom | 2600 | 42 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Indirect | 86 | 3.612 | 9391.2 | $1,671.63 | 42 | 2 | 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 86 | 3.25 | 10% | 8452.08 | $1,504.47 | $225.00 | $450.00 | 0.36 | 939.12 | $167.16 | 2.69 |
| 222.21 | Corridors | 4400 | 130 | 2 | 2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 7.54 | 33176 | $5,905.33 | 130 | 0 | No Change | 58 | 7.54 | 0% | 33176 | $5,905.33 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | | 4400 | 62 | 2 | 2x2, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 58 | 3.596 | 15822.4 | $2,816.39 | 62 | 0 | No Change | 58 | 3.60 | 0% | 15822.4 | $2,816.39 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Front Canopy | 2000 | 20 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 0.52 | 1040 | $185.12 | 20 | 0 | No Change | 26 | 0.52 | 0% | 1040 | $185.12 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 1 | Exterior | 2000 | 75 | 1 | Recessed Down Light, 26w CFL Lamp | 26 | 1.95 | 3900 | $694.20 | 75 | 0 | No Change | 26 | 1.95 | 0% | 3900 | $694.20 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 680 | | 4400 | 45 | 1 | Wallpack, (1) 26w PL Quad Lamp | 26 | 1.17 | 5148 | $916.34 | 45 | 0 | No Change | 26 | 1.17 | 0% | 5148 | $916.34 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 750 | | 2000 | 37 | 1 | 250w HPS, "Shoe Box" Area Light | 295 | 10.915 | 21830 | $3,885.74 | 37 | 0 | No Change | 295 | 10.92 | 0% | 21830 | $3,885.74 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| | Totals | | 2,672 | 623 | | | 244.3 | 679162.8 | $120,891 | 2672.0 | 154.0 | | | 226.7 | | 633,152.7 | $112,701.18 | | $26,375 | 17.58 | 46,010 | $8,190 | 3.22 |

| | | |
|---|---|---|
| Dual Technology Occupancy Sensor & Day Light Sensor - (Sensor Switch CM-PC, PP-20, CM-PDT) | 25% | 360 |
| Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal) | 25% | 160 |
| 2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal) | 10% | 225 |
| Dual Technology Occupancy Sensor - Remote Mnt. | 10% | 160 |
| Dual Technology Occupancy Sensor - Switch Mnt. | 10% | 75 |
| Dual Technology Occupancy Sensor - Fixture Mnt. | 10% | 100 |

**Project Name:** LGEA Solar PV Project - Mount Olive Middle School
**Location:** Budd Lake, NJ
**Description:** Photovoltaic System - Direct Purchase

**Simple Payback Analysis**

| | Photovoltaic System - Direct Purchase |
|---|---|
| Total Construction Cost | $1,968,570 |
| Annual kWh Production | 271,793 |
| Annual Energy Cost Reduction | $48,379 |
| Annual SREC Revenue | $95,128 |
| First Cost Premium | **$1,968,570** |
| Simple Payback: | **13.72** **Years** |

**Life Cycle Cost Analysis**

| | | | |
|---|---|---|---|
| Analysis Period (years): | 25 | Financing %: | 0% |
| Financing Term (mths): | 0 | Maintenance Escalation Rate: | 3.0% |
| Average Energy Cost ($/kWh) | **$0.178** | Energy Cost Escalation Rate: | 3.0% |
| Financing Rate: | 0.00% | SREC Value ($/kWh) | $0.350 |

| Period | Additional Cash Outlay | Energy kWh Production | Energy Cost Savings | Additional Maint Costs | SREC Revenue | Net Cash Flow | Cumulative Cash Flow |
|---|---|---|---|---|---|---|---|
| 0 | $1,968,570 | 0 | 0 | 0 | $0 | (1,968,570) | 0 |
| 1 | $0 | 271,793 | $48,379 | $0 | $95,128 | $143,507 | ($1,825,063) |
| 2 | $0 | 270,434 | $49,831 | $0 | $94,652 | $144,482 | ($1,680,581) |
| 3 | $0 | 269,082 | $51,325 | $0 | $94,179 | $145,504 | ($1,535,077) |
| 4 | $0 | 267,736 | $52,865 | $0 | $93,708 | $146,573 | ($1,388,504) |
| 5 | $0 | 266,398 | $54,451 | $2,744 | $93,239 | $144,946 | ($1,243,557) |
| 6 | $0 | 265,066 | $56,085 | $2,730 | $92,773 | $146,128 | ($1,097,430) |
| 7 | $0 | 263,740 | $57,767 | $2,717 | $92,309 | $147,360 | ($950,070) |
| 8 | $0 | 262,422 | $59,500 | $2,703 | $91,848 | $148,645 | ($801,425) |
| 9 | $0 | 261,110 | $61,285 | $2,689 | $91,388 | $149,984 | ($651,441) |
| 10 | $0 | 259,804 | $63,124 | $2,676 | $90,931 | $151,379 | ($500,061) |
| 11 | $0 | 258,505 | $65,018 | $2,663 | $90,477 | $152,832 | ($347,230) |
| 12 | $0 | 257,213 | $66,968 | $2,649 | $90,024 | $154,343 | ($192,887) |
| 13 | $0 | 255,926 | $68,977 | $2,636 | $89,574 | $155,915 | ($36,971) |
| 14 | $0 | 254,647 | $71,046 | $2,623 | $89,126 | $157,550 | $120,579 |
| 15 | $0 | 253,374 | $73,178 | $2,610 | $88,681 | $159,249 | $279,828 |
| 16 | $0 | 252,107 | $75,373 | $2,597 | $88,237 | $161,014 | $440,841 |
| 17 | $0 | 250,846 | $77,634 | $2,584 | $87,796 | $162,847 | $603,688 |
| 18 | $0 | 249,592 | $79,963 | $2,571 | $87,357 | $164,750 | $768,438 |
| 19 | $0 | 248,344 | $82,362 | $2,558 | $86,920 | $166,725 | $935,163 |
| 20 | $0 | 247,102 | $84,833 | $2,545 | $86,486 | $168,774 | $1,103,936 |
| 21 | $1 | 245,867 | $87,378 | $2,532 | $86,053 | $170,899 | $1,274,836 |
| 22 | $2 | 244,637 | $89,999 | $2,520 | $85,623 | $173,103 | $1,447,938 |
| 23 | $3 | 243,414 | $92,699 | $2,507 | $85,195 | $175,387 | $1,623,326 |
| 24 | $4 | 242,197 | $95,480 | $2,495 | $84,769 | $177,755 | $1,801,080 |
| 25 | $5 | 240,986 | $98,345 | $2,482 | $84,345 | $180,208 | $1,981,288 |
| | **Totals:** | 6,402,343 | $1,763,868 | $54,830 | $2,240,820 | $3,949,858 | $130,645 |
| | | | | **Net Present Value (NPV)** | | **$1,981,313** | |
| | | | | **Internal Rate of Return (IRR)** | | **6.0%** | |

| Building | Roof Area (sq ft) | Panel | Qty | Panel Sq Ft | Panel Total Sq Ft | Total $KW_{DC}$ | Total Annual kWh | Panel Weight (33 lbs) | W/SQFT |
|---|---|---|---|---|---|---|---|---|---|
| Mount Olive Middle School | 15,525 | Sunpower SPR230 | 951 | 14.7 | 13,984 | 218.73 | 271,793 | 31,383 | 15.64 |


PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

| Station Identification | |
|---|---|
| City: | Atlantic_City |
| State: | New_Jersey |
| Latitude: | 39.45° N |
| Longitude: | 74.57° W |
| Elevation: | 20 m |
| PV System Specifications | |
| DC Rating: | 218.7 kW |
| DC to AC Derate Factor: | 0.800 |
| AC Rating: | 175.0 kW |
| Array Type: | Fixed Tilt |
| Array Tilt: | 15.0° |
| Array Azimuth: | 180.0° |
| Energy Specifications | |
| Cost of Electricity: | 0.2 ¢/kWh |

| Results | | | |
|---|---|---|---|
| Month | Solar Radiation (kWh/m²/day) | AC Energy (kWh) | Energy Value ($) |
| 1 | 2.80 | 15426 | 26.69 |
| 2 | 3.53 | 17661 | 30.55 |
| 3 | 4.46 | 23915 | 41.37 |
| 4 | 5.28 | 26724 | 46.23 |
| 5 | 5.86 | 30118 | 52.10 |
| 6 | 6.10 | 29137 | 50.41 |
| 7 | 6.05 | 29548 | 51.12 |
| 8 | 5.60 | 27434 | 47.46 |
| 9 | 4.99 | 24051 | 41.61 |
| 10 | 3.97 | 20201 | 34.95 |
| 11 | 2.86 | 14599 | 25.26 |
| 12 | 2.43 | 12978 | 22.45 |
| Year | 4.50 | 271793 | 470.20 |

.= Proposed PV Layout

Notes:

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

# Solar Thermal Calculations

Concord Engineering Group

Mt. Olive Middle School

**SOLAR THERMAL SYSTEM CALCULATIONS (FLAT PLATE COLLECTORS)**

| | |
|---|---|
| Solar Thermal Panel SF: | 2,016 |
| Solar Panel Qty: | 42 |
| Panel Direction: | 180° (South) |
| Tilt Angle (degree from horizontal): | 40.7° |
| Ave Solar Thermal Operating Temperature: | 90 |
| Panel Area (SF per panel): | 48 |

*Solar Panel Efficiencies are based on Viesmann Flat Plate collector model VITOSOL 200F

| Month | AMB T | AVE ΔT | SOLAR RADIATION | | | DHW PRODUCTION | | |
|---|---|---|---|---|---|---|---|---|
| | (°F) | (°F) | KWH/M^2/Day | KWH/SF/Day | Panel Eff. | Net KWH/SF/Day | Net KWH | Net kBtu |
| 1 | 30 | 60 | 3.36 | 0.312 | 41.0% | 0.128 | 7,853 | 26,811 |
| 2 | 30 | 60 | 4.05 | 0.376 | 41.0% | 0.154 | 9,466 | 32,317 |
| 3 | 40 | 50 | 4.58 | 0.425 | 46.7% | 0.199 | 12,184 | 41,598 |
| 4 | 50 | 40 | 4.84 | 0.450 | 52.3% | 0.235 | 14,440 | 49,297 |
| 5 | 60 | 30 | 5.3 | 0.492 | 58.0% | 0.286 | 17,524 | 59,827 |
| 6 | 70 | 20 | 5.33 | 0.495 | 63.7% | 0.315 | 19,345 | 66,044 |
| 7 | 80 | 10 | 5.27 | 0.490 | 69.3% | 0.339 | 20,830 | 71,113 |
| 8 | 85 | 5 | 5.25 | 0.488 | 72.2% | 0.352 | 21,599 | 73,738 |
| 9 | 75 | 15 | 5.06 | 0.470 | 66.5% | 0.313 | 19,182 | 65,489 |
| 10 | 65 | 25 | 4.46 | 0.414 | 60.8% | 0.252 | 15,467 | 52,804 |
| 11 | 50 | 40 | 3.15 | 0.293 | 52.3% | 0.153 | 9,398 | 32,084 |
| 12 | 40 | 50 | 2.87 | 0.267 | 46.7% | 0.124 | 7,635 | 26,067 |
| **TOTALS** | | | | | | | **174,923** | **597,188** |
| **AVERAGE** | | | **4.46** | **0.414** | | **0.238** | **14,577** | **49,766** |

Notes: Solar radiation values obtained from National Renewable Energy Laboratory PVWatts Version 1 Calculator Program

## Solar Thermal System Panel Layout

| Building | Roof Area (sq ft) | Panel | Qty | Panel Sq Ft | Panel Total Sq Ft | Average kWh (heat) | Total Annual kWh (heat) | Average kBtu (heat) | Total Annual kBtu (heat) |
|---|---|---|---|---|---|---|---|---|---|
| Mt. Olive Middle School | 2,016 | Viesmann Flat Plate (VITOSOL 200F) | 42 | 48.0 | 2,016 | 14,577 | 174,923 | 49,766 | 597,188 |


.= Proposed Solar Thermal Layout

Notes:
1. Estimated production based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.