# LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: HIGHLAND HIGH SCHOOL ENERGY AUDIT REPORT

**PREPARED FOR:** **BLACK HORSE PIKE REGIONAL SCHOOL DISTRICT**
**450 ERIAL ROAD**
**BLACKWOOD, NJ 08012**
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# I. EXECUTIVE SUMMARY

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

Highland Regional High School
450 Erial Road
Blackwood, NJ 08012

District Contact Person: Jean Grubb, CPA, SBA
Facility Contact Person: Bill Collins

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 | $ 235,319 |
| Natural Gas | $ 113,814 |
| Total | $ 349,133 |

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 | $38,672 | $10,509 | 3.7 | 307.6% |
| ECM #2 | Lighting Controls | $36,645 | $10,847 | 3.4 | 344.0% |
| ECM #3 | Computer Monitor Replacement | $10,200 | $2,313 | 4.4 | 240.1% |
| ECM #4 | Condensing Boiler Installation | $410,428 | $16,953 | 24.2 | 23.9% |
| ECM #5 | AC Unit Replacement | $212,358 | $6,235 | 34.1 | -56.0% |
| ECM #6 | Library AC Unit Upgrade | $72,181 | $6,196 | 11.6 | 28.8% |
| ECM #7 | Cafeteria AC Unit Controls Upgrade | $23,988 | $4,786 | 5.0 | 199.3% |
| ECM #8 | Water Cooled CU Replacement | $156,985 | $11,698 | 13.4 | 11.8% |
| ECM #9 | Water Conservation | $52,124 | $2,516 | 20.7 | 44.8% |
| ECM #10 | Premium Efficiency Motors | $12,806 | $1,441 | 8.9 | 102.5% |
| ECM #11 | Valve Blanket Insulation | $10,000 | $554 | 18.1 | 33.0% |
| ECM #12 | Kitchen Hood Controls | $10,671 | $564 | 18.9 | -20.7% |
| **RENEWABLE ENERGY MEASURES (REM's)** | | | | | |
| **ECM NO.** | **DESCRIPTION** | **NET INSTALLATION COST** | **ANNUAL SAVINGS** | **SIMPLE PAYBACK (Yrs)** | **SIMPLE LIFETIME ROI** |
| REM #1 | PV Solar | $7,903,260 | $532,509 | 14.8 | 68.4% |
| **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 | 25.8 | 77844.0 | 0.0 |
| ECM #2 | Lighting Controls | 31.1 | 80350.0 | 0.0 |
| ECM #3 | Computer Monitor Replacement | 0.0 | 17136.0 | 0.0 |
| ECM #4 | Condensing Boiler Installation | 0.0 | 0.0 | 15697.0 |
| ECM #5 | AC Unit Replacement | 46.2 | 46185.0 | 0.0 |
| ECM #6 | Library AC Unit Upgrade | 1.0 | 40749.0 | 643.0 |
| ECM #7 | Cafeteria AC Unit Controls Upgrade | 0.0 | 27360.0 | 1012.0 |
| ECM #8 | Water Cooled CU Replacement | 7.0 | 5583.0 | 0.0 |
| ECM #9 | Water Conservation | 0.0 | 0.0 | 0.0 |
| ECM #10 | Premium Efficiency Motors | 2.5 | 10677.0 | 0.0 |
| ECM #11 | Valve Blanket Insulation | 0.0 | 0.0 | 513.0 |
| ECM #12 | Kitchen Hood Controls | 0.0 | 1339.0 | 355.0 |
| **RENEWABLE ENERGY MEASURES (REM's)** | | | | |
| ECM NO. | DESCRIPTION | ANNUAL UTILITY REDUCTION | | |
| | | ELECTRIC DEMAND (KW) | ELECTRIC CONSUMPTION (KWH) | NATURAL GAS (THERMS) |
| REM #1 | PV Solar | 878.1 | 1097957.0 | 0.0 |

**Fast Payback Energy Conservation Measures:**

The Energy Conservation Measures (ECMs) identified within the report represent the potential annual energy and cost savings at the facility resulting from our energy audit. It is recommended to consider all ECMs as part of the School District's initiative to save energy, reduce emissions, and lower operating costs. Several ECMs shown within this report represent significant savings relative to the cost to implement. The ECMs shown with a simple payback of 10 years and less are considered very cost effective and should be considered a high priority for the District. The following ECMs are highly recommended:

- Lighting Upgrades

Lighting retrofits throughout the School District are a straight forward conservation measure that is prescriptive in nature and provides substantial savings for the investment. Lighting retrofits are a good example of ECMs that can be implemented with "in house" staff to reduce the installation cost and further reduce paybacks. Throughout most of the school the measure includes replacing existing 700 series T-8 fluorescent lamps with new higher efficiency T-8 lamps. This upgrade also includes installation of high bay T-5 fixtures to replace the existing metal halide fixtures found in the gymnasium and auditorium. In addition it is recommended to utilize CFL lamps in lieu of all existing incandescent lamps throughout the School District. Overall lighting upgrades represent one of the most easily implemented ECMs and are highly recommended for all facilities.

- Lighting Controls

Similar to lighting upgrades, lighting controls are very simple upgrades and can save considerable energy. Lighting controls do not require replacement of the fixture and typically can save more energy than lighting upgrades alone. For the purpose of this energy audit, each ECM is calculated as stand-alone ECMs. The maximum savings can be achieved through the implementation of both the lighting upgrades and lighting controls ECMs. Lighting controls will automatically turn off lights when spaces and rooms are not occupied. It is important to note that ECMs are calculated as stand-alone ECMs and therefore the total savings will be slightly less than the sum of both individual ECMs (Lighting Upgrade and Lighting Controls). The discrepancy between additive ECMs is within the tolerances for this level of analysis (+/- 20%). Lighting controls provide the maximum savings in spaces that have changing occupancy schedules throughout the day such as the classrooms after school hours, labs, music rooms, media centers, etc. Lighting controls is highly recommended in addition to the lighting upgrade ECMs.

- Computer Monitor Replacement

Plug loads within buildings are becoming a larger and larger portion of the total energy use in all types of facilities. Plug loads are most dominant in combination with computers and computer equipment. Modern computer monitors are flat screen LCD panels that are far more efficient than older style cathode ray-tube (CRT) monitors. Typical energy use of a flat screen monitor is approximately 1/3 of the energy used by a CRT monitor. A large portion of the computer

monitors throughout the District are CRT style monitors. This represents a significant energy savings potential. It is highly recommended to replace the existing CRT monitors with flat screen monitors to take advantage of the energy savings as well as other ergonomic benefits of modern LCD monitors.

- Cafeteria AC Units Controls Upgrade

A programmed schedule would provide energy savings by allowing the building automation system to setback the temperature setting when the space is not occupied and returning to the normal temperature setting when the space is occupied. The major benefit of this ECM is in the heating season since the outside temperature is the coldest during unoccupied periods. In night setback, the overall energy use is reduced since the inside temperature is kept closer to the outside temperature which limits heat loss.

- Premium Efficiency Motors

The improved efficiency of the NEMA Premium® efficient motors in comparison to standard efficiency type is primarily due to improved designs with use of better materials to reduce losses. The existing fans and pumps at the school are configured primarily with standard efficiency motors. These standard efficiency motors run a considerable amount of time over a one year time period. Replacing the existing standard efficiency motors with NEMA Premium® efficiency models yields significant energy savings. This ECM is a one-for-one style replacement with dependable savings that is based on a simple calculation. In addition to the savings, this ECM provides new motors for a variety of existing equipment.

**Capital Improvement Energy Conservation Measures:**

The ECMs that have much longer paybacks are considered capital improvement ECMs. These ECMs typically have high installation costs that are more difficult to justify the savings based solely on the energy savings associated with the improvement. Despite the long paybacks, these ECMs in many cases provide valuable and much needed infrastructure improvements for the facility. These ECMs include boiler upgrades, HVAC equipment upgrades, etc. The savings identified for the following ECMs provides additional incentive for the district's capital improvement projects.

- Condensing Boilers

Boiler replacements are one of the most significant HVAC system upgrades for a facility. The installation of condensing boilers provides a heating efficiency increase ranging from 10% to 15% over boilers of non-condensing type and an even greater savings potential over existing equipment found in the School. Even with this significant increase in efficiency the simple payback for a condensing boiler ECM is still greater than 15 years, depending on the boiler capacity and installation difficulty, due to the complexity of upgrading a major infrastructure component of the School. This ECM represents the most substantial upfront cost which creates

long paybacks, but it is the most practical ECM to pursue due to the potential long term energy and maintenance savings that can be realized.

- AC Unit Upgrades

High efficiency AC unit installations will typically have high installation costs. However, the savings over time can be substantial. The simple payback for AC unit upgrades range between 25 years and 30 years depending on the existing equipment efficiency, runtime, and size / installation cost. Similar to most capital improvement projects, the energy savings alone does not justify the installation. The benefit of replacing the aging AC systems with new equipment provides value through avoided costs (i.e. maintenance, replacement, operational, refrigerant availability and disposal, etc.) that would otherwise burden the School District and should not be overlooked.

- Library AC Unit Upgrade

The library for this school is conditioned by a 50-Ton packaged rooftop unit. It is equipped with direct expansion cooling and hot water heat. The unit was originally designed to operate as a variable volume system with terminal boxes and electric reheat located above the ceiling serving independent zones. This system has since been overridden and the unit now operates as a constant volume system with the terminal boxes held in the full open position. This ECM would bring the packaged rooftop unit back to its original functionality by having it operate as a variable air volume system including the proper operation of the compressors. Demand controlled ventilation would be added to the sequences of operation to adjust the amount of outdoor air provided to the space based on actually occupancy. The existing terminal boxes with reheat would be removed and replaced with terminal boxes with hot water coils.

- Water Cooled CU Replacement

Portions of Corridor A at the high school are cooled by direct expansion, indoor, water-cooled condensing systems. The cooling media is from the domestic water supply and the waste water discharges to the sanitary system. Usually, energy savings derived from replacing condensing units does not justify a reasonable payback term. Nevertheless, as the equipment ages, it loses efficiency due to clogged condensers, internal parts wear and deposits of oil and other contaminants on the heat exchangers. Replacing an older condensing unit avoids these issues along with some energy savings. The new direct expansion system will not require the consumption of domestic water which yields considerable cost savings.

- Water Conservation

The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. The existing urinals are automatically flushed by a time clock device that cycle every 15 minutes for a total of 28 flushes per day per urinal. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period.

- Hot Water Valve Blanket Insulation

Hot Water piping insulation is a valuable asset to avoid the loss of heat from the boiler system. Large diameter bare steel pipe can account for significant energy loss over an entire heating system. Since the piping remains hot 24/7, bare pipe heat losses are multiplied by the entire operating hours of the heating system. Pipe & valve insulation reduces the loss compared to bare pipe by a factor of 10 or more. Pipe insulation becomes deteriorated over time due to the repair of pipe / fitting leaks and service of components.

- Kitchen Hood Controls

Kitchen hood controls allow the exhaust air through the commercial kitchen hood to reduce with respect to the level of heat and smoke produced by the kitchen cooking equipment. This ECM provides savings on fan motors as well as energy required to heat and cool the make-up air exhausted by the hood. The savings is extremely dependent on the operating hours of the kitchen hood exhaust fan. Based on the survey and discussions with the operating staff, it was determined that the kitchen exhaust was operating for many hours beyond the needs of the cooking equipment.

**Combined Project Approach:**

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

**Table 3**
**Combined Project Summary**

| COMBINED PROJECT APPROACH SUMMARY TABLE | | | | | | |
|---|---|---|---|---|---|---|
| **ECM NO.** | **DESCRIPTION** | **ANNUAL ENERGY SAVINGS ($)** | **PROJECT COST ($)** | **SMART START INCENTIVES** | **CUSTOMER COST** | **SIMPLE PAYBACK** |
| ECM #1 | Lighting Upgrade | $10,509 | $57,752 | $19,080 | $38,672 | 3.7 |
| ECM #2 | Lighting Controls | $10,847 | $41,800 | $5,155 | $36,645 | 3.4 |
| ECM #3 | Computer Monitor Replacement | $2,313 | $10,200 | $0 | $10,200 | 4.4 |
| ECM #4 | Condensing Boiler Installation | $16,953 | $421,638 | $11,210 | $410,428 | 24.2 |
| ECM #6 | Library AC Unit Upgrade | $6,196 | $72,181 | $0 | $72,181 | 11.6 |
| ECM #7 | Cafeteria AC Unit Controls Upgrade | $4,786 | $23,988 | $0 | $23,988 | 5.0 |
| ECM #8 | Water Cooled CU Replacement | $11,698 | $158,825 | $1,840 | $156,985 | 13.4 |
| ECM #9 | Water Conservation | $2,516 | $52,124 | $0 | $52,124 | 20.7 |
| ECM #10 | Premium Efficiency Motors | $1,441 | $13,271 | $465 | $12,806 | 8.9 |
| ECM #11 | Valve Blanket Insulation | $554 | $10,000 | $0 | $10,000 | 18.1 |
| ECM #12 | Kitchen Hood Controls | $564 | $10,671 | $0 | $10,671 | 18.9 |
| | *Design / Construction Extras (15%)* | | *$130,868* | | *$130,868* | |
| | **Total Project** | **$68,377** | **$1,003,318** | **$37,750** | **$965,568** | **14.1** |

| | |
|---|---|
| **Total Highland High School Energy Costs:** | **$349,133** |
| **Est. Total Highland High School Energy Savings:** | **$68,377** |
| **Overall Highland High School Percent Reduction:** | **19.6%** |

A funding mechanism that is available for large scale, combined projects is the E.S.I.P, P.L. 2009, c.4. The Energy Savings Improvement Program (ESIP) allows for financing of any combination of energy efficiency projects across multiple facilities into one large project. The term of the financing must be under 15 years and the savings provides the revenue for the financing cost. The combination of ECMs provides Black Horse Pike Regional School District with the opportunity to implement a large portion of the ECMs identified within Highland High

School with an overall simple payback of 13.1 years. The program financing allows for the implementation with no upfront cost for Blackhorse Regional School District. Implementation of an ESIP provides significant benefits and should be strongly considered for Highland High School. The Total Entity Project Summary table below shows the savings, costs, incentive programs and paybacks for all ECMs at Highland High School. Implementation of all ECMs identified within the table represents a total annual savings of approximately $73,836 for Black Horse Pike Regional School District which is a 21.1% reduction in overall annual utility costs.

**Other Considerations:**

- Renewable Energy Measures

Renewable Energy Measures (REMs) were also reviewed for implementation at Highland High School. CEG utilized a roof and ground mounted solar array to house a substantial PV system. The recommended 878.14 kW PV system will produce approximately 1,097,957 kWh of electricity annually and will reduce the schools electrical consumption from the grid by 63%. The system's calculated simple payback of 14.8 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.

- Maintenance and Operational Measures

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:

  - Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.
  - Maintain all weather stripping on entrance doors.
  - Clean all light fixtures to maximize light output.
  - Provide more frequent air filter changes to decrease overall system power usage and maintain better IAQ.

- Retro-Commissioning

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.

**Overall Assessment:**

There are numerous ECMs that can be implemented to further reduce energy use and save on the facility's operating costs. The total energy cost of $349,133 could be reduced by approximately 21.1% through the implementation of the ECMs recommended in this audit. Highland High School is in a unique position to implement energy efficiency improvements and still include large capital projects. When the total project is capable of being funded through the savings, CEG highly recommends the School to take advantage of this opportunity.

# II. INTRODUCTION

The comprehensive energy audit covers the 220,065 square foot Highland High School, which includes the following spaces: gymnasium, cafeteria, library, various trade shops, administration offices, auditorium, classrooms, maintenance, computer labs, music suites, and kitchen.

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:

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

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

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

$$Lifetime\ Ma\,\mathrm{int}\,enance\ Savings = \left( Yearly\ Ma\,\mathrm{int}\,enance\ Savings \times ECM\ Lifetime \right)$$

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

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

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

# IV. HISTORIC ENERGY CONSUMPTION/COST

## A. Energy Usage / 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. The facilities receive electric distribution service through Atlantic City Electric on the Annual General Service (AGS) rate structure. The school has contracted South Jersey Energy, a Third Party Supplier (TPS), to provide electric commodity supply (generation) service. 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. South Jersey Gas provides natural gas to the facility under the General Service Gas-LV rate structure. The Third Part Supplier (TPS) is Hess Corporation. 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 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 at this facility is as follows:

| Description | Average |
|---|---|
| Electricity | 13.5¢ / kWh |
| Natural Gas | $1.08 / Therm |

**Table 4**
**Electricity Billing Data**

**ELECTRIC USAGE SUMMARY**

Utility Provider: Atlantic City Electric
Rate: Annual General
Meter No: 86283945
Customer ID No:
Third Party Utility S. J. Energy Co.
TPS Meter / Acct No:

| MONTH OF USE | CONSUMPTION KWH | DEMAND | TOTAL BILL |
|---|---|---|---|
| Jan-09 | 145,440 | 408.0 | $19,182 |
| Feb-09 | 131,200 | 446.4 | $18,055 |
| Mar-09 | 148,960 | 430.4 | $19,582 |
| Apr-09 | 168,640 | 417.6 | $21,777 |
| May-09 | 141,600 | 420.8 | $18,591 |
| Jun-09 | 160,960 | 449.6 | $21,580 |
| Jul-09 | 115,520 | 276.8 | $16,119 |
| Aug-09 | 124,160 | 347.2 | $16,954 |
| Sep-09 | 143,360 | 422.4 | $19,615 |
| Oct-09 | 150,080 | 459.2 | $20,727 |
| Nov-09 | 152,160 | 430.4 | $20,549 |
| Dec-09 | 167,040 | 406.4 | $22,587 |
| **Totals** | **1,749,120** | **459.2 Max** | **$235,319** |

**AVERAGE DEMAND 409.6 KW average**
**AVERAGE RATE $0.135 $/kWh**

**Figure 1**
**Electricity Usage Profile**

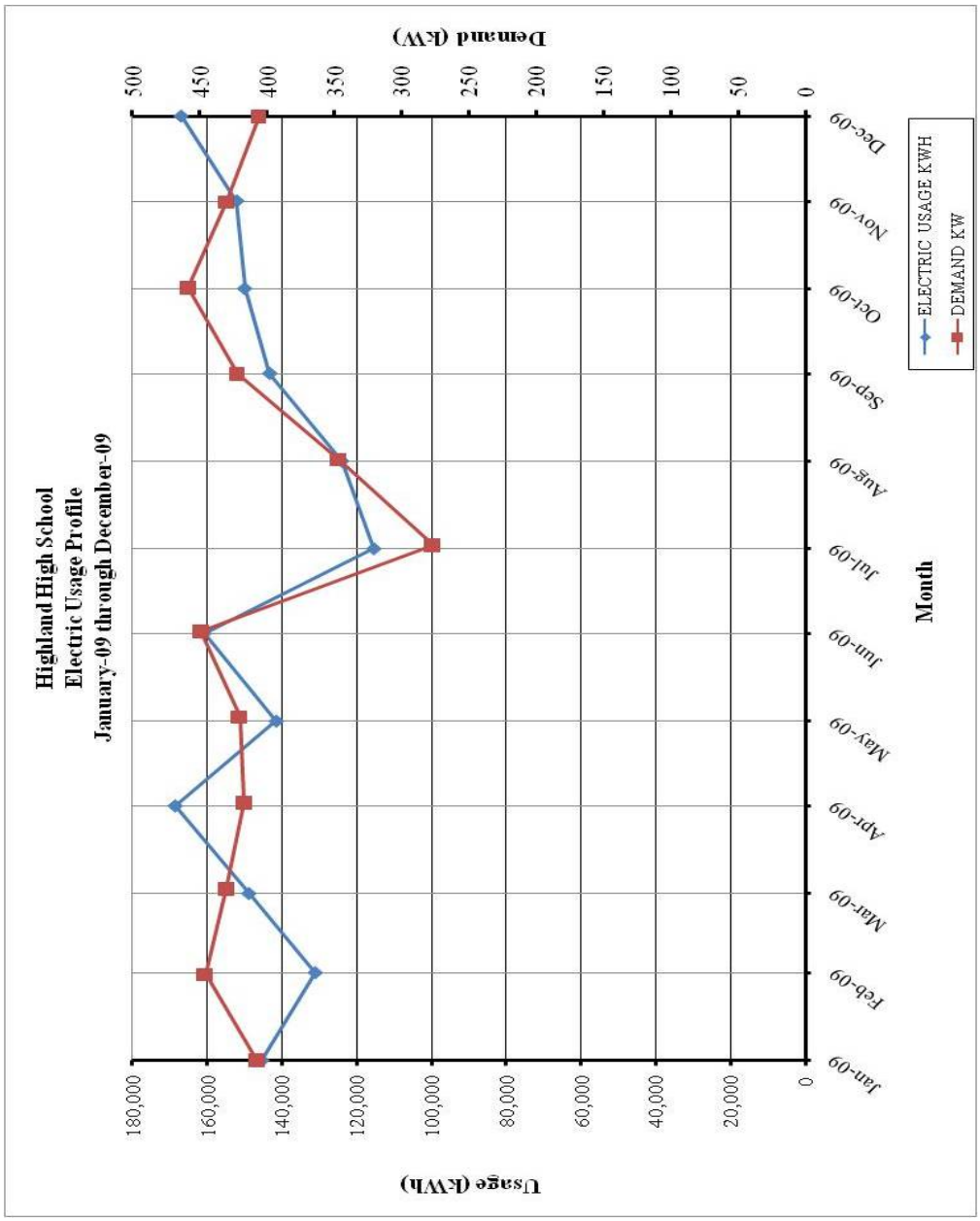


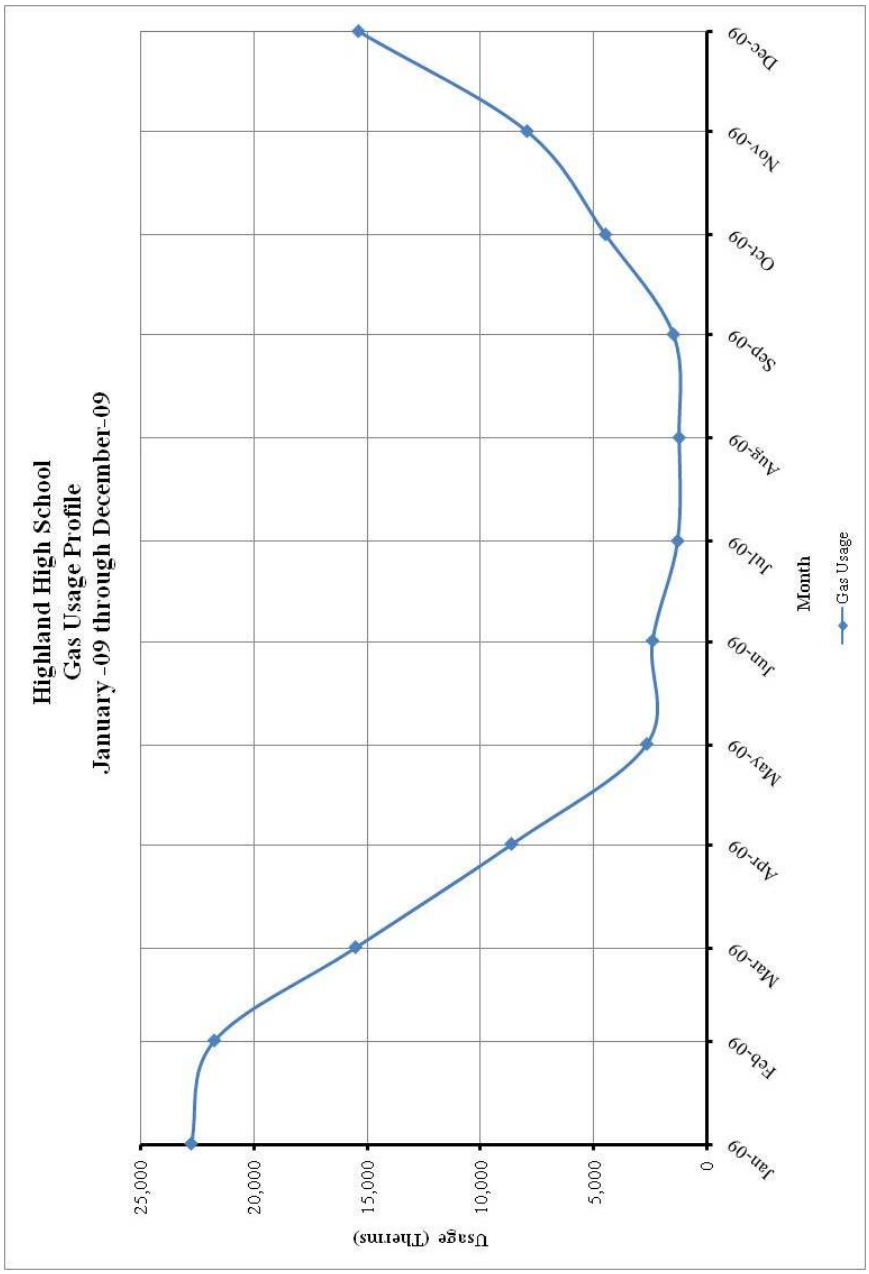
**Table 5**
**Natural Gas Billing Data**

| NATURAL GAS USAGE SUMMARY | |
|---|---|
| Utility Provider: | South Jersey Gas |
| Rate: | General Service Gas-LV |
| Meter No: | 259856 |
| Point of Delivery ID: | |
| Third Party Utility Provider: | Hess Corporation |
| TPS Meter No: | |

| MONTH OF USE | CONSUMPTION (THERMS) | TOTAL BILL |
|---|---|---|
| Jan-09 | 22,742.58 | $29,226.95 |
| Feb-09 | 21,724.92 | $25,211.15 |
| Mar-09 | 15,500.64 | $14,786.55 |
| Apr-09 | 8,629.47 | $7,844.44 |
| May-09 | 2,665.14 | $2,849.09 |
| Jun-09 | 2,411.55 | $2,744.83 |
| Jul-09 | 1,304.10 | $1,812.10 |
| Aug-09 | 1,238.40 | $1,725.95 |
| Sep-09 | 1,486.25 | $1,794.90 |
| Oct-09 | 4,485.12 | $4,176.93 |
| Nov-09 | 7,943.75 | $7,521.46 |
| Dec-09 | 15,374.19 | $14,119.42 |
| **TOTALS** | **105,506.11** | **$113,813.77** |

**AVERAGE RATE:** **$1.08** **$/THERM**

**Figure 2**
**Natural Gas Usage Profile**



## 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:

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

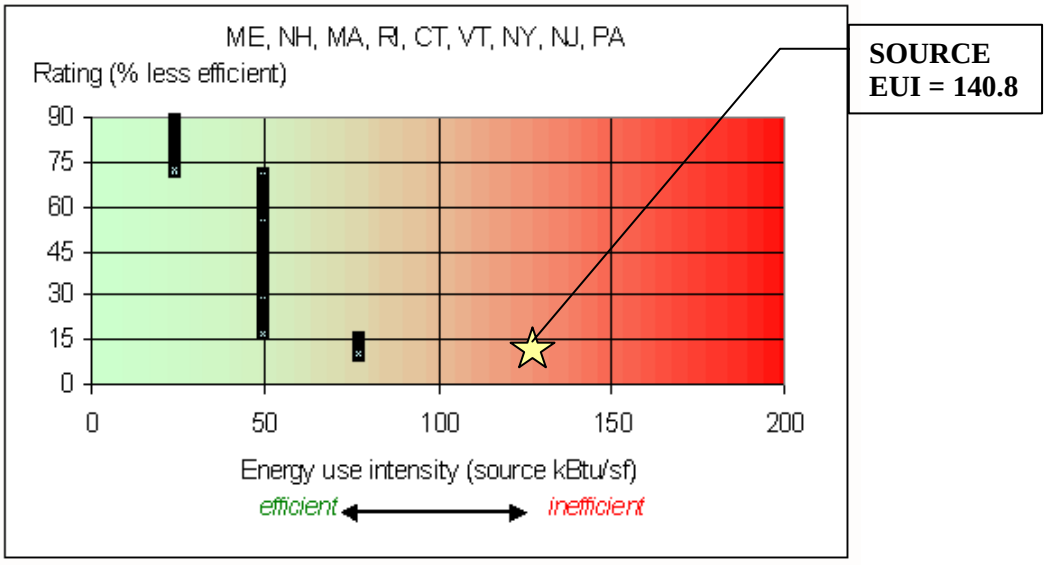
$$Building\ \ Source\ EUI = \frac{(Electric\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio + Gas\ Usage\ in\ kBtu\ \ X\ \ SS\ \ Ratio)}{Building\ \ Square\ \ Footage}$$

**Table 6**
**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 | 1,749,120.0 | | | 5,971,496 | 3.340 | 19,944,796 |
| NATURAL GAS | | 105,506.1 | | 10,550,611 | 1.047 | 11,046,490 |
| FUEL OIL | | | 0.0 | 0 | 1.010 | 0 |
| PROPANE | | | 0.0 | 0 | 1.010 | 0 |
| TOTAL | | | | 16,522,107 | | 30,991,285 |
| *Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007. | | | | | | |
| **BUILDING AREA** | | 220,065 | SQUARE FEET | | | |
| **BUILDING SITE EUI** | | *75.08* | kBtu/SF/YR | | | |
| **BUILDING SOURCE EUI** | | *140.83* | kBtu/SF/YR | | | |

Figure 3 below depicts a national EUI grading for the source use of High Schools.

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



## 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: blackhorsepikeBOE
Password: lgeaceg2010

Security Question: What city were you born in?
Security Answer: "blackwood"

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 7**
**ENERGY STAR Performance Rating**

| ENERGY STAR PERFORMANCE RATING | | |
|---|---|---|
| **FACILITY DESCRIPTION** | **ENERGY PERFORMANCE RATING** | **NATIONAL AVERAGE** |
| Highland High School | 52 | 50 |

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

# V. FACILITY DESCRIPTION

The 220,065 square foot Highland High School is a two-story building located at 450 Erial Road in Blackwood, New Jersey. The facility is comprised of a gymnasium, weight room, cafeteria, library, various trade shops, administration offices, auditorium, classrooms, maintenance, computer labs, music suites, and kitchen.

The total occupancy at the Highland High School is approximately 1,390 including students, teachers and the custodial staff. The facility is open between the hours of 6:00AM and 11:00 PM for school hours, afterschool programs and custodial services. The school is heavily used in the summer for sports, summer camps and other activities. Therefore, occupied portions of the building are kept at occupied conditions to control temperature and humidity for staff and programs that may be occurring at the facility during the summer.

The facility was originally constructed in 1965 and has received additions in 1986, 1990 and 1999 with HVAC upgrades in 2008 and 2010. Exterior walls are brick/block construction with minimum insulation typical of the time period. The amount of insulation within the wall is unknown. The windows throughout the facility are in good condition and appear to be maintained. Typical windows throughout the facility are double pane, ¼" insulated glass with vinyl frames. Blinds are utilized throughout the facility for occupant comfort. The blinds are valuable because they help to reduce heat loss in the winter and reduce solar heat in the summer. The majority of the roof is constructed of a built-up roof with light color stone covering that includes a 2-inch rigid insulation and 2-inch insulrock on bulb tees.

HVAC Systems

The central heating system is located in the facility's original boiler room and consists of two (2) 1967 H. B. Smith cast iron sectional hot water boilers each rated at 6,522 MBH output. These boilers are approximately 70% efficient and are 13 years beyond their ASHRAE Service Life of 30 years. The heating hot water is distributed throughout the facility via several constant volume end suction pumps feeding three major zones in the facility and are located within the original boiler room. This system provides heating to all areas of the building except the 1986 Gym and the 1999 Weight Room Additions. The 1986 Gym Addition is heated by a 1988 Weil-McLain cast iron sectional hot water boiler located in the original boiler room and is rated at 810 MBH output that feeds two in-line hot water pumps. These pumps in turn feed the four (4) hot water coils in the Gym units and the H&V units in the basement locker rooms. The Weight Room addition is heated by a 1999 vintage packaged rooftop unit with gas-fired heating. The Library & Classroom Addition is heated by packaged rooftop units with hot water coils while the Auditorium and Cafeteria are heated by duct-mounted hot water heating coils. Typical smaller terminal heating equipment throughout the facility consists of vertical unit ventilators with fin-tube radiation in classrooms; hot water unit heaters for receiving, storage, and mechanical rooms; horizontal unit ventilators for the shops; and basic fin-tube radiation or cabinet heaters for entrances.

Cooling is provided for the 1990 Library & Classroom Addition, the 1999 Weight Room Addition, the 2008 Auditorium HVAC Replacement, and the 2010 Cafeteria Renovation. The original 1965 building is heating only except for the A Wing. Portions of Corridor A at the high

school are cooled by direct expansion, indoor, water-cooled condensing systems. The cooling media is from the domestic water supply and the waste water discharges to the sanitary system. This is a wasteful cooling process that costs the School District in both water and sewer charges. There are approximately 10 units of this style all serving interior zones.

The Library is cooled by a 50-Ton packaged rooftop air conditioning unit. The unit was originally designed to operate as a variable volume system with terminal boxes and electric reheat located above the ceiling serving independent zones. This system has since been overridden and the unit now operates as a constant volume system with the terminal boxes held in the full open position. It has been reported that there have been problems in the past with this unit maintaining proper humidity levels in the Library. The compressor sequences of operation have been manipulated to compensate for the humidity problems. CEG strongly recommends that this packaged rooftop unit be brought back to its original functionality by having it operate as a variable air volume system including the proper operation of the compressors. The 1990 Classroom Addition is cooled by self-contained heating and cooling unit ventilators with DX cooling. The 1999 Weight Room Addition is cooled by a 10-Ton packaged rooftop air conditioning unit with DX cooling. The Auditorium is cooled by two (2) 30-Ton packaged rooftop air conditioning units installed in 2008 while the Cafeteria is cooled by three (3) 15-Ton packaged rooftop units installed in 2010.

Exhaust System

Air is exhausted from the building through the packaged rooftop units, unit ventilators and centrifugal roof exhausters. Dedicated exhaust is provided for toilet rooms, specialty rooms (such as art rooms, wood shop, chemistry rooms, and biology rooms, etc.) and large assembly areas (such as the auditorium and gymnasium). The exhaust for the specialty areas is manually controlled by the maintenance staff based on temperature and occupancy comfort. The toilet rooms exhaust fans are manually controlled by bath room wall switches. The commercial kitchen includes two 12 feet by 4 feet commercial exhaust hoods. The hoods are utilized for heat and smoke exhaust over cooking ovens steamers, and a gas fired range. The kitchen hood is manually controlled by a wall switch and operates approximately 8 hrs per day.

HVAC System Controls

The hot water heating systems within the original 1965 facility, the 1986 Gym Addition and the 1990 Library/Classroom Addition are controlled via a pneumatic system located in the original boiler room that consists of day-auto-night controllers for the auditorium, 1st floor academic, 2nd floor academic, administration, library, cafeteria, shops, fin-tube radiation control, etc. In addition, this system has summer/winter changeover, outside air temperature reset and hot water pump setpoint controls. This pneumatic system is a 1965 vintage system that is long past the service life of 20 years per ASHRAE. Throughout the building there are pneumatic manual wall thermostats for various HVAC units and local pneumatic controls with adjustable settings on the heating units that were installed in 1965. All HVAC units in the older section of the school are controlled by local or remote pneumatic thermostats. We could not determine an actual level of accuracy of the pneumatic thermostats without calibrated instrumentation but there are certainly air leakage in the sensors, field devices and air lines. The noted air leakage leads to inefficient operation of the equipment the thermostat is controlling. These indoor temperature controls are

inaccurate due to temperature drift, age, cost of maintenance of pneumatics and not having been re-calibrated. In addition, pneumatic controls do not have the ability to maintain the temperature at setpoint under changing load conditions. The 1999 Weight Room Addition, Library and the Auditorium/Cafeteria renovations have newer HVAC units with Direct Digital Controls (DDC) features. During the detailed field inspection, CEG discovered that the Cafeteria rooftop units operate in occupied mode 24/7 due to value engineering of the local controls at the unit at the time of original installation. A programmed schedule would provide energy savings by allowing the building automation system to setback the temperature setting when the Cafeteria is not occupied.

Domestic Hot Water

During the heating season, domestic hot water for the kitchen, restrooms, office lounge, etc., is provided by a 6-foot diameter by 12-foot long storage tank with an internal heat exchanger fed by the heating hot water boilers via two (2) in-line circulation pumps. In the summer time, the domestic hot water is produced by an H. B. Smith cast iron sectional boiler rated at 784 MBH output that feeds the same heat exchanger/tank. The domestic hot water is circulated throughout the building by a hot water re-circ pump. The circulation pump is controlled by an aqua stat. The domestic hot water piping insulation appeared to be in good condition.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-8 lamps and electronic ballasts. Storage rooms and closets are lit with compact fluorescent lamps. The exit signs use incandescent lamps and are a strong candidate for the LED lamp type exit sign fixture.

# 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 Upgrade

**Description:**

The majority of the lighting throughout the Highland High School is provided by lighting fixtures consisting of standard 32-Watt, T-8 lamps and electronic ballasts. There are still some spaces that have 40-Watt, T-12 lighting fixtures and incandescent lamps. The existing Gymnasium and Auxiliary Gymnasium lighting systems comprise of a total of sixty (60) 400-Watt Metal-Halide (MH) fixtures which have poor lumen maintenance (approximately 30% reduction in lighting output at 40% of rated lamp life). Also, the fixture ballast can be very noisy, requiring up to 10 minutes for re-striking after shutdown, and there is a noticeable color shift as the lamp approaches the end of its life.

This ECM includes the replacement of all 32-Watt, T-8 and 40-Watt, T-12 lamps with 25-Watt, Super T-8 lamps throughout the entire facility. The new, energy efficient Super T-8 lamps will provide adequate lighting and will save on electrical costs due to better performance of these lamps. This ECM also includes maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a Super T-8 lamp is approximately 24,000 burn-hours, in comparison to the existing standard T-8 lamp which is approximately 20,000 burn-hours.

This ECM would also replace each of the existing Gymnasium and Auxiliary Gymnasium light fixtures with new T-5 high-bay light fixtures which would include six, 4-foot T-5 High Output (HO) lamps. The T-5 HO lamps are rated for 20,000 hours versus the 10,000 hours for the 400-Watt MH lamps so there would again be savings in replacement cost/labor. In addition, the T-5 HO lamps have better lighting quality and lumen maintenance.

The last part of this ECM involves replacing the seventy-five (75) existing exit signs that have 7-Watt Compact Fluorescent Lamps (CFLs) or incandescent bulbs with the newer LED technology units. In addition, the remainder of the incandescent lamps would be replaced with the appropriately sized CFL lamp.

**Energy Savings Calculations:**

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

From the **NJ Smart Start® Program Incentives Appendix**, the following incentives are warranted:

For the LED Exit Sign: $20/LED Exit sign (≤75kW facility connected load) and $10/LED Exit sign (≥75kW facility connected load).
Smart Start ® Incentive = (# of LED Exit fixtures x $10 per fixture)

Smart Start ® Incentive = 75 fixtures x $10 per fixture = $750.

For replacement of T-8 lamps to Super T-8 lamps is $10 per fixture.
Smart Start ® Incentive = (# of T-8 fixtures x $10 per fixture)
Smart Start ® Incentive = 1,233 fixtures x $10 per fixture = $12,330

For replacement of 400-Watt MH fixtures to a T-5 lighting system
Smart Start ® Incentive = (# of T-5 fixtures x $100 per fixture)
Smart Start ® Incentive = 60 fixtures x $100 per fixture = $6,000.

Total Smart Start ® Incentive Value = $19,080.

**Energy Savings Summary:**

| ECM #1 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $57,752 |
| **NJ Smart Start Equipment Incentive ($):** | $19,080 |
| **Net Installation Cost ($):** | $38,672 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $10,509 |
| **Total Yearly Savings ($/Yr):** | $10,509 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 3.7 |
| **Simple Lifetime ROI** | 307.6% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $157,635 |
| **Internal Rate of Return (IRR)** | 26% |
| **Net Present Value (NPV)** | $86,783.76 |

## ECM #2: 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 body heat which will switch the lights on when the room is occupied. Occupancy sensors can either be mounted in place of a current wall switch, or on the ceiling to cover large areas.

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

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

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

This ECM includes installation of ceiling or switch mount sensors for individual offices, conference rooms, classrooms, large bathrooms, and library offices. 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 Sensor - Remote Mount | $250 per installation |
| Dual Technology Occupancy Sensor - Switch Mount | $150 per installation |
| Dual Technology Occupancy Sensor with 2 Pole Powerpack Remote mount | $300 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 Fixture Mounted (existing facility only) = $20 per sensor
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor

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

$$\text{Smart Start® Incentive} = (39\ \text{wall mount} \times \$\ 20) + (125\ \text{ceiling mount} \times \$35) = \$5{,}155$$

**Energy Savings Summary:**

| ECM #2 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $41,800 |
| **NJ Smart Start Equipment Incentive ($):** | $5,155 |
| **Net Installation Cost ($):** | $36,645 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $10,847 |
| **Total Yearly Savings ($/Yr):** | $10,847 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 3.4 |
| **Simple Lifetime ROI** | 344.0% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $162,705 |
| **Internal Rate of Return (IRR)** | 29% |
| **Net Present Value (NPV)** | $92,845.78 |

## ECM #3: Computer Monitor Replacement

**Description:**

The computers throughout the facility utilize a mixture of CRT computer monitors and LCD computer monitors. Computers are located in the offices, computer labs, lounges, and classrooms. The CRT computer monitors are outdated and have several disadvantages such as significantly increased higher energy consumption, use large amounts of desk space, poor picture quality, distortions, flickering image, secular glare problems, high weight, and electromagnetic emissions. Many of these 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.

Based on the site survey, it was noted that in some areas the computers were left on and allowed to run 24 / 7, while in other rooms the computers were shut down. Some 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 school. Installation costs were neglected for this ECM with the intention that this ECM would be replaced by the school employees. The calculations are based on the following operating assumptions:

**Energy Savings Calculations:**

| | |
|---|---|
| No. of CRT Monitors: | 102 |
| Weeks per Yr: | 40 |
| Hrs per Week: | 84 (12 hrs per day cumulative average) |

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

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

| COMPUTER MONITOR CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CRT Monitors | LCD Monitor | |
| **# of Computers** | 102 | 102 | |
| **Monitor Power Cons. (W)** | 75 | 25 | 50 |
| **Operating Hrs per Week** | 84 | 84 | |
| **Operating Weeks per Yr** | 40 | 40 | |
| **Elec Cost ($/kWh)** | 0.135 | 0.135 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Electric Usage (kWh)** | 25,704 | 8,568 | 17,136 |
| **Energy Cost ($)** | $3,470 | $1,157 | $2,313 |
| **COMMENTS:** | CRT Monitor consumption based on Dell CRT monitor M/N: CRT-E771MM. Operating hours based on estimated average. | | |

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.

Installation Costs: # Monitors X Cost per Monitor
102 Monitors X $100 per Monitor
$10,200

**Energy Savings Summary:**

| ECM #3 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $10,200 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $10,200 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $2,313 |
| **Total Yearly Savings ($/Yr):** | $2,313 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 4.4 |
| **Simple Lifetime ROI** | 240.1% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $34,695 |
| **Internal Rate of Return (IRR)** | 21% |
| **Net Present Value (NPV)** | $17,412.44 |

## ECM #4: Condensing Boiler Installation

**Description:**

The central heating system consists of two (2) 1967 H. B. Smith cast iron sectional hot water boilers each rated at 6,522 MBH output that serve the building's heating hot water loop. The boilers are fired by natural gas and are roughly 13 years past the ASHRAE service life for a typical cast iron boiler.

The 1986 Gym Addition is heated by a 1988 Weil-McLain cast iron sectional hot water natural gas boiler rated at 810 MBH output. The boiler has roughly 8 years of service life left for a typical cast iron boiler.

During the heating season, domestic hot water for the kitchen, restrooms, office lounge, etc. is provided by a 6-foot diameter by 12-foot long storage tank with an internal heat exchanger feed by the heating hot water boilers via two (2) in-line circulation pumps. The tank and heat exchanger are original to the building and are in poor condition. According to the maintenance staff the storage tank is constantly in need of repair. In the summer time, the domestic hot water is produced by an H. B. Smith cast iron sectional boiler rated at 784 MBH output that feeds the same heat exchanger/tank. The summer boiler has roughly 4 years of service life left for a typical cast iron boiler.

New condensing boilers could substantially improve the operating efficiency of the heating system of the building. The condensing boilers provide significantly higher efficiencies than standard boilers by significantly reducing the flue gas temperature and extracting the latent energy. Condensing boiler's peak efficiency tops out at 99% depending on return water temperature. Due to the operating conditions of the building, the annual average operating efficiency of the proposed condensing boiler is expected to be 88% for comfort heating and 95% for instantaneous domestic hot water heating. The larger original plant boilers and the existing summer domestic hot water boiler efficiencies are approximately 74% and the Gym boiler efficiency is approximately 80%, which makes the proposed new condensing modular boilers a 8% to 14% increase in efficiency. The new modular boiler sets also have the ability to be controlled by a digital boiler sequencer to optimize plant efficiency which could yield further savings than what is calculated in this ECM.

This ECM includes installation of three condensing, gas-fired modular boilers to replace three of the existing boilers located in the original boiler room. This consolidation would include one of the 6,522 MBH boilers, the 810 MBH Gym boiler, and the 784 MBH summer domestic hot water boiler. Domestic hot water would be provided by two condensing, gas-fired instantaneous domestic hot water modular boilers as a complete standalone system. The existing storage tank with exchanger would no longer be necessary and would be abandoned in place or demolished at the Owner's discretion. The existing second 6,522 MBH boiler will remain as a back-up. The basis for this ECM is Aerco model number BMK-3.0LN and BMK-1.5LN boilers or equivalent for the comfort heating and Aerco model number INN-1060 or equivalent for the domestic hot water. The basis of design for this ECM is based on variable supply water temperature adjusted

based on outdoor temperature. The boiler installation is based on a one-for-one replacement which takes into account the capacity of the existing boilers.

**Energy Savings Calculations:**

The natural gas utility bills were utilized in the calculation of the energy savings. There is one meter for all gas-fired equipment in the facility. In order to extrapolate the natural gas consumption of the equipment analyzed in this ECM, engineering assumptions where made. In order to properly evaluate this ECM, further investigation into actual consumption should be pursued at the engineering and design phase before implementation.

*Equations Used:*

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

$$\mathrm{Pr}oposed\ Heating\ Gas\ Usage = \frac{Bldg\ Heat\ \mathrm{Re}quired\ (BTU)}{Heating\ Eff.(\%) \times Fuel\ Heat\ Value\left(\frac{BTU}{Therm}\right)}$$

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

| CONDENSING BOILER CALCULATIONS - COMFORT HEATING | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Existing Cast Iron Sectional Boiler | New Condensing Boilers | |
| **Consumed Nat Gas (Therms)** | 76,433 | 64,274 | |
| **Boiler Efficiency (%)** | 74% | 88% | 14% |
| **Nat Gas Heat Value (BTU/Therm)** | 100,000 | 100,000 | |
| **Equivalent Building Heat Usage (MMBTUs)** | 5,656 | 5,656 | |
| **Gas Cost ($/Therm)** | 1.08 | 1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Natural Gas Usage (Therms)** | 76,433 | 64,274 | 12,160 |
| **Energy Cost ($)** | $82,548 | $69,415 | $13,133 |
| **COMMENTS:** | The majority of the consumption is assumed to be from the 74% efficient 6,522 MBH boiler. Therefore this efficiency was used as the baseline. | | |

| CONDENSING BOILER CALCULATIONS - DOMESTIC HOT WATER | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Existing Cast Iron Sectional Boiler | New Condensing Boilers | |
| **Consumed Nat Gas (Therms)** | 16,001 | 12,464 | |
| **Boiler Efficiency (%)** | 74% | 95% | 21% |
| **Nat Gas Heat Value (BTU/Therm)** | 100,000 | 100,000 | |
| **Equivalent Building Heat Usage (MMBTUs)** | 1,184 | 1,184 | |
| **Gas Cost ($/Therm)** | 1.08 | 1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Natural Gas Usage (Therms)** | 16,001 | 12,464 | 3,537 |
| **Energy Cost ($)** | $17,281 | $13,461 | $3,820 |
| **COMMENTS:** | The majority of the consumption is assumed to be from the 74% efficient 6,522 MBH boiler. Therefore this efficiency was used as the baseline. | | |

Installation cost of the new condensing boilers, demolition, flue piping, boiler water piping modifications, gas piping modifications, electric, etc. is estimated to be $421,638.

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

Gas Fired Boilers > 300 MBH – 1500 MBH
(2) Boilers at 1060 MBH each

$$Smart\ Start® \ Incentive = \left(Boiler\ MBH \times \ \$1.75\right) = 2{,}120 \times 1.75 = \$3{,}710$$

Gas Fired Boilers > 1500 MBH – < 4000 MBH
(2) Boilers at 3000 MBH each and (1) Boiler at 1500 MBH

$$Smart\ Start® \ Incentive = \left(Boiler\ MBH \times \ \$1.00\right) = 7{,}500 \times 1 = \$7{,}500$$

Total Smart Start® Incentive = $11,210

**Energy Savings Summary:**

| ECM #4 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $421,638 |
| **NJ Smart Start Equipment Incentive ($):** | $11,210 |
| **Net Installation Cost ($):** | $410,428 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $16,953 |
| **Total Yearly Savings ($/Yr):** | $16,953 |
| **Estimated ECM Lifetime (Yr):** | 30 |
| **Simple Payback** | 24.2 |
| **Simple Lifetime ROI** | 23.9% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $508,590 |
| **Internal Rate of Return (IRR)** | 1% |
| **Net Present Value (NPV)** | ($78,141.72) |

## ECM #5: AC Unit Replacement

**Description:**

Portions of the facility are cooled by direct expansion, outdoor, air-cooled condensing systems. Both packaged and split systems were discovered and analyzed. Some of the existing units have surpassed their useful life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. The estimated service life for a condensing unit is twenty (20) years and fifteen (15) years for a packaged rooftop unit. Other systems are within the useful life but are not as efficient as the latest technology available. Usually, energy savings derived from replacing condensing units does not justify a reasonable payback term. Nevertheless, as the equipment ages, it loses efficiency due to clogged condensers, internal parts wear and deposits of oil and other contaminants on the heat exchangers. Replacing an older condensing unit avoids these issues along with gaining energy savings.

This energy conservation measure includes replacement of the packaged and split system condensing units on the roof with new equipment at equal capacities to R-410a refrigerant and replacement of the DX coil in the matching air handlers as required to accommodate the higher pressure refrigerant. The cost of this ECM also includes running new refrigerant lines.

It must be noted that manufacturing of the refrigerant gas R-22 is being phased out gradually. After 2010, HVAC manufacturers will continue to produce condensers and heat pumps using R-22 only from pre-existing R-22 supplies. The availability of R-22 gas will decline and R-22 equipment will be more expensive to maintain. On the other hand, converting most R-22 refrigeration systems into an alternative R-410a system requires replacement of the condensing unit, evaporator coils in the air handling unit, refrigerant pipes and fittings.

The unit's cooling efficiencies and capacities are as shown below. This ECM includes a one-to-one replacement of the older air conditioning units with newer, high efficiency systems. It is recommended to fully evaluate the capacity needed for all new systems prior to moving forward with this ECM. A summary of this ECM can be found in the table below:

| IMPLEMENTATION SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| **ECM INPUTS** | **SERVICE FOR** | **NUMBER OF UNITS** | **COOLING CAPACITY, BTU/HR** | **COOLING CAPACITY, TONS** | **TOTAL COOLING CAPACITY, TONS** | **REPLACEMENT BASED ON** |
| **SS-3** | Conference Rm A203 | 1 | 15,000 | 1.3 | 1.3 | Mitsubishi |
| **SS-6** | Nurse/Exam Rooms | 3 | 18,000 | 1.5 | 4.5 | Trane Equipment |
| **SS-4** | 2nd Floor Admin Offices | 1 | 22,000 | 1.8 | 1.8 | Mitsubishi |
| **RTU-2/RTU-3/RTU-7** | Faculty Dining/Classroom F126/Librarian's Office | 3 | 24,000 | 2.0 | 6.0 | Trane Equipment |
| **SS-5** | 2nd Floor Admin Offices | 2 | 30,000 | 2.5 | 5.0 | Mitsubishi |
| **RTU-4/RTU-11** | Kitchen (Room F128)/Science Rooms | 3 | 36,000 | 3.0 | 9.0 | Trane Equipment |
| **SS-1** | Three Offices near Room C103 | 1 | 36,000 | 3.0 | 3.0 | Trane Equipment |
| **RTU-9** | Choral Room | 1 | 48,000 | 4.0 | 4.0 | Trane Equipment |
| **SS-2** | Room F211 | 1 | 48,000 | 4.0 | 4.0 | Trane Equipment |
| **RTU-8** | Cafeteria | 1 | 90,000 | 7.5 | 7.5 | Trane Equipment |
| **RTU-1** | Weight Room (Sports Annex) | 1 | 120,000 | 10.0 | 10.0 | Trane Equipment |
| **RTU-10** | Auditorium | 2 | 360,000 | 30.0 | 60.0 | Trane Equipment |
| **Total** | | **20** | | | **116.1** | |

*ECM INPUTS references the tag labeled in the major equipment list but may not necessarily represent the tag of the equipment in the field.*

The basis is Trane equipment with R410a refrigerant. This ECM includes replacement of the indoor air handling units and outdoor condensing units.

**Energy Savings Calculations:**

Cooling Energy Savings:

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

$$Energy\,Savings, kWh = Cooling\,Capacity, \frac{BTU}{Hr} \times \left( \frac{1}{SEER_{Existing}} - \frac{1}{SEER_{Proposed}} \right) \times \frac{Full\,Load\,Hours}{1000 \frac{W}{kWh}}$$

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

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

| ENERGY SAVINGS CALCULATIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| **ECM INPUTS** | **COOLING CAPACITY, BTU/Hr** | **ANNUAL COOLING HOURS** | **EXISTING UNITS SEER/EER** | **PROPOSED SEER/EER** | **# OF UNITS** | **ENERGY SAVINGS kWh** | **DEMAND SAVINGS kW** |
| **SS-3** | 15,000 | 1,000 | 8 | 16 | 1 | 938 | 0.9 |
| **SS-6** | 18,000 | 1,000 | 9 | 13 | 3 | 1,846 | 1.8 |
| **SS-4** | 22,000 | 1,000 | 10 | 16 | 1 | 825 | 0.8 |
| **RTU-2/RTU-3/RTU-7** | 24,000 | 1,000 | 6 | 15 | 3 | 7,200 | 7.2 |
| **SS-5** | 30,000 | 1,000 | 10 | 16 | 2 | 2,250 | 2.3 |
| **RTU-4/RTU-11** | 36,000 | 1,000 | 6 | 15 | 3 | 10,800 | 10.8 |
| **SS-1** | 36,000 | 1,000 | 7 | 17.5 | 1 | 3,086 | 3.1 |
| **RTU-9** | 48,000 | 1,000 | 6 | 15 | 1 | 4,800 | 4.8 |
| **SS-2** | 48,000 | 1,000 | 6 | 17.5 | 1 | 5,257 | 5.3 |
| **RTU-8** | 90,000 | 1,000 | 10.1 | 13 | 1 | 1,988 | 2.0 |
| **RTU-1** | 120,000 | 1,000 | 11 | 12.5 | 1 | 1,309 | 1.3 |
| **RTU-10** | 360,000 | 1,000 | 9.5 | 10.3 | 2 | 5,887 | 5.9 |
| **Total** | | | | | 20 | 46,185 | 46.2 |

**Project Cost, Incentives and Maintenance Savings**

From the **NJ Smart Start® Program Incentives Appendix**, the replacement AC units with high efficiency AC units falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (SEER) noted below. The program incentives are calculated as follows:

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

| SPLIT SYSTEM AC UNITS REBATE SUMMARY | | | | |
|---|---|---|---|---|
| **UNIT DESCRIPTION** | **UNIT EFFICIENCY** | **REBATE $/TON** | **PROPOSED CAPACITY TONS** | **TOTAL REBATE $** |
| 5.4 tons or less Unitary AC and Split System | ≥14 SEER | $92 | 38.6 | $3,550 |
| 5.4 tons to 11.25 tons Unitary AC and Split System | ≥11.5 EER | $73 | 17.5 | $1,278 |
| 20 tons to 30 tons Unitary AC and Split System | ≥10.5 EER | $79 | 60.0 | $4,740 |
| | | | | |
| **TOTAL** | | | **116.1** | **$9,567** |

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

| COST & SAVINGS SUMMARY | | | | | | | |
|---|---|---|---|---|---|---|---|
| **ECM INPUTS** | **INSTALLED COST** | **# OF UNITS** | **TOTAL COST** | **REBATES** | **NET COST** | **ENERGY SAVING** | **PAY BACK YEARS** |
| **SS-3** | $2,700 | 1 | $2,700 | $115 | $2,585 | $127 | 20.4 |
| **SS-6** | $1,500 | 3 | $4,500 | $414 | $4,086 | $249 | 16.4 |
| **SS-4** | $5,700 | 1 | $5,700 | $169 | $5,531 | $111 | 49.7 |
| **RTU-2/RTU-3/RTU-7** | $8,850 | 3 | $26,550 | $552 | $25,998 | $972 | 26.7 |
| **SS-5** | $5,700 | 2 | $11,400 | $460 | $10,940 | $304 | 36.0 |
| **RTU-4/RTU-11** | $8,850 | 3 | $26,550 | $828 | $25,722 | $1,458 | 17.6 |
| **SS-1** | $9,000 | 1 | $9,000 | $276 | $8,724 | $417 | 20.9 |
| **RTU-9** | $9,600 | 1 | $9,600 | $368 | $9,232 | $648 | 14.2 |
| **SS-2** | $9,000 | 1 | $9,000 | $368 | $8,632 | $710 | 12.2 |
| **RTU-8** | $13,800 | 1 | $13,800 | $548 | $13,253 | $268 | 49.4 |
| **RTU-1** | $16,125 | 1 | $16,125 | $730 | $15,395 | $177 | 87.1 |
| **RTU-10** | $43,500 | 2 | $87,000 | $4,740 | $82,260 | $795 | 103.5 |
| **Total** | | 20 | $221,925 | $9,567 | $212,358 | $6,235 | 34.1 |

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

**Energy Savings Summary:**

| ECM #5 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $221,925 |
| **NJ Smart Start Equipment Incentive ($):** | $9,567 |
| **Net Installation Cost ($):** | $212,358 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $6,235 |
| **Total Yearly Savings ($/Yr):** | $6,235 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 34.1 |
| **Simple Lifetime ROI** | -56.0% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $93,525 |
| **Internal Rate of Return (IRR)** | -9% |
| **Net Present Value (NPV)** | ($137,924.97) |

## ECM #6: Library AC Unit Upgrade

**Description:**

The library for this school is conditioned by a 50-Ton packaged rooftop unit. It is equipped with direct expansion cooling and hot water heat. The unit was originally designed to operate as a variable volume system with terminal boxes and electric reheat located above the ceiling serving independent zones. This system has since been overridden and the unit now operates as a constant volume system with the terminal boxes held in the full open position. The unit is equipped with standalone controls integral to the Trane Intellipak system and operates on a simple programmable schedule. It has been reported that there have been problems in the past with this unit maintaining proper humidity levels in the Library. The compressor sequences of operation have been manipulated to compensate for the humidity problems. The existing system is equipped with full economizer however it is not equipped with demand controlled ventilation.

Air static pressure in a VAV air handling system is maintained by modulating the speed of the fan. Air is distributed throughout the building by ductwork, and VAV terminal boxes control the flow of cool air delivered to the space they serve. As the space cooling load increases, the flow of cold air likewise increases to maintain the space temperature. If space cooling loads decrease, the requirement for cold air flow to cool the space also decreases. The air flow to the VAV terminal boxes is delivered at a system static pressure. The static pressure level is established by the minimum pressure required for the terminal boxes to deliver full cooling flows. During the winter, air flow requirements drop to their minimum levels and the static pressure required at terminal boxes decreases. This reduced air flow requirement brings about an opportunity to reduce the system static pressure levels along with reducing energy usage.

When CO2 sensors are used to maintain indoor air quality (IAQ), they continuously monitor the air in a conditioned space. Because people constantly exhale CO2, the difference between the indoor CO2 concentration and the outdoor concentration indicates the occupancy or activity level in a space and thus its ventilation requirements. The CO2 sensor readings are monitored at the air handling system control panel, which automatically increases ventilation when the CO2 concentration in a zone rises above a specified level.

This ECM would bring the packaged rooftop unit back to its original functionality by having it operate as a variable air volume system including the proper operation of the compressors. This would include upgrading the existing controls at the unit and integrating into the existing building automation system at the school. Along with this controls upgrade, demand controlled ventilation would be added to the sequences of operation to adjust the amount of outdoor air provided to the space based on actually occupancy. The existing terminal boxes with reheat would be removed and replaced with terminal boxes with hot water coils piped from hot water piping passing through the Library ceiling.

In order to properly evaluate this ECM, further investigation into the humidity issues should be pursued at the engineering and design phase before implementation.

**Energy Savings Calculations:**

Cooling & Heating Energy Savings:

Seasonal energy consumption of the system in the cooling and heating modes was calculated using Trane System Analyzer Software. The results are summarized below:

| ENERGY CALCULATIONS - ELECTRIC | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CAV System | VAV System | |
| **RTU-6 Cooling Capacity (Tons)** | 50 | 50 | |
| **RTU-6 Efficiency (EER)** | 10.0 | 10.0 | |
| **RTU-6 SUPPLY FAN HP** | 25 | 25 | |
| **Cooling & Fan Energy, Annual kWh** | 148,064 | 107,315 | |
| **Electric Cost ($/kWh)** | $0.135 | $0.135 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Cooling & Fan Energy Annual kWh** | 148,064 | 107,315 | 40,749 |
| **Electric Energy Cost ($)** | $19,989 | $14,488 | $5,501 |
| **COMMENTS**: Existing and proposed kWh estimated using Trane System Analyzer software. ECM INPUTS references the tag labeled in the major equipment list but may not necessarily represent the tag of the equipment in the field. | | | |

| ENERGY CALCULATIONS - NATURAL GAS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CAV System | VAV System | |
| **RTU-6 Total Heating Energy (Therms)** | 1,787 | 1,144 | |
| **Boiler Efficiency (%)** | 74% | 74% | |
| **Heating Fuel Value** | 100,000 | 100,000 | |
| **Gas Cost ($/Therm)** | $1.08 | $1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Heating Energy,Therms** | 1,787 | 1,144 | 643 |
| **Heating Energy Cost ($)** | $1,930 | $1,236 | $694 |
| **COMMENTS:** Existing and proposed therms estimated using Trane System Analyzer software. ECM INPUTS references the tag labeled in the major equipment list but may not necessarily represent the tag of the equipment in the field. | | | |

Installation cost of the new controls, demolition, terminal boxes, water piping modifications, ductwork modifications, electric, etc. is estimated to be $72,181.

No incentives are available for the installation of this equipment.

**Energy Savings Summary:**

| ECM #6 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $72,181 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $72,181 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $6,196 |
| **Total Yearly Savings ($/Yr):** | $6,196 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 11.6 |
| **Simple Lifetime ROI** | 28.8% |
| **Simple Lifetime Maintenance Savings** | 0 |
| **Simple Lifetime Savings** | $92,940 |
| **Internal Rate of Return (IRR)** | 3% |
| **Net Present Value (NPV)** | $1,786.45 |

## ECM #7: Cafeteria AC Unit Controls Upgrade

**Description:**

The cafeteria is conditioned by three (3) 15 ton York roof top units with direct expansion cooling and hot water heating coils mounted in the supply air duct. It was reported by the maintenance staff that these units operate in occupied mode 24/7 due to value engineering of the local controls at the unit at the time of original installation. Since these units are relatively new and in good condition, upgrading the controls and connecting into the main building automation system would yield energy savings.

A programmed schedule would provide energy savings by allowing the building automation system to setback the temperature setting when the space is not occupied and returning to the normal temperature setting when the space is occupied. The major benefit of this ECM is in the heating season since the outside temperature is the coldest during unoccupied periods. In night setback, the overall energy use is reduced since the inside temperature is kept closer to the outside temperature which limits heat loss.

This ECM includes installation of local direct digital controls at the three heating and cooling HVAC unit as well as integration with the existing building automation system. The recommended set point for the Cafeteria is as follows:

| | |
|---|---|
| Occupied Heating = | 70° F |
| Unoccupied Heating = | 60° F |
| | |
| Occupied Cooling = | 74° F |
| Unoccupied Cooling = | 84° F |

**Energy Savings Calculations:**

Energy savings calculations are based on percent savings through heating degree days for standard base temperatures and set-back temperatures. The reduced heating degree days represents a lower heating load for the portion of hours that the thermostat is in night set-back.

Cooling energy savings is based on the capacity of the cooling equipment installed and the percent savings through the cooling degree days for standard base temperatures and set back temperatures. Since the night time cooling hours are typically at or below the occupied cooling set point, the cooling set back savings is based only on the estimated unoccupied daytime hours for the cafeteria.

Heating Energy Savings:

Total Hours per Week = 168

Available Setback Hours per Week = 128

$$\text{Set Back Heating Energy} = \text{Exiting Gas (Therms)} \times \frac{HDD_{65°F}}{HDD_{65°F}} \times \frac{\text{Set Back Hrs Per Week}}{\text{168 Hrs per Week}}$$

$$\text{Non Set Back Heating Energy} = \text{Exiting Gas (Therms)} \times \frac{\text{Non Set Back Hrs Per Week}}{\text{168 Hrs per Week}}$$

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

Energy savings calculations are summarized in the table below.

| HEATING ENERGY CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Standard Controls | Integrated Controls | |
| **Total Heating Energy (Therms)** | 4,074 | 4,074 | |
| **Heating Degree Days (70°F / 60°F)** | 6,029 | 4,064 | |
| **Hours of setback per week** | 0 | 128 | |
| **Heating Fuel Value** | 100,000 | 100,000 | |
| **Gas Cost ($/Therm)** | $1.08 | $1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Heating Energy,Therms** | 4,074 | 3,063 | 1,012 |
| **Heating Energy Cost ($)** | $4,400 | $3,308 | $1,093 |
| **COMMENTS:** | Degree Days based on McQuire AFB,NJ. | | |

Cooling Energy Savings:

$$\text{Cooling Energy kWh} = \text{Cooling Capacity}, \frac{\text{BTU}}{\text{Hr}} \times \left(\frac{1}{\text{EER}}\right) \times \frac{\text{Full Load Hrs}}{1000 \frac{\text{W}}{\text{kWh}}}$$

$$\text{Set Back Cooling Energy} = \text{Cooling Energy (kWh)} \times \frac{HDD_{82°F}}{HDD_{72°F}} \times \frac{\text{Set Back Hrs Per Week}}{\text{168 Hrs per Week}}$$

$$\text{Non Set Back Cooling Energy} = \text{Cooling Energy (kWh)} \times \frac{\text{Non Set Back Hrs Per Week}}{\text{168 Hrs per Week}}$$

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

| COOLING ENERGY CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Standard Controls | Integrated Controls | |
| **Tag RTU-5 Cooling Capacity (Tons) 3 Units** | 45 | 45 | |
| **Tag RTU-5 Total Efficiency (EER)** | 12.1 | 12.1 | |
| **Full Load Cooling Hrs** | 800 | 800 | |
| **Cooling Energy, kWh (Non Set Back)** | 45,302 | 45,302 | |
| **Cooling Degree Days (84°F / 74°F)** | 246 | 51 | |
| **Hours of setback per week** | 0 | 128 | |
| **Electric Cost ($/kWh)** | $0.135 | $0.135 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Cooling Energy kWh** | 45,302 | 17,942 | 27,360 |
| **Electric Energy Cost ($)** | $6,116 | $2,422 | $3,694 |
| **COMMENTS:** | Degree Days based on McQuire AFB,NJ. | | |

Cost

The installed cost for this ECM is estimated at a total of $23,988. No incentives are available for installation of HVAC controls.

**Energy Savings Summary:**

| ECM #7 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $23,988 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $23,988 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $4,786 |
| **Total Yearly Savings ($/Yr):** | $4,786 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 5.0 |
| **Simple Lifetime ROI** | 199.3% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $71,790 |
| **Internal Rate of Return (IRR)** | 18% |
| **Net Present Value (NPV)** | $33,146.96 |

## ECM #8: Water-Cooled Condensing Unit Replacement

**Description:**

Portions of Corridor A at the high school are cooled by direct expansion, indoor, water-cooled condensing systems. The cooling media is from the domestic water supply and the waste water discharges to the sanitary system. There are approximately 10 units of this style all serving interior zones. These units are original to the building and they have surpassed their useful life as outlined in Chapter 36 of the 2007 ASHRAE Applications Handbook. The estimated service life for a water-cooled air conditioner is fifteen (15) years. Usually, energy savings derived from replacing condensing units does not justify a reasonable payback term. Nevertheless, as the equipment ages, it loses efficiency due to clogged condensers, internal parts wear and deposits of oil and other contaminants on the heat exchangers. Replacing an older condensing unit avoids these issues along with some energy savings. The new direct expansion system will not require the consumption of domestic water which yields considerable cost savings.

This energy conservation measure includes replacement of the water-cooled condensing systems with new variable refrigerant volume direct expansion air cooled condensing equipment at equal capacities with R-410a refrigerant. The cost of this ECM also includes running new refrigerant lines to a new condensing unit mounted on the roof.

It must be noted that manufacturing of the refrigerant R-22 is being gradually phased out. After 2010, HVAC manufacturers will continue to produce condensers and heat pumps using R-22 only from pre-existing R-22 supplies. The availability of R-22 gas will decline and R-22 equipment will be more expensive to maintain. On the other hand, converting most R-22 refrigeration systems into an alternative R-410a system requires replacement of the condensing unit, evaporator coils in the air handling unit, refrigerant pipes and fittings.

The unit's cooling efficiencies and capacities are as shown below. The owner should have a professional engineer verify cooling loads prior to moving forward with this ECM.

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

| IMPLEMENTATION SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| **ECM INPUTS** | **SERVICE FOR** | **NUMBER OF UNITS** | **COOLING CAPACITY, BTU/HR** | **COOLING CAPACITY, TONS** | **TOTAL COOLING CAPACITY, TONS** | **REPLACEMENT BASED ON** |
| **UV** | Corridor A | 10 | 24,000 | 2.0 | 20.0 | Mitsubishi PURY-P240 and PFFY-P24 |
| | | | | | | |

*ECM INPUTS references the tag labeled in the major equipment list but may not necessarily represent the tag of the equipment in the field.*

The basis of design is Mitsubishi equipment with R410a refrigerant.

**Energy Savings Calculations:**

Cooling Energy Savings:

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

$$Energy\,Savings, kWh = Cooling\,Capacity, \frac{BTU}{Hr} \times \left( \frac{1}{SEER_{Existing}} - \frac{1}{SEER_{Proposed}} \right) \times \frac{Full\,Load\,Hours}{1000 \frac{W}{kWh}}$$

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

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

| ENERGY SAVINGS CALCULATIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| ECM INPUTS | COOLING CAPACITY, BTU/Hr | ANNUAL COOLING HOURS | EXISTING UNITS EER | PROPOSED EER | ENERGY SAVINGS kWh | DEMAND SAVINGS kW | COST SAVINGS $ |
| UV | 24,000 | 800 | 10 | 14.1 | 5,583 | 7.0 | $754 |
| | | | | | | | |

Water Conservation Savings

Domestic water consumption of the air conditioners during cooling mode is calculated with the equation below:

$$Water\,Cons = QtyUnits \times GPMperUnit \times CoolingLoadHours \times 60min$$

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

| WATER CONSERVATION CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Existing Water Cooled Units | Air Cooled Units | |
| **Condenser Water GPM** | 40 | 0 | 40 |
| **Cooling Load Hours** | 800 | 800 | |
| **Water Cost ($/1000)** | $5.70 | $5.70 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Water Consumption (Gal)** | 1,920,000 | 0 | 1,920,000 |
| **Water Cost ($)** | $10,944 | $0 | $10,944 |
| **COMMENTS:** | | | |

From the **NJ Smart Start® Program Incentives Appendix**, the replacement AC units with high efficiency AC units falls under the category "Unitary HVAC Split System" and warrants an incentive based on efficiency (SEER) noted below. The program incentives are calculated as follows:

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

| AC UNITS REBATE SUMMARY | | | | |
|---|---|---|---|---|
| **UNIT DESCRIPTION** | **UNIT EFFICIENCY** | **REBATE $/TON** | **PROPOSED CAPACITY TONS** | **TOTAL REBATE $** |
| 5.4 tons or less Unitary AC and Split System | ≥14 SEER | $92 | 20.0 | $1,840 |
| | | | | |

**Energy Savings Summary:**

| ECM #8 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $158,825 |
| **NJ Smart Start Equipment Incentive ($):** | $1,840 |
| **Net Installation Cost ($):** | $156,985 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $11,698 |
| **Total Yearly Savings ($/Yr):** | $11,698 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 13.4 |
| **Simple Lifetime ROI** | 11.8% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $175,470 |
| **Internal Rate of Return (IRR)** | 1% |
| **Net Present Value (NPV)** | ($17,335.04) |

## ECM #9: Water Conservation

**Description:**

The facility utilizes a mixture of old and new plumbing fixtures. The typical water closet and urinal water consumption only meet the minimum federally required standard for water efficiency. The existing urinals are automatically flushed by a time clock device that cycle every 15 minutes for a total of 28 flushes per day per urinal. New fixtures are available that use less water than today's requirements and can add up to significant water reduction over a long period of time.

This ECM includes the replacement of the existing water closets and urinals within the facility. The proposed retrofit includes installation of low flow flushometer style water closets that utilize 1.28 gallons per flush and ultra-low flushometer style urinals that utilize 1/8 gallons per flush. The time clock system for the urinals would also be disabled. For the basis of this calculation the LEED rating system was used to estimate the occupancy usage for students within the school. This ECM does not include private bathrooms for teachers use and is based solely on the large public bathrooms used by the students. When water consumption information was not available, the GPF values were estimated for the existing fixtures. The water cost per gallon was estimated based on other facilities served by the same municipality.

**Energy Savings Calculations:**

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

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

| WATER CONSERVATION CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Existing | Low Flow Fixtures | |
| **Total Number of Students** | 1,169 | 1,169 | |
| **% Male to Female** | 50% | 50% | |
| **Occupied Days Per Year** | 180 | 180 | |
| **WC Uses per Day per Person** | 0.6 | 0.6 | |
| **Urinal Uses per Day per Person** | NA | 0.4 | |
| **Total Urinal Flushes Per Day** | 840 | 234 | |
| **Total WC Flushes Per Day** | 350.7 | 350.7 | |
| **Urinal Gallons Per Flush (GPF)** | 1.0 | 0.125 | 0.875 |
| **WC Gallons Per Flush (GPF)** | 3.5 | 1.28 | 2.22 |
| **Water Cost ($/1000)** | $5.70 | $5.70 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Water Consumption (Gal)** | 527,541 | 86,062 | 441,479 |
| **Water Cost ($)** | $3,007 | $491 | $2,516 |
| **COMMENTS:** | *Savings are based on LEED Reference Guide for Green Building Design and Construction - 2009 Edition for WC and Urinal water usage. | | |

The cost for installation of 40 water closets and 30 low flow urinals throughout the facility is estimated to be $52,124.

There are no Smart Start rebates for installation of low flow plumbing fixtures.

**Energy Savings Summary:**

| ECM #9 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $52,124 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $52,124 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $2,516 |
| **Total Yearly Savings ($/Yr):** | $2,516 |
| **Estimated ECM Lifetime (Yr):** | 30 |
| **Simple Payback** | 20.7 |
| **Simple Lifetime ROI** | 44.8% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $75,480 |
| **Internal Rate of Return (IRR)** | 3% |
| **Net Present Value (NPV)** | ($2,809.29) |

## ECM #10: Install NEMA Premium® Efficiency Motors

**Description:**

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

The electric motors driving the hot water pumps in the old boiler room and supply fans in some of the heating and ventilating equipment 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 | POLE | RPM | FRAME TYPE | HOURS OF OPERATION | EXISTING EFFICIENCY | NEMA PREMIUM EFFICIENCY |
| Zone 1 (P-2) | Hot Water Pump | 20 | 4 | 1750 | TEFC | 4,320 | 88.5% | 93.0% |
| Zone 2 | Hot Water Pump | 10 | 4 | 1750 | TEFC | 4,320 | 89.5% | 92.4% |
| HV-1 | Supply Fan | 5 | 4 | 1750 | TEFC | 4,320 | 82.0% | 90.2% |
| HV-3 | Supply Fan | 5 | 4 | 1750 | TEFC | 4,320 | 82.0% | 90.2% |
| HV-2 | Supply Fan | 5 | 4 | 1750 | TEFC | 4,320 | 82.0% | 90.2% |
| HV-4 | Supply Fan | 5 | 4 | 1750 | TEFC | 4,320 | 82.0% | 90.2% |

**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 |
| Zone 1 (P-2) | 20 | 90% | 88.5% | 93.0% | 0.73 | 3,189 | $430 |
| Zone 2 | 10 | 90% | 89.5% | 92.4% | 0.24 | 1,023 | $138 |
| HV-1 | 5 | 90% | 82.0% | 90.2% | 0.37 | 1,616 | $218 |
| HV-3 | 5 | 90% | 82.0% | 90.2% | 0.37 | 1,616 | $218 |
| HV-2 | 5 | 90% | 82.0% | 90.2% | 0.37 | 1,616 | $218 |
| HV-4 | 5 | 90% | 82.0% | 90.2% | 0.37 | 1,616 | $218 |
| **TOTAL** | | | | | **2.5** | **10,677** | **$1,441** |

**Project Cost, Incentives and Maintenance Savings**

The Smart Start Incentives are calculated from the **NJ Smart Start® Program Incentives Appendix**. The results are listed below.

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 |
| Zone 1 (P-2) | 20 | $4,635 | $125 | $4,510 | $430 | 10.5 |
| Zone 2 | 10 | $2,560 | $100 | $2,460 | $138 | 17.8 |
| HV-1 | 5 | $1,519 | $60 | $1,459 | $218 | 6.7 |
| HV-3 | 5 | $1,519 | $60 | $1,459 | $218 | 6.7 |
| HV-2 | 5 | $1,519 | $60 | $1,459 | $218 | 6.7 |
| HV-4 | 5 | $1,519 | $60 | $1,459 | $218 | 6.7 |
| **TOTAL** | **Totals:** | **$13,271** | **$465** | **$12,806** | **$1,441** | **8.9** |

**Energy Savings Summary:**

| ECM #10 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $13,271 |
| **NJ Smart Start Equipment Incentive ($):** | $465 |
| **Net Installation Cost ($):** | $12,806 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $1,441 |
| **Total Yearly Savings ($/Yr):** | $1,441 |
| **Estimated ECM Lifetime (Yr):** | 18 |
| **Simple Payback** | 8.9 |
| **Simple Lifetime ROI** | 102.5% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $25,938 |
| **Internal Rate of Return (IRR)** | 9% |
| **Net Present Value (NPV)** | $7,012.81 |

## ECM #11: Valve Blanket Insulation Installation

**Description:**

The boiler plant supplies heating hot water to the facility for heating season. The piping remains heated at approximately 180°F continuously during this period (approximately 6 months). Un-insulated piping has significant heat losses due to the exposure of the steel piping to the surrounding air. Insulated piping has a heat loss which is a small fraction of the heat loss from un-insulated piping. It was noted that the majority of piping within the boiler room was insulated however numerous valves throughout the system have not been insulated.

Based on the site survey approximately 25 pipe valves were not insulated. Valve blankets are designed to provide insulation value over large hydronic valves that must remain accessible. This ECM includes installation of valve blankets on all exposed boiler system valves within the boiler room.

**Energy Savings Calculations:**

Heat Loss for un-insulated steel piping is based on ASHRAE 2009 Fundamentals – "Insulation for Mechanical Systems"

Bare Steel Piping Heat Loss 6" pipe: 373 BTU/HR per Linear FT

$$\text{Heat Loss}\frac{\text{BTU}}{\text{HR}}\text{ per Linear FT} = \frac{1}{\text{R-Value}} \times \text{Pipe Dia (FT)} \times 3.14 \times (\text{Pipe Temp (°F)} - \text{Ambient Temp(°F)})$$

$$\text{Heat Loss}\frac{\text{BTU}}{\text{HR}} = \text{Heat Loss}\frac{\text{BTU}}{\text{HR}}\text{ per Linear FT} \times \text{Length of Uninsulated Pipe}$$

$$\text{Energy Use, Therms} = \frac{\text{Heat Loss}\frac{\text{BTU}}{\text{HR}} \times \text{Operating Hrs}}{\text{Heating System Eff. (\%)} \times \text{Fuel Heat Value}\frac{\text{BTU}}{\text{Therm}}}$$

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

| VALVE BLANKET INSULATION CALCULATIONS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | Bare Pipe | Insulation Blanket | |
| **Length of Un-Insulated Pipe** | 25 | 25 | |
| **Pipe Diameter (In)** | 6 | 6 | |
| **Blanket Insulation R-value** | 0 | 6 | 6 |
| **Temperature Difference Pipe** | 100 | 100 | |
| **Pipe Heat Loss - 6" Pipe** | 373 | 26 | 347 |
| **Heat Loss (BTU/Hr)** | 9,325 | 654 | 8,671 |
| **Heating System Operating Hrs** | 4380 | 4380 | |
| **Energy Loss (kBtus)** | 40,844 | 2,865 | 37,978 |
| **Heating System Eff (%)** | 74% | 74% | |
| **Fuel Heat Value (BTU/Therm)** | 100,000 | 100,000 | |
| **Nat Gas Cost ($/Therm)** | 1.08 | 1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Nat Gas Usage Usage (Therms)** | 552 | 39 | 513 |
| **Energy Cost ($)** | $596 | $42 | $554 |
| **COMMENTS:** | Bare Pipe Heat Loss value is based on ASHRAE 2009 Fundamentals "Insulation for Mechanical Systems" | | |

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

**Energy Savings Summary:**

| ECM #11 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $10,000 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $10,000 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $554 |
| **Total Yearly Savings ($/Yr):** | $554 |
| **Estimated ECM Lifetime (Yr):** | 24 |
| **Simple Payback** | 18.1 |
| **Simple Lifetime ROI** | 33.0% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $13,296 |
| **Internal Rate of Return (IRR)** | 2% |
| **Net Present Value (NPV)** | ($617.71) |

## ECM #12: Kitchen Hood Controls

**Description:**

The Highland High School kitchen is equipped with two exhaust hood systems for the cooking ranges in the kitchen. The size of each range hood is 4'x20'. The kitchen exhaust fan is controlled manually by a switch on the kitchen hoods.

Standard kitchen hood controls consist of switches and relays that interlock the kitchen grease hood exhaust fan(s) with the 100% outside air unit that provides make-up air for this system. Normal occupation of kitchen hood system is limited to occupied hours. During the site inspection it was noted that the kitchen exhaust fan runs for approximately 4 hours a day. Based on the operation, there is great potential energy savings through better controls of the hood exhaust fan and make-up air unit. It should be noted that make up air is supplied via transfer air from the food line area and adjacent corridors.

This energy conservation measure 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:**

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.

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

| ENERGY CALCULATIONS - NATURAL GAS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CAV System | VAV System | |
| **Make up Air Unit Total Heating Energy (Therms)** | 1,365 | 1,010 | |
| **Boiler Efficiency (%)** | 74% | 74% | |
| **Heating Fuel Value** | 100,000 | 100,000 | |
| **Gas Cost ($/Therm)** | $1.08 | $1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Heating Energy,Therms** | 1,365 | 1,010 | 355 |
| **Heating Energy Cost ($)** | $1,475 | $1,091 | $383 |
| **COMMENTS:** | | | |

| ENERGY CALCULATIONS - ELECTRIC | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CAV System | VAV System | |
| **Supply Fan HP** | 2 | 2 | |
| **Fan Energy, Annual kWh** | 2,652 | 1,314 | |
| **Electric Cost ($/kWh)** | $0.135 | $0.135 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Fan Energy Annual kWh** | 2,652 | 1,314 | 1,339 |
| **Electric Energy Cost ($)** | $358 | $177 | $181 |
| **COMMENTS:** | | | |

**Energy Savings Summary:**

| ECM #12 - ENERGY SAVINGS SUMMARY | |
|---|---|
| **Installation Cost ($):** | $10,671 |
| **NJ Smart Start Equipment Incentive ($):** | $0 |
| **Net Installation Cost ($):** | $10,671 |
| **Maintenance Savings ($/Yr):** | $0 |
| **Energy Savings ($/Yr):** | $564 |
| **Total Yearly Savings ($/Yr):** | $564 |
| **Estimated ECM Lifetime (Yr):** | 15 |
| **Simple Payback** | 18.9 |
| **Simple Lifetime ROI** | -20.7% |
| **Simple Lifetime Maintenance Savings** | $0 |
| **Simple Lifetime Savings** | $8,460 |
| **Internal Rate of Return (IRR)** | -3% |
| **Net Present Value (NPV)** | ($3,938.00) |

# 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 Generation

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which are mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). Parking lots can also be utilized for the installation of a solar array. A truss system can be installed that is high enough to park vehicles under the array and no parking lot area is lost. The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The 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 area and parking lots of the facility being audited for the purposes of determining a potential for a roof and ground mounted photovoltaic system. A total roof and ground area of 62,378 S.F. can be utilized for a 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 878.14 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 1,097,957 KWh annually, reducing the overall utility bill by approximately 63% 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 roof 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 school 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** | **SIMPLE ROI** | **INTERNAL RATE OF RETURN** |
| Direct Purchase | 14.8 Years | 68.4% | 5% |

*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 school to invest in a solar system through a Direct Purchase CEG does not recommend the school pursue this route. It would be more advantageous for the school 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 school at a reduced rate compared to their existing electric rate.

# IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

**Load Profile:**

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 steady year long load profile for facilities that have occupancy during the summer months. The average monthly usage for all accounts combined is 593,126 kWh.

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. 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 Atlantic City Electric's (AECO) BGS-FP and PSE&G'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 through August have little consumption.

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 a product structure to include either 1) a fixed basis rate with a market based Nymex/commodity rate or 2) a fixed basis rate with fixed Nymex/commodity winter rate (Nov – March) and market based Nymex/commodity rate for the summer months (April – October) for 100% of the facilities **metered** natural gas requirements are both recommended due to current market pricing.

**Tariff Analysis:**

Electricity:

The facilities receive electrical service through Atlantic City Electric (AECO) on AGS-Sec (Annual General Service Secondary) and PSE&G's GPL (General Power and Light) and LPLS (Large Power and Light Service). The facilities have contracted a Third Party Supplier (TPS) to provide electric commodity service. Current Third Party Supplier Terms and Conditions are unknown. For electric supply (generation) service, the client has a choice to either use AECO's or PSE&G's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electric.

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

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

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

The utility's, Atlantic City Electric and PSE&G will continue to be responsible for maintaining the existing network of wires, pipes and poles that make up the delivery system, which will serve all consumers, regardless of whom they choose to purchase their electricity or natural gas from. AECO's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge, Market Transition, Transition Bond Charge, Non Utility Generation Charge, Societal Benefits Charge (SBC), Infrastructure Investment Charge, System Control Charge, Regulatory Assets Recovery Charge, and Regional Greenhouse Gas Initiative Charge. PSE&G's delivery service rate includes the following charges: Customer Service Charge, Distribution Charge (kWh and Demand), Societal Benefits Charge (SBC), and Securitization Transition Charge.

Natural Gas:

The facilities currently receive natural gas distribution service through South Jersey Gas on rate schedules General Service Gas - Firm Transportation (GSG-FT). Hess Energy is the contracted Third Party Supplier (TPS) which provides natural gas commodity supply service. The terms and conditions of the natural gas contract with Hess Energy is not available.

South Jersey Gas 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 South Jersey Gas for rate schedule GSG.
http://www.southjerseygas.com/108/tariff/bgssrates.pdf

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

**Electric and Natural Gas Commodities Market Overview:**

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

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

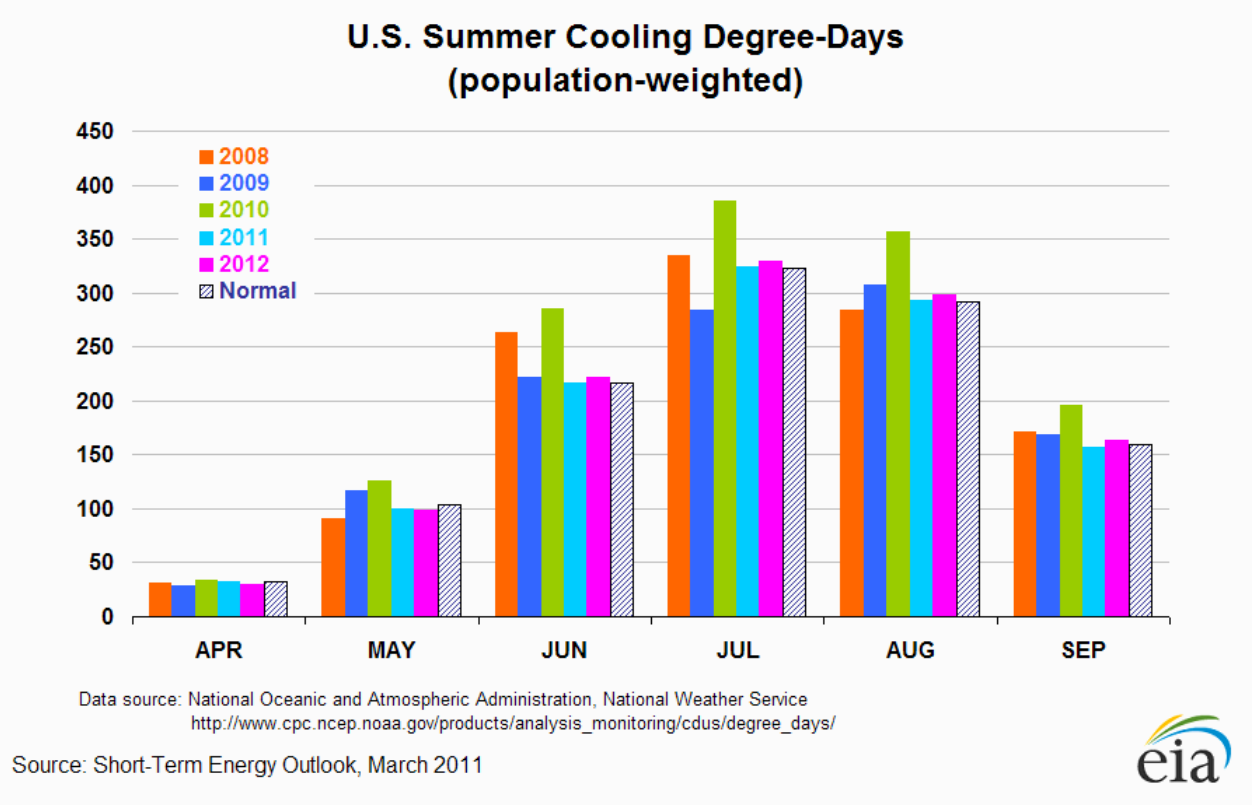
***Short Term Energy Outlook - US Energy Information Administration (3/08/2011):***

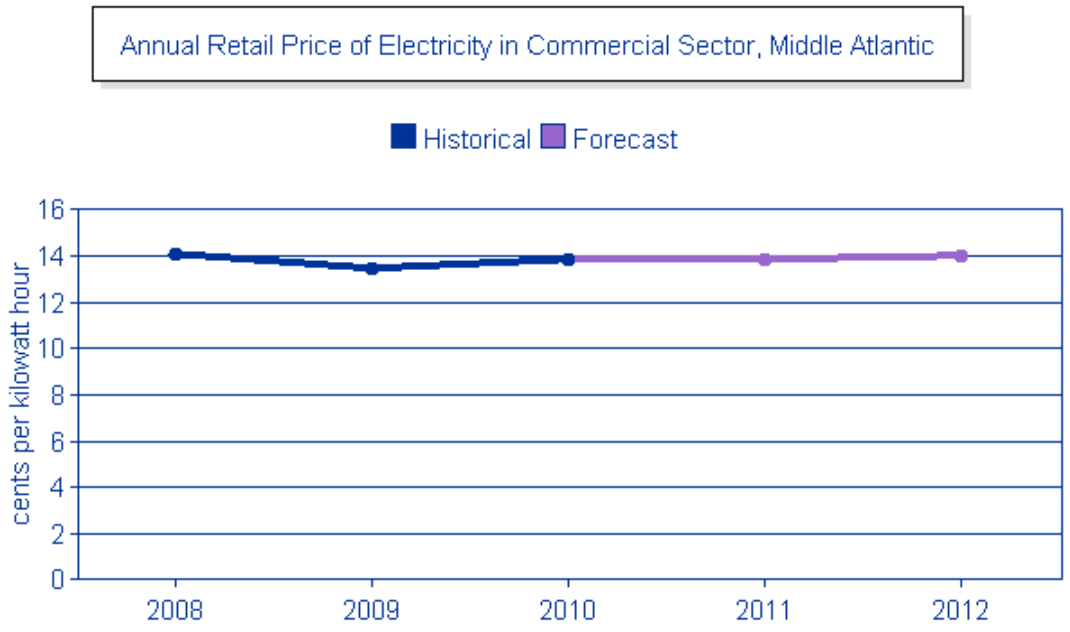
**U.S. Natural Gas Prices.** *The Henry Hub spot price averaged $4.09 per MMBtu in February 2011, $0.40 per MMBtu less than the average spot price in January 2011. EIA expects that the Henry Hub spot price will average $4.10 per MMBtu in 2011, a drop of $0.29 per MMBtu from the 2010 average. EIA expects the natural gas market to begin to tighten in 2012, with the Henry Hub spot price increasing to an average of $4.58 per MMBtu.*

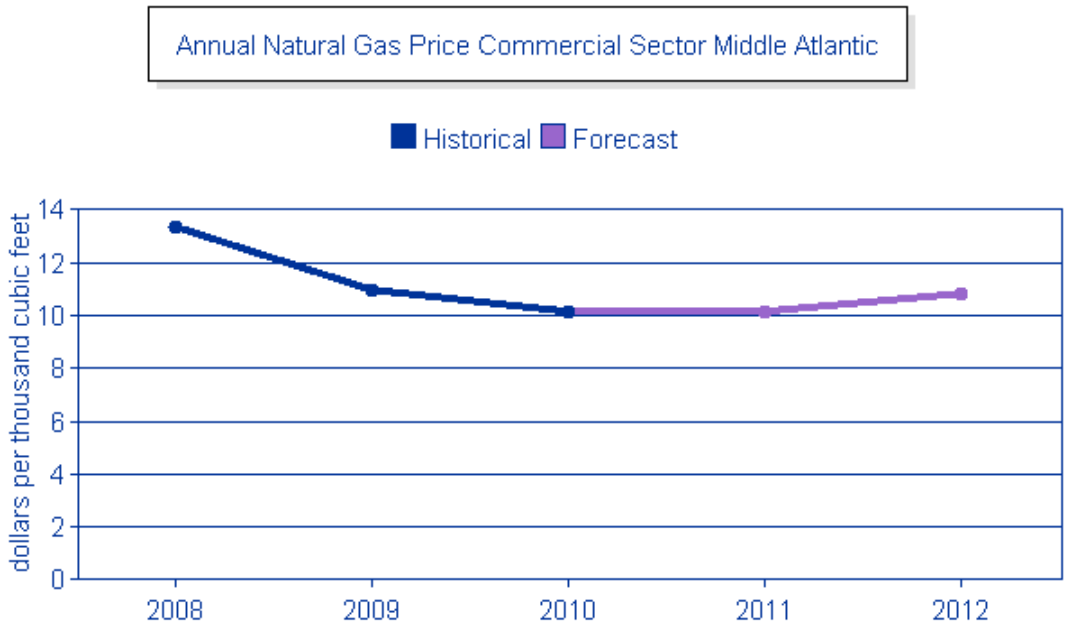
*Uncertainty over future natural gas prices is slightly lower this year compared with last year at this time. Natural gas futures for May 2011 delivery (for the 5-day period ending March 3) averaged $3.98 per MMBtu, and the average implied volatility over the same period was 33 percent. This produced lower and upper bounds for the 95-percent confidence interval for May 2011 contracts of $3.09 per MMBtu and $5.11 per MMBtu, respectively. At this time last year, the natural gas May 2010 futures contract averaged $4.77 per MMBtu and implied volatility averaged 39 percent. The corresponding lower and upper limits of the 95-percent confidence interval were $3.57 per MMBtu and $6.39 per MMBtu.*

***U.S. Electricity Retail Prices.*** *During 2010, retail prices for electricity distributed to the residential sector averaged 11.58 cents per kilowatthour, about the same level as in 2009. EIA expects residential prices to rise by 1.0 percent in 2011, followed by an increase of 0.5 percent in*

*2012. The effect of lower generation fuel costs in 2011 should be more evident in retail prices for electricity distributed to the industrial sector, which EIA projects will fall 1.6 percent during 2011 and then rise 0.2 percent next year.*






*Pricing includes both utility distribution and energy commodity charges.*

**Recommendations:**

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

   *The below recommendations presented by CEG are based on current information provided by the school facilities for its utility usage. Any savings presented with these recommendations are estimates only based on that information. It is recommended that further analysis and review of more recent utility data and actual TPS contracts be performed prior to performing any of the presented recommendations.*

   Overall, after review of the utility consumption, billing, and current commodity pricing outlook, CEG recommends that the facilities participate in the energy supply aggregation groups for both electricity and natural gas supply service for all facilities. Many aggregation groups utilize the advisement of a 3rd party unbiased Energy Consulting Firm experienced in the aggregation of and procurement of retail electricity and natural gas commodity. It is important to note that 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

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

# 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. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to $20,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

This incentive is provided in addition to the other NJ Clean Energy program funding. This program's incentive is considered the entity's capital and therefore can be applied to the LGEA program's requirements to implement the recommended energy conservation measures totaling at least 25% of the energy audit cost. Additional requirements of this program are as follows:

1. The entity must utilize additional funding through one or more of the NJ Clean Energy programs such as Smart Start, Direct Install, and Pay for Performance.

2. The EECBG funding in combination with other NJ Clean Energy programs may not exceed the total cost of the energy conservation measures being implemented.

3. Envelope measures are applicable only if recommended by the LGEA energy audit and if the energy audit was completed within the past 12 months.

4. New construction and previously installed measures are not eligible for the EECBG rebate.

5. Energy conservation measures eligible for the EECBG must fall within the list of approved energy conservation measures. The complete list of eligible measures and other program requirements are included in the "EECBG Complete Application Package." The application package is available on the NJ Clean Energy website - http://njcleanenergy.com/commercial-industrial/programs/energy-efficiency-and-conservation-block-grants.

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. 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

**Highland High School**

| ECM NO. | DESCRIPTION | INSTALLATION COST | | | | YEARLY SAVINGS | | | ECM LIFETIME | LIFETIME ENERGY SAVINGS | LIFETIME MAINTENANCE SAVINGS | LIFETIME ROI | SIMPLE PAYBACK | INTERNAL RATE OF RETURN (IRR) | NET PRESENT VALUE (NPV) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MATERIAL | LABOR | REBATES, INCENTIVES | NET INSTALLATION COST | ENERGY | MAINT. / SREC | TOTAL | | (Yearly Saving * ECM Lifetime) | (Yearly Maint Svaing * ECM Lifetime) | (Lifetime Savings - Net Cost) / (Net Cost) | (Net cost / Yearly Savings) | $\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$ | $\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$ |
| | | ($) | ($) | ($) | ($) | ($/Yr) | ($/Yr) | ($/Yr) | (Yr) | ($) | ($) | (%) | (Yr) | ($) | ($) |
| ECM #1 | Lighting Upgrade | $28,876 | $28,876 | $19,080 | $38,672 | $10,509 | $0 | $10,509 | 15 | $157,635 | $0 | 307.6% | 3.7 | 26.36% | $86,783.76 |
| ECM #2 | Lighting Controls | $31,350 | $10,450 | $5,155 | $36,645 | $10,847 | $0 | $10,847 | 15 | $162,705 | $0 | 344.0% | 3.4 | 28.95% | $92,845.78 |
| ECM #3 | Computer Monitor Replacement | $10,200 | $0 | $0 | $10,200 | $2,313 | $0 | $2,313 | 15 | $34,695 | $0 | 240.1% | 4.4 | 21.45% | $17,412.44 |
| ECM #4 | Condensing Boiler Installation | $179,800 | $241,838 | $11,210 | $410,428 | $16,953 | $0 | $16,953 | 30 | $508,590 | $0 | 23.9% | 24.2 | 1.44% | ($78,141.72) |
| ECM #5 | AC Unit Replacement | $89,550 | $132,375 | $9,567 | $212,358 | $6,235 | $0 | $6,235 | 15 | $93,525 | $0 | -56.0% | 34.1 | -8.85% | ($137,924.97) |
| ECM #6 | Library AC Unit Upgrade | $33,400 | $38,781 | $0 | $72,181 | $6,196 | $0 | $6,196 | 15 | $92,940 | $0 | 28.8% | 11.6 | 3.34% | $1,786.45 |
| ECM #7 | Cafeteria AC Unit Controls Upgrade | $10,100 | $13,888 | $0 | $23,988 | $4,786 | $0 | $4,786 | 15 | $71,790 | $0 | 199.3% | 5.0 | 18.36% | $33,146.96 |
| ECM #8 | Water Cooled CU Replacement | $71,800 | $87,025 | $1,840 | $156,985 | $11,698 | $0 | $11,698 | 15 | $175,470 | $0 | 11.8% | 13.4 | 1.42% | ($17,335.04) |
| ECM #9 | Water Conservation | $12,250 | $39,874 | $0 | $52,124 | $2,516 | $0 | $2,516 | 30 | $75,480 | $0 | 44.8% | 20.7 | 2.58% | ($2,809.29) |
| ECM #10 | Premium Efficiency Motors | $5,700 | $7,571 | $465 | $12,806 | $1,441 | $0 | $1,441 | 18 | $25,938 | $0 | 102.5% | 8.9 | 8.78% | $7,012.81 |
| ECM #11 | Valve Blanket Insulation | $2,500 | $7,500 | $0 | $10,000 | $554 | $0 | $554 | 24 | $13,296 | $0 | 33.0% | 18.1 | 2.42% | ($617.71) |
| ECM #12 | Kitchen Hood Controls | $4,963 | $5,708 | $0 | $10,671 | $564 | $0 | $564 | 15 | $8,460 | $0 | -20.7% | 18.9 | -2.77% | ($3,938.00) |
| **REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY** | | | | | | | | | | | | | | | |
| REM #1 | PV Solar | $7,903,260 | $0 | $0 | $7,903,260 | $148,224 | $384,285 | $532,509 | 25 | $13,312,725 | $9,607,125 | 68.4% | 14.8 | 4.49% | $1,369,397.86 |

**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
# Highland High School

**Building ID:** 2598398
**For 12-month Period Ending:** December 31, 2009[1]
**Date SEP becomes ineligible:** N/A
**Date SEP Generated:** February 21, 2011

**Facility**
Highland High School
450 Erial Road
Blackwood, NJ 08012

**Facility Owner**
Black Horse Pike Regional School District
580 Erial Road
Blackwood, NJ 08012

**Primary Contact for this Facility**
Jean Grubb
580 Erial Road
Blackwood, NJ 08012

**Year Built:** 1965
**Gross Floor Area (ft²):** 220,065

**Energy Performance Rating**[2] (1-100) 52

**Site Energy Use Summary**[3]

| | |
|---|---|
| Electricity - Grid Purchase(kBtu) | 5,967,997 |
| Natural Gas (kBtu)[4] | 10,550,611 |
| Total Energy (kBtu) | 16,518,608 |

**Energy Intensity**[5]

| | |
|---|---|
| Site (kBtu/ft²/yr) | 75 |
| Source (kBtu/ft²/yr) | 141 |

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

| | |
|---|---|
| Greenhouse Gas Emissions ($MtCO_2e$/year) | N/A |

**Electric Distribution Utility**
N/A

**National Average Comparison**

| | |
|---|---|
| National Average Site EUI | 77 |
| National Average Source EUI | 144 |
| % Difference from National Average Source EUI | -2% |
| 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 south burnt mill road
voorhees, NJ 08043

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. 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.

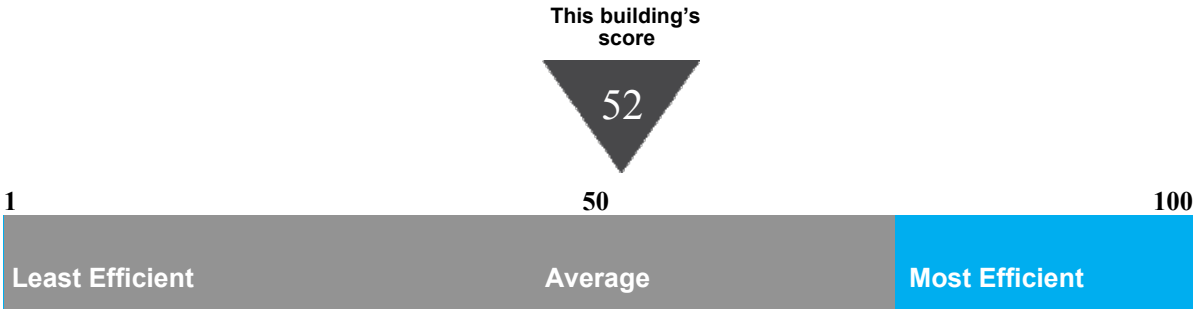
# Statement of Energy Performance

## 2009

Highland High School
450 Erial Road
Blackwood, NJ 08012

Portfolio Manager Building ID: 2598398

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 141 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending December 2009

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 02/21/2011

# MAJOR EQUIPMENT LIST

**Concord Engineering Group**

**Highland High School**

## Rooftop / AC Units

| Tag | RTU-1 | RTU-2 | RTU-3 |
|---|---|---|---|
| **Unit Type** | Elec Cooling/Gas Heat | Elec Cooling/Gas Heat | Elec Cooling/Gas Heat |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Weight Room (Sports Annex) | Faculty Dining | Classroom F126 |
| **Manufacturer** | Trane | York | York |
| **Model #** | YCD120C4 | D1NA024N05606C | No Tag |
| **Serial #** | N/A | NLHM140884 | No Tag |
| **Cooling Type** | DX Coil | DX Coil | DX Coil |
| **Cooling Capacity (Tons)** | 10 Tons | 2 Tons | 2 Tons |
| **Cooling Efficiency (SEER/EER)** | 11.0 EER | 10.0 SEER | 6.0 SEER (Estimated) |
| **Heating Type** | Nat Gas | Nat Gas | Nat Gas |
| **Heating Input (MBH)** | 120 | 70 | N/A |
| **Efficiency** | 80.0% | 80% | N/A |
| **Fuel** | Natural Gas | Natural Gas | Natural Gas |
| **Approx Age** | 10 | 11 | 20 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 5 | 4 | (5) |
| **Comments** | Controlled by programmable Tstat | Controlled by programmable Tstat | Controlled by programmable Tstat |

## Rooftop / AC Units

| Tag | RTU-4 | RTU-5 | RTU-6 |
|---|---|---|---|
| **Unit Type** | Elec Cooling/Gas Heat | Elec Cooling/HW Heat | Elec Cooling/HW Heat |
| **Qty** | 1 | 3 | 1 |
| **Location** | Roof | Cafeteria Roof | Library Roof |
| **Area Served** | Kitchen (Room F128) | Cafeteria | Library |
| **Manufacturer** | York | York | Trane |
| **Model #** | No Tag | J15ZRC00Q4HZZ100 | SLHFC5042757C7B |
| **Serial #** | No Tag | N1K0303216, 217, & 218 | C05F06010 |
| **Cooling Type** | DX Coil | DX Coil | DX Coil |
| **Cooling Capacity (Tons)** | 3-Tons | 15-Tons | 50-Tons |
| **Cooling Efficiency (SEER/EER)** | 6.0 SEER (Estimated) | 12.1 EER | 10 EER |
| **Heating Type** | Nat Gas | Duct-Mounted Hot Water Heating Coils | Duct-Mounted Hot Water Heating Coils |
| **Heating Input (MBH)** | N/A | N/A | N/A |
| **Efficiency** | N/A | N/A | N/A |
| **Fuel** | Natural Gas | N/A | N/A |
| **Approx Age** | 20 | 1 | 6 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | (5) | 14 | 9 |
| **Comments** | Controlled by programmable Tstat | Controlled by building automation system installed by CM3. System is overidden into occupied mode 24/7 due to communication problems at install that have not been resolved. Units are equipped with demand controlled ventilation. | Stand alone controls integral to the Trane Intellipak system. System is capable of operating as a VAV system however is presently set as a constant volume system with 3 abandoned terminal units with disconnected electric heat. Had problems with humidity due to being over sized when originally installed but the compressors have been staged accordingly along with the assistance of some hot gas bypass. System is not equipped with demand controlled ventilation. |

## Rooftop / AC Units

| Tag | RTU-7 | | RTU-8 |
|---|---|---|---|
| **Unit Type** | Elec Cooling/Gas Heat | Heating and Ventilating | Cooling Only |
| **Qty** | 1 | 2 | 1 |
| **Location** | Library Roof | Trainer Office Roof | Roof |
| **Area Served** | Librarian's Office | Lockers | |
| **Manufacturer** | Trane | No Tag | York |
| **Model #** | No Tag | No Tag | D4CG090N13046A |
| **Serial #** | No Tag | No Tag | NBJM022269 |
| **Cooling Type** | DX Coil | N/A | DX Coil |
| **Cooling Capacity (Tons)** | 2-Tons | N/A | 7.5-Tons |
| **Cooling Efficiency (SEER/EER)** | 7.0 SEER (Estimated) | N/A | 10.1 EER |
| **Heating Type** | Nat Gas | Nat Gas | N/A |
| **Heating Input (MBH)** | N/A | 163 | N/A |
| **Efficiency** | N/A | 80% | N/A |
| **Fuel** | Natural Gas | Natural Gas | N/A |
| **Approx Age** | 22 | 24 | 9 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | (7) | (9) | 6 |
| **Comments** | Controlled by building automation system. | | Controlled by building automation system. |

## Rooftop / AC Units

| Tag | RTU-9 | SS-1 | RTU-10 |
|---|---|---|---|
| **Unit Type** | Elec Cooling/Gas Heat | Cooling Only | Cooling Only |
| **Qty** | 1 | 1 | 2 |
| **Location** | Choral Roof | Roof over Room C103 | Stage Roof |
| **Area Served** | Choral Room | Three (3) Offices | Auditorium |
| **Manufacturer** | York | Trane | Trane |
| **Model #** | No Tag | 1CD036A400B | TCH360A40Y1B5BE |
| **Serial #** | No Tag | F431……. | C08K10380 & 10381 |
| **Cooling Type** | DX Coil | DX Coil | DX Coil |
| **Cooling Capacity (Tons)** | 4-Tons | 3-Tons | 30-Tons |
| **Cooling Efficiency (SEER/EER)** | 6.0 SEER (Estimated) | 7.0 SEER | 9.5 EER |
| **Heating Type** | Nat Gas | N/A | N/A |
| **Heating Input (MBH)** | N/A | N/A | N/A |
| **Efficiency** | N/A | N/A | N/A |
| **Fuel** | Natural Gas | N/A | N/A |
| **Approx Age** | 20 | 19 | 2 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | (5) | (4) | 13 |
| **Comments** | Controlled by programmable Tstat | Controlled by programmable Tstat | Controlled by building automation system installed by CM3. Unit is equipped with demand controlled ventilation. |

## Rooftop / AC Units

| Tag | SS-2 | SS-3 | SS-4 |
|---|---|---|---|
| **Unit Type** | Cooling Only | Split Condenser | Split Heat Pumps |
| **Qty** | 1 | 1 | 1 |
| **Location** | Roof | Roof | Roof |
| **Area Served** | Room F211 | Conference Rm A203 | 2nd Floor Admin Offices |
| **Manufacturer** | Trane | Mitsubishi | Mitsubishi |
| **Model #** | TTB727A100A0 | MU15NN | MXZ-2A20NA-1 |
| **Serial #** | B29248396 | 7000387T | 8000299 |
| **Cooling Type** | Heat Pump | DX Coil | Heat Pump |
| **Cooling Capacity (Tons)** | 4-Ton | 15,000 Btuh | 22,000 Btuh |
| **Cooling Efficiency (SEER/EER)** | 7.0 SEER (Estimated) | 8.0 SEER | 10.0 SEER |
| **Heating Type** | N/A | N/A | N/A |
| **Heating Input (MBH)** | N/A | N/A | N/A |
| **Efficiency** | N/A | N/A | N/A |
| **Fuel** | N/A | N/A | N/A |
| **Approx Age** | 23 | 11 | 8 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | (8) | 4 | 7 |
| **Comments** | Controlled by non-programmable Tstat | Controlled by programmable Tstat | Controlled by programmable Tstat |

## Rooftop / AC Units

| Tag | SS-5 | SS-6 | RTU-11 |
|---|---|---|---|
| **Unit Type** | Split Heat Pump | Split Condenser | Cooling Only |
| **Qty** | 2 | 3 | 2 |
| **Location** | Roof | Roof | Science Wing Roof |
| **Area Served** | 2nd Floor Admin Offices | Nurse/Exam Rooms | Science Rooms |
| **Manufacturer** | Mitsubishi | Rheem | Trane |
| **Model #** | MXZ-3A30NA-1 | RAKA-018JAZ | TCD 036 A400BA |
| **Serial #** | 82902409 & 82901263 | 5460 M2496 12155, 12156, & 12159 | N/A |
| **Cooling Type** | Heat Pump | DX Coil | DX Coil |
| **Cooling Capacity (Tons)** | 30,000 Btuh | 18,000 Btuh | 3-Tons |
| **Cooling Efficiency (SEER/EER)** | 10.0 SEER | 9.0 SEER | 6.0 SEER |
| **Heating Type** | N/A | N/A | N/A |
| **Heating Input (MBH)** | N/A | N/A | N/A |
| **Efficiency** | N/A | N/A | N/A |
| **Fuel** | N/A | N/A | N/A |
| **Approx Age** | 7 | 10 | 20 |
| **ASHRAE Service Life** | 15 | 15 | 15 |
| **Remaining Life** | 8 | 5 | (5) |
| **Comments** | Controlled by programmable Tstat | Controlled by programmable Tstat | Controlled by programmable Tstat |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Highland High School

## Boilers

| Tag | Boiler-1 & 2 | Gym Addition | |
|---|---|---|---|
| **Unit Type** | Cast Iron Sectional | Cast Iron Sectional | |
| **Qty** | 2 | 1 | |
| **Location** | Main Boiler Room | Main Boiler Room | |
| **Area Served** | Entire School | Gym | |
| **Manufacturer** | H B Smith | Weil-McLain | |
| **Model #** | 640 | BG-488-RS | |
| **Serial #** | State # 6313 - 1H & 2H | 88-3056-H | |
| **Input Capacity (MBH)** | 8,400 | 1,010 | |
| **Rated Output Capacity (MBH)** | 6,522 | 810 | |
| **Approx. Efficiency %** | 74% | 80% | |
| **Fuel** | Natural Gas | Natural Gas | |
| **Approx Age** | 43 | 22 | |
| **ASHRAE Service Life** | 30 | 30 | |
| **Remaining Life** | (13) | 8 | |
| **Comments** | | | |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Highland High School

## Domestic Water Heater

| Tag | HWH-1 | | |
|---|---|---|---|
| **Unit Type** | Cast Iron Sectional | | |
| **Qty** | 1 | | |
| **Location** | Main Boiler Room | | |
| **Area Served** | Entire Facility | | |
| **Manufacturer** | H B Smith | | |
| **Model #** | 84-177-H | | |
| **Serial #** | N/A | | |
| **Input Capacity (MBH)** | 980 | | |
| **Rated Output Capacity (MBH)** | 784 | | |
| **Efficiency %** | 70% | | |
| **Blower Motor** | 1/3 HP | | |
| **Fuel** | Natural Gas | | |
| **Approx Age** | 26 | | |
| **ASHRAE Service Life** | 30 | | |
| **Remaining Life** | 4 | | |
| **Comments** | | | |

# MAJOR EQUIPMENT LIST

## Concord Engineering Group

### Highland High School

## Pumps

| Tag | Admin Zone | Zone 1 (P-2) | Zone 2 |
|---|---|---|---|
| **Unit Type** | Centrifugal Split | Centrifugal Split | Centrifugal Split |
| **Qty** | 2 | 1 | 1 |
| **Location** | Main Boiler Room | Main Boiler Room | Main Boiler Room |
| **Area Served** | Admin Area | Zone 1 | Zone 2 |
| **Manufacturer** | Bell & Gosssett | Armstrong | Bell & Gossett |
| **Model #** | 185011 | 5x4x11.5 4030 | U3B 8-7/8-BF |
| **Serial #** | N/A | N/A | N/A |
| **Horse Power** | 3 | 20 | 10 |
| **Flow** | 50 GPM @ 72 FT HD | 440 GPM @ 90FT HD | 290 GPM @ 70FT HD |
| **Motor Info** | | Marathon Electric | |
| **Electrical Power** | 460 V/3 Phase | 460 V/3 Phase | 460 V / 3 Phase |
| **RPM** | 1750 | 1750 | 1750 |
| **Motor Efficiency %** | N/A | 88.5% | N/A |
| **Approx Age** | Uknown | Uknown | Uknown |
| **ASHRAE Service Life** | 20 | 20 | 20 |
| **Remaining Life** | Uknown | Uknown | Uknown |
| **Comments** | | | |

## Pumps

| Tag | Zone 1 & 2 Spare | Gym Addition Pump | DHW Booster Pumps |
|---|---|---|---|
| **Unit Type** | Centrifugal Split | In-Line | In-Line |
| **Qty** | 1 | 2 | 2 |
| **Location** | Main Boiler Room | Main Boiler Room | Main Boiler Room |
| **Area Served** | Zone 1 & 2 | Gym | Entire Facility |
| **Manufacturer** | Armstrong | Armstrong | Armstrong |
| **Model #** | 5x4x11.5 4030 | N/A | N/A |
| **Serial #** | N/A | N/A | N/A |
| **Horse Power** | 20 | 0.50 | 3/4 |
| **Flow** | 440 GPM @ 90FT HD | N/A | N/A |
| **Motor Info** | Marathon Electric | N/A | N/A |
| **Electrical Power** | 460 V/3 Phase | 208V/1 Phase | 115V/1 Phase |
| **RPM** | 1750 | 1725 | 1725 |
| **Motor Efficiency %** | 88.5% | N/A | N/A |
| **Approx Age** | Uknown | Uknown | Uknown |
| **ASHRAE Service Life** | 20 | 20 | 20 |
| **Remaining Life** | Uknown | Uknown | Uknown |
| **Comments** | | | |

# MAJOR EQUIPMENT LIST

**Concord Engineering Group**

**Highland High School**

## Air Handling Units

| Tag | HV-1 & 3 | HV-2 & 4 | HV-1 thru 4 |
|---|---|---|---|
| **Location** | Basement Mech Rm | Basement Mech Rm | Gym Ceiling |
| **Area Served** | Locker Rooms | Locker Rooms | Gym |
| **Manufacturer** | Nesbitt | Nesbitt | Trane |
| **Qty** | 2 | 2 | 4 |
| **Model #** | No tag | No tag | N/A |
| **Serial #** | H.P.H. 150 | L.P.H. 85 | N/A |
| **Supply Flow, CFM** | 6,500 | 4,300 | 2,000 |
| **Heating Type** | Hot Water | Hot Water | Hot Water |
| **Input (MBh)** | N/A | N/A | 150 |
| **Output (MBh)** | N/A | N/A | N/A |
| **Supply Motor HP** | 5 | 5 | 3 |
| **Supply Motor Efficiency** | 82% | 82% | 86% |
| **Return Fan Motor HP** | N/A | N/A | N/A |
| **R/F Motor Efficiency** | N/A | N/A | N/A |
| **Approx. Age** | 45 | 45 | 24 |
| **ASHRAE Service Life** | 20 | 20 | 20 |
| **Remaining Life** | (25) | (25) | (4) |
| **Notes** | 20 years for hot water coils, motors, dampers, pneumatics,etc. | 20 years for hot water coils, motors, dampers, pneumatics,etc. | 20 years for hot water coils, motors, dampers, pneumatics,etc. |

# Investment Grade Lighting Audit

**CEG Job #:** 9C10098
**Project:** Highland High School
450 Erial Road
Blackwood, NJ 08012
**Bldg. Sq. Ft.** 220,065

**Highland High School**

**KWH COST:** $0.135

## ECM #1: Lighting Upgrade - General

| TING LIGHTINC | | | | | | | | | | PROPOSED LIGHTING | | | | | | | | SAVINGS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CEG Type | Fixture Location | Yearly Usage | No. Fixts | No. Lamps | Fixture Type | Fixt Watts | Total kW | kWh/Yr Fixtures | Yearly $ Cost | No. Fixts | No. Lamps | Retro-Unit Description | Watts Used | Total kW | kWh/Yr Fixtures | Yearly $ Cost | Unit Cost (INSTALLED) | Total Cost | kW Savings | kWh/Yr Savings | Yearly $ Savings | Yearly Simple Payback |
| 221.11 | B217 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | B215 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | B213 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 211.11 | B211 Faculty | 2600 | 16 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.53 | 1,372.8 | $185.33 | 16 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.45 | 1164.8 | $157.25 | $7.00 | $112.00 | 0.08 | 208 | $28.08 | 3.99 |
| 211.11 | B211 Faculty Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 211.11 | B209 Faculty Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 221.11 | B207 Classroom | 2600 | 12 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 221.11 | B205 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | B203 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 211.11 | Boys' Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 227.21 | | 2600 | 1 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.07 | 169.0 | $22.82 | 1 | 2 | Sylvania Lamp FBO30/841XP/6//SS/ECO | 49 | 0.05 | 127.4 | $17.20 | $24.00 | $24.00 | 0.02 | 41.6 | $5.62 | 4.27 |
| 222.21 | B Corridor | 4400 | 14 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.87 | 3,819.2 | $515.59 | 14 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.78 | 3449.6 | $465.70 | $14.00 | $196.00 | 0.08 | 369.6 | $49.90 | 3.93 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 221.21 | F Corridor | 4400 | 10 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens | 58 | 0.58 | 2,552.0 | $344.52 | 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

| 602 | | 8760 | 3 | 2 | Incandescent Exit Sign | 20 | 0.06 | 525.6 | $70.96 | 3 | 1 | LED Exit Sign | 2 | 0.01 | 52.56 | $7.10 | $65.00 | $195.00 | 0.05 | 473.04 | $63.86 | 3.05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.11 | F212 Classroom | 2600 | 30 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.86 | 4,836.0 | $652.86 | 30 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.68 | 4368 | $589.68 | $14.00 | $420.00 | 0.18 | 468 | $63.18 | 6.65 |
| 221.14 | F210 Science Department | 2600 | 7 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.41 | 1,055.6 | $142.51 | 7 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.39 | 1019.2 | $137.59 | $14.00 | $98.00 | 0.01 | 36.4 | $4.91 | 19.94 |
| 221.11 | F208 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.14 | F206 Prep Room | 2600 | 7 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.41 | 1,055.6 | $142.51 | 7 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.39 | 1019.2 | $137.59 | $14.00 | $98.00 | 0.01 | 36.4 | $4.91 | 19.94 |
| 221.11 | F204 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | F200 Classroom | 2600 | 33 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 2.05 | 5,319.6 | $718.15 | 33 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.85 | 4804.8 | $648.65 | $14.00 | $462.00 | 0.20 | 514.8 | $69.50 | 6.65 |
| 221.11 | F201 Storage | 1200 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.37 | 446.4 | $60.26 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 403.2 | $54.43 | $14.00 | $84.00 | 0.04 | 43.2 | $5.83 | 14.40 |
| 221.11 | F203 Classroom | 2600 | 33 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 2.05 | 5,319.6 | $718.15 | 33 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.85 | 4804.8 | $648.65 | $14.00 | $462.00 | 0.20 | 514.8 | $69.50 | 6.65 |
| 221.11 | F207 Classroom | 2600 | 30 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.86 | 4,836.0 | $652.86 | 30 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.68 | 4368 | $589.68 | $14.00 | $420.00 | 0.18 | 468 | $63.18 | 6.65 |
| 221.14 | F211 Electrical Room | 1200 | 5 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.29 | 348.0 | $46.98 | 5 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.28 | 336 | $45.36 | $14.00 | $70.00 | 0.01 | 12 | $1.62 | 43.21 |
| 221.14 | A200 Custodial Closet | 1200 | 1 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.06 | 69.6 | $9.40 | 1 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.06 | 67.2 | $9.07 | $14.00 | $14.00 | 0.00 | 2.4 | $0.32 | 43.21 |
| 221.11 | A200 Girls' Restroom | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.19 | 483.6 | $65.29 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 436.8 | $58.97 | $14.00 | $42.00 | 0.02 | 46.8 | $6.32 | 6.65 |
| 221.11 | A204 Classroom | 2600 | 21 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.30 | 3,385.2 | $457.00 | 21 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.18 | 3057.6 | $412.78 | $14.00 | $294.00 | 0.13 | 327.6 | $44.23 | 6.65 |
| 221.11 | A201 Year Book Office | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.11 | A206 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.11 | Men's Restroom | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.12 | 322.4 | $43.52 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 291.2 | $39.31 | $14.00 | $28.00 | 0.01 | 31.2 | $4.21 | 6.65 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.11 | A208 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.11 | A210 Special Services | 2600 | 27 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.67 | 4,352.4 | $587.57 | 27 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.51 | 3931.2 | $530.71 | $14.00 | $378.00 | 0.16 | 421.2 | $56.86 | 6.65 |
| 121.14 | A212 Storage Closet | 1200 | 1 | 2 | 1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens | 78 | 0.08 | 93.6 | $12.64 | 1 | 2 | 2 Lamp, 32w T8, Elect. Ballast; retrofit | 58 | 0.06 | 69.6 | $9.40 | $100.00 | $100.00 | 0.02 | 24 | $3.24 | 30.86 |
| 221.11 | A214 VP Office | 2600 | 8 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.50 | 1,289.6 | $174.10 | 8 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.45 | 1164.8 | $157.25 | $14.00 | $112.00 | 0.05 | 124.8 | $16.85 | 6.65 |
| 222.21 | A207 Balcony | 1200 | 3 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.19 | 223.2 | $30.13 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 201.6 | $27.22 | $14.00 | $42.00 | 0.02 | 21.6 | $2.92 | 14.40 |
| 221.11 | Women's Restroom | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.12 | 322.4 | $43.52 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 291.2 | $39.31 | $14.00 | $28.00 | 0.01 | 31.2 | $4.21 | 6.65 |
| 222.21 | A Corridor | 4400 | 14 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.87 | 3,819.2 | $515.59 | 14 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.78 | 3449.6 | $465.70 | $14.00 | $196.00 | 0.08 | 369.6 | $49.90 | 3.93 |
| 602 | | 8760 | 3 | 2 | Incandescent Exit Sign | 20 | 0.06 | 525.6 | $70.96 | 3 | 1 | LED Exit Sign | 2 | 0.01 | 52.56 | $7.10 | $65.00 | $195.00 | 0.05 | 473.04 | $63.86 | 3.05 |
| 221.11 | A216 Classroom | 2600 | 27 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.67 | 4,352.4 | $587.57 | 27 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.51 | 3931.2 | $530.71 | $14.00 | $378.00 | 0.16 | 421.2 | $56.86 | 6.65 |
| 211.11 | Boys' Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 222.21 | E Corridor | 4400 | 7 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.43 | 1,909.6 | $257.80 | 7 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.39 | 1724.8 | $232.85 | $14.00 | $98.00 | 0.04 | 184.8 | $24.95 | 3.93 |
| 602 | | 8790 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 351.6 | $47.47 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.16 | $4.75 | $65.00 | $130.00 | 0.04 | 316.44 | $42.72 | 3.04 |
| 221.11 | A220 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.14 | E201 World Languages | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.17 | 452.4 | $61.07 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 436.8 | $58.97 | $14.00 | $42.00 | 0.01 | 15.6 | $2.11 | 19.94 |
| 221.11 | E203 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | E200 Book Room | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.37 | 967.2 | $130.57 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 873.6 | $117.94 | $14.00 | $84.00 | 0.04 | 93.6 | $12.64 | 6.65 |
| 221.11 | E202 Classroom | 2600 | 20 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.24 | 3,224.0 | $435.24 | 20 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.12 | 2912 | $393.12 | $14.00 | $280.00 | 0.12 | 312 | $42.12 | 6.65 |
| 221.11 | E205 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |

# Investment Grade Lighting Audit

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| 221.11 | E206 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.11 | E207 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | E208 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.11 | E209 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | E210 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.14 | E213 Book Room | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.12 | 301.6 | $40.72 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 291.2 | $39.31 | $14.00 | $28.00 | 0.00 | 10.4 | $1.40 | 19.94 |
| 221.11 | B223 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.11 | E212 Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.37 | 967.2 | $130.57 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 873.6 | $117.94 | $14.00 | $84.00 | 0.04 | 93.6 | $12.64 | 6.65 |
| 211.11 | CustodialCloset | 1200 | 1 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.03 | 39.6 | $5.35 | 1 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.03 | 33.6 | $4.54 | $7.00 | $7.00 | 0.01 | 6 | $0.81 | 8.64 |
| 211.11 | Girls' Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 211.11 | Stairwell D1 | 4400 | 8 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.26 | 1,161.6 | $156.82 | 8 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.22 | 985.6 | $133.06 | $7.00 | $56.00 | 0.04 | 176 | $23.76 | 2.36 |
| 613 | Mech. Room B212 | 1200 | 2 | 1 | Industrial Fixture, 100w A19 Lamp | 100 | 0.20 | 240.0 | $32.40 | 2 | 1 | (1) 26w CFL Lamp | 26 | 0.05 | 62.4 | $8.42 | $20.00 | $40.00 | 0.15 | 177.6 | $23.98 | 1.67 |
| 613 | B208 Mech. Room | 1200 | 2 | 1 | Industrial Fixture, 100w A19 Lamp | 100 | 0.20 | 240.0 | $32.40 | 2 | 1 | (1) 26w CFL Lamp | 26 | 0.05 | 62.4 | $8.42 | $20.00 | $40.00 | 0.15 | 177.6 | $23.98 | 1.67 |
| 222.21 | Stairwell Near Elevator | 4400 | 3 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.19 | 818.4 | $110.48 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 739.2 | $99.79 | $14.00 | $42.00 | 0.02 | 79.2 | $10.69 | 3.93 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 1 | LED Exit Sign | 2 | 0.00 | 17.52 | $2.37 | $65.00 | $65.00 | 0.02 | 157.68 | $21.29 | 3.05 |
| 211.11 | Stairwell A2 | 4400 | 8 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.26 | 1,161.6 | $156.82 | 8 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.22 | 985.6 | $133.06 | $7.00 | $56.00 | 0.04 | 176 | $23.76 | 2.36 |
| 211.11 | Stairwell A4 | 4400 | 8 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.26 | 1,161.6 | $156.82 | 8 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.22 | 985.6 | $133.06 | $7.00 | $56.00 | 0.04 | 176 | $23.76 | 2.36 |
| 221.31 | A128 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |

# Investment Grade Lighting Audit

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| 221.14 | E101 Office | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.17 | 452.4 | $61.07 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 436.8 | $58.97 | $14.00 | $42.00 | 0.01 | 15.6 | $2.11 | 19.94 |
| 221.31 | E103 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.31 | E105 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.31 | E107 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.31 | E109 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.14 | E111 Book Room | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.17 | 452.4 | $61.07 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 436.8 | $58.97 | $14.00 | $42.00 | 0.01 | 15.6 | $2.11 | 19.94 |
| 221.31 | B127 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 222.21 | B Corridor | 4400 | 8 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.50 | 2,182.4 | $294.62 | 8 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.45 | 1971.2 | $266.11 | $14.00 | $112.00 | 0.05 | 211.2 | $28.51 | 3.93 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 221.31 | E112 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.31 | E110 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 221.31 | E108 VP Office | 2600 | 9 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.56 | 1,450.8 | $195.86 | 9 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.50 | 1310.4 | $176.90 | $14.00 | $126.00 | 0.05 | 140.4 | $18.95 | 6.65 |
| 221.31 | E106 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 232.21 | E104 Classroom | 2600 | 12 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 1.03 | 2,683.2 | $362.23 | 12 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 1.01 | 2620.8 | $353.81 | $21.00 | $252.00 | 0.02 | 62.4 | $8.42 | 29.91 |
| 227.21 | | 2600 | 4 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.26 | 676.0 | $91.26 | 4 | 2 | Sylvania Lamp FBO30/841XP/6//SS/ECO | 49 | 0.20 | 509.6 | $68.80 | $24.00 | $96.00 | 0.06 | 166.4 | $22.46 | 4.27 |
| 211.11 | Women's Restroom | 2600 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.07 | 171.6 | $23.17 | 2 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.06 | 145.6 | $19.66 | $7.00 | $14.00 | 0.01 | 26 | $3.51 | 3.99 |
| 105 | A Corridor Display Case | 4400 | 5 | 2 | 3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens | 60 | 0.30 | 1,320.0 | $178.20 | 5 | 1 | Reballast & Relamp; Sylvania Lamp FO28/841/SS/ECO | 28 | 0.14 | 616 | $83.16 | $80.00 | $400.00 | 0.16 | 704 | $95.04 | 4.21 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.31 | A127 Classroom | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.99 | 2,579.2 | $348.19 | 16 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.90 | 2329.6 | $314.50 | $14.00 | $224.00 | 0.10 | 249.6 | $33.70 | 6.65 |
| 232.21 | | 2600 | 1 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.09 | 223.6 | $30.19 | 1 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 0.08 | 218.4 | $29.48 | $21.00 | $21.00 | 0.00 | 5.2 | $0.70 | 29.91 |
| 232.21 | A125 Resource Officer | 2600 | 2 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.17 | 447.2 | $60.37 | 2 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 0.17 | 436.8 | $58.97 | $21.00 | $42.00 | 0.00 | 10.4 | $1.40 | 29.91 |
| 232.21 | A123 Conference Room | 2600 | 2 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.17 | 447.2 | $60.37 | 2 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 0.17 | 436.8 | $58.97 | $21.00 | $42.00 | 0.00 | 10.4 | $1.40 | 29.91 |
| 221.31 | A121 Classroom | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.99 | 2,579.2 | $348.19 | 16 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.90 | 2329.6 | $314.50 | $14.00 | $224.00 | 0.10 | 249.6 | $33.70 | 6.65 |
| 232.21 | | 2600 | 1 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.09 | 223.6 | $30.19 | 1 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 0.08 | 218.4 | $29.48 | $21.00 | $21.00 | 0.00 | 5.2 | $0.70 | 29.91 |
| 221.14 | A119 Elec. Room | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.12 | 139.2 | $18.79 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 134.4 | $18.14 | $14.00 | $28.00 | 0.00 | 4.8 | $0.65 | 43.21 |
| 211.11 | A117 Men's Restroom | 2600 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.07 | 171.6 | $23.17 | 2 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.06 | 145.6 | $19.66 | $7.00 | $14.00 | 0.01 | 26 | $3.51 | 3.99 |
| 211.11 | A115 Closet | 1200 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.07 | 79.2 | $10.69 | 2 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.06 | 67.2 | $9.07 | $7.00 | $14.00 | 0.01 | 12 | $1.62 | 8.64 |
| 211.11 | Women's Restroom | 2600 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.07 | 171.6 | $23.17 | 2 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.06 | 145.6 | $19.66 | $7.00 | $14.00 | 0.01 | 26 | $3.51 | 3.99 |
| 221.14 | A109 Elec. Room | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.12 | 139.2 | $18.79 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 134.4 | $18.14 | $14.00 | $28.00 | 0.00 | 4.8 | $0.65 | 43.21 |
| 221.14 | A107 Office | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.17 | 452.4 | $61.07 | 3 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.17 | 436.8 | $58.97 | $14.00 | $42.00 | 0.01 | 15.6 | $2.11 | 19.94 |
| 221.31 | A105 Classroom | 2600 | 28 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.74 | 4,513.6 | $609.34 | 28 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.57 | 4076.8 | $550.37 | $14.00 | $392.00 | 0.17 | 436.8 | $58.97 | 6.65 |
| 221.31 | A105 Storage | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.12 | 148.8 | $20.09 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 134.4 | $18.14 | $14.00 | $28.00 | 0.01 | 14.4 | $1.94 | 14.40 |
| 221.14 | A103 Storage/Elec. Room | 1200 | 4 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.23 | 278.4 | $37.58 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 268.8 | $36.29 | $14.00 | $56.00 | 0.01 | 9.6 | $1.30 | 43.21 |
| 222.21 | A100 Classroom | 2600 | 9 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.56 | 1,450.8 | $195.86 | 9 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.50 | 1310.4 | $176.90 | $14.00 | $126.00 | 0.05 | 140.4 | $18.95 | 6.65 |
| 221.14 | A102 Custodian Closet | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.12 | 139.2 | $18.79 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 134.4 | $18.14 | $14.00 | $28.00 | 0.00 | 4.8 | $0.65 | 43.21 |
| 211.11 | Men's Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.21 | A Corridor | 4400 | 16 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens | 58 | 0.93 | 4,083.2 | $551.23 | 16 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 4 | 2 | Incandescent Exit Sign | 20 | 0.08 | 700.8 | $94.61 | 4 | 1 | LED Exit Sign | 2 | 0.01 | 70.08 | $9.46 | $65.00 | $260.00 | 0.07 | 630.72 | $85.15 | 3.05 |
| 221.31 | A104 Conference Room | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 221.31 | Ms. Smith's Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.37 | 967.2 | $130.57 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 873.6 | $117.94 | $14.00 | $84.00 | 0.04 | 93.6 | $12.64 | 6.65 |
| 221.31 | Mrs. Vizoco's Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.37 | 967.2 | $130.57 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 873.6 | $117.94 | $14.00 | $84.00 | 0.04 | 93.6 | $12.64 | 6.65 |
| 221.31 | Guidance Receptionist, Area & Hall | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.99 | 2,579.2 | $348.19 | 16 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.90 | 2329.6 | $314.50 | $14.00 | $224.00 | 0.10 | 249.6 | $33.70 | 6.65 |
| 221.31 | Guidance Director Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.37 | 967.2 | $130.57 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 873.6 | $117.94 | $14.00 | $84.00 | 0.04 | 93.6 | $12.64 | 6.65 |
| 221.31 | Mrs. Hensel's Office | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 221.31 | Counselor | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 221.31 | Mrs. Papadinec's Office | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 221.31 | Mrs. Strauss' Office | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 221.31 | Copy Room/Files | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 284.25 | Lobby | 4400 | 2 | 8 | 4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., White Diffuser | 214 | 0.43 | 1,883.2 | $254.23 | 2 | 8 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 192 | 0.38 | 1689.6 | $228.10 | $56.00 | $112.00 | 0.04 | 193.6 | $26.14 | 4.29 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 227.21 | Vestibule | 4400 | 3 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.20 | 858.0 | $115.83 | 3 | 2 | Sylvania Lamp FBO30/841XP/6//SS/ECO | 49 | 0.15 | 646.8 | $87.32 | $24.00 | $72.00 | 0.05 | 211.2 | $28.51 | 2.53 |
| 227.21 | Main Office Stairway | 2600 | 1 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.07 | 169.0 | $22.82 | 1 | 2 | Sylvania Lamp FBO30/841XP/6//SS/ECO | 49 | 0.05 | 127.4 | $17.20 | $24.00 | $24.00 | 0.02 | 41.6 | $5.62 | 4.27 |
| 221.31 | Main Office | 2600 | 14 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.87 | 2,256.8 | $304.67 | 14 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.78 | 2038.4 | $275.18 | $14.00 | $196.00 | 0.08 | 218.4 | $29.48 | 6.65 |
| 221.31 | Principal's Office | 2600 | 8 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.50 | 1,289.6 | $174.10 | 8 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.45 | 1164.8 | $157.25 | $14.00 | $112.00 | 0.05 | 124.8 | $16.85 | 6.65 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.31 | Nurse | 2600 | 9 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.56 | 1,450.8 | $195.86 | 9 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.50 | 1310.4 | $176.90 | $14.00 | $126.00 | 0.05 | 140.4 | $18.95 | 6.65 |
| 621 | Auditorium | 1200 | 64 | 1 | Recessed Light, 300w Quartz Lamp | 300 | 19.20 | 23,040.0 | $3,110.40 | 64 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 6 | 2 | Incandescent Exit Sign | 20 | 0.12 | 1,051.2 | $141.91 | 6 | 1 | LED Exit Sign | 2 | 0.01 | 105.12 | $14.19 | $65.00 | $390.00 | 0.11 | 946.08 | $127.72 | 3.05 |
| 611 | | 1200 | 4 | 1 | 1x1 Recessed, (1) 60w A19 Lamps | 60 | 0.24 | 288.0 | $38.88 | 4 | 1 | Energy Star Rated, Dimmable 13w CFL Lamp | 13 | 0.05 | 62.4 | $8.42 | $20.00 | $80.00 | 0.19 | 225.6 | $30.46 | 2.63 |
| 211.11 | Men's Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 211.11 | B123 Custodial Closet | 1200 | 1 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.03 | 39.6 | $5.35 | 1 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.03 | 33.6 | $4.54 | $7.00 | $7.00 | 0.01 | 6 | $0.81 | 8.64 |
| 221.31 | B121 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series | 62 | 0.93 | 2,418.0 | $326.43 | 15 | 2 | Relamp - Sylvania Lamp | 56 | 0.84 | 2184 | $294.84 | $14.00 | $210.00 | 0.09 | 234 | $31.59 | 6.65 |
| 221.31 | E113 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2,418.0 | $326.43 | 15 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.84 | 2184 | $294.84 | $14.00 | $210.00 | 0.09 | 234 | $31.59 | 6.65 |
| 222.21 | B Corridor | 4400 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series | 62 | 0.74 | 3,273.6 | $441.94 | 12 | 2 | Relamp - Sylvania Lamp | 56 | 0.67 | 2956.8 | $399.17 | $14.00 | $168.00 | 0.07 | 316.8 | $42.77 | 3.93 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 221.31 | B119 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2,418.0 | $326.43 | 15 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.84 | 2184 | $294.84 | $14.00 | $210.00 | 0.09 | 234 | $31.59 | 6.65 |
| 221.31 | B117 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2,418.0 | $326.43 | 15 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.84 | 2184 | $294.84 | $14.00 | $210.00 | 0.09 | 234 | $31.59 | 6.65 |
| 221.31 | B115 Classroom | 2600 | 21 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.30 | 3,385.2 | $457.00 | 21 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.18 | 3057.6 | $412.78 | $14.00 | $294.00 | 0.13 | 327.6 | $44.23 | 6.65 |
| 221.14 | B109 Elec. Room | 1200 | 14 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.81 | 974.4 | $131.54 | 14 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.78 | 940.8 | $127.01 | $14.00 | $196.00 | 0.03 | 33.6 | $4.54 | 43.21 |
| 221.31 | Faculty | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.99 | 2,579.2 | $348.19 | 16 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.90 | 2329.6 | $314.50 | $14.00 | $224.00 | 0.10 | 249.6 | $33.70 | 6.65 |
| 211.11 | Faculty Restroom | 1200 | 6 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.20 | 237.6 | $32.08 | 6 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.17 | 201.6 | $27.22 | $7.00 | $42.00 | 0.03 | 36 | $4.86 | 8.64 |
| 221.14 | B104 Elec. Room | 1200 | 4 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.23 | 278.4 | $37.58 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 268.8 | $36.29 | $14.00 | $56.00 | 0.01 | 9.6 | $1.30 | 43.21 |
| 221.31 | B106 Classroom | 2600 | 25 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.55 | 4,030.0 | $544.05 | 25 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.40 | 3640 | $491.40 | $14.00 | $350.00 | 0.15 | 390 | $52.65 | 6.65 |
| 221.14 | B108 School Store | 2600 | 5 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.29 | 754.0 | $101.79 | 5 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.28 | 728 | $98.28 | $14.00 | $70.00 | 0.01 | 26 | $3.51 | 19.94 |
| 211.11 | Women's Restroom | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.23 | 603.2 | $81.43 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.01 | 20.8 | $2.81 | 19.94 |
| 222.21 | Corridor F | 4400 | 9 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.56 | 2,455.2 | $331.45 | 9 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.50 | 2217.6 | $299.38 | $14.00 | $126.00 | 0.05 | 237.6 | $32.08 | 3.93 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 1 | LED Exit Sign | 2 | 0.00 | 17.52 | $2.37 | $65.00 | $65.00 | 0.02 | 157.68 | $21.29 | 3.05 |
| 222.21 | F110 Classroom | 2600 | 21 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.30 | 3,385.2 | $457.00 | 21 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.18 | 3057.6 | $412.78 | $14.00 | $294.00 | 0.13 | 327.6 | $44.23 | 6.65 |
| 221.31 | F108 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 221.31 | F106 Classroom | 2600 | 27 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.67 | 4,352.4 | $587.57 | 27 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.51 | 3931.2 | $530.71 | $14.00 | $378.00 | 0.16 | 421.2 | $56.86 | 6.65 |
| 221.31 | F105 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.49 | 3,868.8 | $522.29 | 24 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.34 | 3494.4 | $471.74 | $14.00 | $336.00 | 0.14 | 374.4 | $50.54 | 6.65 |
| 221.31 | F104 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.49 | 3,868.8 | $522.29 | 24 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.34 | 3494.4 | $471.74 | $14.00 | $336.00 | 0.14 | 374.4 | $50.54 | 6.65 |
| 221.31 | F103 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.49 | 3,868.8 | $522.29 | 24 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.34 | 3494.4 | $471.74 | $14.00 | $336.00 | 0.14 | 374.4 | $50.54 | 6.65 |
| 221.31 | F101 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |
| 222.21 | Corridor G | 4400 | 40 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 2.48 | 10,912.0 | $1,473.12 | 40 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 2.24 | 9856 | $1,330.56 | $14.00 | $560.00 | 0.24 | 1056 | $142.56 | 3.93 |
| 601 | | 8760 | 8 | 2 | (2) 7w CFL Exit Sign | 16 | 0.13 | 1,121.3 | $151.37 | 8 | 1 | LED Exit Sign | 2 | 0.02 | 140.16 | $18.92 | $65.00 | $520.00 | 0.11 | 981.12 | $132.45 | 3.93 |
| 222.21 | G101 Classroom | 2600 | 28 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.74 | 4,513.6 | $609.34 | 28 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.57 | 4076.8 | $550.37 | $14.00 | $392.00 | 0.17 | 436.8 | $58.97 | 6.65 |
| 601 | | 8760 | 3 | 2 | (2) 7w CFL Exit Sign | 16 | 0.05 | 420.5 | $56.76 | 3 | 1 | LED Exit Sign | 2 | 0.01 | 52.56 | $7.10 | $65.00 | $195.00 | 0.04 | 367.92 | $49.67 | 3.93 |
| 222.11 | G100 Elec. Closet | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Indirect | 58 | 0.12 | 139.2 | $18.79 | 2 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | G102 Classroom | 2600 | 28 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.74 | 4,513.6 | $609.34 | 28 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.57 | 4076.8 | $550.37 | $14.00 | $392.00 | 0.17 | 436.8 | $58.97 | 6.65 |
| 601 | | 8760 | 3 | 2 | (2) 7w CFL Exit Sign | 16 | 0.05 | 420.5 | $56.76 | 3 | 1 | LED Exit Sign | 2 | 0.01 | 52.56 | $7.10 | $65.00 | $195.00 | 0.04 | 367.92 | $49.67 | 3.93 |
| 232.22 | G104 Classroom | 2600 | 8 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens | 86 | 0.69 | 1,788.8 | $241.49 | 8 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 0.67 | 1747.2 | $235.87 | $21.00 | $168.00 | 0.02 | 41.6 | $5.62 | 29.91 |
| 222.21 | G103 Classroom | 2600 | 20 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.24 | 3,224.0 | $435.24 | 20 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.12 | 2912 | $393.12 | $14.00 | $280.00 | 0.12 | 312 | $42.12 | 6.65 |
| 222.21 | G106 Classroom | 2600 | 20 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.24 | 3,224.0 | $435.24 | 20 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.12 | 2912 | $393.12 | $14.00 | $280.00 | 0.12 | 312 | $42.12 | 6.65 |
| 227.211 | Girls' Restroom | 2600 | 6 | 2 | 2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 34 | 0.20 | 530.4 | $71.60 | 6 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222.21 | G108 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 227.211 | Boys' Restroom | 2600 | 6 | 2 | 2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 34 | 0.20 | 530.4 | $71.60 | 6 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | G111 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 34 | 0.41 | 1,060.8 | $143.21 | 12 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | G110 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 222.21 | G112 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 222.21 | G113 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 222.21 | G115 VP Office | 2600 | 8 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.50 | 1,289.6 | $174.10 | 8 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.45 | 1164.8 | $157.25 | $14.00 | $112.00 | 0.05 | 124.8 | $16.85 | 6.65 |
| 222.21 | C100-G | 2600 | 8 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.50 | 1,289.6 | $174.10 | 8 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.45 | 1164.8 | $157.25 | $14.00 | $112.00 | 0.05 | 124.8 | $16.85 | 6.65 |
| 222.21 | C100 Media Center | 2600 | 134 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 8.31 | 21,600.8 | $2,916.11 | 134 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 7.50 | 19510.4 | $2,633.90 | $14.00 | $1,876.00 | 0.80 | 2090.4 | $282.20 | 6.65 |
| 601 | | 8760 | 3 | 2 | (2) 7w CFL Exit Sign | 16 | 0.05 | 420.5 | $56.76 | 3 | 1 | LED Exit Sign | 2 | 0.01 | 52.56 | $7.10 | $65.00 | $195.00 | 0.04 | 367.92 | $49.67 | 3.93 |
| 221.31 | | 2600 | 89 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 5.52 | 14,346.8 | $1,936.82 | 89 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 4.98 | 12958.4 | $1,749.38 | $14.00 | $1,246.00 | 0.53 | 1388.4 | $187.43 | 6.65 |
| 555 | | 2600 | 10 | 1 | Recessed Down Light, 50w R20 Lamp | 50 | 0.50 | 1,300.0 | $175.50 | 10 | 1 | 18w PAR20 CFL Lamp | 18 | 0.18 | 468 | $63.18 | $20.00 | $200.00 | 0.32 | 832 | $112.32 | 1.78 |
| 222.21 | Periodicals | 2600 | 5 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.31 | 806.0 | $108.81 | 5 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.28 | 728 | $98.28 | $14.00 | $70.00 | 0.03 | 78 | $10.53 | 6.65 |
| 221.31 | | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 222.21 | Library Office | 2600 | 5 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.31 | 806.0 | $108.81 | 5 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.28 | 728 | $98.28 | $14.00 | $70.00 | 0.03 | 78 | $10.53 | 6.65 |
| 232.22 | Library Staff | 2600 | 10 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens | 86 | 0.86 | 2,236.0 | $301.86 | 10 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 0.84 | 2184 | $294.84 | $21.00 | $210.00 | 0.02 | 52 | $7.02 | 29.91 |
| 222.21 | Supervisor Special Services Office | 2600 | 7 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.43 | 1,128.4 | $152.33 | 7 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.39 | 1019.2 | $137.59 | $14.00 | $98.00 | 0.04 | 109.2 | $14.74 | 6.65 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 222.21 | Library Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 222.21 | C-100-C TV | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 222.21 | C Corridor | 4400 | 17 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.05 | 4,637.6 | $626.08 | 17 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.95 | 4188.8 | $565.49 | $14.00 | $238.00 | 0.10 | 448.8 | $60.59 | 3.93 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 222.21 | C102 Office | 2600 | 4 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 222.21 | C104 Office | 2600 | 4 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.25 | 644.8 | $87.05 | 4 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.22 | 582.4 | $78.62 | $14.00 | $56.00 | 0.02 | 62.4 | $8.42 | 6.65 |
| 222.21 | F Corridor | 4400 | 18 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.12 | 4,910.4 | $662.90 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 4435.2 | $598.75 | $14.00 | $252.00 | 0.11 | 475.2 | $64.15 | 3.93 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 222.21 | E Corridor | 4400 | 15 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.93 | 4,092.0 | $552.42 | 15 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.84 | 3696 | $498.96 | $14.00 | $210.00 | 0.09 | 396 | $53.46 | 3.93 |
| 602 | | 8760 | 2 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.12 | 1,086.2 | $146.64 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 981.12 | $132.45 | $14.00 | $28.00 | 0.01 | 105.12 | $14.19 | 1.97 |
| 222.21 | D Corridor | 4400 | 7 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.43 | 1,909.6 | $257.80 | 7 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.39 | 1724.8 | $232.85 | $14.00 | $98.00 | 0.04 | 184.8 | $24.95 | 3.93 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 222.21 | F128 Classroom | 2600 | 18 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.12 | 2,901.6 | $391.72 | 18 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.01 | 2620.8 | $353.81 | $14.00 | $252.00 | 0.11 | 280.8 | $37.91 | 6.65 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 1 | LED Exit Sign | 2 | 0.00 | 17.52 | $2.37 | $65.00 | $65.00 | 0.02 | 157.68 | $21.29 | 3.05 |
| 222.21 | F126 Classroom | 2600 | 6 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.37 | 967.2 | $130.57 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 873.6 | $117.94 | $14.00 | $84.00 | 0.04 | 93.6 | $12.64 | 6.65 |
| 222.21 | F124 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.74 | 1,934.4 | $261.14 | 12 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.67 | 1747.2 | $235.87 | $14.00 | $168.00 | 0.07 | 187.2 | $25.27 | 6.65 |
| 232.21 | F120 Cafeteria | 2600 | 34 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 2.92 | 7,602.4 | $1,026.32 | 34 | 3 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 84 | 2.86 | 7425.6 | $1,002.46 | $21.00 | $714.00 | 0.07 | 176.8 | $23.87 | 29.91 |
| 602 | | 8760 | 4 | 2 | Incandescent Exit Sign | 20 | 0.08 | 700.8 | $94.61 | 4 | 1 | LED Exit Sign | 2 | 0.01 | 70.08 | $9.46 | $65.00 | $260.00 | 0.07 | 630.72 | $85.15 | 3.05 |
| 222.11 | Kitchen | 2600 | 32 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Indirect | 58 | 1.86 | 4,825.6 | $651.46 | 32 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 1 | LED Exit Sign | 2 | 0.00 | 17.52 | $2.37 | $65.00 | $65.00 | 0.02 | 157.68 | $21.29 | 3.05 |
| 612 | Compressor Room | 1200 | 2 | 1 | Pendant Mnt., 100w A19 Lamp | 100 | 0.20 | 240.0 | $32.40 | 2 | 1 | (1) 26w CFL Lamp | 26 | 0.05 | 62.4 | $8.42 | $20.00 | $40.00 | 0.15 | 177.6 | $23.98 | 1.67 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.31 | F114 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.49 | 3,868.8 | $522.29 | 24 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.34 | 3494.4 | $471.74 | $14.00 | $336.00 | 0.14 | 374.4 | $50.54 | 6.65 |
| 221.31 | F112 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.49 | 3,868.8 | $522.29 | 24 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.34 | 3494.4 | $471.74 | $14.00 | $336.00 | 0.14 | 374.4 | $50.54 | 6.65 |
| 222.21 | F111 Classroom | 2600 | 24 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.49 | 3,868.8 | $522.29 | 24 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.34 | 3494.4 | $471.74 | $14.00 | $336.00 | 0.14 | 374.4 | $50.54 | 6.65 |
| 211.14 | C101 Elec. Closet | 1200 | 18 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.59 | 712.8 | $96.23 | 18 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.50 | 604.8 | $81.65 | $7.00 | $126.00 | 0.09 | 108 | $14.58 | 8.64 |
| 770 | Gym | 2600 | 48 | 1 | 400w MH, Prismatic Lens | 465 | 22.32 | 58,032.0 | $7,834.32 | 48 | 6 | 2x4 54w T5HO 6 Lamp w/Reflecter | 354 | 16.99 | 44179.2 | $5,964.19 | $240.00 | $11,520.00 | 5.33 | 13852.8 | $1,870.13 | 6.16 |
| 602 | | 8760 | 5 | 2 | Incandescent Exit Sign | 20 | 0.10 | 876.0 | $118.26 | 5 | 1 | LED Exit Sign | 2 | 0.01 | 87.6 | $11.83 | $65.00 | $325.00 | 0.09 | 788.4 | $106.43 | 3.05 |
| 211.11 | | 2600 | 4 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.13 | 343.2 | $46.33 | 4 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.11 | 291.2 | $39.31 | $7.00 | $28.00 | 0.02 | 52 | $7.02 | 3.99 |
| 221.14 | Locker Room Stairs (2) | 4400 | 6 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.35 | 1,531.2 | $206.71 | 6 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.34 | 1478.4 | $199.58 | $14.00 | $84.00 | 0.01 | 52.8 | $7.13 | 11.78 |
| 221.14 | Locker Room | 2600 | 34 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 1.97 | 5,127.2 | $692.17 | 34 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.90 | 4950.4 | $668.30 | $14.00 | $476.00 | 0.07 | 176.8 | $23.87 | 19.94 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 613 | | 2600 | 9 | 1 | Industrial Fixture, 100w A19 Lamp | 100 | 0.90 | 2,340.0 | $315.90 | 9 | 1 | (1) 26w CFL Lamp | 26 | 0.23 | 608.4 | $82.13 | $20.00 | $180.00 | 0.67 | 1731.6 | $233.77 | 0.77 |
| 211.14 | Gym Office | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.10 | 257.4 | $34.75 | 3 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.08 | 218.4 | $29.48 | $7.00 | $21.00 | 0.02 | 39 | $5.27 | 3.99 |
| 211.14 | Gym Storage (2) | 1200 | 28 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.92 | 1,108.8 | $149.69 | 28 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.78 | 940.8 | $127.01 | $7.00 | $196.00 | 0.14 | 168 | $22.68 | 8.64 |
| 211.11 | Boys' Restroom | 2600 | 5 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.17 | 429.0 | $57.92 | 5 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.14 | 364 | $49.14 | $7.00 | $35.00 | 0.03 | 65 | $8.78 | 3.99 |
| 211.11 | Girls' Restroom | 2600 | 5 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.17 | 429.0 | $57.92 | 5 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.14 | 364 | $49.14 | $7.00 | $35.00 | 0.03 | 65 | $8.78 | 3.99 |
| 221.14 | D101 Classroom | 2600 | 34 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 1.97 | 5,127.2 | $692.17 | 34 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.90 | 4950.4 | $668.30 | $14.00 | $476.00 | 0.07 | 176.8 | $23.87 | 19.94 |
| 221.14 | D103 Classroom | 2600 | 34 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 1.97 | 5,127.2 | $692.17 | 34 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.90 | 4950.4 | $668.30 | $14.00 | $476.00 | 0.07 | 176.8 | $23.87 | 19.94 |
| 221.14 | D105 Classroom | 2600 | 42 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 2.44 | 6,333.6 | $855.04 | 42 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 2.35 | 6115.2 | $825.55 | $14.00 | $588.00 | 0.08 | 218.4 | $29.48 | 19.94 |
| 766 | Aux Gym | 2600 | 12 | 1 | 400w MH, Prismatic Lens | 465 | 5.58 | 14,508.0 | $1,958.58 | 12 | 4 | 2x4 54w T5HO 4 Lamp w/Reflective Lens, Wire Cage | 236 | 2.83 | 7363.2 | $994.03 | $240.00 | $2,880.00 | 2.75 | 7144.8 | $964.55 | 2.99 |
| 222.21 | AD Office | 2600 | 10 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.62 | 1,612.0 | $217.62 | 10 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.56 | 1456 | $196.56 | $14.00 | $140.00 | 0.06 | 156 | $21.06 | 6.65 |

# Investment Grade Lighting Audit

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221.34 | Boys' Team Room | 2600 | 21 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 1.22 | 3,166.8 | $427.52 | 21 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 1.18 | 3057.6 | $412.78 | $14.00 | $294.00 | 0.04 | 109.2 | $14.74 | 19.94 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 1 | LED Exit Sign | 2 | 0.00 | 17.52 | $2.37 | $65.00 | $65.00 | 0.02 | 157.68 | $21.29 | 3.05 |
| 221.34 | Athletic Trainer | 2600 | 5 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.29 | 754.0 | $101.79 | 5 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.28 | 728 | $98.28 | $14.00 | $70.00 | 0.01 | 26 | $3.51 | 19.94 |
| 221.34 | Girls' Team Room | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.93 | 2,412.8 | $325.73 | 16 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.90 | 2329.6 | $314.50 | $14.00 | $224.00 | 0.03 | 83.2 | $11.23 | 19.94 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 1 | LED Exit Sign | 2 | 0.00 | 17.52 | $2.37 | $65.00 | $65.00 | 0.02 | 157.68 | $21.29 | 3.05 |
| 227.21 | Weight Room Hall | 2600 | 6 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.39 | 1,014.0 | $136.89 | 6 | 2 | Sylvania Lamp FBO30/841XP/6//SS/ECO | 49 | 0.29 | 764.4 | $103.19 | $24.00 | $144.00 | 0.10 | 249.6 | $33.70 | 4.27 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.04 | 315.36 | $42.57 | 3.05 |
| 242.31 | Weight Room | 2600 | 18 | 4 | 2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic | 107 | 1.93 | 5,007.6 | $676.03 | 18 | 4 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 112 | 2.02 | 5241.6 | $707.62 | $28.00 | $504.00 | -0.09 | -234 | -$31.59 | -15.95 |
| 601 | | 8760 | 2 | 2 | (2) 7w CFL Exit Sign | 16 | 0.03 | 280.3 | $37.84 | 2 | 1 | LED Exit Sign | 2 | 0.00 | 35.04 | $4.73 | $65.00 | $130.00 | 0.03 | 245.28 | $33.11 | 3.93 |
| 211.14 | Maintenance | 2600 | 19 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.63 | 1,630.2 | $220.08 | 19 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.53 | 1383.2 | $186.73 | $7.00 | $133.00 | 0.10 | 247 | $33.35 | 3.99 |
| 221.41 | Maintenance Restroom | 1200 | 1 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic | 58 | 0.06 | 69.6 | $9.40 | 1 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.06 | 67.2 | $9.07 | $14.00 | $14.00 | 0.00 | 2.4 | $0.32 | 43.21 |
| 222.21 | Maintenance Office | 2600 | 1 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed | 62 | 0.06 | 161.2 | $21.76 | 1 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.06 | 145.6 | $19.66 | $14.00 | $14.00 | 0.01 | 15.6 | $2.11 | 6.65 |
| 221.14 | Maintenance Office | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No | 58 | 0.12 | 301.6 | $40.72 | 2 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.11 | 291.2 | $39.31 | $14.00 | $28.00 | 0.00 | 10.4 | $1.40 | 19.94 |
| 221.34 | Boiler Room | 4400 | 15 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.87 | 3,828.0 | $516.78 | 15 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.84 | 3696 | $498.96 | $14.00 | $210.00 | 0.03 | 132 | $17.82 | 11.78 |
| 221.34 | Electrical Room | 1200 | 8 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.46 | 556.8 | $75.17 | 8 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 0.45 | 537.6 | $72.58 | $14.00 | $112.00 | 0.02 | 19.2 | $2.59 | 43.21 |
| 221.31 | C103 Band | 2600 | 49 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 3.04 | 7,898.8 | $1,066.34 | 49 | 2 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 56 | 2.74 | 7134.4 | $963.14 | $14.00 | $686.00 | 0.29 | 764.4 | $103.19 | 6.65 |
| 211.11 | C103 Storage | 1200 | 18 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.59 | 712.8 | $96.23 | 18 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.50 | 604.8 | $81.65 | $7.00 | $126.00 | 0.09 | 108 | $14.58 | 8.64 |
| 211.11 | Maintenance Storage | 2600 | 21 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.69 | 1,801.8 | $243.24 | 21 | 1 | Relamp - Sylvania Lamp FO28/841/SS/ECO | 28 | 0.59 | 1528.8 | $206.39 | $7.00 | $147.00 | 0.11 | 273 | $36.86 | 3.99 |
| 750 | Exterior | 4400 | 29 | 1 | 250w HPS Wallpack | 295 | 8.56 | 37,642.0 | $5,081.67 | 29 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 710 | | 4400 | 4 | 1 | 100w HPS Wallpack | 125 | 0.50 | 2,200.0 | $297.00 | 4 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 725 | | 4400 | 22 | 1 | 150w HPS Wallpack | 188 | 4.14 | 18,198.4 | $2,456.78 | 22 | 0 | No Change | 0 | 0.00 | 0 | $0.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 767 | | 4400 | 12 | 1 | 400w Probe Start MH "Shoebox" Parking Lot Light | 460 | 5.52 | 24,288.0 | $3,278.88 | 12 | 1 | Venture Lighting Optiwave Ballast V90U7421K and 320w MH Lamp | 349 | 4.19 | 18427.2 | $2,487.67 | $240.00 | $2,880.00 | 1.33 | 5860.8 | $791.21 | 3.64 |
| | **Totals** | | 2,898 | 456 | | | 226.11 | 620,580 | $83,778 | 2,898 | 418 | | | 163.6 | 447,934 | $60,471 | | $57,752 | 25.8 | 77,844 | $10,509 | 5.50 |

**CEG Job #:** 9C10098
**Project:** Highland High School
**Address:** 450 Erial Road
Blackwood, NJ 08012
**Building SF:** 220,065

Highland High School

**KWH COST:** $0.135

## ECM #2: Lighting Controls

not rebate eligible

| EXISTING LIGHTING | | | | | | | | | | PROPOSED LIGHTING CONTROLS | | | | SAVINGS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CEG Type | Fixture Location | Yearly Usage | No. Fixts | No. Lamps | Fixture Type | Fixt Watts | Total kW | kWh/Yr Fixtures | Yearly $ Cost | No. Fixts | No. Cont. | Controls Description | | Watts Used | Total kW | Reduction (%) | kWh/Yr Fixtures | Yearly $ Cost | Unit Cost (INSTALLED) | Total Cost | kW Savings | kWh/Yr Savings | Yearly $ Savings | Yearly Simple Payback |
| 221.11 | B217 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | B215 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | B213 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 211.11 | B211 Faculty | 2600 | 16 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.528 | 1372.8 | $185.33 | 16 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 33 | 0.42 | 20% | 1098.24 | $148.26 | $300.00 | $300.00 | 0.11 | 274.56 | $37.07 | 8.09 |
| 211.11 | B211 Faculty Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 211.11 | B209 Faculty Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 221.11 | B207 Classroom | 2600 | 12 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |
| 221.11 | B205 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | B203 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 211.11 | Boys' Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 227.21 | | 2600 | 1 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.065 | 169 | $22.82 | 1 | 0 | No Change | | 65 | 0.07 | 0% | 169 | $22.82 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | B Corridor | 4400 | 14 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.868 | 3819.2 | $515.59 | 14 | 0 | No Change | | 62 | 0.87 | 0% | 3819.2 | $515.59 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.21 | F Corridor | 4400 | 10 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens | 58 | 0.58 | 2552 | $344.52 | 10 | 0 | No Change | | 58 | 0.58 | 0% | 2552 | $344.52 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 3 | 2 | Incandescent Exit Sign | 20 | 0.06 | 525.6 | $70.96 | 3 | 0 | No Change | | 20 | 0.06 | 0% | 525.6 | $70.96 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

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| 221.11 | F212 Classroom | 2600 | 30 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.86 | 4836 | $652.86 | 30 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.49 | 20% | 3868.8 | $522.29 | $300.00 | $600.00 | 0.37 | 967.2 | $130.57 | 4.60 |
| 221.14 | F210 Science Department | 2600 | 7 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.406 | 1055.6 | $142.51 | 7 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 58 | 0.32 | 20% | 844.48 | $114.00 | $250.00 | $250.00 | 0.08 | 211.12 | $28.50 | 8.77 |
| 221.11 | F208 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.14 | F206 Prep Room | 2600 | 7 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.406 | 1055.6 | $142.51 | 7 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 58 | 0.32 | 20% | 844.48 | $114.00 | $250.00 | $250.00 | 0.08 | 211.12 | $28.50 | 8.77 |
| 221.11 | F204 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | F200 Classroom | 2600 | 33 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 2.046 | 5319.6 | $718.15 | 33 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.64 | 20% | 4255.68 | $574.52 | $300.00 | $600.00 | 0.41 | 1063.92 | $143.63 | 4.18 |
| 221.11 | F201 Storage | 1200 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.372 | 446.4 | $60.26 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 62 | 0.30 | 20% | 357.12 | $48.21 | $150.00 | $150.00 | 0.07 | 89.28 | $12.05 | 12.45 |
| 221.11 | F203 Classroom | 2600 | 33 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 2.046 | 5319.6 | $718.15 | 33 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.64 | 20% | 4255.68 | $574.52 | $300.00 | $600.00 | 0.41 | 1063.92 | $143.63 | 4.18 |
| 221.11 | F207 Classroom | 2600 | 30 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.86 | 4836 | $652.86 | 30 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.49 | 20% | 3868.8 | $522.29 | $300.00 | $600.00 | 0.37 | 967.2 | $130.57 | 4.60 |
| 221.14 | F211 Electrical Room | 1200 | 5 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.29 | 348 | $46.98 | 5 | 0 | No Change | | 58 | 0.29 | 0% | 348 | $46.98 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | A200 Custodial Closet | 1200 | 1 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.058 | 69.6 | $9.40 | 1 | 0 | No Change | | 58 | 0.06 | 0% | 69.6 | $9.40 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.11 | A200 Girls' Restroom | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.186 | 483.6 | $65.29 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 62 | 0.15 | 20% | 386.88 | $52.23 | $150.00 | $150.00 | 0.04 | 96.72 | $13.06 | 11.49 |
| 221.11 | A204 Classroom | 2600 | 21 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.302 | 3385.2 | $457.00 | 21 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.04 | 20% | 2708.16 | $365.60 | $300.00 | $300.00 | 0.26 | 677.04 | $91.40 | 3.28 |
| 221.11 | A201 Year Book Office | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 221.11 | A206 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 221.11 | Men's Restroom | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.124 | 322.4 | $43.52 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 62 | 0.10 | 20% | 257.92 | $34.82 | $150.00 | $150.00 | 0.02 | 64.48 | $8.70 | 17.23 |
| 221.11 | A208 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |

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| 221.11 | A210 Special Services | 2600 | 27 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.674 | 4352.4 | $587.57 | 27 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.34 | 20% | 3481.92 | $470.06 | $300.00 | $300.00 | 0.33 | 870.48 | $117.51 | 2.55 |
| 121.14 | A212 Storage Closet | 1200 | 1 | 2 | 1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens | 78 | 0.078 | 93.6 | $12.64 | 1 | 0 | No Change | | 78 | 0.08 | 0% | 93.6 | $12.64 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.11 | A214 VP Office | 2600 | 8 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.496 | 1289.6 | $174.10 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.40 | 20% | 1031.68 | $139.28 | $250.00 | $250.00 | 0.10 | 257.92 | $34.82 | 7.18 |
| 222.21 | A207 Balcony | 1200 | 3 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.186 | 223.2 | $30.13 | 3 | 0 | No Change | | 62 | 0.19 | 0% | 223.2 | $30.13 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.11 | Women's Restroom | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.124 | 322.4 | $43.52 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 62 | 0.10 | 20% | 257.92 | $34.82 | $150.00 | $150.00 | 0.02 | 64.48 | $8.70 | 17.23 |
| 222.21 | A Corridor | 4400 | 14 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.868 | 3819.2 | $515.59 | 14 | 0 | No Change | | 62 | 0.87 | 0% | 3819.2 | $515.59 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 3 | 2 | Incandescent Exit Sign | 20 | 0.06 | 525.6 | $70.96 | 3 | 0 | No Change | | 20 | 0.06 | 0% | 525.6 | $70.96 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.11 | A216 Classroom | 2600 | 27 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.674 | 4352.4 | $587.57 | 27 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.34 | 20% | 3481.92 | $470.06 | $300.00 | $300.00 | 0.33 | 870.48 | $117.51 | 2.55 |
| 211.11 | Boys' Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 222.21 | E Corridor | 4400 | 7 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.434 | 1909.6 | $257.80 | 7 | 0 | No Change | | 62 | 0.43 | 0% | 1909.6 | $257.80 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8790 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 351.6 | $47.47 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 351.6 | $47.47 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.11 | A220 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.14 | E201 World Languages | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.174 | 452.4 | $61.07 | 3 | 0 | No Change | | 58 | 0.17 | 0% | 452.4 | $61.07 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.11 | E203 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | E200 Book Room | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.372 | 967.2 | $130.57 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.30 | 20% | 773.76 | $104.46 | $150.00 | $150.00 | 0.07 | 193.44 | $26.11 | 5.74 |
| 221.11 | E202 Classroom | 2600 | 20 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.24 | 3224 | $435.24 | 20 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.99 | 20% | 2579.2 | $348.19 | $300.00 | $300.00 | 0.25 | 644.8 | $87.05 | 3.45 |
| 221.11 | E205 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | E206 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |

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| 221.11 | E207 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | E208 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 221.11 | E209 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | E210 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.14 | E213 Book Room | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.116 | 301.6 | $40.72 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.09 | 20% | 241.28 | $32.57 | $150.00 | $150.00 | 0.02 | 60.32 | $8.14 | 18.42 |
| 221.11 | B223 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.11 | E212 Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 62 | 0.372 | 967.2 | $130.57 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.30 | 20% | 773.76 | $104.46 | $150.00 | $150.00 | 0.07 | 193.44 | $26.11 | 5.74 |
| 211.11 | CustodialCloset | 1200 | 1 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.033 | 39.6 | $5.35 | 1 | 0 | No Change | | 33 | 0.03 | 0% | 39.6 | $5.35 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Girls' Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 211.11 | Stairwell D1 | 4400 | 8 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.264 | 1161.6 | $156.82 | 8 | 0 | No Change | | 33 | 0.26 | 0% | 1161.6 | $156.82 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 613 | Mech. Room B212 | 1200 | 2 | 1 | Industrial Fixture, 100w A19 Lamp | 100 | 0.2 | 240 | $32.40 | 2 | 0 | No Change | | 100 | 0.20 | 0% | 240 | $32.40 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 613 | B208 Mech. Room | 1200 | 2 | 1 | Industrial Fixture, 100w A19 Lamp | 100 | 0.2 | 240 | $32.40 | 2 | 0 | No Change | | 100 | 0.20 | 0% | 240 | $32.40 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Stairwell Near Elevator | 4400 | 3 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.186 | 818.4 | $110.48 | 3 | 0 | No Change | | 62 | 0.19 | 0% | 818.4 | $110.48 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 0 | No Change | | 20 | 0.02 | 0% | 175.2 | $23.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Stairwell A2 | 4400 | 8 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.264 | 1161.6 | $156.82 | 8 | 0 | No Change | | 33 | 0.26 | 0% | 1161.6 | $156.82 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Stairwell A4 | 4400 | 8 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.264 | 1161.6 | $156.82 | 8 | 0 | No Change | | 33 | 0.26 | 0% | 1161.6 | $156.82 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | A128 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.14 | E101 Office | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.174 | 452.4 | $61.07 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.14 | 20% | 361.92 | $48.86 | $150.00 | $150.00 | 0.03 | 90.48 | $12.21 | 12.28 |
| 221.31 | E103 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |

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| 221.31 | E105 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.31 | E107 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.31 | E109 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.14 | E111 Book Room | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.174 | 452.4 | $61.07 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.14 | 20% | 361.92 | $48.86 | $150.00 | $150.00 | 0.03 | 90.48 | $12.21 | 12.28 |
| 221.31 | B127 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 222.21 | B Corridor | 4400 | 8 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.496 | 2182.4 | $294.62 | 8 | 0 | No Change | | 62 | 0.50 | 0% | 2182.4 | $294.62 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | E112 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 221.31 | E110 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 221.31 | E108 VP Office | 2600 | 9 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.558 | 1450.8 | $195.86 | 9 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.45 | 20% | 1160.64 | $156.69 | $250.00 | $250.00 | 0.11 | 290.16 | $39.17 | 6.38 |
| 221.31 | E106 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 232.21 | E104 Classroom | 2600 | 12 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 1.032 | 2683.2 | $362.23 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 86 | 0.83 | 20% | 2146.56 | $289.79 | $300.00 | $300.00 | 0.21 | 536.64 | $72.45 | 4.14 |
| 227.21 | | 2600 | 4 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.26 | 676 | $91.26 | 4 | 0 | No Change | | 65 | 0.26 | 0% | 676 | $91.26 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Women's Restroom | 2600 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.066 | 171.6 | $23.17 | 2 | 0 | No Change | | 33 | 0.07 | 0% | 171.6 | $23.17 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 105 | A Corridor Display Case | 4400 | 5 | 2 | 3' Channel, 2-Lamp, 30w T12, Mag. Ballast, Surface Mnt., No Lens | 60 | 0.3 | 1320 | $178.20 | 5 | 0 | No Change | | 60 | 0.30 | 0% | 1320 | $178.20 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | A127 Classroom | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.992 | 2579.2 | $348.19 | 16 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.79 | 20% | 2063.36 | $278.55 | $300.00 | $300.00 | 0.20 | 515.84 | $69.64 | 4.31 |
| 232.21 | | 2600 | 1 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.086 | 223.6 | $30.19 | 1 | 0 | No Change | | 86 | 0.09 | 0% | 223.6 | $30.19 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 232.21 | A125 Resource Officer | 2600 | 2 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.172 | 447.2 | $60.37 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 86 | 0.14 | 20% | 357.76 | $48.30 | $150.00 | $150.00 | 0.03 | 89.44 | $12.07 | 12.42 |

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| 232.21 | A123 Conference Room | 2600 | 2 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.172 | 447.2 | $60.37 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 86 | 0.14 | 20% | 357.76 | $48.30 | $150.00 | $150.00 | 0.03 | 89.44 | $12.07 | 12.42 |
| 221.31 | A121 Classroom | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.992 | 2579.2 | $348.19 | 16 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.79 | 20% | 2063.36 | $278.55 | $300.00 | $300.00 | 0.20 | 515.84 | $69.64 | 4.31 |
| 232.21 | | 2600 | 1 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 0.086 | 223.6 | $30.19 | 1 | 0 | No Change | | 86 | 0.09 | 0% | 223.6 | $30.19 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | A119 Elec. Room | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.116 | 139.2 | $18.79 | 2 | 0 | No Change | | 58 | 0.12 | 0% | 139.2 | $18.79 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | A117 Men's Restroom | 2600 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.066 | 171.6 | $23.17 | 2 | 0 | No Change | | 33 | 0.07 | 0% | 171.6 | $23.17 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | A115 Closet | 1200 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.066 | 79.2 | $10.69 | 2 | 0 | No Change | | 33 | 0.07 | 0% | 79.2 | $10.69 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Women's Restroom | 2600 | 2 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.066 | 171.6 | $23.17 | 2 | 0 | No Change | | 33 | 0.07 | 0% | 171.6 | $23.17 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | A109 Elec. Room | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.116 | 139.2 | $18.79 | 2 | 0 | No Change | | 58 | 0.12 | 0% | 139.2 | $18.79 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | A107 Office | 2600 | 3 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.174 | 452.4 | $61.07 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.14 | 20% | 361.92 | $48.86 | $150.00 | $150.00 | 0.03 | 90.48 | $12.21 | 12.28 |
| 221.31 | A105 Classroom | 2600 | 28 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.736 | 4513.6 | $609.34 | 28 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 1.39 | 20% | 3610.88 | $487.47 | $300.00 | $600.00 | 0.35 | 902.72 | $121.87 | 4.92 |
| 221.31 | A105 Storage | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.124 | 148.8 | $20.09 | 2 | 0 | No Change | | 62 | 0.12 | 0% | 148.8 | $20.09 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | A103 Storage/Elec. Room | 1200 | 4 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.232 | 278.4 | $37.58 | 4 | 0 | No Change | | 58 | 0.23 | 0% | 278.4 | $37.58 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | A100 Classroom | 2600 | 9 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.558 | 1450.8 | $195.86 | 9 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.45 | 20% | 1160.64 | $156.69 | $250.00 | $250.00 | 0.11 | 290.16 | $39.17 | 6.38 |
| 221.14 | A102 Custodian Closet | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.116 | 139.2 | $18.79 | 2 | 0 | No Change | | 58 | 0.12 | 0% | 139.2 | $18.79 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Men's Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 221.21 | A Corridor | 4400 | 16 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Acrylic Lens | 58 | 0.928 | 4083.2 | $551.23 | 16 | 0 | No Change | | 58 | 0.93 | 0% | 4083.2 | $551.23 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 4 | 2 | Incandescent Exit Sign | 20 | 0.08 | 700.8 | $94.61 | 4 | 0 | No Change | | 20 | 0.08 | 0% | 700.8 | $94.61 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | A104 Conference Room | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $150.00 | $150.00 | 0.05 | 128.96 | $17.41 | 8.62 |
| 221.31 | Ms. Smith's Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.372 | 967.2 | $130.57 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.30 | 20% | 773.76 | $104.46 | $150.00 | $150.00 | 0.07 | 193.44 | $26.11 | 5.74 |
| 221.31 | Mrs. Vizoco's Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.372 | 967.2 | $130.57 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.30 | 20% | 773.76 | $104.46 | $150.00 | $150.00 | 0.07 | 193.44 | $26.11 | 5.74 |

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| 221.31 | Guidance Receptionist, Area & Hall | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.992 | 2579.2 | $348.19 | 16 | 0 | No Change | | 62 | 0.99 | 0% | 2579.2 | $348.19 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | Guidance Director Office | 2600 | 6 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.372 | 967.2 | $130.57 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.30 | 20% | 773.76 | $104.46 | $150.00 | $150.00 | 0.07 | 193.44 | $26.11 | 5.74 |
| 221.31 | Mrs. Hensel's Office | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $150.00 | $150.00 | 0.05 | 128.96 | $17.41 | 8.62 |
| 221.31 | Counselor | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $150.00 | $150.00 | 0.05 | 128.96 | $17.41 | 8.62 |
| 221.31 | Mrs. Papadinec's Office | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $150.00 | $150.00 | 0.05 | 128.96 | $17.41 | 8.62 |
| 221.31 | Mrs. Strauss' Office | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $150.00 | $150.00 | 0.05 | 128.96 | $17.41 | 8.62 |
| 221.31 | Copy Room/Files | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $150.00 | $150.00 | 0.05 | 128.96 | $17.41 | 8.62 |
| 284.25 | Lobby | 4400 | 2 | 8 | 4x4, 8 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., White Diffuser | 214 | 0.428 | 1883.2 | $254.23 | 2 | 0 | No Change | | 214 | 0.43 | 0% | 1883.2 | $254.23 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | Vestibule | 4400 | 3 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.195 | 858 | $115.83 | 3 | 0 | No Change | | 65 | 0.20 | 0% | 858 | $115.83 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 227.21 | Main Office Stairway | 2600 | 1 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.065 | 169 | $22.82 | 1 | 0 | No Change | | 65 | 0.07 | 0% | 169 | $22.82 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | Main Office | 2600 | 14 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.868 | 2256.8 | $304.67 | 14 | 0 | No Change | | 62 | 0.87 | 0% | 2256.8 | $304.67 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | Principal's Office | 2600 | 8 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.496 | 1289.6 | $174.10 | 8 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.40 | 20% | 1031.68 | $139.28 | $150.00 | $150.00 | 0.10 | 257.92 | $34.82 | 4.31 |
| 221.31 | Nurse | 2600 | 9 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.558 | 1450.8 | $195.86 | 9 | 0 | No Change | | 62 | 0.56 | 0% | 1450.8 | $195.86 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 621 | Auditorium | 1200 | 64 | 1 | Recessed Light, 300w Quartz Lamp | 300 | 19.2 | 23040 | $3,110.40 | 64 | 0 | No Change | | 300 | 19.20 | 0% | 23040 | $3,110.40 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 6 | 2 | Incandescent Exit Sign | 20 | 0.12 | 1051.2 | $141.91 | 6 | 0 | No Change | | 20 | 0.12 | 0% | 1051.2 | $141.91 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 611 | | 1200 | 4 | 1 | 1x1 Recessed, (1) 60w A19 Lamps | 60 | 0.24 | 288 | $38.88 | 4 | 0 | No Change | | 60 | 0.24 | 0% | 288 | $38.88 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Men's Restroom | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 211.11 | B123 Custodial Closet | 1200 | 1 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.033 | 39.6 | $5.35 | 1 | 0 | No Change | | 33 | 0.03 | 0% | 39.6 | $5.35 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | B121 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2418 | $326.43 | 15 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.74 | 20% | 1934.4 | $261.14 | $300.00 | $300.00 | 0.19 | 483.6 | $65.29 | 4.60 |

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| 221.31 | E113 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2418 | $326.43 | 15 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.74 | 20% | 1934.4 | $261.14 | $300.00 | $300.00 | 0.19 | 483.6 | $65.29 | 4.60 |
| 222.21 | B Corridor | 4400 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 3273.6 | $441.94 | 12 | 0 | No Change | | 62 | 0.74 | 0% | 3273.6 | $441.94 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | B119 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2418 | $326.43 | 15 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.74 | 20% | 1934.4 | $261.14 | $300.00 | $300.00 | 0.19 | 483.6 | $65.29 | 4.60 |
| 221.31 | B117 Classroom | 2600 | 15 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.93 | 2418 | $326.43 | 15 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.74 | 20% | 1934.4 | $261.14 | $300.00 | $300.00 | 0.19 | 483.6 | $65.29 | 4.60 |
| 221.31 | B115 Classroom | 2600 | 21 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.302 | 3385.2 | $457.00 | 21 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.04 | 20% | 2708.16 | $365.60 | $300.00 | $300.00 | 0.26 | 677.04 | $91.40 | 3.28 |
| 221.14 | B109 Elec. Room | 1200 | 14 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.812 | 974.4 | $131.54 | 14 | 0 | No Change | | 58 | 0.81 | 0% | 974.4 | $131.54 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | Faculty | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.992 | 2579.2 | $348.19 | 16 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.79 | 20% | 2063.36 | $278.55 | $300.00 | $300.00 | 0.20 | 515.84 | $69.64 | 4.31 |
| 211.11 | Faculty Restroom | 1200 | 6 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.198 | 237.6 | $32.08 | 6 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.16 | 20% | 190.08 | $25.66 | $150.00 | $150.00 | 0.04 | 47.52 | $6.42 | 23.38 |
| 221.14 | B104 Elec. Room | 1200 | 4 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.232 | 278.4 | $37.58 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.19 | 20% | 222.72 | $30.07 | $150.00 | $150.00 | 0.05 | 55.68 | $7.52 | 19.96 |
| 221.31 | B106 Classroom | 2600 | 25 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.55 | 4030 | $544.05 | 25 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.24 | 20% | 3224 | $435.24 | $300.00 | $300.00 | 0.31 | 806 | $108.81 | 2.76 |
| 221.14 | B108 School Store | 2600 | 5 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.29 | 754 | $101.79 | 5 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.23 | 20% | 603.2 | $81.43 | $150.00 | $150.00 | 0.06 | 150.8 | $20.36 | 7.37 |
| 211.11 | Women's Restroom | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.232 | 603.2 | $81.43 | 4 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.19 | 20% | 482.56 | $65.15 | $150.00 | $150.00 | 0.05 | 120.64 | $16.29 | 9.21 |
| 222.21 | Corridor F | 4400 | 9 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.558 | 2455.2 | $331.45 | 9 | 0 | No Change | | 62 | 0.56 | 0% | 2455.2 | $331.45 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 0 | No Change | | 20 | 0.02 | 0% | 175.2 | $23.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | F110 Classroom | 2600 | 21 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.302 | 3385.2 | $457.00 | 21 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.04 | 20% | 2708.16 | $365.60 | $300.00 | $300.00 | 0.26 | 677.04 | $91.40 | 3.28 |
| 221.31 | F108 Classroom | 2600 | 18 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 221.31 | F106 Classroom | 2600 | 27 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.674 | 4352.4 | $587.57 | 27 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.34 | 20% | 3481.92 | $470.06 | $300.00 | $300.00 | 0.33 | 870.48 | $117.51 | 2.55 |

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| 221.31 | F105 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.488 | 3868.8 | $522.29 | 24 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.19 | 20% | 3095.04 | $417.83 | $300.00 | $300.00 | 0.30 | 773.76 | $104.46 | 2.87 |
| 221.31 | F104 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.488 | 3868.8 | $522.29 | 24 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.19 | 20% | 3095.04 | $417.83 | $300.00 | $300.00 | 0.30 | 773.76 | $104.46 | 2.87 |
| 221.31 | F103 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.488 | 3868.8 | $522.29 | 24 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.19 | 20% | 3095.04 | $417.83 | $300.00 | $300.00 | 0.30 | 773.76 | $104.46 | 2.87 |
| 221.31 | F101 Classroom | 2600 | 10 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 222.21 | Corridor G | 4400 | 40 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 2.48 | 10912 | $1,473.12 | 40 | 0 | No Change | | 62 | 2.48 | 0% | 10912 | $1,473.12 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 601 | | 8760 | 8 | 2 | (2) 7w CFL Exit Sign | 16 | 0.128 | 1121.28 | $151.37 | 8 | 0 | No Change | | 16 | 0.13 | 0% | 1121.28 | $151.37 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | G101 Classroom | 2600 | 28 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.736 | 4513.6 | $609.34 | 28 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.39 | 20% | 3610.88 | $487.47 | $300.00 | $600.00 | 0.35 | 902.72 | $121.87 | 4.92 |
| 601 | | 8760 | 3 | 2 | (2) 7w CFL Exit Sign | 16 | 0.048 | 420.48 | $56.76 | 3 | 0 | No Change | | 16 | 0.05 | 0% | 420.48 | $56.76 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.11 | G100 Elec. Closet | 1200 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Indirect | 58 | 0.116 | 139.2 | $18.79 | 2 | 0 | No Change | | 58 | 0.12 | 0% | 139.2 | $18.79 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | G102 Classroom | 2600 | 28 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.736 | 4513.6 | $609.34 | 28 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.39 | 20% | 3610.88 | $487.47 | $300.00 | $600.00 | 0.35 | 902.72 | $121.87 | 4.92 |
| 601 | | 8760 | 3 | 2 | (2) 7w CFL Exit Sign | 16 | 0.048 | 420.48 | $56.76 | 3 | 0 | No Change | | 16 | 0.05 | 0% | 420.48 | $56.76 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 232.22 | G104 Classroom | 2600 | 8 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens | 86 | 0.688 | 1788.8 | $241.49 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 86 | 0.55 | 20% | 1431.04 | $193.19 | $250.00 | $250.00 | 0.14 | 357.76 | $48.30 | 5.18 |
| 222.21 | G103 Classroom | 2600 | 20 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.24 | 3224 | $435.24 | 20 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.99 | 20% | 2579.2 | $348.19 | $300.00 | $300.00 | 0.25 | 644.8 | $87.05 | 3.45 |
| 222.21 | G106 Classroom | 2600 | 20 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.24 | 3224 | $435.24 | 20 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.99 | 20% | 2579.2 | $348.19 | $300.00 | $300.00 | 0.25 | 644.8 | $87.05 | 3.45 |
| 227.211 | Girls' Restroom | 2600 | 6 | 2 | 2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 34 | 0.204 | 530.4 | $71.60 | 6 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | not rebate eligible | 34 | 0.16 | 20% | 424.32 | $57.28 | $250.00 | $250.00 | 0.04 | 106.08 | $14.32 | 17.46 |
| 222.21 | G108 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |
| 227.211 | Boys' Restroom | 2600 | 6 | 2 | 2x2, 2 Lamp, 17w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 34 | 0.204 | 530.4 | $71.60 | 6 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | not rebate eligible | 34 | 0.16 | 20% | 424.32 | $57.28 | $250.00 | $250.00 | 0.04 | 106.08 | $14.32 | 17.46 |
| 222.21 | G111 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 34 | 0.408 | 1060.8 | $143.21 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 34 | 0.33 | 20% | 848.64 | $114.57 | $300.00 | $300.00 | 0.08 | 212.16 | $28.64 | 10.47 |
| 222.21 | G110 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |

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| 222.21 | G112 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |
| 222.21 | G113 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |
| 222.21 | G115 VP Office | 2600 | 8 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.496 | 1289.6 | $174.10 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.40 | 20% | 1031.68 | $139.28 | $250.00 | $250.00 | 0.10 | 257.92 | $34.82 | 7.18 |
| 222.21 | C100-G | 2600 | 8 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.496 | 1289.6 | $174.10 | 8 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.40 | 20% | 1031.68 | $139.28 | $250.00 | $250.00 | 0.10 | 257.92 | $34.82 | 7.18 |
| 222.21 | C100 Media Center | 2600 | 134 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 8.308 | 21600.8 | $2,916.11 | 134 | 6 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 6.65 | 20% | 17280.64 | $2,332.89 | $300.00 | $1,800.00 | 1.66 | 4320.16 | $583.22 | 3.09 |
| 601 | | 8760 | 3 | 2 | (2) 7w CFL Exit Sign | 16 | 0.048 | 420.48 | $56.76 | 3 | 0 | No Change | | 16 | 0.05 | 0% | 420.48 | $56.76 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | | 2600 | 89 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 5.518 | 14346.8 | $1,936.82 | 89 | 0 | No Change | | 62 | 5.52 | 0% | 14346.8 | $1,936.82 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 555 | | 2600 | 10 | 1 | Recessed Down Light, 50w R20 Lamp | 50 | 0.5 | 1300 | $175.50 | 10 | 0 | No Change | | 50 | 0.50 | 0% | 1300 | $175.50 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Periodicals | 2600 | 5 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.31 | 806 | $108.81 | 5 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.25 | 20% | 644.8 | $87.05 | $250.00 | $250.00 | 0.06 | 161.2 | $21.76 | 11.49 |
| 221.31 | | 2600 | 4 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.20 | 20% | 515.84 | $69.64 | $250.00 | $250.00 | 0.05 | 128.96 | $17.41 | 14.36 |
| 222.21 | Library Office | 2600 | 5 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.31 | 806 | $108.81 | 5 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.25 | 20% | 644.8 | $87.05 | $150.00 | $150.00 | 0.06 | 161.2 | $21.76 | 6.89 |
| 232.22 | Library Staff | 2600 | 10 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens | 86 | 0.86 | 2236 | $301.86 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 86 | 0.69 | 20% | 1788.8 | $241.49 | $250.00 | $250.00 | 0.17 | 447.2 | $60.37 | 4.14 |
| 222.21 | Supervisor Special Services Office | 2600 | 7 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.434 | 1128.4 | $152.33 | 7 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.35 | 20% | 902.72 | $121.87 | $250.00 | $250.00 | 0.09 | 225.68 | $30.47 | 8.21 |
| 222.21 | Library Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |
| 222.21 | C-100-C TV | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 0 | No Change | | 62 | 0.74 | 0% | 1934.4 | $261.14 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | C Corridor | 4400 | 17 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.054 | 4637.6 | $626.08 | 17 | 0 | No Change | | 62 | 1.05 | 0% | 4637.6 | $626.08 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | C102 Office | 2600 | 4 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 0 | No Change | | 62 | 0.25 | 0% | 644.8 | $87.05 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | C104 Office | 2600 | 4 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.248 | 644.8 | $87.05 | 4 | 0 | No Change | | 62 | 0.25 | 0% | 644.8 | $87.05 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

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| 222.21 | F Corridor | 4400 | 18 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.116 | 4910.4 | $662.90 | 18 | 0 | No Change | | 62 | 1.12 | 0% | 4910.4 | $662.90 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | E Corridor | 4400 | 15 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.93 | 4092 | $552.42 | 15 | 0 | No Change | | 62 | 0.93 | 0% | 4092 | $552.42 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.124 | 1086.24 | $146.64 | 2 | 0 | No Change | | 62 | 0.12 | 0% | 1086.24 | $146.64 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | D Corridor | 4400 | 7 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.434 | 1909.6 | $257.80 | 7 | 0 | No Change | | 62 | 0.43 | 0% | 1909.6 | $257.80 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | F128 Classroom | 2600 | 18 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.116 | 2901.6 | $391.72 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.89 | 20% | 2321.28 | $313.37 | $300.00 | $300.00 | 0.22 | 580.32 | $78.34 | 3.83 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 0 | No Change | | 20 | 0.02 | 0% | 175.2 | $23.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | F126 Classroom | 2600 | 6 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.372 | 967.2 | $130.57 | 6 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.30 | 20% | 773.76 | $104.46 | $250.00 | $250.00 | 0.07 | 193.44 | $26.11 | 9.57 |
| 222.21 | F124 Classroom | 2600 | 12 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.744 | 1934.4 | $261.14 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 0.60 | 20% | 1547.52 | $208.92 | $300.00 | $300.00 | 0.15 | 386.88 | $52.23 | 5.74 |
| 232.21 | F120 Cafeteria | 2600 | 34 | 3 | 2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 86 | 2.924 | 7602.4 | $1,026.32 | 34 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 86 | 2.34 | 20% | 6081.92 | $821.06 | $300.00 | $600.00 | 0.58 | 1520.48 | $205.26 | 2.92 |
| 602 | | 8760 | 4 | 2 | Incandescent Exit Sign | 20 | 0.08 | 700.8 | $94.61 | 4 | 0 | No Change | | 20 | 0.08 | 0% | 700.8 | $94.61 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.11 | Kitchen | 2600 | 32 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Indirect | 58 | 1.856 | 4825.6 | $651.46 | 32 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 1.48 | 20% | 3860.48 | $521.16 | $300.00 | $600.00 | 0.37 | 965.12 | $130.29 | 4.61 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 0 | No Change | | 20 | 0.02 | 0% | 175.2 | $23.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 612 | Compressor Room | 1200 | 2 | 1 | Pendant Mnt., 100w A19 Lamp | 100 | 0.2 | 240 | $32.40 | 2 | 0 | No Change | | 100 | 0.20 | 0% | 240 | $32.40 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.31 | F114 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.488 | 3868.8 | $522.29 | 24 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.19 | 20% | 3095.04 | $417.83 | $300.00 | $300.00 | 0.30 | 773.76 | $104.46 | 2.87 |
| 221.31 | F112 Classroom | 2600 | 24 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 1.488 | 3868.8 | $522.29 | 24 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.19 | 20% | 3095.04 | $417.83 | $300.00 | $300.00 | 0.30 | 773.76 | $104.46 | 2.87 |
| 222.21 | F111 Classroom | 2600 | 24 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 1.488 | 3868.8 | $522.29 | 24 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 62 | 1.19 | 20% | 3095.04 | $417.83 | $300.00 | $300.00 | 0.30 | 773.76 | $104.46 | 2.87 |
| 211.14 | C101 Elec. Closet | 1200 | 18 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.594 | 712.8 | $96.23 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 33 | 0.48 | 20% | 570.24 | $76.98 | $300.00 | $300.00 | 0.12 | 142.56 | $19.25 | 15.59 |
| 770 | Gym | 2600 | 48 | 1 | 400w MH, Prismatic Lens | 465 | 22.32 | 58032 | $7,834.32 | 48 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 465 | 17.86 | 20% | 46425.6 | $6,267.46 | $300.00 | $600.00 | 4.46 | 11606.4 | $1,566.86 | 0.38 |
| 602 | | 8760 | 5 | 2 | Incandescent Exit Sign | 20 | 0.1 | 876 | $118.26 | 5 | 0 | No Change | | 20 | 0.10 | 0% | 876 | $118.26 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

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| 211.11 | | 2600 | 4 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.132 | 343.2 | $46.33 | 4 | 0 | No Change | | 33 | 0.13 | 0% | 343.2 | $46.33 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | Locker Room Stairs (2) | 4400 | 6 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.348 | 1531.2 | $206.71 | 6 | 0 | No Change | | 58 | 0.35 | 0% | 1531.2 | $206.71 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.14 | Locker Room | 2600 | 34 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 1.972 | 5127.2 | $692.17 | 34 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 1.58 | 20% | 4101.76 | $553.74 | $300.00 | $600.00 | 0.39 | 1025.44 | $138.43 | 4.33 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 613 | | 2600 | 9 | 1 | Industrial Fixture, 100w A19 Lamp | 100 | 0.9 | 2340 | $315.90 | 9 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 100 | 0.72 | 20% | 1872 | $252.72 | $250.00 | $250.00 | 0.18 | 468 | $63.18 | 3.96 |
| 211.14 | Gym Office | 2600 | 3 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.099 | 257.4 | $34.75 | 3 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 33 | 0.08 | 20% | 205.92 | $27.80 | $150.00 | $150.00 | 0.02 | 51.48 | $6.95 | 21.58 |
| 211.14 | Gym Storage (2) | 1200 | 28 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.924 | 1108.8 | $149.69 | 28 | 0 | No Change | | 33 | 0.92 | 0% | 1108.8 | $149.69 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Boys' Restroom | 2600 | 5 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.165 | 429 | $57.92 | 5 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.13 | 20% | 343.2 | $46.33 | $150.00 | $150.00 | 0.03 | 85.8 | $11.58 | 12.95 |
| 211.11 | Girls' Restroom | 2600 | 5 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.165 | 429 | $57.92 | 5 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | not rebate eligible | 33 | 0.13 | 20% | 343.2 | $46.33 | $150.00 | $150.00 | 0.03 | 85.8 | $11.58 | 12.95 |
| 221.14 | D101 Classroom | 2600 | 34 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 1.972 | 5127.2 | $692.17 | 34 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 1.58 | 20% | 4101.76 | $553.74 | $300.00 | $600.00 | 0.39 | 1025.44 | $138.43 | 4.33 |
| 221.14 | D103 Classroom | 2600 | 34 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 1.972 | 5127.2 | $692.17 | 34 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 1.58 | 20% | 4101.76 | $553.74 | $300.00 | $600.00 | 0.39 | 1025.44 | $138.43 | 4.33 |
| 221.14 | D105 Classroom | 2600 | 42 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 2.436 | 6333.6 | $855.04 | 42 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 1.95 | 20% | 5066.88 | $684.03 | $300.00 | $600.00 | 0.49 | 1266.72 | $171.01 | 3.51 |
| 766 | Aux Gym | 2600 | 12 | 1 | 400w MH, Prismatic Lens | 465 | 5.58 | 14508 | $1,958.58 | 12 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 465 | 4.46 | 20% | 11606.4 | $1,566.86 | $300.00 | $300.00 | 1.12 | 2901.6 | $391.72 | 0.77 |
| 222.21 | AD Office | 2600 | 10 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.62 | 1612 | $217.62 | 10 | 1 | Dual Technology Occupancy Sensor - Remote Mnt. | | 62 | 0.50 | 20% | 1289.6 | $174.10 | $250.00 | $250.00 | 0.12 | 322.4 | $43.52 | 5.74 |
| 221.34 | Boys' Team Room | 2600 | 21 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 1.218 | 3166.8 | $427.52 | 21 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 0.97 | 20% | 2533.44 | $342.01 | $300.00 | $300.00 | 0.24 | 633.36 | $85.50 | 3.51 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 0 | No Change | | 20 | 0.02 | 0% | 175.2 | $23.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.34 | Athletic Trainer | 2600 | 5 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.29 | 754 | $101.79 | 5 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.23 | 20% | 603.2 | $81.43 | $150.00 | $150.00 | 0.06 | 150.8 | $20.36 | 7.37 |
| 221.34 | Girls' Team Room | 2600 | 16 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.928 | 2412.8 | $325.73 | 16 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack remote mount | | 58 | 0.74 | 20% | 1930.24 | $260.58 | $300.00 | $300.00 | 0.19 | 482.56 | $65.15 | 4.61 |
| 602 | | 8760 | 1 | 2 | Incandescent Exit Sign | 20 | 0.02 | 175.2 | $23.65 | 1 | 0 | No Change | | 20 | 0.02 | 0% | 175.2 | $23.65 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |

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| 227.21 | Weight Room Hall | 2600 | 6 | 2 | 2x2, 2 Lamp, 32w 700 series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 65 | 0.39 | 1014 | $136.89 | 6 | 0 | No Change | | 65 | 0.39 | 0% | 1014 | $136.89 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 602 | | 8760 | 2 | 2 | Incandescent Exit Sign | 20 | 0.04 | 350.4 | $47.30 | 2 | 0 | No Change | | 20 | 0.04 | 0% | 350.4 | $47.30 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 242.31 | Weight Room | 2600 | 18 | 4 | 2x4, 4 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic | 107 | 1.926 | 5007.6 | $676.03 | 18 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 107 | 1.54 | 20% | 4006.08 | $540.82 | $300.00 | $300.00 | 0.39 | 1001.52 | $135.21 | 2.22 |
| 601 | | 8760 | 2 | 2 | (2) 7w CFL Exit Sign | 16 | 0.032 | 280.32 | $37.84 | 2 | 0 | No Change | | 16 | 0.03 | 0% | 280.32 | $37.84 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.14 | Maintenance | 2600 | 19 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.627 | 1630.2 | $220.08 | 19 | 1 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 33 | 0.50 | 20% | 1304.16 | $176.06 | $300.00 | $300.00 | 0.13 | 326.04 | $44.02 | 6.82 |
| 221.41 | Maintenance Restroom | 1200 | 1 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Wall Mnt., Prismatic | 58 | 0.058 | 69.6 | $9.40 | 1 | 0 | No Change | | 58 | 0.06 | 0% | 69.6 | $9.40 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 222.21 | Maintenance Office | 2600 | 1 | 2 | 2x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Recessed Mnt., Prismatic Lens | 62 | 0.062 | 161.2 | $21.76 | 1 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 62 | 0.05 | 20% | 128.96 | $17.41 | $150.00 | $150.00 | 0.01 | 32.24 | $4.35 | 34.46 |
| 221.14 | Maintenance Office | 2600 | 2 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens | 58 | 0.116 | 301.6 | $40.72 | 2 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.09 | 20% | 241.28 | $32.57 | $150.00 | $150.00 | 0.02 | 60.32 | $8.14 | 18.42 |
| 221.34 | Boiler Room | 4400 | 15 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.87 | 3828 | $516.78 | 15 | 0 | No Change | | 58 | 0.87 | 0% | 3828 | $516.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 221.34 | Electrical Room | 1200 | 8 | 2 | 1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., No Lens | 58 | 0.464 | 556.8 | $75.17 | 8 | 1 | Dual Technology Occupancy Sensor - Switch Mnt. | | 58 | 0.37 | 20% | 445.44 | $60.13 | $150.00 | $150.00 | 0.09 | 111.36 | $15.03 | 9.98 |
| 221.31 | C103 Band | 2600 | 49 | 2 | 1x4, 2 Lamp, 32w 700 Series T8, Elect. Ballast, Pendant Mnt., Prismatic Lens | 62 | 3.038 | 7898.8 | $1,066.34 | 49 | 2 | Dual Tech. Occupancy Sensor w/2 Pole Powerpack - remote mount | | 62 | 2.43 | 20% | 6319.04 | $853.07 | $300.00 | $600.00 | 0.61 | 1579.76 | $213.27 | 2.81 |
| 211.11 | C103 Storage | 1200 | 18 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.594 | 712.8 | $96.23 | 18 | 0 | No Change | | 33 | 0.59 | 0% | 712.8 | $96.23 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 211.11 | Maintenance Storage | 2600 | 21 | 1 | 1x4, 1 Lamp, 32w 700 Series T8, Elect. Ballast, Surface Mnt., Prismatic Lens | 33 | 0.693 | 1801.8 | $243.24 | 21 | 0 | No Change | | 33 | 0.69 | 0% | 1801.8 | $243.24 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 750 | Exterior | 4400 | 29 | 1 | 250w HPS Wallpack | 295 | 8.555 | 37642 | $5,081.67 | 29 | 0 | No Change | | 295 | 8.56 | 0% | 37642 | $5,081.67 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 710 | | 4400 | 4 | 1 | 100w HPS Wallpack | 125 | 0.5 | 2200 | $297.00 | 4 | 0 | No Change | | 125 | 0.50 | 0% | 2200 | $297.00 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 725 | | 4400 | 22 | 1 | 150w HPS Wallpack | 188 | 4.136 | 18198.4 | $2,456.78 | 22 | 0 | No Change | | 188 | 4.14 | 0% | 18198.4 | $2,456.78 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| 767 | | 4400 | 12 | 1 | 400w Probe Start MH "Shoebox" Parking Lot Light | 460 | 5.52 | 24288 | $3,278.88 | 12 | 0 | No Change | | 460 | 5.52 | 0% | 24288 | $3,278.88 | $0.00 | $0.00 | 0.00 | 0 | $0.00 | 0.00 |
| | Totals | | 2,898 | 456 | | | 226.1 | 620,579.7 | $83,778 | 2,898 | 164 | | | | 195.0 | | 540,229.6 | $72,930.99 | | $41,800 | 31.10 | 80,350 | $10,847 | 3.85 |

**Project Name:** LGEA Solar PV Project - Highland HS
**Location:** Blackwood, NJ
**Description:** Photovoltaic System - Direct Purchase

**Simple Payback Analysis**

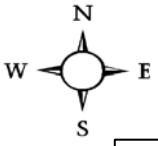
| | Photovoltaic System - Direct Purchase |
|---|---|
| Total Construction Cost | $7,903,260 |
| Annual kWh Production | 1,097,957 |
| Annual Energy Cost Reduction | $148,224 |
| Annual SREC Revenue | $384,285 |
| First Cost Premium | **$7,903,260** |
| Simple Payback: | **14.84** **Years** |

**Life Cycle Cost Analysis**

| | | | |
|---|---|---|---|
| Analysis Period (years): | 25 | Financing %: | 0% |
| Financing Term (mths): | 0 | Maintenance Escalation Rate: | 3.0% |
| Average Energy Cost ($/kWh) | **$0.135** | Energy Cost Escalation Rate: | 3.0% |
| Financing Rate: | 0.00% | SREC Value ($/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 | $7,903,260 | 0 | 0 | 0 | $0 | (7,903,260) | 0 |
| 1 | $0 | 1,097,957 | $148,224 | $0 | $384,285 | $532,509 | ($7,370,751) |
| 2 | $0 | 1,092,467 | $152,671 | $0 | $382,364 | $535,034 | ($6,835,716) |
| 3 | $0 | 1,087,005 | $157,251 | $0 | $380,452 | $537,703 | ($6,298,014) |
| 4 | $0 | 1,081,570 | $161,969 | $0 | $378,549 | $540,518 | ($5,757,496) |
| 5 | $0 | 1,076,162 | $166,828 | $11,084 | $376,657 | $532,400 | ($5,225,096) |
| 6 | $0 | 1,070,781 | $171,832 | $11,029 | $374,773 | $535,577 | ($4,689,519) |
| 7 | $0 | 1,065,427 | $176,987 | $10,974 | $372,900 | $538,913 | ($4,150,606) |
| 8 | $0 | 1,060,100 | $182,297 | $10,919 | $371,035 | $542,413 | ($3,608,193) |
| 9 | $0 | 1,054,800 | $187,766 | $10,864 | $369,180 | $546,081 | ($3,062,111) |
| 10 | $0 | 1,049,526 | $193,399 | $10,810 | $367,334 | $549,923 | ($2,512,189) |
| 11 | $0 | 1,044,278 | $199,201 | $10,756 | $365,497 | $553,942 | ($1,958,246) |
| 12 | $0 | 1,039,057 | $205,177 | $10,702 | $363,670 | $558,144 | ($1,400,102) |
| 13 | $0 | 1,033,861 | $211,332 | $10,649 | $361,851 | $562,535 | ($837,567) |
| 14 | $0 | 1,028,692 | $217,672 | $10,596 | $360,042 | $567,119 | ($270,448) |
| 15 | $0 | 1,023,549 | $224,202 | $10,543 | $358,242 | $571,902 | $301,454 |
| 16 | $0 | 1,018,431 | $230,928 | $10,490 | $356,451 | $576,889 | $878,343 |
| 17 | $0 | 1,013,339 | $237,856 | $10,437 | $354,669 | $582,087 | $1,460,431 |
| 18 | $0 | 1,008,272 | $244,992 | $10,385 | $352,895 | $587,502 | $2,047,933 |
| 19 | $0 | 1,003,231 | $252,342 | $10,333 | $351,131 | $593,139 | $2,641,072 |
| 20 | $0 | 998,214 | $259,912 | $10,282 | $349,375 | $599,005 | $3,240,077 |
| 21 | $1 | 993,223 | $267,709 | $10,230 | $347,628 | $605,107 | $3,845,185 |
| 22 | $2 | 988,257 | $275,741 | $10,179 | $345,890 | $611,452 | $4,456,637 |
| 23 | $3 | 983,316 | $284,013 | $10,128 | $344,161 | $618,045 | $5,074,682 |
| 24 | $4 | 978,399 | $292,533 | $10,078 | $342,440 | $624,896 | $5,699,577 |
| 25 | $5 | 973,507 | $301,309 | $10,027 | $340,728 | $632,010 | $6,331,587 |
| | **Totals:** | 25,863,422 | $5,404,145 | $221,496 | $9,052,198 | $14,234,847 | ($17,999,075) |
| | | | | **Net Present Value (NPV)** | | **$6,331,612** | |
| | | | | **Internal Rate of Return (IRR)** | | **5.0%** | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| Highland HS | 62378 | Sunpower SPR230 | 3818 | 14.7 | 56,140 | 878.14 | 1,097,957 | 125,994 | 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: | 878.1 kW |
| DC to AC Derate Factor: | 0.770 |
| AC Rating: | 676.2 kW |
| Array Type: | Fixed Tilt |
| Array Tilt: | 39.5° |
| Array Azimuth: | 180.0° |
| Energy Specifications | |
| Cost of Electricity: | 0.1 ¢/kWh |

| Results | | | |
|---|---|---|---|
| Month | Solar Radiation (kWh/m²/day) | AC Energy (kWh) | Energy Value ($) |
| 1 | 3.61 | 78564 | 106.06 |
| 2 | 4.20 | 81822 | 110.46 |
| 3 | 4.78 | 98721 | 133.27 |
| 4 | 5.23 | 101383 | 136.87 |
| 5 | 5.44 | 106369 | 143.60 |
| 6 | 5.48 | 99479 | 134.30 |
| 7 | 5.55 | 102860 | 138.86 |
| 8 | 5.41 | 101427 | 136.93 |
| 9 | 5.23 | 97121 | 131.11 |
| 10 | 4.60 | 90810 | 122.59 |
| 11 | 3.59 | 72104 | 97.34 |
| 12 | 3.17 | 67299 | 90.85 |
| Year | 4.69 | 1097957 | 1482.24 |

.= Proposed PV Layout

Notes:

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

| ENERGY CALCULATIONS - NATURAL GAS | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CAV System | VAV System | |
| **Make up Air Unit Total Heating Energy (Therms)** | 1,365 | 1,010 | |
| **Boiler Efficiency (%)** | 74% | 74% | |
| **Heating Fuel Value** | 100,000 | 100,000 | |
| **Gas Cost ($/Therm)** | $1.08 | $1.08 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Heating Energy,Therms** | 1,365 | 1,010 | 355 |
| **Heating Energy Cost ($)** | $1,475 | $1,091 | $383 |
| **COMMENTS:** | | | |

| ENERGY CALCULATIONS - ELECTRIC | | | |
|---|---|---|---|
| **ECM INPUTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **ECM INPUTS** | CAV System | VAV System | |
| **Supply Fan HP** | 2 | 2 | |
| **Fan Energy, Annual kWh** | 2,652 | 1,314 | |
| **Electric Cost ($/kWh)** | $0.135 | $0.135 | |
| **ENERGY SAVINGS CALCULATIONS** | | | |
| **ECM RESULTS** | **EXISTING** | **PROPOSED** | **SAVINGS** |
| **Fan Energy Annual kWh** | 2,652 | 1,314 | 1,339 |
| **Electric Energy Cost ($)** | $358 | $177 | $181 |
| **COMMENTS:** | | | |