



## *Draft Energy Audit Report*

Caldwell-West Caldwell School District Rev\_1  
January 4, 2016

# Table of Contents

## Table of Contents

### Executive Summary

### Section 1 Introduction

|                             |     |
|-----------------------------|-----|
| 1.1 General .....           | 1-1 |
| 1.2 Purpose and Scope ..... | 1-2 |

### Section 2 Facility Description

|                                              |     |
|----------------------------------------------|-----|
| 2.1 West Caldwell High School.....           | 2-1 |
| 2.1.1 Description of Building Envelope ..... | 2-1 |
| 2.1.2 Description of Building HVAC .....     | 2-1 |
| 2.1.3 Description of Building Lighting ..... | 2-2 |
| 2.2 Grover Cleveland Middle School.....      | 2-2 |
| 2.2.1 Description of Building Envelope ..... | 2-2 |
| 2.2.2 Description of Building HVAC .....     | 2-2 |
| 2.2.3 Description of Building Lighting ..... | 2-3 |
| 2.3 Jefferson Elementary School.....         | 2-3 |
| 2.3.1 Description of Building Envelope ..... | 2-3 |
| 2.3.2 Description of Building HVAC .....     | 2-3 |
| 2.3.3 Description of Building Lighting ..... | 2-4 |
| 2.4 Lincoln Elementary School.....           | 2-4 |
| 2.4.1 Description of Building Envelope ..... | 2-4 |
| 2.4.2 Description of Building HVAC .....     | 2-4 |
| 2.4.3 Description of Building Lighting ..... | 2-5 |
| 2.5 Washington Elementary School.....        | 2-5 |
| 2.5.1 Description of Building Envelope ..... | 2-5 |
| 2.5.2 Description of Building HVAC .....     | 2-5 |
| 2.5.3 Description of Building Lighting ..... | 2-5 |
| 2.6 Wilson Elementary School.....            | 2-6 |
| 2.6.1 Description of Building Envelope ..... | 2-6 |
| 2.6.2 Description of Building HVAC .....     | 2-6 |
| 2.6.3 Description of Building Lighting ..... | 2-6 |
| 2.7 Harrison School Building.....            | 2-7 |
| 2.7.1 Description of Building Envelope ..... | 2-7 |
| 2.7.2 Description of Building HVAC .....     | 2-7 |
| 2.7.3 Description of Building Lighting ..... | 2-7 |

### Section 3 Baseline Energy Use

|                                       |     |
|---------------------------------------|-----|
| 3.1 Utility Data Analysis.....        | 3-1 |
| 3.1.1 Electric Charges.....           | 3-1 |
| 3.1.2 Natural Gas Charges.....        | 3-2 |
| 3.2 Facility Results .....            | 3-2 |
| 3.2.1 James Caldwell High School..... | 3-2 |

|                                                  |             |
|--------------------------------------------------|-------------|
| 3.2.2 Grover Cleveland Middle School.....        | 3-3         |
| 3.2.3 Jefferson Elementary School.....           | 3-5         |
| 3.2.4 Lincoln Elementary School.....             | 3-6         |
| 3.2.5 Washington Elementary School.....          | 3-8         |
| 3.2.6 Wilson Elementary School.....              | 3-9         |
| 3.2.7 Harrison School Building.....              | 3-11        |
| <b>3.3 Aggregate Costs.....</b>                  | <b>3-13</b> |
| <b>3.4 Portfolio Manager.....</b>                | <b>3-13</b> |
| 3.4.1 Portfolio Manager Overview.....            | 3-13        |
| 3.4.2 Energy Performance Rating.....             | 3-13        |
| 3.4.3 Portfolio Manager Account Information..... | 3-14        |

## **Section 4 – Energy Conservation and Retrofit Measures (ECRM)**

|                                                            |             |
|------------------------------------------------------------|-------------|
| <b>4.1 Building Light Systems.....</b>                     | <b>4-2</b>  |
| <b>4.2 HVAC Systems.....</b>                               | <b>4-4</b>  |
| 4.2.1 West Caldwell High School.....                       | 4-4         |
| 4.2.2 Grover Cleveland Middle School.....                  | 4-4         |
| 4.2.3 Jefferson Elementary School.....                     | 4-5         |
| 4.2.4 Lincoln Elementary School.....                       | 4-6         |
| 4.2.5 Washington Elementary School.....                    | 4-7         |
| 4.2.6 Wilson Elementary School.....                        | 4-7         |
| 4.2.7 Harrison School Building.....                        | 4-8         |
| 4.2.8 Combined Heat and Power.....                         | 4-8         |
| 4.2.9 Building Management System.....                      | 4-9         |
| <b>4.3 Energy Conservation and Reduction Measures.....</b> | <b>4-11</b> |
| 4.3.1 Window Upgrade.....                                  | 4-11        |
| 4.3.2 Premium Efficiency Motors.....                       | 4-11        |
| 4.3.3 Variable Speed Drives.....                           | 4-11        |
| <b>4.4 Photovoltaic Solar Energy System Overview.....</b>  | <b>4-12</b> |
| 4.3.1.1 Basis for Design and Calculations.....             | 4-14        |
| 4.3.1.2 Calculation of PV System Yield.....                | 4-14        |
| <b>4.5 On-Site Wind Power Generation.....</b>              | <b>4-15</b> |
| <b>4.6 Additional Measures.....</b>                        | <b>4-16</b> |

## **Section 5 – Evaluation of Energy Purchasing and Procurement Strategies**

|                                         |            |
|-----------------------------------------|------------|
| <b>5.1 Energy Deregulation.....</b>     | <b>5-1</b> |
| <b>5.2 Demand Response Program.....</b> | <b>5-5</b> |

## **Section 6 – Ranking of Energy Conservation and Retrofit Measures**

|                             |            |
|-----------------------------|------------|
| <b>6.1 ECRMs.....</b>       | <b>6-1</b> |
| 6.1.1 Lighting Systems..... | 6-1        |
| 6.1.2 HVAC Systems.....     | 6-2        |
| 6.1.3 Solar Energy.....     | 6-3        |
| 6.1.4 Wind Energy.....      | 6-3        |

## **Section 7 – Grants, Incentives and Funding Sources**

|                                                        |            |
|--------------------------------------------------------|------------|
| <b>7.1 Renewable Energy.....</b>                       | <b>7-1</b> |
| 7.1.1 Renewable Energy Certificates (NJ BPU).....      | 7-1        |
| 7.1.2 Renewable Energy Incentive Program (NJ BPU)..... | 7-1        |

|                                                                      |            |
|----------------------------------------------------------------------|------------|
| 7.1.3 Utility Financing Programs.....                                | 7-1        |
| 7.1.4 Renewable Energy Manufacturing Incentive (NJ BPU) .....        | 7-1        |
| 7.1.5 Clean Renewable Energy Bonds (IRS) .....                       | 7-2        |
| 7.1.6 Qualified Energy Conservation Bonds (IRS).....                 | 7-2        |
| 7.1.7 Global Climate Change Mitigation Incentive Fund (US EDA) ..... | 7-2        |
| 7.1.8 Private Tax-Exempt Financing .....                             | 7-2        |
| 7.1.9 Performance Based Contracts (ESCOs) .....                      | 7-2        |
| 7.1.10 Power Purchase Agreements (SPCs) .....                        | 7-3        |
| <b>7.2 Energy Efficiency .....</b>                                   | <b>7-3</b> |
| 7.2.1 Introduction .....                                             | 7-3        |
| 7.2.2 New Jersey Smart Start Buildings Program (NJ BPU) .....        | 7-3        |
| 7.2.3 Pay for Performance Program (NJ BPU) .....                     | 7-4        |
| 7.2.4 Direct Install (NJ BPU) .....                                  | 7-4        |

## Appendices

|                                                                    |
|--------------------------------------------------------------------|
| <b>Appendix A – Utility Bill Information</b>                       |
| <b>Appendix B – Statement of Energy Performance Summary Sheets</b> |
| <b>Appendix C – Measure Calculations</b>                           |
| <b>Appendix D – Lighting Spreadsheets</b>                          |
| <b>Appendix E – Solar Energy Financing Worksheet</b>               |
| <b>Appendix F – Engineer’s Opinion of Probable Construction</b>    |
| <b>Appendix G – ECRM Financial Analyses</b>                        |
| <b>Appendix H – HVAC Equipment Inventories</b>                     |

## Executive Summary

As part of an initiative to reduce energy cost and consumption, Caldwell-West Caldwell Board of Education has secured the services of CDM Smith to perform an energy audit for seven (7) facilities which are owned and operated by the Board, in an effort to develop comprehensive Energy Conservation and Retrofit Measures (ECRMs).

CDM Smith's energy audit team visited the facilities June 1 – 2, 2015. As a result of the site visit and evaluation of the historical energy usage of the facilities, CDM Smith was successful in identifying opportunities for energy savings measures.

CDM Smith has also evaluated the potential for renewable energy technologies to be implemented at the Board's facilities to offset the electrical energy usage. Specifically, the use of solar electric photovoltaic panels and wind turbines were investigated.

Not all ECRMs identified as a result of the energy audit are recommended. ECRMs must be economically feasible to be recommended to the Board for implementation. The feasibility of each ECRM is measured through a simple payback analysis. The simple payback period is determined after establishing Engineer's Opinion of Probable Construction Cost estimates, Operation and Maintenance (O&M) cost estimates, projected annual energy savings estimates are also used to determine the payback. The potential value of New Jersey Clean Energy rebates, or Renewable Energy Credits, if applicable are also applied in determining payback. ECRMs with a payback period of 20 years or less can be recommended.

### Historical Energy Usage

The following table, Table ES-1, summarizes the historical energy usage at each of the Board's facilities as presented in Section 3. The data in Table ES-1 has been taken from the facility data forms, provided by the Board. These values serve as a bench-marking tool. The building profiles are established through the EPA's Portfolio Manager Program. This data is used to quantify the reduction in electrical energy and natural gas usage following the implementation of recommended ECRMs.

**Table ES-1**  
**Summary of Annual Energy Usage & Cost**

| Facility                       | Electrical Energy Use (kWh) | Peak Summer Demand (kW) | Peak Winter Demand (kW) | Fuel Use for Entire Building (therms) | Cost for Electric Service | Cost for Fuel |
|--------------------------------|-----------------------------|-------------------------|-------------------------|---------------------------------------|---------------------------|---------------|
| James Caldwell High School     | 1,067,471                   | 113                     | 95                      | 67,132                                | \$165,158                 | \$52,498      |
| Grover Cleveland Middle School | 794,780                     | 192                     | 193                     | 8,784                                 | \$137,374                 | \$4,949       |
| Jefferson Elementary School    | 191,790                     | 63                      | 65                      | 18,654                                | \$36,076                  | \$14,420      |
| Lincoln Elementary School      | 141,720                     | 30                      | 16                      | 22,836                                | \$ 28,808                 | \$16,869      |
| Washington Elementary School   | 165,545                     | 66                      | 53                      | 38,252                                | \$ 30,423                 | \$ 31,149     |
| Wilson Elementary School       | 151,760                     | 59                      | 50                      | 11,976                                | \$ 25,003                 | \$ 10,143     |
| Harrison School Building       | 136,650                     | 27                      | 13                      | 19,084                                | \$24,277                  | \$15,455      |

## Recommended ECRMs

The following Table ES-2 presents the ranking of recommended ECRMs identified for the building lighting and HVAC systems based on the simple payback analysis.

Additional ECRMs associated with the building envelope and the miscellaneous appliances are identified and evaluated, as discussed in Sections 2 and 4. However, these are not recommended due to longer payback periods. Table ES-2 includes the following:

- The Engineer's Opinion of Probable Construction Cost,
- Projected annual energy cost savings,
- Projected annual energy usage savings,
- Total simple payback period

The ECRMs are ranked based on payback period.

**Table ES-2**  
**Ranking of Energy Savings Measures Summary**

| Overall Ranking (Based on Simple Payback) | Facility Measure                                                   | Total Cost | Energy Savings         | Annual Fiscal Savings <sup>2</sup> | CO2 Emissions (tons) | Simple Payback (Years) |
|-------------------------------------------|--------------------------------------------------------------------|------------|------------------------|------------------------------------|----------------------|------------------------|
| 1                                         | <b>Lincoln Elementary School</b><br>Premium Efficiency Motors      | \$208      | 0. Therms<br>530 kWh   | \$108                              | 0.2                  | <b>1.9</b>             |
| 2                                         | <b>Washington Elementary School</b><br>Condensing DHW              | \$3,762    | 756. Therms<br>kWh     | \$616                              | 4.4                  | <b>6.1</b>             |
| 3                                         | <b>Grover Cleveland Middle School</b><br>Premium Efficiency Motors | \$2,715    | 0. Therms<br>1,864 kWh | \$322                              | 0.7                  | <b>8.4</b>             |
| 4                                         | <b>Washington Elementary School</b><br>Variable Speed Drive        | \$6,000    | 0. Therms<br>3,183 kWh | \$585                              | 1.1                  | <b>10.3</b>            |

| Overall Ranking<br>(Based on Simple Payback) | Facility<br>Measure                                              | Total Cost | Energy Savings                                 | Annual Fiscal Savings <sup>2</sup> | CO2 Emissions (tons) | Simple Payback (Years) |
|----------------------------------------------|------------------------------------------------------------------|------------|------------------------------------------------|------------------------------------|----------------------|------------------------|
| 5                                            | <b>Grover Cleveland Middle School</b><br>Combined Heat and Power | \$100,100  | -36,374. Therms<br>280,800 kWh<br>594,000 kbtu | \$8,242                            | -77.9                | <b>12.1</b>            |
| 6                                            | <b>Lincoln Elementary School</b><br>DDC Controls                 | \$74,750   | 457. Therms<br>28,344 kWh                      | \$6,099                            | 12.8                 | <b>12.3</b>            |
| 7                                            | <b>James Caldwell High School</b><br>Lighting Upgrades           | \$368,649  | 0. Therms<br>90,277 kWh                        | \$15,604                           | 32.2                 | <b>13</b>              |
| 8                                            | <b>Lincoln Elementary School</b><br>Condensing Boilers           | \$129,669  | 4,892. Therms                                  | \$9,614                            | 28.6                 | <b>13.5</b>            |
| 9                                            | <b>Lincoln Elementary School</b><br>Lighting Upgrades            | \$122,568  | 0. Therms<br>20,786 kWh                        | \$4,225                            | 7.4                  | <b>15.9</b>            |
| 10                                           | <b>Washington Elementary School</b><br>Lighting Upgrades         | \$92,742   | 0. Therms<br>23,191 kWh                        | \$4,262                            | 8.3                  | <b>17.1</b>            |
| 11                                           | <b>Jefferson Elementary School</b><br>Condensing Boilers         | \$129,670  | 1,780. Therms                                  | \$7,376                            | 10.4                 | <b>17.6</b>            |
| 12                                           | <b>Harrison School Building</b><br>Lighting Upgrades             | \$113,280  | 0. Therms<br>14,543 kWh                        | \$2,514                            | 5.2                  | <b>18.7</b>            |
| 13                                           | <b>Wilson Elementary School</b><br>Lighting Upgrades             | \$114,123  | 0. Therms<br>26,529 kWh                        | \$4,371                            | 9.5                  | <b>20</b>              |
| 14                                           | <b>Grover Cleveland Middle School</b><br>Lighting Upgrades       | \$411,184  | 0. Therms<br>93,189 kWh                        | \$16,107                           | 33.2                 | <b>20.2</b>            |
| 15                                           | <b>Jefferson Elementary School</b><br>Lighting Upgrades          | \$77,767   | 0. Therms<br>28,608 kWh                        | \$5,381                            | 10.2                 | <b>20.2</b>            |
| 16                                           | <b>Wilson Elementary School</b><br>Condensing DHW                | \$4,178    | 227. Therms<br>0 kWh                           | \$192                              | 1.3                  | <b>21.7</b>            |

1. Engineers Probable Construction Cost takes into account any applicable rebates.

2. Annual Fiscal Savings takes into account additional O&M cost or savings associated with the measure.

3. Negative savings, or increased energy consumption resulting from a measure, are indicated in red, with parentheses

4. This project may be eligible for higher incentives through the NJCEP Pay for Performance (P4P) program. Please see Section 7 for more information.

## Renewable Energy Technologies

### Solar Energy

Section 4 of the report provides for an economic evaluation of a solar energy system at several of the Board facilities. The evaluation covered the economic feasibility of the Board installing a solar energy system under a typical construction contract and to assume full responsibility of the operation of such a system.

Based on a simple payback model, summarized in Table ES-3, the Board should not investigate the installation of a solar energy system at these 14 buildings. Other options such as Power Purchase Agreements are potentially available as well to help finance the project. Solar technology is constantly changing and will most likely continue to lower in price.

Two major factors influencing the project financial evaluation are the variance of the prevailing energy market conditions and Solar Renewable Energy Credit (SREC) rates. The largest impact to the payback model is the SREC credit pricing. For the payback model, conservative estimates of the SREC's market value over a 25 year period are assumed. These are discussed in Section 4.

Table ES-3 includes a simple payback analysis for the installation of a solar energy system at the identified Board buildings.

**Table ES-3**  
**Simple Payback Analysis for Solar Energy Systems**

| Building                       | Retrofit Cost | Annual SREC Credit | First Year Production | Annual Fiscal Savings | Simple Payback (Years) |
|--------------------------------|---------------|--------------------|-----------------------|-----------------------|------------------------|
| Harrison School Building       | \$1,000,000   | \$32,558           | 178,350               | \$64,661              | 20.5                   |
| James Caldwell High School     | \$1,600,000   | \$54,263           | 297,250               | \$98,850              | 21.5                   |
| Grover Cleveland Middle School | \$1,000,000   | \$32,558           | 178,350               | \$59,310              | 22.4                   |
| Washington Elementary School   | \$192,000     | \$6,946            | 38,048                | \$13,794              | 28.0                   |
| Wilson Elementary School       | \$150,000     | \$5,426            | 29,725                | \$10,182              | 32.6                   |
| Jefferson Elementary School    | \$120,000     | \$4,341            | 23,780                | \$8,621               | 33.8                   |
| Lincoln Elementary School      | \$196,000     | \$3,473            | 19,024                | \$7,278               | 35.5                   |

### Wind Power Generation

Section 4 of the report provides for an economic evaluation of a wind turbine energy system. The evaluation covered the economic feasibility of furnishing and installing a wind turbine energy system under a typical construction contract and to assume full responsibility of the operation of such a system.

CDM completed a preliminary desktop wind power production analysis and has concluded that the Board should reevaluate on site wind power when NJ clean energy incentives are published.

Wind power is a renewable energy source which also qualifies for Renewable Energy Certificates (REC's). The prevailing energy market, Renewable Energy Incentive Program (REIP) and REC's comprise the major factors influencing a wind turbine simple payback. Other options, such as government bonds or a Power Purchase Agreement are potentially available to assist with the financing of this project.

## Recommended ECRMs

Table ES-4 summarizes the Total Engineer's Opinion of Probable Construction Cost. Annual energy savings, projected annual energy, and O&M cost savings, and the payback period are also summarized. This data is based on the implementation of all of the above recommended ECRMs.

**Table ES-4**  
**Recommended ECRM's**

| Total Engineer's Opinion of Probable Construction Cost | Projected Annual Energy Savings | Projected Annual Fiscal Savings | Simple Payback Period (years) |
|--------------------------------------------------------|---------------------------------|---------------------------------|-------------------------------|
| \$1,651,265                                            | 8,112 Therms<br>331,044 kWh     | \$77,376                        | <b>21.3</b>                   |

Please note: savings and costs does not include the combined heat and power measure.

## Operation and Maintenance Measures

### Operation and Maintenance

The person who is responsible for the operation of these systems has the greatest influence on the energy usage of the system. The building energy usage is recorded monthly which creates a simple measure for the person responsible to evaluate the increase of system efficiency, specifically the reduction of energy wasted. Some building owners provide incentives for lower energy bills, including financial bonuses to responsible parties, or redirecting energy cost savings into other building funds.

# Section 1

## Introduction

### 1.1 General

As part of an initiative to reduce energy cost and consumption, Caldwell-West Caldwell Board of Education has secured the services of Camp Dresser McKee & Smith (CDM Smith) to perform an energy audit at seven (7) facilities in an effort to develop comprehensive energy conservation initiatives. The costs associated with this energy audit report qualify for reimbursement through New Jersey Clean Energy Local Government Energy Audit Program.

The performance of an Energy Audit requires a coordinated phased approach to identify, evaluate and recommend energy conservation and retrofit measures (ECRM). The various phases conducted under this Energy Audit included the following:

Gather preliminary data on all facilities;

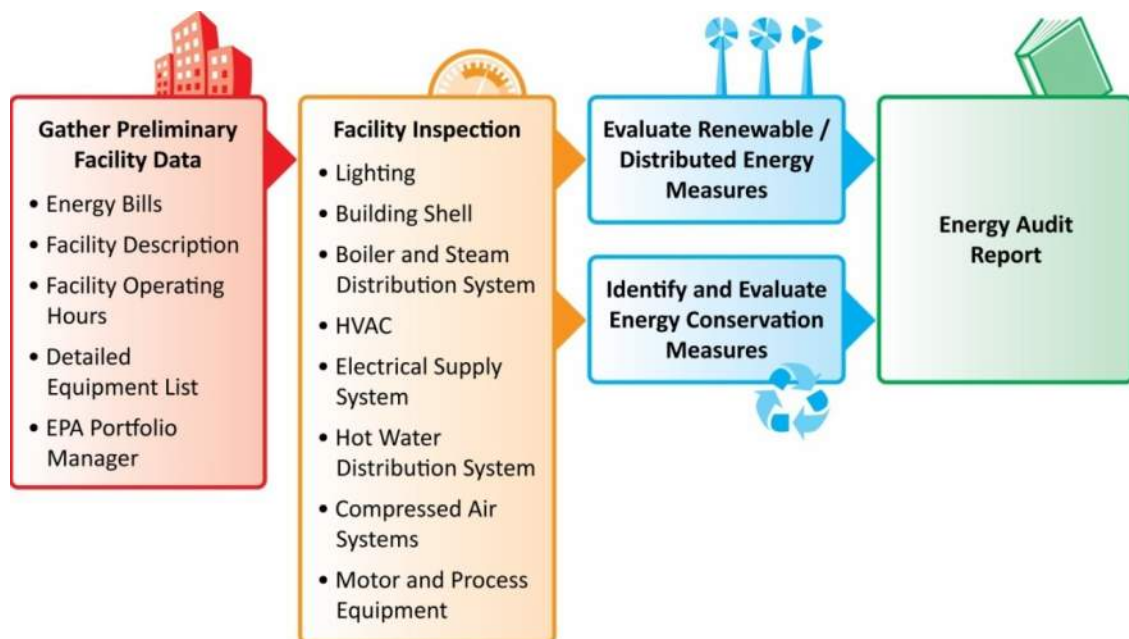
Facility inspection;

Identify and evaluate potential ECRMs and evaluate renewable/distributed energy measures;

Develop the energy audit report.

Figure 1-1 is a schematic representation of the phases utilized by CDM Smith to prepare the Energy Audit Report

**Figure 1-1: Energy Audit Phases**



## 1.2 Purpose and Scope

An energy audit includes conducting a survey of a facility and analyzing its energy consumption. This effort provides a list of potential capital-intensive improvements (energy conservation and retrofit measures, or ECRMs). These ECRM's require more thorough data collection and engineering analysis, along with an estimate of associated potential costs and savings.

The objective of this energy audit is to identify energy conservation and retrofit measures. In an effort to reduce facility energy usage and to develop an economic basis to financially validate the planning and implementation of ECRM's.

Significant energy savings may be available with retrofits to the heating and cooling systems and lighting systems. It should be noted that the magnitude of energy savings available is not only dependent on the type of heating, lighting or insulation systems in use. Available savings also depend on the age and condition of the equipment and the capital available to implement major changes. The rising cost of power and the desire to minimize dependence on foreign oil supplies, energy consumption are taking a higher priority across the nation. Feasible alternatives for reducing energy consumption and operating costs must be evaluated on a case-by-case basis.

The purpose of this energy audit is to identify the various critical building comfort systems that are major consumers of electrical energy and are clear candidates for energy savings measures. In addition, potential energy producing systems such as solar electric and wind energy systems were also evaluated. A discussion on these technologies is included in Section 4 Energy Conservation and Retrofit Measures (ECRM).

In addition to identifying ECRMs and the potential for on-site energy generation, there is potential for further energy cost savings through the use of a third party energy supplier and participation in a Demand Response Program. This is discussed further in Section 5.

## Section 2

# Building Description

The energy audit included an evaluation of the building's envelope (exterior shell) to determine the components' effective R-values to be utilized in the building model and to locate and fix any thermal weaknesses that may be present. The components of a building envelope include the exterior walls, foundation and roof. The construction and material, age and general condition of these components, including exterior windows and doors, impact the building's energy use.

### 2.1 James Caldwell High School

James Caldwell High School appears to have been constructed in 1959 with an addition that was constructed in 1967 and is approximately 140,251 square feet. It is normally occupied by approximately 785 students. The school is generally open from 6 AM to 6 PM.

#### 2.1.1 Description of Building Envelope

The James Caldwell High School was built in 1959. The building has multiple additions. The original building is masonry wall construction. The additions are steel structure with CMU infill and brick façade. The building roofs are all flat with bitumen rolls. The walls and roof are assumed to have minimal insulation installed.

The building has 2 generations of windows. The original windows are single pane with aluminum frame. Many repairs to these windows were observed. The new windows are double pane with interstitial blinds. The frames are constructed of aluminum with thermal breaks.

#### 2.1.2 Description of Building HVAC

The building spaces are conditioned by Nesbitt hot water unit ventilators and gas-fired roof top units. The original building is conditioned by the original unit ventilators. These units have pneumatic actuators on the outdoor air dampers and hot water control valve. The science wing has York gas-fired roof top units. The roof top unit furnaces are rated at 80% efficient.

The heating hot water is generated by five Aerco Benchmark 3.0 condensing boilers. Each boiler is rated at 3,000 MBH input capacity and 95% efficient. The boiler room was upgraded in 2009. There are three 15HP Taco hot water pumps, with variable speed drives. The hot water pump motors are rated at 93% efficient.

The space cooling is provided by roof top units. The science wing units are gas heated and dx cooled. The administration offices are cooled by dx roof top units. There are window air conditioning units in several classrooms.

The building has two Aerco KC1000 domestic water heaters. Each unit is rated at 1,000 MBH and 95% efficient with 23 gallons of storage. The building has a mix of pneumatic controls and DDC.

The buildings have a mix of controls. The controls are generally pneumatic for local thermostats, unit-vent control valves and dampers. Pneumatic control panels were observed for large HV units and exhaust fans. The roof top air conditioner units are self-controlled with local thermostats. The central boiler plant is direct digital controlled. The headend is located in the Harrison facilities office.

### 2.1.3 Description of Building Lighting

The building lighting is fluorescent T8 with some T5 and compact fluorescent lamps. The gymnasium lighting has been recently upgraded to LED lamped fixtures. The lighting controls are manual. The only occupancy sensors were observed in the staff areas of the updated kitchen. All recorded lighting levels appear to be appropriate for their spaces.

Building plug loads are primarily computers and office related equipment. The building had approximately 137 desktop computers. The cafeteria kitchen equipment is gas heated. Science classes have lab equipment and aquarium or terrariums. Building electrical systems are in good condition.

## 2.2 Grover Cleveland Middle School

Grover Cleveland Middle School appears to have been constructed in 1950's and is approximately 103,520 square feet. It is normally occupied by approximately 617 students. The building is typically occupied from 7 am to 6 pm weekdays.

### 2.2.1 Description of Building Envelope

The Grover Cleveland Middle School was built around 1940. The building walls are solid brick with plaster interior finish. The exterior of the building is in good condition and shows evidence of many repairs. The building has at least one addition. The additions are steel framed with brick exterior walls and drywall interior. The addition is assumed to have R-11 insulation in the walls and R-19 insulation in the ceiling. The original building is assumed to have no insulation installed.

The building windows were upgraded. The windows have aluminum frames and have a double hung configuration. The window glass is double pane with interstitial blinds. Doors are aluminum framed full light and insulated metal clad half light configurations. The door glazing is typically double pane.

### 2.2.2 Description of Building HVAC

The building is heated by hot water unit ventilators and radiators. The unit ventilators that are original to the building are manufactured by Nesbitt and have pneumatic controls. The addition has AAF unit ventilators. The space heating is controlled by local pneumatic thermostats. The large areas have air handling units to supply heating and outdoor ventilation air.

The heating hot water is supplied by central hot water boiler plant. The plant has seven hot water boilers. Each boiler is a Laars HH100MN natural gas-fired rated at 1,000 MBH input capacity and 85% combustion efficiency. The boilers were manufactured in 1997.

The hot water is circulated through the radiation by two pairs of 15 HP pumps for the main building and 7.5 HP pumps for the addition. The hot water pumps for the main building are manufactured by Taco and have Marathon motors, rated at 91% efficiency. The hot water pumps for the addition are manufactured by Bell & Gossett and have Marathon motors rated at 84% efficiency. These pumps operate at a constant speed.

The only spaces that have cooling are cooled by window air conditioning units. These typically have about 2 tons of cooling capacity and five or more years old.

There is one domestic water heater in the boiler room. It was manufactured by AO Smith in 2009. The domestic water heater is gas fired and rated at 80% efficiency and has a storage capacity of 95 gallons.

The buildings have a mix of controls. The controls are generally pneumatic for local thermostats, unit-vent control valves and dampers. The central boiler plant is direct digital controlled. The headend is located in the Harrison facilities office.

### 2.2.3 Description of Building Lighting

The building lighting is primarily 4 foot T8 lamps. The fixtures appear to have been retrofitted with new electronic ballasts and T8 lamps. These lamps are installed in a variety of fixture configurations including 1X4 surface and suspended, and 2X4 and 2X2 recessed and surfaced.

Many fixtures are retrofitted with compact fluorescent lamps. Some T12 lamps and magnetic ballasts remain. All observed exit fixtures are LED lamped. The lighting controls are all manual. The only occupancy sensors were observed in the staff areas of the updated kitchen.

Building plug loads are primarily computers and office related equipment. The building had approximately 111 desktop computers. The cafeteria kitchen equipment is gas heated. Building electrical systems are in good condition.

## 2.3 Jefferson Elementary School

Jefferson Elementary School appears to have been constructed in 1920's and is approximately 25,055 square feet. It is normally occupied by approximately 308 students. The building is typically occupied from 7 am to 4 pm weekdays.

### 2.3.1 Description of Building Envelope

Jefferson Elementary has concrete block construction with brick façade. The building is assumed to have no insulation installed in the walls. Building windows were replaced between 10 and 20 years ago. The new windows are aluminum frame with double pane and interstitial blinds. The windows are in good condition. The exterior doors are typically half light metal doors.

The building roof is built up roofing with stone ballast. The building has an addition with EPDM roofing. The roof is assumed to have an R value of R-19.

### 2.3.2 Description of Building HVAC

The building spaces are conditioned by Nesbitt unit ventilators with pneumatic controls. The unit ventilators are original to the building. There are three Lennox gas-fired roof top units, which provided group rooms with heating and cooling. The roof top units are rated at 65 MBH of heating and 2 tons of cooling.

The heating hot water is supplied by three Teledyne steam boilers. The boilers are rated at 1,000 MBH and 80% efficient. They were manufactured in 1997. At the time of the field visit, the boilers were removed. The boiler information included is from the boiler certificate of the equipment that was removed. The boilers to be installed are Aerco condensing hot water boilers.

The administrative offices, a few classrooms, and the library are cooled by window air conditioning units.

The building has one domestic water heater, manufactured by Rheem. It is gas-fired and rated at 38 MBH input and has a storage capacity of 40 gallons.

### 2.3.3 Description of Building Lighting

The building lighting is primarily 4 foot T8 lamps. The fixtures appear to have been retrofitted with new electronic ballasts and T8 lamps. These lamps are installed in a variety of fixture configurations including 1X4 surface and suspended, and 2X4 and 2X2 recessed and surfaced. The lighting controls observed were manual switches.

Many fixtures are retrofitted with compact fluorescent lamps. The gym and locker rooms have T5 lamp fixtures. Some T12 lamps and magnetic ballasts remain. Some incandescent and halogen lamps remain. All observed exit fixtures are LED lamped.

Building plug loads are primarily computers and office related equipment. The building had approximately 43 desktop computers. The cafeteria kitchen equipment is gas heated. Building electrical systems are in good condition.

## 2.4 Lincoln Elementary School

Lincoln Elementary School appears to have been constructed in 1920's and is approximately 31,509 square feet. It is normally occupied by approximately 232 students. The building is typically occupied from 7 am to 4 pm weekdays.

### 2.4.1 Description of Building Envelope

The original building exterior walls are 18 inch thick solid brick. These walls are assumed to have an insulation value of R-4. The building additions are steel with brick or stucco façade. The addition is assumed to have R-11 walls. The building roof is bitumen rolls. The roof is assumed to have an R-19 insulation value. The addition roof is steel decking on

Building windows were replaced between 10 and 20 years ago. The new windows are aluminum frame with double pane and interstitial blinds. The windows are in good condition. The exterior doors are typically half light metal doors.

### 2.4.2 Description of Building HVAC

The building spaces are conditioned by Nesbitt unit ventilators with pneumatic controls. There is one Lennox gas-fired roof top unit, which provides heating and cooling.

The heating hot water is generated by three hot water boilers. Each boiler is a Laars HH1000MN natural gas fired rated at 1,000 MBH input. There are a total of four hot water pumps. The first pair of hot water pumps are Taco and the motors are rated 82.5% efficiency. The second pair of hot water pumps are Bell & Gossett with motors are rated at 81.5% efficiency.

The space cooling is provided by one gas-fired roof top unit and window air conditioning units. The roof top unit cools Special Ed room R2 and R3, while the window air conditioning units cool the administrative offices and several classrooms.

The building has four domestic water heaters. One domestic water heater is located in the boiler room and is manufactured by AO Smith. It is gas-fired rated at 40 MBH input and 80% efficiency, and has a storage capacity of 40 gallons. There is an electric domestic water heater located in the store room. The unit is

manufactured by Slate. The unit has a storage capacity of 120 gallons and 3 heating elements rated at 6 kW each.

The building has some DDC controls for the roof top units.

### 2.4.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. Classrooms and offices have occupancy sensors to control the lighting. Other fixtures have retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building plug loads are primarily computers and office related equipment. The building had approximately 48 desktop computers. Many classrooms have projectors. The cafeteria kitchen equipment is gas heated. Building electrical systems are accessible and in good condition. Each addition has different electrical layouts.

## 2.5 Washington Elementary School

Washington Elementary School was constructed in 1949 and is approximately 44,340 square feet. It is normally occupied by approximately 360 students. The building is typically occupied from 7 am to 4 pm weekdays.

### 2.5.1 Description of Building Envelope

The exterior walls are block with brick facade. These walls are assumed to have an insulation value of R-4. The building has an addition, which appears to be steel framed with masonry walls and brick façade. The building roof is bitumen rolls for the flat roof and slate on the peaked portion. The addition roof is steel decking on steel trusses. The roof of the entire building is assumed to have an R-19 insulation value.

Building windows were replaced between 10 and 20 years ago. The new windows are aluminum frame with double pane glazing. Some windows have blinds between the panes. Some of the windows are wood framed with interstitial blinds. The windows are in good condition. The exterior doors are typically half light metal doors.

### 2.5.2 Description of Building HVAC

The building spaces are conditioned by Nesbitt steam unit ventilators. The unit ventilators are original to the building and have pneumatic controls.

The heating steam is generated by two HB Smith steam boilers. The boilers were manufactured in 2009 and are rated at 2,845 MBH input and 82% efficiency.

The space cooling is provided by two gas-fired roof top units and window air conditioning units. The two roof top units are manufactured by York and Lennox, and cool the Skills and Special Education rooms. They provide 4 and 2 tons of cooling, respectively. The window air conditioning units provide cooling for various classrooms and administrative offices.

The building has one domestic water heater in the boiler room. The unit is gas-fired and rated at 38 MBH input, and has a storage capacity of 40 gallons. The domestic water heater is manufactured by Rheem in 2014.

### 2.5.3 Description of Building Lighting

The lighting system is primarily 2X4 surface mounted and 2X4 recessed T8 fixtures. Classrooms and offices have occupancy sensors to control the lighting. Other fixtures have retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building plug loads are primarily computers and office related equipment. The building had approximately 47 desktop computers. The cafeteria kitchen equipment is gas heated. Building electrical systems are in good condition. Each addition has different electrical layouts.

## 2.6 Wilson Elementary School

Wilson Elementary School was constructed in 1967 and is approximately 30,650 square feet. It is normally occupied by approximately 360 students. The building is typically occupied from 7 am to 4 pm weekdays.

### 2.6.1 Description of Building Envelope

The building exterior walls are steel structure with masonry infill. The exterior surface is a mix of brick and stucco. The interior is drywall. These walls are assumed to have R-11 walls. The building roof is bitumen rolls. The flat portion of the roof has stone ballast. The roof is assumed to have an R-8 insulation value.

Building windows were replaced between 10 and 20 years ago. The new windows are aluminum frame with double pane and interstitial blinds. The windows are in good condition. The exterior doors are typically half light metal doors.

### 2.6.2 Description of Building HVAC

The building spaces are conditioned by Nesbitt unit ventilators with hot water heating coils. The unit ventilators are original to the building. There is an original Nesbitt heating and ventilation unit, which serves the gymnasium. There are two Trane air handling units, which serve the faculty lounge and resource room. The air handling units were manufactured in 1995. The units have indoor dx cooling coils and outdoor, air-cooled condensing units rated at 2.5 and 5 tons of cooling, respectively. These units have electric heating coils.

The hot water heating is generated by two Aerco Benchmark 2.0 condensing boilers. The boilers were manufactured in 2009 and are rated at 2,000 MBH input capacity and 95% efficiency. There are six hot water pumps divided into three pump zones. The pumps were manufactured by Taco in 2009. The pump motors are rated at 5 HP and 90.2% efficiency.

The space cooling is provided by window air conditioning units, serving administrative offices, a few classrooms, and the library.

The building has four gas-fired domestic water heaters in the boiler room. The domestic water heaters were manufactured by AO Smith in 2005. They are rated at 40 MBH input with 80% efficiency, and have a storage capacity of 40 gallons.

### 2.6.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. Classrooms and offices have occupancy sensors to control the lighting. Other fixtures have retrofitted with CFL's. All observed exit fixtures are LED lamped. Lighting controls are all manual. Occupancy sensors were only observed in staff areas such as the copy room.

Building plug loads are primarily computers and office related equipment. The building had approximately 49 desktop computers. The cafeteria kitchen equipment is gas heated. Building electrical systems are in good condition. Each addition has different electrical layouts.

## 2.7 Harrison School Building

Harrison School Building was constructed in 1967 and is approximately 31,825 square feet. It is normally occupied by approximately 150 students. Harrison School houses a preschool and the district administration offices. The building is typically occupied from 7 am to 5 pm weekdays.

### 2.7.1 Description of Building Envelope

The building exterior walls are steel structure with masonry infill. The exterior walls are block with brick facade. The interior is drywall or paneling. The building roof is bitumen rolls. The roof is assumed to have an R-8 insulation value.

The windows are part of wall system. This system includes aluminum frame and single pane glazing. The unglazed portion has solid panel. The windows and panels show signs of repairs and are in fair condition. These windows are assumed to be due for replacement. The exterior doors are typically half light metal doors.

### 2.7.2 Description of Building HVAC

The building spaces are conditioned by Nesbitt hot water unit ventilators in the classrooms. The administrative offices are heated and cooled by packaged terminal air conditioning units of various age and manufacturer.

The heating hot water is generated by two Aerco Benchmark 3.0 condensing boilers. The boilers were manufactured in 2009 and are rated at 3,000 MBH input. There are two hot water pumps located in the boiler room. The pumps were manufactured by Bell & Gossett in 2003 and the motors are rated at 5 HP and 87.5% efficiency.

The space cooling is provided by window air conditioning units, serving the administrative offices and classrooms. The space heating is provided by Electrolux electric unit heaters.

There is one gas-fired domestic water heater located in the boiler room. It was manufactured by Rheem in 2011. It is rated at 75 MBH input, and 80% efficiency, and has a storage capacity of 72 gallons.

### 2.7.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed fixtures. Fixtures have primarily T12 lamps and magnetic ballasts. Some spaces have T8 fixtures with electronic ballasts. Other fixtures have incandescent lamps or have been retrofitted with CFL's. Observed exit fixtures are LED or fluorescent lamped. Lighting controls are manual in classrooms. Lighting controls in the administration offices are occupancy sensors.

Building plug loads are primarily computers and office related equipment. The building had approximately 34 desktop computers. The cafeteria has no major kitchen equipment. Building electrical systems are in good condition.

## Section 3

# Baseline Energy Use

### 3.1 Utility Data Analysis

The first step in the energy audit process is the compilation and quantification of the facility's current and historical energy usage and associated utility costs. It is important to establish the existing patterns of electricity, gas, and oil usage in order to be able to identify areas in which energy consumption can be reduced.

For this study, the monthly gas and electric bills per facility are analyzed and unit costs of energy were obtained. The unit cost of energy is as determined from the information provided by the Board. These costs are used to determine the feasibility of switching from one energy source to another or reducing energy demand to generate annual cost savings.

#### 3.1.1 Electric Charges

It is also important to understand how the utilities charge for the service. The majority of the energy consumed is electric as a result of both indoor and outdoor lighting and appliances, such as kitchen appliances, computers, printers and projectors. Electricity is charged by three basic components: electrical consumption (kWh), electrical demand (kW) and power factor (kVAR) (reactive power). The cost for electrical consumption is similar to the cost for fuel. The monthly consumption appears on the utility bill as monthly kWh with a unit cost associated with it. The service connections are either billed on a flat rate or time of day rates per kWh.

Electrical demand can be as much as 50 percent or more of the electric bill. The maximum demand (kW value) during the billing period is multiplied by the demand cost factor and the result is added to the electric bill. It is often possible to decrease the electric bill by 15 – 25 percent by reducing the demand, while still using the same amount of energy. The rates for these buildings did not appear to have a ratchet. A ratchet rate for demand charges the highest measured demand for multiple months. This increases the penalty of high electrical demand.

The power factor (reactive power) is the power required to energize electric and magnetic fields that result in the production of real power. Power factor is important because transmission and distribution systems must be designed and built to manage the need for real power, as well as the reactive power component (the total power). If the power factor is low, then the total power required can be greater than 50 percent than the real power alone. The power factor charge is a penalty for having a low power factor. Fortunately, this penalty charge does not impact the Board.

The other parts of the electric bill are the supply charges, delivery charges, system benefits, transmission revenue adjustments, state and municipality tariff surcharges and sales taxes, which cannot be avoided.

Public Service Electric & Gas (PSE&G) is the current distributor and supplier of electric energy for all Board facilities included in this report.

### 3.1.2 Natural Gas Charges

PSE&G is the current distributor of natural gas for all Board facilities included in this report. The natural gas supplier is unclear for the majority of the schools. The Board should verify natural gas costs before moving forward on energy savings projects.

## 3.2 Facility Results

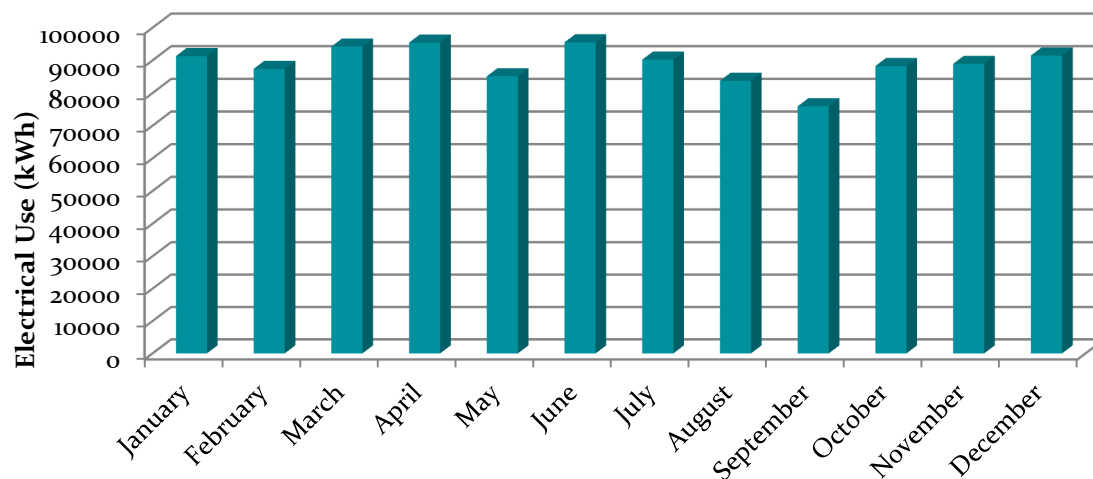
### 3.2.1 James Caldwell High School

Electric power for James Caldwell High School is fed from from PSE&G. Figure 3.2-1 illustrates the monthly total energy consumption from July, 2014 through July, 2015.

From this graph, it can be determined that the average electrical consumption for James Caldwell High School is approximately 89,000 kWh/month.

Table 3.2-1 illustrates the seasonal peak demand loads for James Caldwell High School from July, 2014 through July, 2015. Monthly consumption rates have been re-ordered as needed to illustrate a typical January-December year. This approach has been taken for all monthly utility consumption graphs shown in this report. The information presented is only as recent as the most recent bill received.

**Figure 3.2-1: James Caldwell High School Electricity Usage**



The most recent tariff rates available at the time of this audit for the electrical service at James Caldwell High School, from PSE&G are as follows:

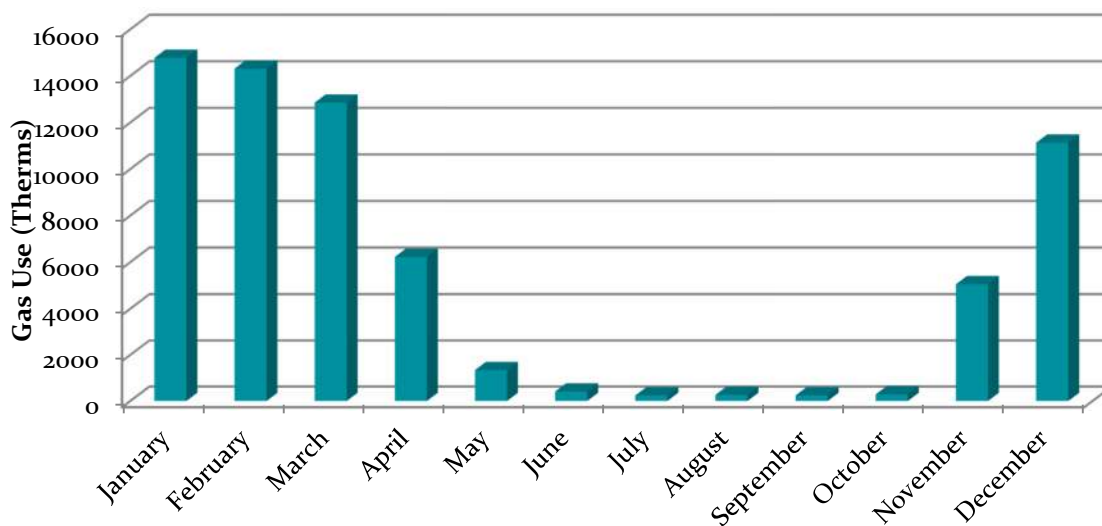
|                                          |                              |
|------------------------------------------|------------------------------|
|                                          | <b>Acct #: 42 008 458 06</b> |
| Service Charge:                          | \$372.11/month               |
| October-May Delivery Service Charges:    | \$0.003603/kWh               |
| June-September Delivery Service Charges: | \$0.010246/kWh               |
| Demand Charge:                           | \$3.6248/kW                  |
| Summer Demand Charge:                    | \$8.6237/kW                  |
| Societal Benefits Charge:                | \$0.004828/kWh               |
| Securitization Transition:               | \$0.007258/kWh               |
| October-May Supply Service Charges:      | \$0.079373/kWh               |
| June-September Supply Service Charges:   | \$0.084455/kWh               |

**Table 3.2-1: James Caldwell High School Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 113              |
| Winter | 95               |

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -2 illustrates the monthly average natural gas consumption at James Caldwell High School from July, 2014 through July, 2015.

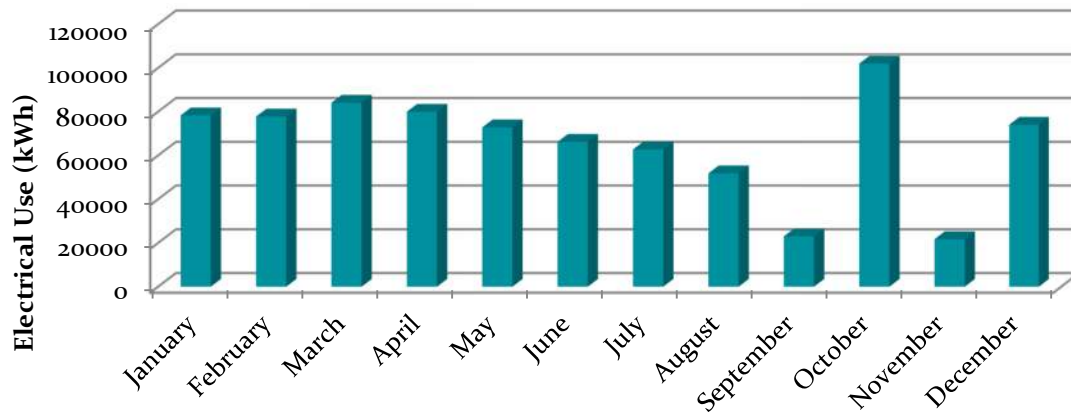
**Figure 3.2-2: James Caldwell High School Gas Usage**

### 3.2.2 Grover Cleveland Middle School

Electric power for Grover Cleveland Middle School is fed from one General Service Secondary three phase line PSE&G. Figure 3.2-3 illustrates the average monthly total energy consumption from June, 2014 through August, 2015.

From this graph, it can be determined that the average electrical consumption for Grover Cleveland Middle School is approximately 66,000 kWh/month.

Table 3.2-2 illustrates the seasonal peak electrical demand loads for Grover Cleveland Middle School from June, 2014 through August, 2015. The information presented is only as recent as the most recent bill received.

**Figure 3.2-3: Grover Cleveland Middle School Electricity Usage**

The most recent tariff rates available at the time of this audit for the electrical service at Grover Cleveland Middle School, from PSE&G are as follows:

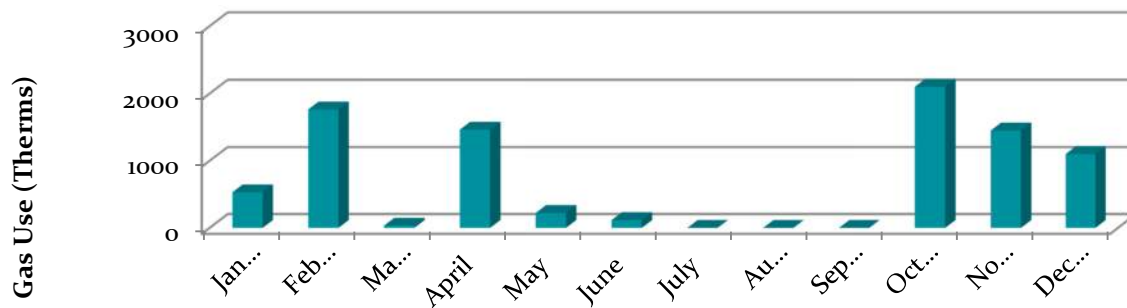
|                                        |                                        |                              |
|----------------------------------------|----------------------------------------|------------------------------|
|                                        |                                        | <b>Acct #: 42 000 021 08</b> |
| Service Charge:                        |                                        | \$372.11/month               |
| October-May Supply Service Charges:    |                                        | \$0.003603/kWh               |
| June-September Supply Service Charges: |                                        | \$0.010246/kWh               |
| Demand:                                |                                        | \$3.6248/kW                  |
| Summer Demand Charge:                  |                                        | \$8.6237/kW                  |
| Societal Benefits Charge:              |                                        | \$0.004828/kWh               |
| Securitization Transition:             |                                        | \$0.007258/kWh               |
|                                        | October-May Supply Service Charges:    | \$0.079373/kWh               |
|                                        | June-September Supply Service Charges: | \$0.084455/kWh               |

**Table 3.2-2: Grover Cleveland Middle School Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 192              |
| Winter | 193              |

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -4 illustrates the monthly average natural gas consumption at Grover Cleveland Middle School from June, 2014 through August, 2015.

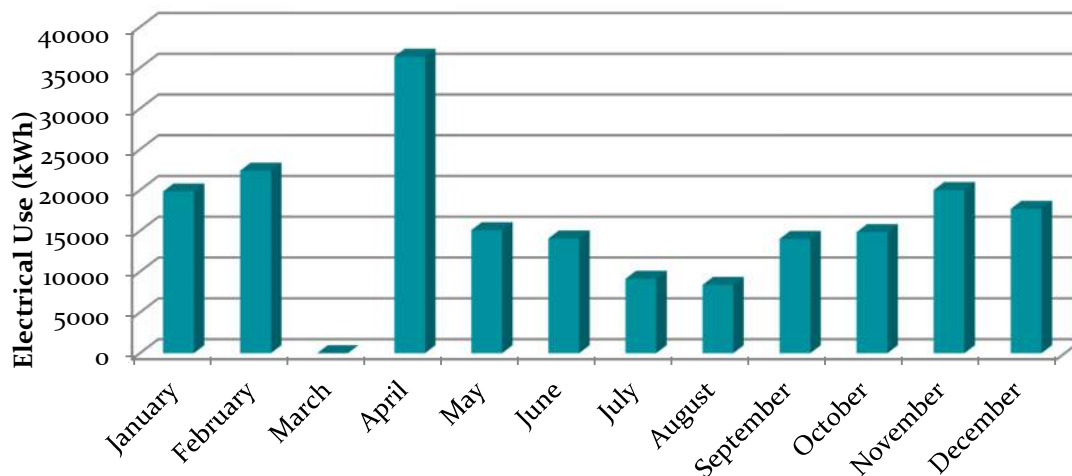
**Figure 3.2-4: Grover Cleveland Middle School Gas Usage**

### 3.2.3 Jefferson Elementary School

Electric power for Jefferson Elementary School is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-5 illustrates the average monthly total energy consumption from July, 2014 through July, 2015.

From this graph, it can be determined that the average electrical consumption for Jefferson Elementary School is approximately, 16,000 kWh/month.

Table 3.2-3 illustrates the seasonal peak electrical demand loads for Jefferson Elementary School from July, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

**Figure 3.2-5: Jefferson Elementary School Electricity Usage**

The most recent tariff rates available at the time of this audit for the electrical service at Jefferson Elementary School, from PSE&G are as follows:

|                                     |                              |
|-------------------------------------|------------------------------|
|                                     | <b>Acct #: 65 157 205 05</b> |
| Service Charge:                     | \$4.24/month                 |
| October-May Supply Service Charges: | \$0.071596/kWh               |

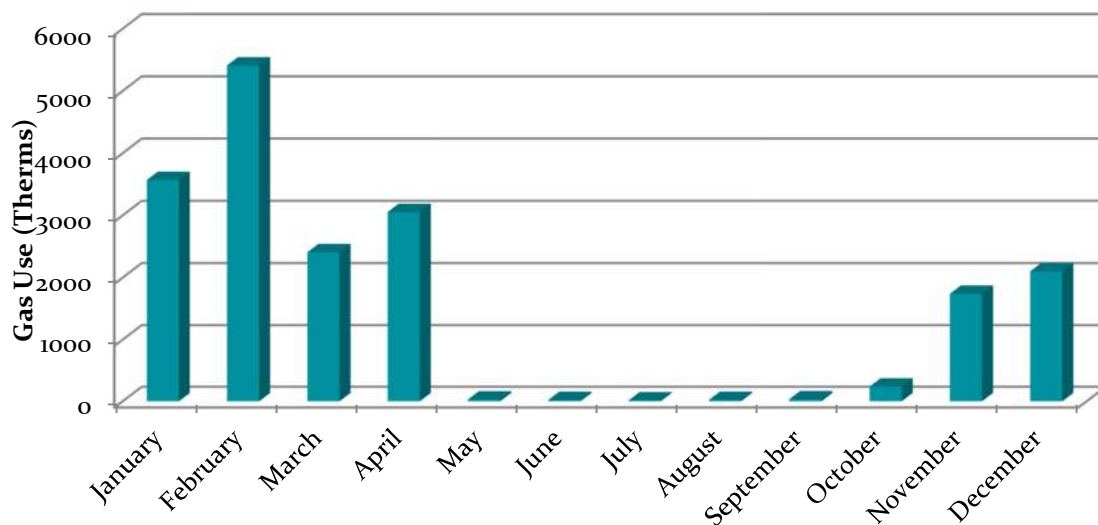
|                                                                                                                              |               |                     |
|------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|
| June-September Supply Service Charges:                                                                                       |               | \$0.073799/kWh      |
| Demand Charge:                                                                                                               |               | \$4.3627/kW         |
| Summer Demand Charge:                                                                                                        |               | \$8.0968/kW         |
| Societal Benefits Charge:                                                                                                    |               | \$0.004828/kWh      |
| Securitization Transition:                                                                                                   |               | \$0.007258/kWh      |
| Supply Service Charges:                                                                                                      | Generation:   | Data not available* |
|                                                                                                                              | Transmission: | \$0.003868/kWh      |
|                                                                                                                              | Charge:       | \$0.09858/kWh       |
| *Electricity for this facility is purchased from Direct Energy, which does not identify a generation charge in their billing |               |                     |

**Table 3.2-3: Jefferson Elementary School Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 63               |
| Winter | 65               |

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -6 illustrates the monthly average natural gas consumption at Jefferson Elementary School from July, 2014 through July, 2015.

**Figure 3.2-6: Jefferson Elementary School Gas Usage**

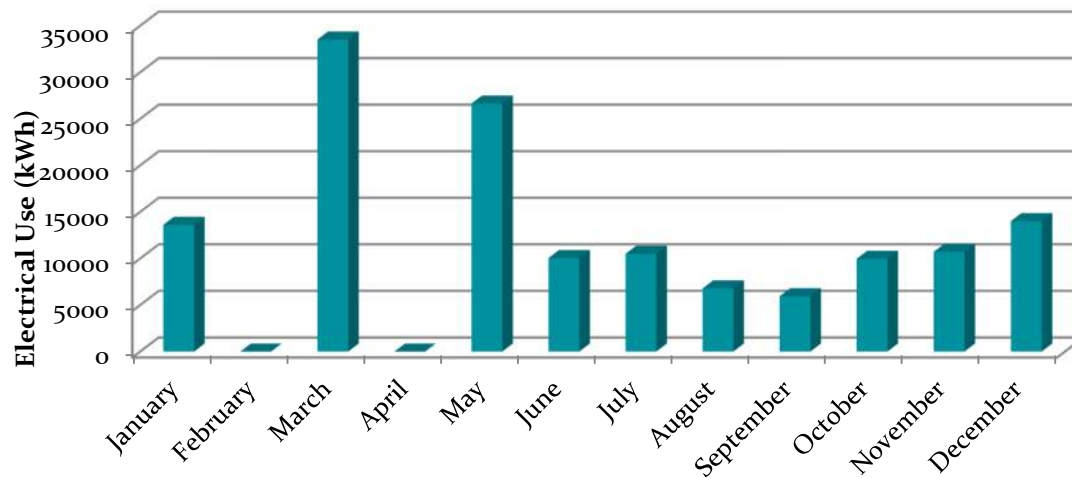
### 3.2.4 Lincoln Elementary School

Electric power for Lincoln Elementary School is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-7 illustrates the average monthly total energy consumption from July, 2014 through July, 2015.

From this graph, it can be determined that the average electrical consumption for Lincoln Elementary School is approximately 12,000 kWh/month.

Table 3.2-4 illustrates the seasonal peak electrical demand loads for Lincoln Elementary School from July, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

**Figure 3.2-7: Lincoln Elementary School Electricity Usage**



The most recent tariff rates available at the time of this audit for the electrical service at Lincoln Elementary School, from PSE&G are as follows:

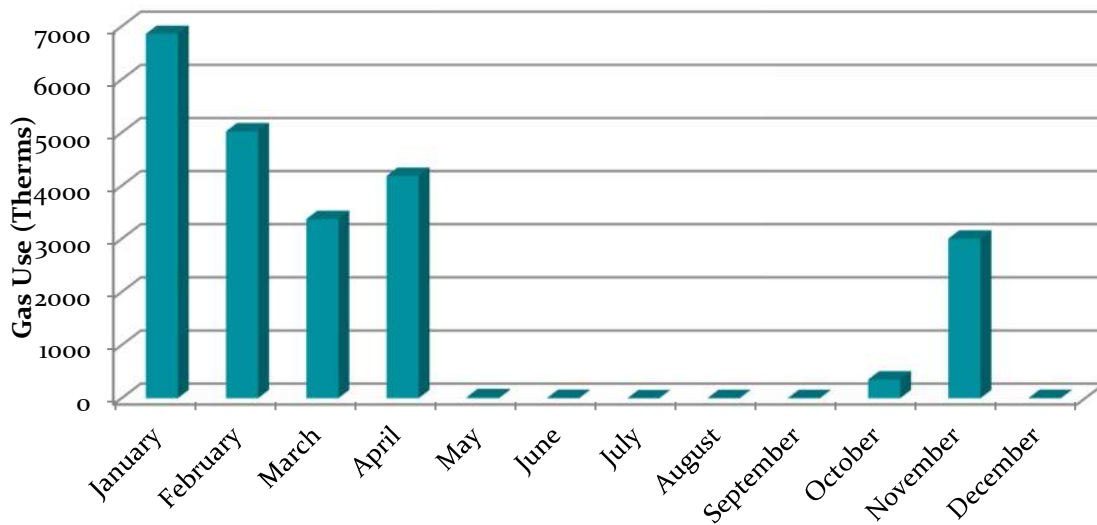
|                                                                                                                               |               |                              |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------|
|                                                                                                                               |               | <b>Acct #: 66 165 449 07</b> |
| Service Charge:                                                                                                               |               | \$4.24/month                 |
| October-May Supply Service Charges:                                                                                           |               | \$0.071596/kWh               |
| June-September Supply Service Charges:                                                                                        |               | \$0.073799/kWh               |
| Demand Charge:                                                                                                                |               | \$4.3627/kW                  |
| Summer Demand Charge:                                                                                                         |               | \$8.0968/kW                  |
| Societal Benefits Charge:                                                                                                     |               | \$0.004828/kWh               |
| Securitization Transition:                                                                                                    |               | \$0.007258/kWh               |
| Supply Service Charges:                                                                                                       | Generation:   | Data not available*          |
|                                                                                                                               | Transmission: | \$0.004536/kWh               |
|                                                                                                                               | Charge:       | \$0.09858/kWh                |
| *Electricity for this facility is purchased from Direct Energy, which does not identify a generation charge in their billing. |               |                              |

**Table 3.2-4: Lincoln Elementary School Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 30               |
| Winter | 16               |

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -8 illustrates the monthly average natural gas consumption at Lincoln Elementary School from July, 2014 through July, 2015.

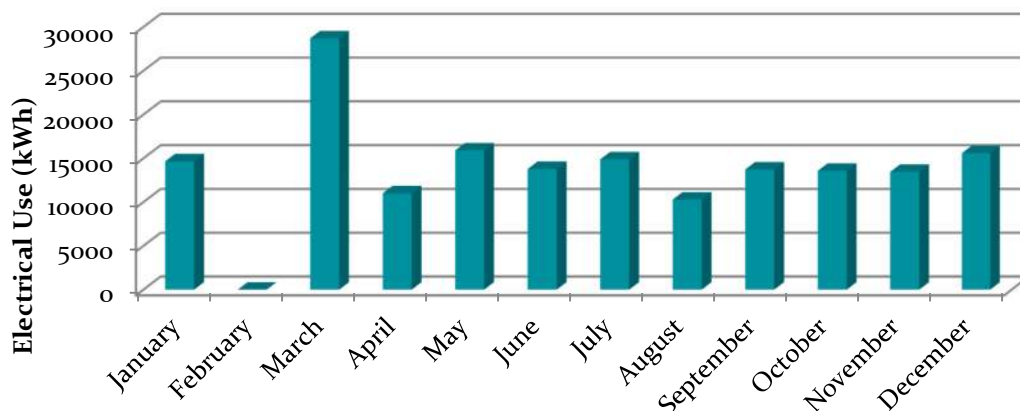
**Figure 3.2-8: Lincoln Elementary School Gas Usage**

### 3.2.5 Washington Elementary School

Electric power for Washington Elementary School is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-1 illustrates the average monthly total energy consumption from June, 2014 through June, 2015.

From this graph, it can be determined that the average electrical consumption for Washington Elementary School is approximately 14,000 kWh/month.

Table 3.2-5 illustrates the seasonal peak electrical demand loads for Washington Elementary School from June, 2014 through June, 2015. The information presented is only as recent as the most recent bill received.

**Figure 3.2-8: Washington Elementary School Electricity Usage**

The most recent tariff rates available at the time of this audit for the main electrical service at Washington Elementary School, from PSE&G are as follows:

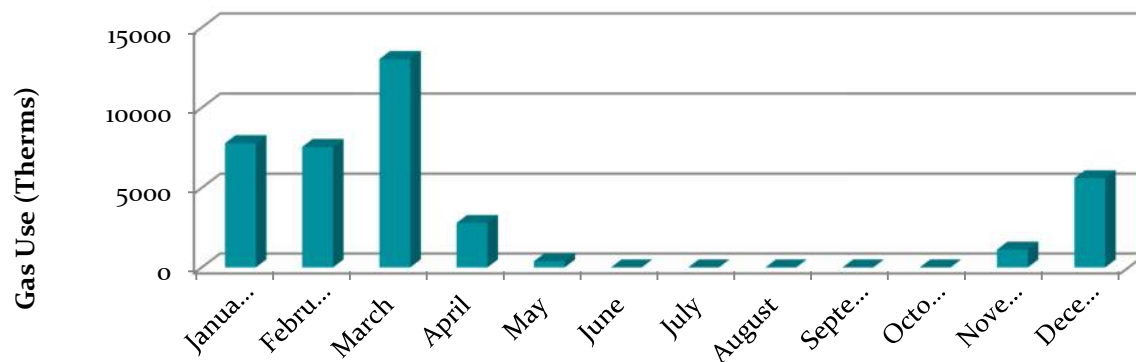
|                                                                                                                               |               |                              |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------|
|                                                                                                                               |               | <b>Acct #: 65 836 454 08</b> |
| Service Charge:                                                                                                               |               | \$4.24/month                 |
| October-May Supply Service Charges:                                                                                           |               | \$0.071596/kWh               |
| June-September Supply Service Charges:                                                                                        |               | \$0.073799/kWh               |
| Demand Charge:                                                                                                                |               | \$4.3627/kW                  |
| Summer Demand Charge:                                                                                                         |               | \$8.0968/kW                  |
| Societal Benefits Charge:                                                                                                     |               | \$0.004828/kWh               |
| Securitization Transition:                                                                                                    |               | \$0.007258/kWh               |
| Supply Service Charges:                                                                                                       | Generation:   | Data not available*          |
|                                                                                                                               | Transmission: | \$0.004221/kWh               |
|                                                                                                                               | Charge:       | \$0.09858/kWh                |
| *Electricity for this facility is purchased from Direct Energy, which does not identify a generation charge in their billing. |               |                              |

**Table 3.2-5: Washington Elementary School Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 66               |
| Winter | 53               |

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -9 illustrates the monthly average natural gas consumption at Washington Elementary School from June, 2014 through June, 2015.

**Figure 3.2-9: Washington Elementary School Gas Usage**

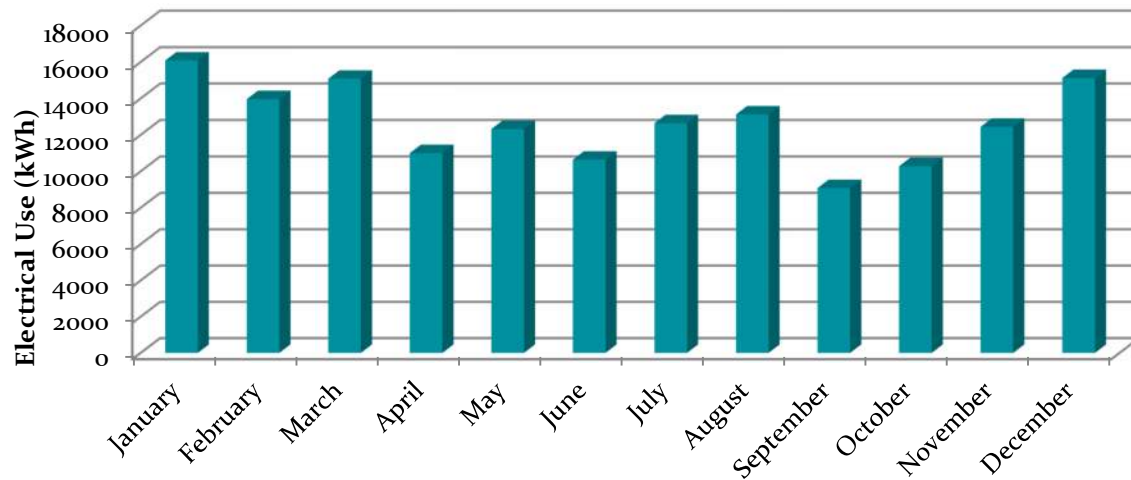
### 3.2.6 Wilson Elementary School

Electric power for Wilson Elementary School is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-10 illustrates the average monthly total energy consumption from June, 2014 through June, 2015.

From this graph, it can be determined that the average electrical consumption for Wilson Elementary School is approximately 13,000 kWh/month.

Table 3.2-6 illustrates the seasonal peak electrical demand loads for Wilson Elementary School from June, 2014 through June, 2015. The information presented is only as recent as the most recent bill received.

**Figure 3.2-10: Wilson Elementary School Electricity Usage**



The most recent tariff rates available at the time of this audit for the electrical service at Wilson Elementary School, from PSE&G are as follows:

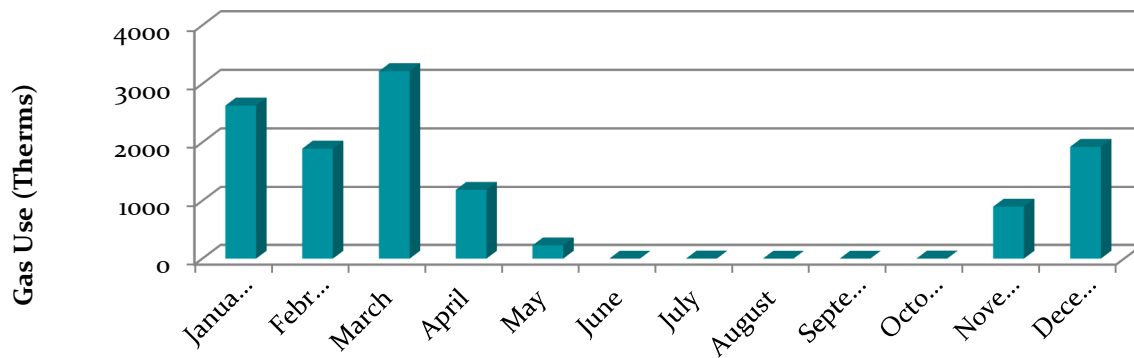
|                                                                                                                               |               |                       |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|
|                                                                                                                               |               | Acct #: 66 389 825 08 |
| Service Charge:                                                                                                               |               | \$4.24/month          |
| October-May Supply Service Charges:                                                                                           |               | \$0.071596/kWh        |
| June-September Supply Service Charges:                                                                                        |               | \$0.073799/kWh        |
| Demand Charge:                                                                                                                |               | \$4.3627/kW           |
| Summer Demand Charge:                                                                                                         |               | \$8.0968/kW           |
| Societal Benefits Charge:                                                                                                     |               | \$0.004828/kWh        |
| Securitization Transition:                                                                                                    |               | \$0.007258/kWh        |
| Supply Service Charges:                                                                                                       | Generation:   | Data not available*   |
|                                                                                                                               | Transmission: | \$0.09858/kWh         |
|                                                                                                                               | Charge:       | \$0.00329/kWh         |
| *Electricity for this facility is purchased from Direct Energy, which does not identify a generation charge in their billing. |               |                       |

**Table 3.2-6: Wilson Elementary School Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 59               |
| Winter | 50               |

Refer to Table 3.3-1, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -11 illustrates the monthly average natural gas consumption at Wilson Elementary School from June, 2014 through June, 2015.

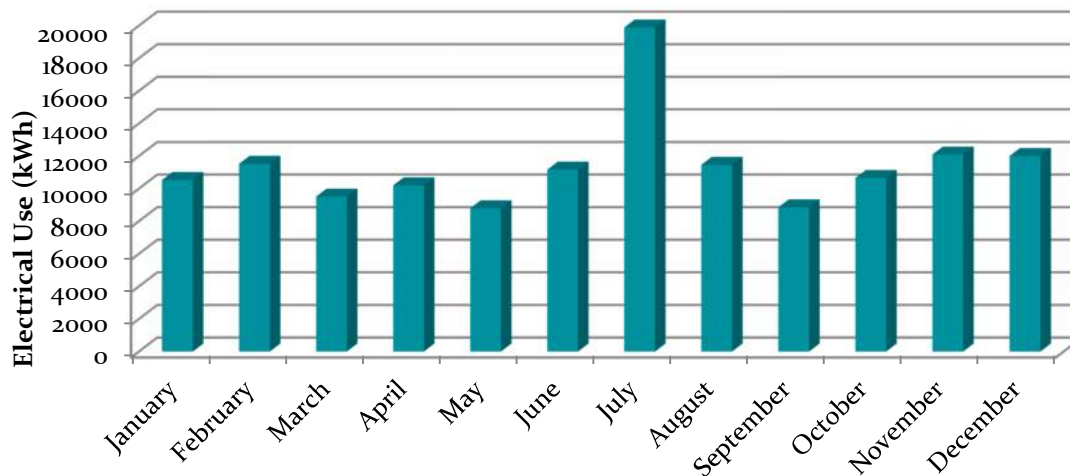
**Figure 3.2-11: Wilson Elementary School Gas Usage**

### 3.2.7 Harrison School Building

Electric power for Harrison School Building is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-12 illustrates the average monthly total energy consumption from June, 2014 through June, 2015.

From this graph, it can be determined that the average electrical consumption for Harrison School Building is approximately 11,000 kWh/month during the time period considered in this analysis.

Table 3.2-7 illustrates the seasonal peak electrical demand loads for Harrison School Building from June, 2014 through June, 2015. The information presented is only as recent as the most recent bill received.

**Figure 3.2-12: Harrison School Building Electricity Usage**

The most recent tariff rates available at the time of this audit for the electrical service at Harrison School Building, from PSE&G are as follows.

|                                     |                              |
|-------------------------------------|------------------------------|
|                                     | <b>Acct #: 66 165 457 09</b> |
| Service Charge:                     | \$4.24/month                 |
|                                     |                              |
| October-May Supply Service Charges: | \$0.071596/kWh               |

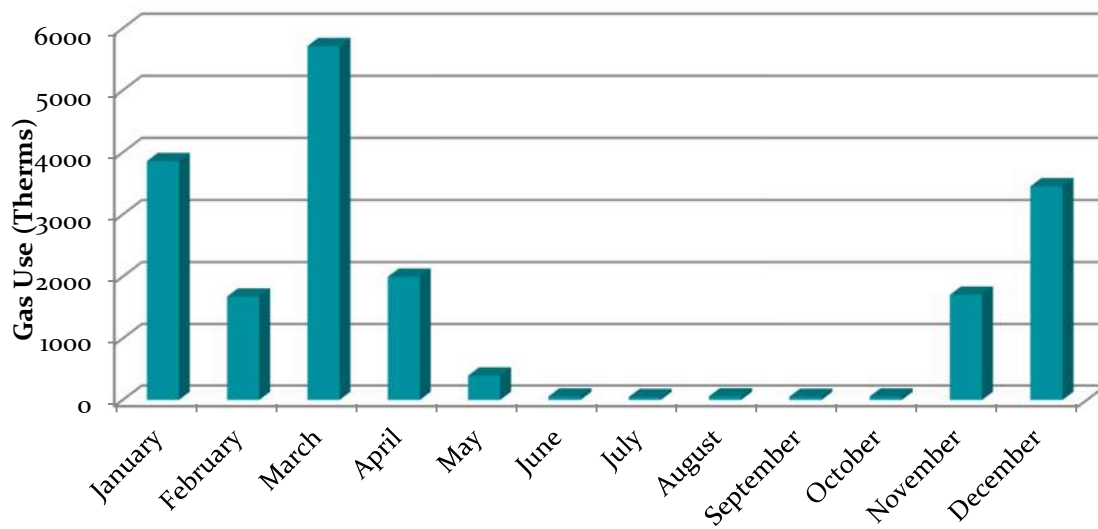
|                                                                                                                               |               |                     |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|
| June-September Supply Service Charges:                                                                                        |               | \$0.073799/kWh      |
| Demand Charge:                                                                                                                |               | \$4.3627/kW         |
| Summer Demand Charge:                                                                                                         |               | \$8.0968/kW         |
| Societal Benefits Charge:                                                                                                     |               | \$0.004828/kWh      |
| Securitization Transition:                                                                                                    |               | \$0.007258/kWh      |
| Supply Service Charges:                                                                                                       | Generation:   | Data not available* |
|                                                                                                                               | Transmission: | \$/kWh              |
|                                                                                                                               | Charge:       | \$0.00329/kWh       |
| *Electricity for this facility is purchased from Direct Energy, which does not identify a generation charge in their billing. |               |                     |

**Table 3.2-7: Harrison School Building Seasonal Peak Demands**

| Season | Peak Demand (kW) |
|--------|------------------|
| Summer | 27               |
| Winter | 13               |

Refer to Table 3.3-13, in Section 3.3 for the average electrical aggregate cost. These tariffs are subject to change quite frequently. Refer to Appendix A for a complete Historical Data Analysis.

Figure 3.2 -6 illustrates the monthly average natural gas consumption at Harrison School Building from June, 2014 through June, 2015.

**Figure 3.2-13: Harrison School Building Gas Usage**

## 3.3 Aggregate Costs

For the purposes of computing energy savings for all identified energy conservation and retrofit measures, aggregate unit costs for electrical energy and fuel, in terms of cost/kWh and cost/therm, were determined for each service location and utilized in the simple payback analyses discussed in subsequent sections. The aggregate unit cost accounts for all distribution and supply charges for each location, unless otherwise noted.

Table 3.3-1 and Table 3.3-2 summarize the aggregate costs for electrical energy consumption and therms utilized, respectively.

**Table 3.3-1: Electrical Aggregate Unit Costs**

| Service Location               | Aggregate \$ / kW-hr |
|--------------------------------|----------------------|
| James Caldwell High School     | \$0.15               |
| Grover Cleveland Middle School | \$0.15               |
| Jefferson Elementary School    | \$0.18               |
| Lincoln Elementary School      | \$0.20               |
| Washington Elementary School   | \$0.18               |
| Wilson Elementary School       | \$0.16               |
| Harrison School Building       | \$0.18               |

**Table 3.3-2: Natural Gas Aggregate Unit Costs**

| Service Location               | Aggregate \$ / therm |
|--------------------------------|----------------------|
| James Caldwell High School     | \$0.78               |
| Grover Cleveland Middle School | \$0.56               |
| Jefferson Elementary School    | \$0.77               |
| Lincoln Elementary School      | \$0.77               |
| Washington Elementary School   | \$0.81               |
| Wilson Elementary School       | \$0.85               |
| Harrison School Building       | \$0.81               |

These natural gas costs may not include the commodity cost due to a third party provider.

## 3.4 Portfolio Manager

### 3.4.1 Portfolio Manager Overview

Portfolio Manager is an interactive energy management tool that allows the Board to track and assess energy consumption at the facilities in a secure online environment. Portfolio Manager can help the Board set investment priorities, verify efficiency improvements, and receive EPA recognition for superior energy performance.

### 3.4.2 Energy Performance Rating

For many facilities, you can rate their energy performance on a scale of 1–100 relative to similar facilities nationwide. Your facility is *not* compared to the other facilities entered into Portfolio Manager to determine your ENERGY STAR rating. Instead, statistically representative models are used to compare your facility against similar facilities from a national survey conducted by the Department of Energy's Energy Information Administration.

This national survey, known as the Commercial Building Energy Consumption Survey (CBECS), is conducted every four years.

This survey gathers data on building characteristics and energy use from thousands of facilities across the United States. Your facility's peer group of comparison is those facilities in the CBECS survey that have similar facility and operating characteristics. A rating of 50 indicates that the facility, from an energy

consumption standpoint, performs better than 50% of all similar facilities nationwide. A rating of 75 indicates that the facility performs better than 75% of all similar facilities nationwide.

### 3.4.3 Portfolio Manager Account Information

A Portfolio Manager profile has been established for the Board, which includes a profile for the 7 buildings. Information entered into this Portfolio Manager Facility profile, including electrical energy consumption and natural gas consumption has been used to establish a performance baseline.

It is recommended that the information be updated to track the buildings' energy usage. Ratings shown below are based on the 12 month period of utility bills submitted. Three of these 7 buildings are eligible for an energy star label. Ratings were given for all of the 7 buildings.

|                                 |    |
|---------------------------------|----|
| James Caldwell High School:     | 53 |
| Grover Cleveland Middle School: | 86 |
| Jefferson Elementary School:    | 51 |
| Lincoln Elementary School:      | 69 |
| Washington Elementary School:   | 73 |
| Wilson Elementary School:       | 94 |
| Harrison School Building:       | 88 |

The following website link can be used to access Portfolio Manager. These accounts have been shared with the TRC-LGEA portfolio manager account. Create an account and connect to the username below to share and transfer the building profiles that have been established for the Board:

<https://www.energystar.gov/istar/pmpam/>

**USERNAME:** dowdcj

## Section 4

# Energy Conservation and Retrofit Measures (ECRM)

The following is a summary of how Annual Return on Investment (AROI), Internal Rate of Return (IRR), and Net Present Value (NPV) will be broken down in the cost analysis for all ECRMs recommended in this report.

Included in the simplified payback analysis summary table is the 'Annual Return on Investment' (AROI) values. This value is a performance measure used to evaluate the efficiency of an investment and is calculated using the following equation:

$$AROI = \frac{AECS + OCS}{NET\ ECM\ Cost} - \frac{1}{Lifetime}$$

Where OCS = Operating Cost Savings, and AECS = Annual Energy Cost Savings.

Also included in the table are net present values for each option. The NPV calculates the present value of an investment's future cash flows based on the time value of money, which is accounted for by a discount rate (DR) (assume bond rate of 3%). NPV is calculated using the following equation:

$$NPV = \sum_{n=0}^N \frac{C_n}{(1 + DR)^n}$$

Where  $C_n$ =Annual cash flow, and N = number of years.

The Internal Rate of Return (IRR) expresses an annual rate that results in a break-even point for the investment. If the Board is currently experiencing a lower return on their capital than the IRR, the project is financially advantageous. This measure also allows the Board to compare ECRM's against each other to determine the most appealing choices.

$$IRR \rightarrow 0 = \sum_{n=0}^N \frac{C_n}{(1 + IRR)^n}$$

Where  $C_n$ =Annual cash flow, and N = number of years.

The lifetime energy savings represents the cumulative energy savings over the assumed life of the ECRM. As noted in previous sections of this report, CDM Smith bases a recommendation solely on a measure's calculated simple payback. The metrics defined above (IRR, NPV, AROI) are included as part of the scope of this audit, and for the Board's consideration as additional financial metrics to consider when deciding whether or not to pursue a specific measure that has been evaluated in this report.

## 4.1 Building Lighting Systems

The goal of this section is to present any lighting energy conservation measures that may also be cost beneficial. It should be noted that replacing current bulbs with more energy-efficient equivalents will have a small effect on the building heating and cooling loads. The building cooling load will see a small decrease from an upgrade to more efficient bulbs and the heating load will see a small increase, as the more energy efficient bulbs give off less heat.

For all of the buildings, it was noted there were existing interior occupancy sensors installed. Installing occupancy sensors in rooms where there are none will typically increase energy savings. If the space is not occupied or illuminated there will be little savings by installing occupancy sensors. No specific spaces have been identified for installation of occupancy sensors. Occupancy sensors should be installed as needed to reduce on time in unoccupied spaces.

Please note that the Engineer's Estimate of Probable Construction Costs presented herein are estimates based on historic data compiled from similar installations and engineering opinions. Additional engineering will be required for each measure identified in this report. Final scope of work and budget cost estimates will need to be confirmed prior to the coordination of project financing or the issuance of a Request for Proposal.

The following Table 4.1-1 summarizes a simple payback analysis assuming the implementation of all lighting system improvements at all of the Board's facilities included in this energy audit. Maintenance cost savings (MCS) are also included.

Incentives included in the analyses provided in Table 4.1-1 are taken from the New Jersey Clean Energy SmartStart Prescriptive Lighting Application and Worksheet, a copy of which can be found in Appendix F of this report. These forms may also be downloaded directly from:

<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/application-forms/regular-forms/regular-forms>

**Table 4.1-1  
Lighting Upgrades**

| Location                       | Base Cost | Incentives | Total Cost | Energy Savings | Annual Savings | Simple Payback | MCS     | AROI   | IRR    | NPV         | Lifetime Savings |
|--------------------------------|-----------|------------|------------|----------------|----------------|----------------|---------|--------|--------|-------------|------------------|
| Grover Cleveland Middle School | \$385,009 | \$16,360   | \$368,649  | \$19,570       | \$28,447       | 13.0           | \$8,877 | 0.00%  | 0.00%  | \$45,630    | \$529,085        |
| Washington Elementary School   | \$115,388 | \$1,265    | \$114,123  | \$3,710        | \$7,893        | 14.5           | \$4,182 | 0.25%  | 3.09%  | \$821       | \$146,798        |
| Jefferson Elementary School    | \$128,448 | \$5,880    | \$122,568  | \$4,577        | \$7,717        | 15.9           | \$3,140 | -0.37% | 1.90%  | (\$10,182)  | \$143,531        |
| Lincoln Elementary School      | \$96,807  | \$4,065    | \$92,742   | \$3,326        | \$5,432        | 17.1           | \$2,107 | -0.81% | 1.02%  | (\$13,631)  | \$101,035        |
| Wilson Elementary School       | \$118,250 | \$4,970    | \$113,280  | \$3,449        | \$6,067        | 18.7           | \$2,619 | -1.31% | -0.04% | (\$24,921)  | \$112,846        |
| Harrison School Building       | \$80,767  | \$3,120    | \$77,647   | \$2,181        | \$3,857        | 20.1           | \$1,676 | -1.70% | -0.91% | (\$21,477)  | \$71,736         |
| James Caldwell High School     | \$427,989 | \$16,245   | \$411,744  | \$10,833       | \$20,361       | 20.2           | \$9,527 | -1.72% | -0.96% | (\$115,231) | \$378,684        |

\*Incentives may be available through the NJ Smart Start Buildings Custom Measures or other programs which would improve the financial results of these measures.

MCS: Maintenance Cost Savings which includes labor and bulb costs for replacing bulbs at the end of service.

## 4.2 HVAC Systems

The goal of this section is to present any heating and cooling energy reduction and cost saving measures that may also be cost beneficial. Where possible, measures will be presented with a life-cycle cost analysis. This analysis displays a payback period based on weighing the capital cost of the measure against predicted annual fiscal savings. To do this, the buildings have been modeled as accurately as possible to predict energy usage for space heating and cooling, as well as domestic hot water use.

The measures for these buildings were done with spreadsheet analysis. The weather dependent measures such as heating and envelope were modelled using bin hours for the weather data. These models were calibrated, using historical utility bills, to predict the impact of theoretical energy savings measures. The remaining measures, such as domestic hot water heating, are evaluated using published indexes or other assumptions to approximate usage and savings.

Once annual energy savings from a particular measure have been predicted and the initial capital cost has been estimated, payback periods may be approximated. Equipment cost estimate calculations are provided in Appendix H.

A detailed inventory of HVAC equipment observed at the facilities is included in Appendix J of this report. Along with basic equipment information such as manufacturers, model numbers, and estimated efficiencies, this inventory also seeks to provide an estimate of equipment remaining useful service life. For each piece of equipment, a known or estimated age is provided alongside the ASHRAE expected service life for that type of equipment. From this, an estimated remaining useful service life can be deduced. In some cases, service locations may have been estimated based on unit proximity. Additionally, in cases where a unit's manufacturer and/or model could not be determined due to an unreadable, faded, destroyed, or lost tag, manufacturer and model number information has been represented as "unknown".

Incentives included in HVAC ECRM analyses are taken from the New Jersey Clean Energy SmartStart program. A listing of the incentives available may be found in the application worksheets included in Appendix F of this report. These forms may also be downloaded directly from:

<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/application-forms/regular-forms/regular-forms>

### 4.2.1 James Caldwell High School

The high school heating and cooling systems were recently upgraded. There were no recommended energy upgrades to the building heating and cooling equipment.

### 4.2.2 Grover Cleveland Middle School

#### Condensing Boiler Upgrade

The building heating systems are from 1997. A model has been created for the Grover Cleveland Middle School. The model uses bin hour weather data to calculate the heating usage of the building systems. The heating systems that are installed utilizes 85% efficient boilers.

The combustion process creates carbon dioxide and water vapor. Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas that goes up the chimney. Keeping more energy in the boiler reduces the combustion gas temperature. The lower temperature causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves installing new condensing boiler to replace the existing equipment. The measure assume removal of the 3 existing boilers and installing 3 condensing boilers, 2,000 MBH input and 92% efficient. This measure is recommended due to the existing equipment being near the end of the useful life.

**Table 4.2-1: Grover Cleveland Middle School Condensing Boiler Upgrade**

|                                        |            |
|----------------------------------------|------------|
| Predicted Annual Savings (therms)      | 686 therms |
| Total Annual Savings                   | \$386      |
| Initial Capital Cost of Upgrade        | \$239,919  |
| Incentives                             | \$4,000    |
| Cost of Upgrade                        | \$235,919  |
| Annual Maintenance Cost Savings (AMCS) | \$9,000    |
| Simple Payback                         | 25.1       |
| IRR                                    | -0.28%     |
| NPV                                    | \$75,430   |
| Lifetime Savings                       | \$227,758  |

### Condensing DHW Upgrade

The domestic hot water in the building is generated by a gas fired, atmospheric combustion storage water heater. The heater is assumed to be 80% efficient.

Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas. The additional energy reduces the combustion gas temperature which causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves generating the domestic hot water with a condensing heater. This could be accomplished by heating with a condensing space heating boiler or installing new condensing domestic water heater to replace the existing equipment. This measure is based upon installing a 95% efficient domestic water heater in the Grover Cleveland Middle School that is properly sized for the connected load.

**Table 4.2-2: Grover Cleveland Middle School Condensing DHW Upgrade**

|                                        |            |
|----------------------------------------|------------|
| Predicted Annual Savings (therms)      | 518 therms |
| Total Annual Savings                   | \$292      |
| Initial Capital Cost of Upgrade        | \$11,105   |
| Incentives                             | \$398      |
| Cost of Upgrade                        | \$10,707   |
| Annual Maintenance Cost Savings (AMCS) | \$0        |
| Simple Payback                         | 36.7       |

This measure is not recommended due to the excessive payback. The equipment mentioned here should be considered when replacing existing domestic water heaters.

### 4.2.3 Jefferson Elementary School

#### Condensing Boiler Upgrade

The building heating systems were installed 1997. A bin hour model has been created for the Jefferson Elementary School. The model uses bin hour weather data to calculate the heating usage of the building systems. The existing heating system is assumed to be 80% combustion efficient. At the time of the audit,

the space heating boilers had been removed. The baseline heating system is based upon the boiler certificates. The system to be installed are Aerco condensing boilers that are 92% efficient.

The combustion process creates carbon dioxide and water vapor. Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas that goes up the chimney. Keeping more energy in the boiler reduces the combustion gas temperature. The lower temperature causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves installing new condensing boilers to replace the existing equipment. The measure is removing the 3 existing hot water boiler and installing of 2 condensing boilers rated a 1,500 MBH input each. The condensing boilers are assumed to have an annual thermal efficiency of 92%. This measure is recommended due to the existing equipment being near the end of the useful life.

**Table 4.2-1: Jefferson Elementary School Condensing Boiler Upgrade**

|                                        |              |
|----------------------------------------|--------------|
| Predicted Annual Savings (therms)      | 1,780 therms |
| Total Annual Savings                   | \$ 7,315     |
| Initial Capital Cost of Upgrade        | \$136,270    |
| Incentives                             | \$ 6,600     |
| Cost of Upgrade                        | \$129,670    |
| Annual Maintenance Cost Savings (AMCS) | \$6,000      |
| Simple Payback (years)                 | 17.7         |
| IRR                                    | -16.15%      |
| NPV                                    | \$ -111,768  |
| Lifetime Savings                       | \$ 65,397    |

#### 4.2.4 Lincoln Elementary School

##### Condensing Boiler Upgrade

The building heating systems are from 1997 age. A model has been created for the Lincoln Elementary School. The model uses bin hour weather data to calculate the heating usage of the building systems. The heating systems that are installed utilizes 85% efficient boilers.

The combustion process creates carbon dioxide and water vapor. Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas that goes up the chimney. Keeping more energy in the boiler reduces the combustion gas temperature. The lower temperature causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves installing new condensing boilers to replace the existing equipment. The measure is removing the 3 existing hot water boiler and installing of 2 condensing boilers rated a 1,500 MBH input each. The condensing boilers are assumed to have an annual thermal efficiency of 92%. This measure is recommended due to the existing equipment being near the end of the useful life.

**Table 4.2-1: Lincoln Elementary School Condensing Boiler Upgrade**

|                                   |              |
|-----------------------------------|--------------|
| Predicted Annual Savings (therms) | 4,892 therms |
| Total Annual Savings              | \$3,614      |
| Initial Capital Cost of Upgrade   | \$136,269    |
| Incentives                        | \$4,000      |

|                                        |           |
|----------------------------------------|-----------|
| Cost of Upgrade                        | \$132,269 |
| Annual Maintenance Cost Savings (AMCS) | \$6,000   |
| Simple Payback                         | 13.8      |
| IRR                                    | -7.90%    |
| NPV                                    | \$83,073  |
| Lifetime Savings                       | \$109,936 |

## 4.2.5 Washington Elementary School

### Condensing DHW Upgrade

The domestic hot water in the building is generated by a gas fired, atmospheric combustion storage water heater. The heater is assumed to be 80% efficient.

The combustion process creates carbon dioxide and water vapor. Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas that goes up the chimney. Keeping more energy in the boiler reduces the combustion gas temperature. The lower temperature causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves generating the domestic hot water with a condensing heater. This could be accomplished by heating with a condensing space heating boiler or installing new condensing domestic water heater to replace the existing equipment. This measure is based upon installing a 95% efficient domestic water heater in the Works building properly sized for the connected load.

**Table 4.2-2: Washington Elementary School Condensing DHW Upgrade**

|                                        |            |
|----------------------------------------|------------|
| Predicted Annual Savings (therms)      | 756 therms |
| Total Annual Savings                   | \$616      |
| Initial Capital Cost of Upgrade        | \$4,377    |
| Incentives                             | \$50       |
| Cost of Upgrade                        | \$4,327    |
| Annual Maintenance Cost Savings (AMCS) | \$0        |
| Simple Payback                         | 7.0        |
| IRR                                    | 13.27%     |
| NPV                                    | \$4,054    |
| Lifetime Savings                       | \$10,646   |

## 4.2.6 Wilson Elementary School

### Condensing DHW Upgrade

The domestic hot water in the building is generated by a gas fired, atmospheric combustion storage water heater. The heater is assumed to be 80% efficient.

The combustion process creates carbon dioxide and water vapor. Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas that goes up the chimney. Keeping more energy in the boiler reduces the combustion gas temperature. The lower temperature causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves generating the domestic hot water with a condensing heater. This could be accomplished by heating with a condensing space heating boiler or installing new condensing domestic water heater to replace the existing equipment. This measure is based upon installing a 95% efficient domestic water heater in the Wilson Elementary School that is properly sized for the connected load.

**Table 4.2-2: Wilson Elementary School Condensing DHW Upgrade**

|                                        |            |
|----------------------------------------|------------|
| Predicted Annual Savings (therms)      | 227 therms |
| Total Annual Savings                   | \$363      |
| Initial Capital Cost of Upgrade        | \$4,370    |
| Incentives                             | \$50       |
| Cost of Upgrade                        | \$4,320    |
| Annual Maintenance Cost Savings (AMCS) | \$0        |
| Simple Payback                         | 22.5       |

## 4.2.7 Harrison School Building

### Condensing DHW Upgrade

The domestic hot water in the building is generated by a gas fired, atmospheric combustion storage water heater. The heater is assumed to be 80% efficient.

The combustion process creates carbon dioxide and water vapor. Condensing heating appliances increase combustion efficiency by removing more energy from the combustion gas that goes up the chimney. Keeping more energy in the boiler reduces the combustion gas temperature. The lower temperature causes the water vapor produced by combustion to condense to liquid. The condensation occurs in the boiler and the stack, which requires the boiler and venting to be tolerant and able to drain the liquid.

This measure involves generating the domestic hot water with a condensing heater. This could be accomplished by heating with a condensing space heating boiler or installing new condensing domestic water heater to replace the existing equipment. This measure is based upon installing a 95% efficient domestic water heater in the Harrison School that is properly sized for the connected load.

**Table 4.2-2: Harrison School Building Condensing DHW Upgrade**

|                                        |           |
|----------------------------------------|-----------|
| Predicted Annual Savings (therms)      | 94 therms |
| Total Annual Savings                   | \$76      |
| Initial Capital Cost of Upgrade        | \$4,370   |
| Incentives                             | \$50      |
| Cost of Upgrade                        | \$4,320   |
| Annual Maintenance Cost Savings (AMCS) | \$0       |
| Simple Payback                         | 56.7      |

This measure is not recommended due to the excessive payback. The equipment mentioned here should be considered when replacing existing domestic water heaters.

## 4.2.8 Combined Heat and Power

### CHP Screening

When using thermal energy and electrical energy coincidentally, it can be cost effective to produce both on site instead of purchasing them from the grid. Commonly the grid power producers use similar

technologies to produce electricity but nominally waste the thermal energy produced. Sites with continuous need for electrical and thermal energy can produce a base load of both energies.

This measure involves installing a device that will consume natural gas and produce electrical and thermal energy. These yields are typical for 65 kW devices such as a micro turbine or engine generator. The savings of this system is approximated by the following screening. The screening assumes 4320 hours on time per year. Buildings with average electrical demands of at least twice the unit rated electrical capacity are presumed to have a majority of hours. The detailed calculations are included in Appendix C.

| School                          | Electric  |          |                                           | Gas    |           |          |
|---------------------------------|-----------|----------|-------------------------------------------|--------|-----------|----------|
|                                 | kWh       | kW (avg) | \$                                        | Therms | MBH (avg) | \$       |
| *James Caldwell High School     | 1,067,471 | 122      | \$160,121                                 | 67,132 | 766       | \$92,642 |
| *Grover Cleveland Middle School | 794,780   | 91       | \$119,217                                 | 8,784  | 100       | \$10,189 |
| Jefferson Elementary School     | 191,790   | 22       | \$34,522                                  | 18,654 | 213       | \$25,556 |
| Lincoln Elementary School       | 141,720   | 16       | \$28,344                                  | 22,836 | 261       | \$31,285 |
| Washington Elementary School    | 165,545   | 19       | \$29,798                                  | 38,252 | 437       | \$53,935 |
| Wilson Elementary School        | 151,760   | 17       | \$24,282                                  | 11,976 | 137       | \$17,365 |
| Harrison School Building        | 136,650   | 16       | \$24,597                                  | 19,084 | 218       | \$26,908 |
|                                 |           |          | *Schools that appear to be CHP candidates |        |           |          |

The cost effectiveness has only been evaluated for the schools that pass the preliminary screening. Also, the gas rates established from the provided fuel bills were significantly less than typically observed for schools in New Jersey. It is assumed to be due to a third party energy supplier. For that reason \$0.60/therm was added to the utility cost to present a more conservative evaluation.

| Facility                       | Total Cost | Energy Savings                                 | Incentive | Annual Fiscal Savings <sup>2</sup> | Simple Payback (Years) |
|--------------------------------|------------|------------------------------------------------|-----------|------------------------------------|------------------------|
| James Caldwell High School     | \$143,000  | -36,374 therms<br>280,800 kWh<br>594,000 kbtuh | \$42,900  | \$239                              | -43.75                 |
| Grover Cleveland Middle School | \$143,000  | -36,374 therms<br>280,800 kWh<br>594,000 kbtuh | \$42,900  | \$8,242                            | 17.52                  |

The evaluations shows that the High School would actually increase cost and the Middle school would have a payback near the expected equipment life of the system. This measure should have additional analysis to determine the effectiveness and proper size of the system. Correcting gas cost could show the measure as more favorable.

#### 4.2.9 Building Management System

Currently many HVAC systems at the buildings have pneumatic controls. Some buildings have partially functioning pneumatic controls, while others may have abandoned or bypassed the pneumatics. Some of the buildings have Automated Logic thermostats in rooms and have attempted to have full electronic control. It was stated during a meeting that the control system throughout the schools in the District were never fully installed or operational. It is assumed that all the buildings with this measure recommended have limited or no operable automatic HVAC controls.

Direct digital control (DDC) building management system (BMS) offer energy savings when implemented. A system like this would monitor and control all HVAC equipment, allowing maintenance staff to operate systems and adjust climate control in real time to maximize occupant comfort, while minimizing unnecessary heating and cooling. Typically implementation of a BMS will save the owner 5-15% of the energy devoted to HVAC. Systems are currently independently monitored and controlled. CDM Smith conservatively estimates that incorporating the remaining HVAC equipment into the DDC BMS will allow the buildings to save on average, 10% of the energy being used for HVAC.

The district has a centralized building management system. This system has some level of control of each school.

This measure involves installing a DDC control system which will control the HVAC equipment. This will included replacing pneumatic control valves for heating equipment, outdoor air dampers, start up and shut down of the exhaust fans and sensors for controlling these devices. The existing central DDC system controls the individual building boiler plant based upon the equipment installed. This measure only applies to the terminal units and zones served.

The system will be able to vary the operation of the unit, outdoor air damper, space temperature set points, and air conditioning systems (if applicable). This will include zone scheduling, temperature setback and unoccupied outdoor air shut off.

CDM Smith was not able to locate any available grants or incentives for consolidating systems and switching to DDC. The estimated installed cost, projected energy and cost savings, and simple payback are included in the table below. The complete calculations are included in Appendix C. Savings are estimated to be 10% of the assumed heating and cooling usage.

| Facility                       | Total Cost | Energy Savings |            | Annual Fiscal Savings | IRR   | NPV         | Lifetime Savings | Simple Payback (Years) |
|--------------------------------|------------|----------------|------------|-----------------------|-------|-------------|------------------|------------------------|
| Grover Cleveland Middle School | \$219,578  | 15,896 kWh     | 176 therms | \$ 2,847              | -8.0% | (\$164,470) | \$52,816         | 77.1                   |
| Lincoln Elementary School      | \$74,750   | 2,834 kWh      | 457 therms | \$ 914                | -8.6% | (\$57,580)  | \$23,682         | 81.8                   |
| Washington Elementary School   | \$60,734   | 3,311 kWh      | 765 therms | \$ 1,231              | -5.2% | (\$37,876)  | \$31,486         | 49.3                   |
| Harrison School Building       | \$56,063   | 2,733 kWh      | 382 therms | \$ 795                | -7.6% | (\$41,151)  | \$20,563         | 70.5                   |

This measure is not recommended due to the long payback. This measure should be revisited when major building projects are being considered.

## 4.3 Energy Conservation and Reduction Measures

### 4.3.1 Window Upgrade

The existing building windows are typically replacements and almost exclusively double pane windows. The windows are in fair condition. The existing windows are presumed to have a u-value of 1.0.

New windows with insulated glass, thermal break in frame, and low e-coatings help to reduce the heating and cooling loads of the space. The evaluated replacement windows have a u-value of 0.35.

This measure involves replacing windows with aluminum frame, double pane, argon filled, and low-e glazing with a u-value of 0.35 or less. This measure is not recommended due to the long paybacks.

| Facility                     | Total Cost  | Energy Savings |               |          | Simple Payback (Years) |
|------------------------------|-------------|----------------|---------------|----------|------------------------|
| James Caldwell High School   | \$1,108,744 | 153 kWh        | 12,729 therms | \$ 9,978 | <b>111.1</b>           |
| Washington Elementary School | \$281,391   | -96 kWh        | 3,470 therms  | \$ 2,808 | <b>100.2</b>           |
| Harrison School Building     | \$284,490   | 315 kWh        | 2,742 therms  | \$ 2,277 | <b>124.9</b>           |

### 4.3.2 Premium Efficiency Motors

Installing premium efficiency motors in place of older or standard efficiency motors reduces the electricity required to perform the same work.

This measure is based upon replacement of the following motors. Motors are presumed to be ODP style and 1800 RPM. The efficiencies of non-NEMA rated motors have been estimated. The detailed calculations are included in Appendix C.

| Facility                       | Total Cost | Energy Savings | Incentive | Annual Fiscal Savings | IRR   | NPV     | Lifetime Savings | Simple Payback (Years) |
|--------------------------------|------------|----------------|-----------|-----------------------|-------|---------|------------------|------------------------|
| Grover Cleveland Middle School | \$3,113    | 1,864 kWh      | \$398     | \$ 322                | 12.8% | \$4,011 | \$ 9,801         | <b>8.4</b>             |
| Lincoln Elementary School      | \$656      | 530 kWh        | \$448     | \$ 108                | 53.7% | \$1,259 | \$ 3,278         | <b>1.9</b>             |
| Washington Elementary School   | \$1,312    | 173 kWh        | \$50      | \$ 32                 | -8.6% | (\$829) | \$ 550           | <b>39.7</b>            |
| Wilson Elementary School       | \$656      | 60 kWh         | \$50      | \$ 10                 | -4.7% | (\$400) | \$ 212           | <b>61.3</b>            |
| Harrison School Building       | \$2,233    | 358 kWh        | \$50      | \$ 64                 | -0.9% | (\$855) | \$ 1,935         | <b>34.3</b>            |

### 4.3.3 Variable Speed Drives

Variable speed drives modify the power to motors. The slower speed reduces the power consumption of fans and pumps. The speed reduction is to reduce over supplying the space. This is commonly to reduce pumping during lower system loads.

This measure is based upon installing variable speed drives for the following motors.

| Location                       | Motor Use      | HP         |
|--------------------------------|----------------|------------|
| Grover Cleveland Middle School | Hot Water Pump | <b>15</b>  |
| Grover Cleveland Middle School | Hot Water Pump | <b>7.5</b> |
| Lincoln Elementary School      | Hot Water Pump | <b>3</b>   |
| Washington Elementary School   | Supply Fan     | <b>3</b>   |
| Washington Elementary School   | Return Fan     | <b>2</b>   |
| Harrison School Building       | Hot Water Pump | <b>5</b>   |

The detailed calculations are included in Appendix C. The savings are based upon the New York Power Authority Calculation handbook values for savings by VFD's by building type, geographic location, and controlled device. The values for this analysis are for the devices listed above in a high school in greater New York City.

| Facility                       | Total Cost | Energy Savings | Incentive | Annual Fiscal Savings | IRR     | NPV       | Lifetime Savings | Simple Payback (Years) |
|--------------------------------|------------|----------------|-----------|-----------------------|---------|-----------|------------------|------------------------|
| Grover Cleveland Middle School | \$9,325    | 990 kWh        | \$1,350   | \$171                 | -9.29%  | (\$5,483) | \$3,183          | <b>46.6</b>            |
| Lincoln Elementary School      | \$3,200    | 132 kWh        | \$180     | \$27                  | -16.38% | (\$2,629) | \$499            | <b>112.6</b>           |
| Washington Elementary School   | \$6,400    | 3,183 kWh      | \$400     | \$585                 | 7.88%   | \$2,519   | \$10,880         | <b>10.3</b>            |
| Harrison School Building       | \$9,875    | 220 kWh        | \$300     | \$39                  | -21.74% | (\$9,006) | \$727            | <b>245.0</b>           |

The variable speed drive is recommended for Washington Elementary School fans. The other measures are not recommended due to the excessive payback.

## 4.4 Photovoltaic Solar Energy System Overview

Photovoltaic (PV) cells convert energy in sunlight directly into electrical energy through the use of silicon semiconductors, diodes and collection grids.

Several PV cells are then linked together in a single frame of module to become a solar panel. PV cells are able to convert the energy from the sun into electricity. The angle of inclination of the PV cells, the amount of sunlight available, the orientation of the panels, the amount of physical space available and the efficiency of the individual panels are all factors that affect the amount of electricity that is generated.

Based on the estimated cumulative total available roof area, calculations determine that the installation of 7 systems with a total rating of approximately 633 kW (dc) will be appropriate for the City's buildings listed below.

As part of this energy audit, a preliminary engineering feasibility study of the sites outlined above to support solar generation facilities was completed consisting of the following tasks:

- a. Site visit by CDM Smith engineers
- b. Satellite Image Analysis and Conceptual design and layout of the photovoltaic system
- c. Design and construction cost estimates
- d. Determine a preliminary design for the size and energy production of the solar system

The total unobstructed available area of each section of the roof with southern exposure was evaluated. **It is important to note that the structural integrity of the roofs was not confirmed during CDM Smith's site visit; therefore, buildings may require some degree of roof reinforcing work prior to the implementation of a roof mounted solar system.**

In the case of the flat areas, the PV system sizing and kWh production was calculated assuming the installation of a crystalline module facing south direction (180 Degree Azimuth) and tilted approximately 15 degrees to allow better rain water shedding and snow melting. Please note that the kWh production as well as system size may differ significantly based on final panel tilt selected during the RFP and design phase.

Blended electric rates were used based on actual utility bills and were applied for the buildings.

The following is a preliminary study on the feasibility of installing PV solar systems at the 7 City buildings to generate a portion of each facility's electricity requirements. Each system is designed to offset the electric purchased from the local utility and not as a backup or emergency source of power.

In order to determine the best location for the installation of the PV solar system, a satellite image analysis and site walkthrough of the buildings was performed during June 2015. As per the Scope of Work, only the building roofs were considered for PV installation.

Also, as part of the assessment, CDM Smith investigated possible locations for electrical equipment that need to be installed such as combiner boxes, disconnect switches and DC to AC inverters. Consideration was also given to locations of interconnection between the solar system and building's electrical grid.

Table 4.3-1 provides a summary of all proposed roof mounted PV systems for the City. The Project Team conducted facility walkthroughs and utilized satellite image analysis and to determine the estimated total available area, then calculated the potential capacity of a solar array system for each location.

It should be noted that the interconnection point for the PV system will require a modification or replacement of the existing service entrance equipment wherein the PV system feeder connections will have to be made after the main circuit breaker, and protective relaying will also have to be implemented. Any connection points would have to meet NEC and local utility requirements.

Further investigation and verification of existing electrical equipment at each location would be required prior to implementation of a PV system. See Section 2 for a detailed description of each building's roof type.

**Table 4.3-1: Proposed Solar System Summary**

| Location                   | Roof Type | Proposed PV Array Size (kW DC) |
|----------------------------|-----------|--------------------------------|
| James Caldwell High School | Flat      | 250                            |

|                                |      |     |
|--------------------------------|------|-----|
| Grover Cleveland Middle School | Flat | 150 |
| Jefferson Elementary School    | Flat | 20  |
| Lincoln Elementary School      | Flat | 16  |
| Washington Elementary School   | Flat | 32  |
| Wilson Elementary School       | Flat | 25  |
| Harrison School Building       | Flat | 150 |

#### 4.4.1 Basis for Design and Calculations

The proposed Photovoltaic (PV) Power systems outlined above for each facility are comprised of the PV arrays, inverter(s), combiner boxes, disconnect switches, and all of the necessary wiring and interconnection equipment. The solar panels will be mounted onto the roof. The array outputs will feed power into the DC to AC inverters. AC outputs will then be connected at each building's electrical service as outlined above. Pending further engineering analysis of the roofs, it is yet to be determined if the solar arrays will be installed using a self-ballasting system, or roof penetration system, or a combination of both.



The most common roof mounted system is referred to as a ("fixed tilt") system typically mounted to a metal rack that can be fixed at a specific angle. There are also ("tracking systems") or movable along one or two axes to follow the position of the sun during the day. For a roof-mounted PV system, tracking systems are very rarely installed and are usually used for ground-mounted systems only, as they require more complex racks and higher maintenance costs. For the "fixed" system, the tilt is determined based on the following factors: geographical location, total targeted kWh production, seasonal electricity requirements and weather conditions such as wind.

Ideally, the module tilt for Central to Eastern New Jersey should be 25-35 degrees with an azimuth as close as possible to 180 (south); However, experience has shown that PV systems typically installed at a tilt of 20 degrees or lower to avoid any issues with wind and maximize total system size

The type of PV panels and equipment used to mount the system shall be determined based on the wind conditions and structural integrity of the roof determined during the design phase of the project. In general, penetration/tie-down systems, non-penetrating ballasted type systems, or a combination of the two should be considered.

#### 4.4.2 Calculation of PV System Yield

An industry accepted software package PV Watts was used to calculate projected annual electrical production of the crystalline silicon PV system in its first year.

Results of this calculation are summarized in Table 4.3-2. The PV systems were designed to provide maximum kWh production based on available roof space.

**Table 4.3-2: Summary of Solar (PV) Systems**

| Building                       | Simple Payback | Size       | kWh        | Energy Savings | SREC*    | AROI  | IRR   | NPV         | Lifetime Savings |
|--------------------------------|----------------|------------|------------|----------------|----------|-------|-------|-------------|------------------|
|                                |                | (kW DC)    | Production |                |          |       |       |             | (25 Years)       |
| James Caldwell High School     | 21.5           | <b>250</b> | 297,250    | \$44,588       | \$54,263 | 0.65% | 0.92% | (\$414,305) | \$1,625,627      |
| Grover Cleveland Middle School | 22.4           | <b>150</b> | 178,350    | \$26,753       | \$32,558 | 0.46% | 0.57% | (\$298,583) | \$975,376        |

|                              |      |     |         |          |          |        |        |             |             |
|------------------------------|------|-----|---------|----------|----------|--------|--------|-------------|-------------|
| Jefferson Elementary School  | 33.8 | 20  | 23,780  | \$4,280  | \$4,341  | -1.04% | -2.29% | (\$131,829) | \$156,060   |
| Lincoln Elementary School    | 35.5 | 16  | 19,024  | \$3,805  | \$3,473  | -1.18% | -2.48% | (\$121,762) | \$138,720   |
| Washington Elementary School | 28.0 | 32  | 38,048  | \$6,849  | \$6,946  | -0.43% | -0.91% | (\$135,926) | \$249,696   |
| Wilson Elementary School     | 32.6 | 25  | 29,725  | \$4,756  | \$5,426  | -0.93% | -2.22% | (\$147,132) | \$173,400   |
| Harrison School Building     | 20.5 | 150 | 178,350 | \$32,103 | \$32,558 | 0.89%  | 1.64%  | (\$176,218) | \$1,170,452 |

\*An SREC factor of 0.18255/kWh was used in this calculation, based on the weighted average SREC trading price as of June 2014.

Due to the high initial capital cost and relatively long calculated payback, CDM Smith does not recommend that the City directly incur the cost of photovoltaic system installations at their facilities. As an alternative, the City may consider consulting a Special Purpose Company (SPC) to fund the installation of these systems through a power purchase agreement (PPA). PPAs and SPCs are further discussed in Section 7 of this report.

## 4.5 On-Site Wind Power Generation

On-site wind power generation typically utilizes a form of turbine, which is rotated with the flow of wind across it, this rotational force powers a generator, producing DC electricity. The DC electricity is then converted into AC electricity, which can be used for commercial power, or can be fed back into the power grid, reducing the overall electric demand. The size of the turbine is proportional to the amount of wind and concurrently the amount of energy it can produce. An ideal location for a wind turbine is 20 feet above any surrounding object within a 250 foot radius. In general this relates to a property size of one acre or more.

Utilizing NASA's online wind mapping tool, it was determined that the local average wind speeds in Ventnor, nearby Atlantic City, is 7 mph. In general, around 9mph of average wind speed, as determined over the course of a year, is necessary to "fuel" the turbine. These values fall below the range of feasibility for installation of a new wind turbine system. The NREL, national renewable energy laboratories, have rated this area of New Jersey at a level below "fair for wind energy production.

For the purposes of this feasibility analysis, CDM Smith chose a 35 kW wind turbine. This turbine size is used most often for small commercial applications. Power Curve data was determined through the use of the product specification sheets on vendor websites, and vendor provided tools. Actual turbine size, height, location, and manufacturer should be determined upon design of a wind turbine system.

The estimated wind speed data, associated wind probability distribution function (weibull value), turbulence losses, and other relevant data were then incorporated into the Wind Cad Modeling spreadsheet to estimate the annual output for the wind turbine. Refer to Appendix C for Wind Cad Modeling.

Table 4.4-5 includes a simple payback analysis for the installation of a wind turbine energy system on the most desirable site. Refer to Appendix C for a more detailed wind turbine financing spreadsheet, including utility cost avoidance and REC's.

**Table 4.4-5**  
**Simple Payback Analysis for Wind Turbine Energy System**

| Parameter                          | Wind Turbine |
|------------------------------------|--------------|
| Annual Return On Investment (AROI) | -1.90%       |
| Lifetime Energy Savings (15 years) | \$242,915    |
| Internal Rate of Return (IRR)      | 2.12%        |
| Net Present Value (NPV)            | \$-13,046    |

\*Refer to Appendix C for Wind Cad Modeling

Based on the simple payback model, summarized in Table 4.4-5, the wind power has minimal cost savings of the life of the equipment. If the New Jersey begins offering wind energy incentives, the City could re-evaluate specific locations and incentives. Also, the technology is constantly changing and will most likely continue to lower in price.

It should be noted that CDM Smith used only REC values, utility cost avoidance factors, and the REIP incentive in determining simple payback periods. As stated above, other incentives and financial programs such as Power Purchase Agreements are available to help finance this installation. For example, if a Power Purchase Agreement is completed, the private company financing the project would benefit from the 30% tax credit. Other incentives such as CREB's and first year usage incentives could be available to the City in lowering the payback period. Refer to [www.dsireusa.org](http://www.dsireusa.org) for an extensive listing of possible incentives for the New Jersey area.

It should also be noted that the wind turbine represented above is for feasibility purposes only. If the City decides to install a wind turbine, different mounting heights, turbine sizes, and manufacturers should be considered. In addition, permits may be required for installation according to local zoning laws. The FAA must also be notified in order to give clearance for the tower, and for installation of aviation safety lights if necessary.

## 4.6 Additional Measures

It may be possible to reduce the plug load of the facilities even further with the implementation of smart strips and energy star appliances. Smart Strips save energy by electronically unplugging all of the devices that are plugged into the “Automatically Switched outlets” when the device plugged into the control outlet is turned off. It is important to note that CDM Smith is not suggesting that computers be plugged into the automatically switched off outlets, as there would be potential for the computers to be shut off mid-operation. There are a vast amount of computer peripherals that are typically left on after a computer is shut off, including monitors, scanners, printers and DSL/Cable modems. These peripherals can be plugged into the automatic outlets.

A standard Smart Strip has one ‘control’ outlet, six (6) outlets that are automatically switched off when the control device is and three (3) outlets that are always hot. An example of how the University can implement the use of Smart Strips office or library settings is to plug a computer into the control outlet, five (5) monitors and a personal printer (8 W in standby mode) into the automatic outlets and three (3) computers into the always hot outlets. An LCD monitor can use up to 34W; in standby mode the monitor utilizes 1 – 2W. A CRT monitor typically utilizes around 75W. The following table 4.6-1 summarizes the payback of a Smart Strip, assuming 5 LCD monitors and 1 printer are automatically powered down that would otherwise been left on 8 hours/day and in standby mode 16 hours/day, 5 days/week for 9 months.

**Table 4.6-1: Simple Payback**

| Smart Strip Application Example                            |       |
|------------------------------------------------------------|-------|
| Predicted Annual Savings – 5 LCD monitors, 1 printer (kWh) | 308   |
| *Total Annual Savings                                      | \$52  |
| Initial Capital Cost                                       | \$40  |
| Simple Payback (years)                                     | 0.8   |
| Lifetime Energy Savings (15 years)                         | \$785 |

\*Aggregate Cost of \$.17/kWh

The following Table 4.6-2 summarizes other applications for the Smart Strip that may be applicable throughout the buildings:

**Table 4.6-2 Applications for Smart Strips**

| Control Outlet | Switched Outlets                    |
|----------------|-------------------------------------|
| Computer       | Monitors, printers, scanners, lamps |
| TV             | VCR, DVD player, cable box          |
| Lamp           | Stereo, space heater                |

The Board should continue to implement Energy Star appliances. This is recommended on an ‘as-needed’ basis.

In addition to replacing old appliances with Energy Star appliances, the following two maintenance procedures can work to save the energy consumed by the refrigerators. One is cleaning dirty condenser coils, twice a year. A refrigerator’s condenser coils and cooling fins are located either under the unit behind a grille in the front or on the back of the appliance. The coils can be cleaned with a brush or vacuum cleaner hose. The second source of wasted energy associated with a refrigerator is the door seal. Realigning the door or replacing a no longer airtight door seal will work to improve energy efficiency.

# Section 5

## Evaluation of Energy Purchasing and Procurement Strategies

### 5.1 Energy Deregulation

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law, the deregulation of the market, allowed all consumers to shop for their electric supplier. The intent was to create a competitive market for electrical energy supply. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party supplier. Energy deregulation in New Jersey increased the energy buyers' options by separating the function of electricity distribution from that of electricity supply.

To sell electric generation service in New Jersey, electric power suppliers must be licensed by the New Jersey Board of Public Utilities (NJ BPU). They must also be registered with the local public utility (JCP&L/PSE&G) to sell electric service in that utility's service areas. The current list is available at the link provided

<http://www.bpu.state.nj.us/bpu/commercial/shopping.html#nbr1>. The following suppliers are licensed with the NJ BPU and are registered to sell electric service in the PSE&G service territory:

- Abest Power & Gas of NJ, LLC
- AEP Energy, Inc.
- Agera Energy, LLC
- Alpha Gas & Electric, LLC
- Ambit Northeast, LLC (Ambit Energy)
- American Power and Gas of NJ, LLC
- American Powernet Management, LP
- Amerigreen Energy, Inc.
- AP Gas & Electric, LLC
- Astral Energy, LLC
- Barclays Capital Services, Inc.
- BBPC, LLC (Eastern Energy)
- Berkshire Energy Partners, LLC
- Blue Pilot Energy, LLC
- Brick Standard, LLC

- CCES LLC (Clean Currents Energy Services)
- Champion Energy Services, LLC
- Choice Energy, LLC
- Clearview Electric, Inc.
- Commerce Energy, Inc.
- Community Energy, Inc.
- ConEdison Solutions
- ConocoPhillips Company
- Constellation NewEnergy, Inc.
- Corporate Services Support Corp.
- Credit Suisse (USA) Inc.
- Direct Energy Business, LLC
- Discount Energy Group, LLC
- DTE Energy Supply, Inc.
- EDF Energy Services, LLC
- Energy.me Midwest, Inc.
- Energy Plus Holdings, LLC
- EnerPenn, YEP Energy
- Ethical Electric Benefit Co. (Ethical Electric)
- Energy Service Providers (New Jersey Gas & Electric)
- FirstEnergy Solutions
- First Point Power, LLC
- Frontier Utilities Northeast, LLC
- Gateway Energy Services Corp.
- GDF SUEZ Energy Resources NA, Inc.
- Glacial Energy of New Jersey, Inc.
- Global Energy Marketing LLC
- Green Mountain Energy Company

- Harborside Energy LLC
- Hess Corporation
- Hess Energy Marketing LLC
- Hess Small Business Services, LLC
- HIKO Energy, LLC
- Hudson Energy Services, LLC
- IDT Energy, Inc.
- Independence Energy Group, LLC
- Inspire Energy Holdings, LLC
- Integrys Energy Services, Inc.
- Jsynergy, LLC
- Liberty Power Delaware, LLC
- Liberty Power Holdings, LLC
- Linde Energy Services
- Mansfield Power & Gas, LLC
- Marathon Power LLC
- MP2 Energy NJ, LLC
- Natures Current, LLC
- MPower Energy NJ LLC
- NATGASCO, Inc (Supreme Energy, Inc)
- New Jersey Gas & Electric
- NextEra Energy Services New Jersey, LLC
- Noble Americas Energy Solutions
- Nordic Energy Services, LLC
- North American Power & Gas, LLC
- North Eastern States, Inc. (Entrust Energy)
- Oasis Power, LLC (Oasis Energy)
- Palmco Power NJ, LLC

- Park Power, LLC
- Plymouth Rock Energy, LLC
- Power Management Co. (PMC Lightsavers Limited Liability Company)
- Progressive Energy Consulting, LLC
- Prospect Resources, Inc.
- Public Power & Utility of New Jersey, LLC
- Quest Energy Solutions
- Reliant Energy
- ResCom Energy LLC
- Residents Energy, LLC
- Respond Power LLC
- Save on Energy, LLC
- SFE Energy
- SJ Energy Partners, Inc.
- SmartEnergy Holdings, LLC
- South Jersey Energy Company
- Sperian Energy Corp.
- Spark Energy, LP
- Sperian Energy Corp.
- Sprague Energy Corp.
- Starion Energy PA Inc.
- Stream Energy New Jersey, LLC
- Summit Energy Services, Inc.
- Talen Energy Marketing, LLC
- Texas Retail Energy, LLC
- TransCanada Power Marketing Ltd.
- TriEagle Energy, LP
- UGI Energy Services Inc.

- Verde Energy USA, Inc.
- Viridian Energy
- Xoom Energy New Jersey, LLC
- YEP Energy
- Your Energy Holdings, LLC

The Board may also be able to purchase aggregate energy through the Government Energy Aggregation Act (GEA) of 2003. This is a process where a third party contract administrator solicits third party energy supplier quotes for aggregate blocks of energy at lower costs. This option is typically more feasible for large energy users (such as Water and Wastewater Treatment Plants) and for large municipalities. The Board should do more research on this topic and determine if a partnership with another municipality would be an option to peruse.

## 5.2 Demand Response Program

Demand Response is a program through which a business can make money on reducing their electricity use when wholesale electricity prices are high or when heavy demand causes instability on the electric grid, which can result in voltage fluctuations or grid failure. Demand Response is an energy management program that compensates the participant for reducing their energy consumption at critical times. Demand Response is a highly efficient and cost effective means of reducing the potential for electrical grid failure and price volatility and is one of the best solutions to the Mid-Atlantic region's current energy challenges.

The program provides at least 2 hours advance notice before curtailment is required. There is typically 1 event a year that lasts about 3 hours in the summer months, when demand for electricity is at its highest.

Participation in Demand Response is generally done through companies known as Curtailment Service Providers, or CSPs, who are members of PJM Interconnection. There is no cost to enroll in the program and participation is voluntary, for instance, you can choose when you want to participate. In most cases, there is no penalty for declining to reduce your electricity use when you're asked to do so. The event is managed remotely by notifying your staff of the curtailment request and then enacting curtailment through your Building Management System.

CSPs will share in a percentage of your savings, which may differ among various CSPs, since there may be costs associated with the hardware and /or software required for participation, so it is recommended that a number of CSPs be contacted to review their offers.

Buildings with non-emergency services, and with high electrical usage during peak hours (typically mid-day to early afternoon), that can shut down portions of the building loads are ideal for the implementation of demand response.

None of these buildings seem like good candidates for load curtailment. No facilities have emergency or onsite generation. Only the high school and middle school have demands over 100 kW. The demand of these 2 buildings equates to little more than the installed lighting. The building management systems are not likely connected to the systems that would create demand reduction. Participation in this program would require major modification of building systems or installation of generation equipment.

## Section 6

# Ranking of Energy Conservation and Retrofit Measures (ECRM)

### 6.1 ECRMs

The main objective of this energy audit is to identify potential Energy Conservation and Retrofit Measures and to determine whether or not the identified ECRM's are economically feasible to warrant the cost for planning and implementation of each measure. Economic feasibility of each identified measure was evaluated through a simple payback analysis. The simple payback analysis consists of establishing the Engineer's Opinion of Probable Construction Cost estimates; O&M cost savings estimates, projected annual energy savings estimates and the potential value of New Jersey Clean Energy Rebates or Renewable Energy Credits, if applicable. The simple payback period is then determined as the amount of time (years) until the energy savings associated with each measure amounts to the capital investment cost.

As discussed in Section 3, aggregate unit costs for electrical energy delivery and usage and natural gas delivery and usage, which accounts for all demand and tariff charges at each complex, was determined and utilized in the simple payback analyses.

In general, ECRMs having a payback period of 20 years or less have been recommended and only those recommended ECRMs within Section 4 of the report have been ranked for possible implementation. The most attractive rankings are those with the lowest simple payback period.

Ranking of ECRMs has been broken down into the following categories:

- Lighting Systems
- HVAC Systems
- Other Measures
- Renewables

#### 6.1.1 Lighting Systems

Table 6.1-1 includes the recommended ECRMs to provide energy savings for all building lighting systems, which include the installation of energy-efficient luminaires. A detailed discussion on building lighting systems is presented in Section 4.1.

**Table 6.1-1**  
**Ranking of Energy Savings Measures Summary – Lighting System Retrofits**

| Location                       | Base Cost | Incentives | Total Cost | Energy Savings | Annual Savings | Simple Payback |
|--------------------------------|-----------|------------|------------|----------------|----------------|----------------|
| Grover Cleveland Middle School | \$385,009 | \$16,360   | \$368,649  | \$19,570       | \$28,447       | 13.0           |
| Washington Elementary School   | \$115,388 | \$1,265    | \$114,123  | \$3,710        | \$7,893        | 14.5           |
| Jefferson Elementary School    | \$128,448 | \$5,880    | \$122,568  | \$4,577        | \$7,717        | 15.9           |
| Lincoln Elementary School      | \$96,807  | \$4,065    | \$92,742   | \$3,326        | \$5,432        | 17.1           |
| Wilson Elementary School       | \$118,250 | \$4,970    | \$113,280  | \$3,449        | \$6,067        | 18.7           |
| Harrison School Building       | \$80,767  | \$3,120    | \$77,647   | \$2,181        | \$3,857        | 20.1           |
| James Caldwell High School     | \$427,989 | \$16,245   | \$411,744  | \$10,833       | \$20,361       | 20.2           |

## 6.1.2 HVAC Systems

Table 6.1-2 includes the recommended ECRM to provide energy savings for building HVAC systems, which provide a simple payback of less than 20 years. A detailed discussion on building HVAC systems is presented in Section 4.2.

**Table 6.1-2**  
**Ranking of Energy Savings Measures Summary – HVAC System Upgrade**

| Facility Measure                                                   | Total Cost | Energy Savings                                 | Annual Fiscal Savings <sup>2</sup> | Simple Payback (Years) |
|--------------------------------------------------------------------|------------|------------------------------------------------|------------------------------------|------------------------|
| <b>Lincoln Elementary School</b><br>Premium Efficiency Motors      | \$208      | 0. Therms<br>530 kWh                           | \$108                              | <b>1.9</b>             |
| <b>Washington Elementary School</b><br>Condensing DHW              | \$3,762    | 756. Therms<br>kWh                             | \$616                              | <b>6.1</b>             |
| <b>Grover Cleveland Middle School</b><br>Premium Efficiency Motors | \$2,715    | 0. Therms<br>1,864 kWh                         | \$322                              | <b>8.4</b>             |
| <b>Washington Elementary School</b><br>Variable Speed Drive        | \$6,000    | 0. Therms<br>3,183 kWh                         | \$585                              | <b>10.3</b>            |
| <b>Grover Cleveland Middle School</b><br>Combined Heat and Power   | \$100,100  | -36,374. Therms<br>280,800 kWh<br>594,000 kbtu | \$8,242                            | <b>12.1</b>            |
| <b>Lincoln Elementary School</b><br>DDC Controls                   | \$74,750   | 457. Therms<br>28,344 kWh                      | \$6,099                            | <b>12.3</b>            |
| <b>Lincoln Elementary School</b><br>Condensing Boilers             | \$129,669  | 4,892. Therms                                  | \$9,614                            | <b>13.5</b>            |
| <b>Washington Elementary School</b><br>Lighting Upgrades           | \$92,742   | 0. Therms<br>23,191 kWh                        | \$4,262                            | <b>17.1</b>            |
| <b>Jefferson Elementary School</b><br>Condensing Boilers           | \$129,670  | 1,780. Therms                                  | \$7,376                            | <b>17.6</b>            |

### 6.1.3 Solar Energy

Implementation of new solar energy systems has been evaluated to determine the economic feasibility for furnishing and installing such systems. These facilities are either not cost effective or very close to not cost effective. Based solely on the simple payback modeling performed, it would not benefit the Board to further investigate installing the solar energy systems. However, other options such as Power Purchase Agreements (PPA) are potentially available to help finance the project. Therefore, if the Board is interested in installing additional solar energy systems at the various facilities, consultation with a special purpose company is recommended to obtain financing through a PPA. This is further discussed in Section 7. Table 6.1-3, includes a ranking of the solar energy ECRMs evaluated for the Caldwell – West Caldwell Board of Education.

**Table 6.1-3**  
**Ranking of Energy Savings Measures Summary – Solar Energy Systems**

| Building                       | Retrofit Cost | Annual Energy Savings | Annual SREC | Simple Payback |
|--------------------------------|---------------|-----------------------|-------------|----------------|
| James Caldwell High School     | \$ 1,600,000  | \$44,588              | \$54,263    | 21.5           |
| Grover Cleveland Middle School | \$ 1,000,000  | \$26,753              | \$32,558    | 22.4           |
| Jefferson Elementary School    | \$ 120,000    | \$4,280               | \$4,341     | 33.8           |
| Lincoln Elementary School      | \$ 196,000    | \$3,805               | \$3,473     | 35.5           |
| Washington Elementary School   | \$ 192,000    | \$6,849               | \$6,946     | 28.0           |
| Wilson Elementary School       | \$ 150,000    | \$4,756               | \$5,426     | 32.6           |
| Harrison School Building       | \$ 1,000,000  | \$32,103              | \$32,558    | 20.5           |

### 6.1.4 Wind Energy

Implementation of new wind energy systems has been evaluated to determine the economic feasibility for furnishing and installing such systems. Based on the simple payback modeling performed, it would benefit the Board to further investigate installing the wind energy systems. This is primarily based on the initial upfront capital investment required for a wind energy system installation and an acceptable payback period. Table 6.1-5, includes a ranking of the wind energy ECRMs evaluated for the Caldwell West Caldwell Board of Education.

**Table 6.1-4**  
**Ranking of Energy Savings Measures Summary – Wind Turbine Energy System**

| Parameter                           | Wind Turbine<br>(Average Site Wind Speed –<br>10 mph) |
|-------------------------------------|-------------------------------------------------------|
| Engineer's Opinion of Probable Cost | \$450,000                                             |
| 1 <sup>st</sup> Year Production     | 138,608                                               |
| Annual Estimated Electric Savings   | \$19,405                                              |
| Annual Estimated REC Revenue        | \$1,247                                               |
| <b>Project Simple Payback</b>       | <b>23.2</b>                                           |

## Section 7

# Grants, Incentives and Funding Sources

### 7.1 Renewable Energy

#### 7.1.1 Renewable Energy Certificates (NJ BPU)

As part of New Jersey's Renewable Portfolio Standards (RPS), electric suppliers are required to have an annually-increasing percentage of their retail sales generated by renewable energy. Electric suppliers fulfill this obligation by purchasing renewable energy certificates (RECs) from the owners of solar generating systems. One REC is created for every 1,000 kWh (1 MWh) of renewable electricity generated. Although solar systems generate electricity and SRECs in tandem, the two are independent commodities and sold separately.

The RPS, and creation of RECs, is intended to provide additional revenue flow and financial support for renewable energy projects in New Jersey. Class I RECs, which include electricity generation from wind, wave, tidal, geothermal and sustainable biomass typically trade at around \$0.90/MWh. RECs generated from solar electricity, or SRECs, have recently been trading between \$63 - \$510 per MWh, with the weighted average trade value at approximately \$180-\$200.

Photovoltaic array installations evaluated within this report would benefit from this program.

#### 7.1.2 Renewable Energy Incentive Program (NJ BPU)

The Renewable Energy Incentive Program (REIP) is currently offering incentives for municipalities to invest in CHP systems through the Small and Large Scale Combined Heat and Power (CHP)/Fuel Cell Program. The existing small and large CHP-Fuel Cell programs will be combined to offer rolling grants to support CHP and fuel cell projects serving commercial, industrial, and institutional customers in New Jersey. There is a total of \$50 million in grants available. The Large Scale CHP/Fuel Cell program is operated by the New Jersey BPU. Details on further qualifications, disbursement caps, and grant applications have not yet been released. Information on these details will be posted to the NJ BPU website. Other incentives are also available under this program, for more information on REIP, please see [www.njcleanenergy.com](http://www.njcleanenergy.com).

#### 7.1.3 Utility Financing Programs

All four Electric Distribution Companies (EDCs) in New Jersey have developed long term contracting or financing programs for the development of solar energy systems. In all of the programs, Solar Renewable Energy Credits (SRECs) generated by the solar energy systems will be sold at auction to energy suppliers who are required to purchase a certain quantity of SRECs to meet their Renewable Portfolio Standard requirements.

Photovoltaic array installations evaluated within this report would benefit from this program.

#### 7.1.4 Renewable Energy Manufacturing Incentive (NJ BPU)

New Jersey's Renewable Energy Manufacturing Incentive (REMI) program provides rebates to purchase and install solar panels, inverters, and racking systems manufactured in New Jersey.

Rebates for panels start at \$0.25 per watt and rebates for racking systems and inverters start at \$0.15 per watt for solar projects up to 500 kW in capacity. To be eligible for REMI, applicants must apply to either the Renewable Energy Incentive Program (REIP) or the SREC Registration Program (SRP).

Photovoltaic array installations evaluated within this report may benefit from this program.

### 7.1.5 Clean Renewable Energy Bonds (IRS)

The IRS is currently not accepting application for CREBs. For more information, please refer to <http://www.irs.gov/pub/irs-drop/a-10-54.pdf>.

### 7.1.6 Qualified Energy Conservation Bonds (IRS)

These IRS 0% interest bonds are very similar to CREBs except they are allocated based on state and county population. New Jersey was allocated \$90 million as part of the ARRA stimulus fund. QECBs are typically distributed through municipal bond banks or state economic development agencies.

### 7.1.7 Global Climate Change Mitigation Incentive Fund (US EDA)

The Economic Development Agency (part of the U.S. Department of Commerce) administers the GCCMIF to public works projects that reduce greenhouse gas emissions and creates new jobs. In FY 2012, \$16.5 million was allocated to the fund, and additional funding is expected to be allocated in FY 2013.

Applications are due on a rolling basis. Private sector and or for-profit companies are not eligible for this fund.

### 7.1.8 Private Tax-Exempt Financing

Similar to traditional municipal bond financing, there are many private financial service companies that offer a myriad of options for tax-exempt financing of municipal projects. The providers of these services suggest that this capital can be offered at competitive rates in an expedited timeframe and with fewer complications when compared to traditional municipal financing methods. Though these factors would need to be compared on a case-by-case basis, the one distinct advantage to private financing on the current project would likely be the flexibility to structure payments to meet budget needs with consideration given to the terms and conditions of existing loan and/or bond agreements.

For example, this mechanism could be used to limit the initial debt payments when the current bond debt is the greatest and the operations savings of the project has yet to be fully realized. It should also be noted that, in many cases, the construction and long term financing can be rolled into a single private financing agreement. Also, in some instances, equipment manufacturers have the ability to offer competitive financing terms (e.g. Siemens Financial Services Corporation), though financing from these sources is generally contingent upon a substantial portion of the project cost (~20% to 30%) being for their respective equipment.

### 7.1.9 Performance Based Contracts (ESCOs)

A second financing alternative for a project of this nature would be to enter into a Performance Based Contract with an Energy Services Company (ESCO). The premise of this type of contract is that it requires no initial municipal capital contributions in order to implement the project - instead relying on future operations cost savings and/or energy production, to fund the annual payments. Prior to entering into an agreement for the funding of the project, an ESCO would perform an energy audit and/or conceptual studies to confirm future energy cost savings or energy production inherent with the projects implementation and operation. The contract would then be formulated based on some measurable parameter(s) (energy production, etc) which would be verified by measurement throughout the contract duration. The savings in energy costs or energy production would then be used to pay back the capital investment of the project over the contract time period (typically on the order of 10-years or less).

The ESCO would guarantee the agreed upon energy savings or energy production. If the project does not meet energy savings or production commitments, the ESCO pays the owner the equivalent difference.

With this funding alternative, the ownership and operation of the facility would be maintained by the original owner. A performance contract may also include ESCO operation and maintenance of the energy-related facilities if that were deemed appropriate. Significant ESCO's with experience in this area include Siemens Building Technologies, Chevron and Johnson Controls. CDM Smith has functioned in several roles on performance based contracts including being the owner's representative and, on different contracts, providing design-build services (as a subcontractor to the ESCO). CDM Smith can provide additional experience-based information upon request.

### **7.1.10 Power Purchase Agreements (SPCs)**

A Power Purchase Agreement (PPA) also delivers a project with no initial capital contribution by the original owner. In this model, a Special Purpose Company (SPC) created by a developer, would own the energy production facilities. Within the framework of a PPA, a SPC will typically lease property from the owners for construction and operation of the new facilities. The funding and construction of the new facilities would be performed by the SPC who would then own and operate the facilities for the duration of the contract (typically 20 to 30 years). Throughout that period of time, the original owner would purchase power from the SPC at a pre-negotiated rate which would take into account the initial capital cost, operation and maintenance of the constructed facility, ancillary benefits of the project and investor returns on investment. For renewable energy, financial incentives may enable this financing approach to compete favorably with utility power tariffs. Incentives include state and local tax credits, renewable energy credits, and Federal energy production tax credits or energy investment tax credits. It is expected that a number of experienced companies and developers may be interested in a PPA for New Jersey municipal renewable energy projects.

Photovoltaic array installations evaluated within this report would benefit from this program.

## **7.2 Energy Efficiency**

### **7.2.1 Introduction**

New Jersey's Clean Energy Program (NJ CEP) promotes increased energy efficiency and the use of clean, renewable sources of energy including solar, wind, geothermal, and sustainable biomass. The results for New Jersey are a stronger economy, less pollution, lower costs, and reduced demand for electricity. NJCEP offers financial incentives, programs, and services for residential, commercial, and municipal customers.

NJCEP reduces the need to generate electricity and burn natural gas which eliminates the pollution that would have been caused by such electric generation or natural gas usage. The benefits of these programs continue for the life of the measures installed, which on average is about 15 years. Thus, the public receives substantial environmental and public health benefits from programs that also lower energy bills and benefit the economy.

### **7.2.2 New Jersey Smart Start Buildings Program (NJ BPU)**

The New Jersey Smart Start Buildings Program offers rebate incentives for several qualifying equipment such as high efficient premium motors and lighting, and lighting controls.

Incentive information and incentive calculation worksheets are provided for the various new equipment installation identified in this report and are included in Appendix F.

### 7.2.3 Pay for Performance Program (NJ BPU)

CDM Smith anticipates that the following buildings are possible candidates for the Pay for Performance Program: Grover Cleveland Middle School. These potential candidates are based upon building models and energy savings calculations, and require further analysis to confirm they will qualify for the Pay for Performance Program.

Based on these preliminary estimates, we believe that this project might qualify for incentives through the Pay for Performance (P4P) program. If the project meets P4P program requirements and an application to the program is accepted, we estimate that the total P4P incentives to be approximately \$25,955, which is paid in three installments: (1) Approval of Energy Reduction Plan; (2) Installation of recommended measures; (3) Verification of savings twelve months after installation of recommended measures. The incentives were calculated at \$.1/ft<sup>2</sup> with a minimum incentive of \$5,000.

Please note: This is a preliminary estimate of P4P incentives based on the assumptions in this report and P4P program eligibility rules. P4P incentives are not guaranteed until an application has been submitted and approved by the P4P program and all other program eligibility requirements have been met. Please see below for an overview of the P4P program.

The Pay for Performance Program is offered through the New Jersey Smart Start Program. Commercial, industrial and institutional buildings are eligible for participation if not already receiving Energy Efficiency and Conservation Block Grants.

Incentives are available for buildings that are able to present an Energy Reduction Plans that reduce the building's current energy consumption by 15% or more, in addition to incentives for installing the recommended measures and incentives for presenting the energy savings in a post-construction benchmarking report. No more than 50% of the total energy savings may be derived from lighting retrofits. In addition, the total energy savings of 15% may not come from the implementation of one energy savings measure. The incentive structure is provided in Appendix F.

### 7.2.4 Direct Install (NJ BPU)

Owners of existing small to mid-size commercial and industrial facilities with a peak electric demand that did not exceed 200 kW in any of the preceding 12 months are eligible to participate in Direct Install. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies.

This program will cover up to 70% of the retro-fitting costs associated with the use of new energy efficient equipment. Lighting, HVAC, refrigeration, motors, natural gas systems, and variable frequency drives are covered under the Direct Install program.

The buildings covered under this audit that are potentially eligible for participation in the Direct Install Program, based on the requirement to have not exceeded a peak demand of 200 kW in the preceding 12 months, are: James Caldwell High School, Grover Cleveland Middle School, Jefferson Elementary School, Lincoln Elementary School, Washington Elementary School, Wilson Elementary School and Harrison School Building.

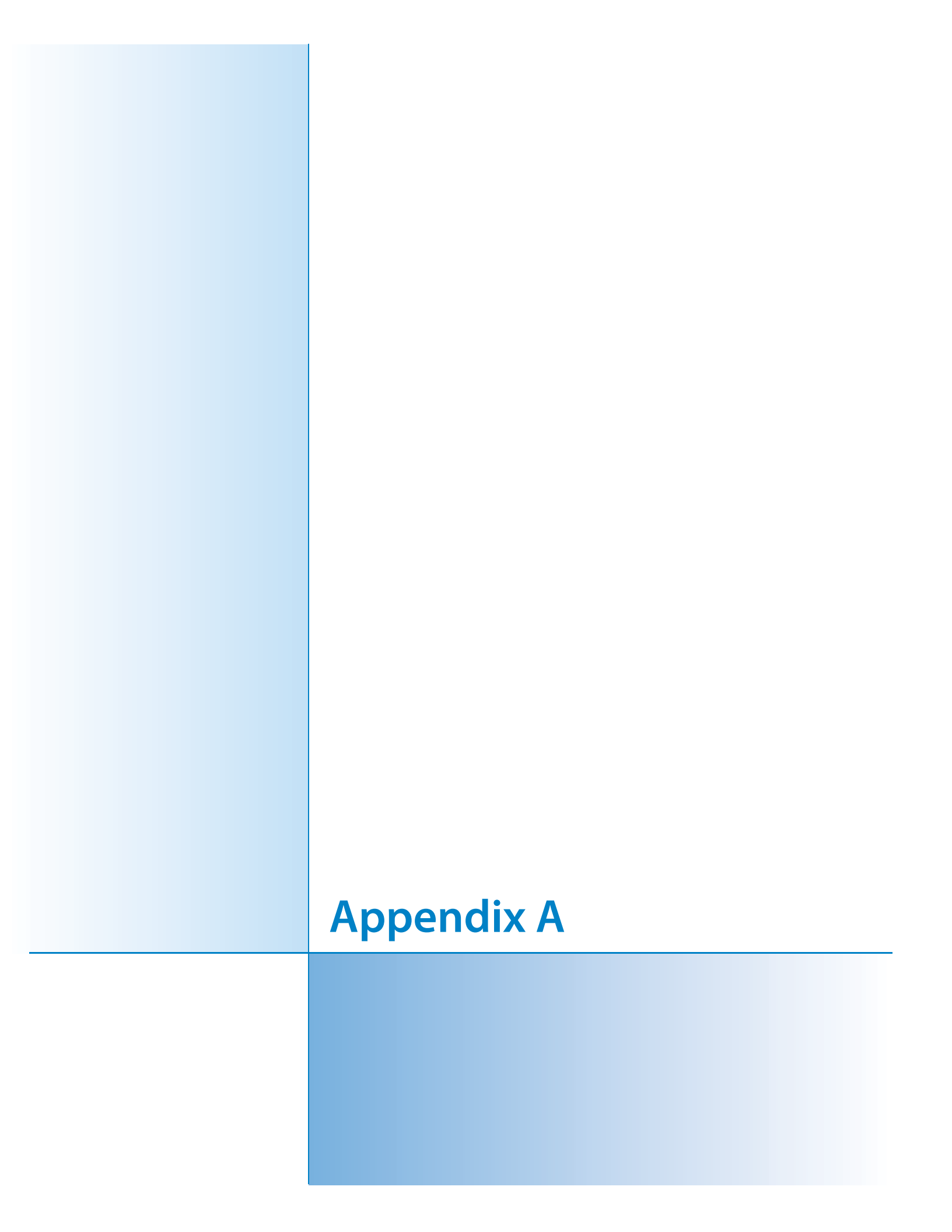
The Direct Install Program is designed to fast-track project implementation so energy savings can be realized sooner rather than later. The steps for participation are to contact the contractor assigned and trained to provide Direct Install services in your County and schedule an Energy Assessment with this contractor. The contractor will assist in completing the Program Application and Participation Agreement.

The Energy Assessment with the participating contractor will work to determine which conservation measures qualify and the resulting project cost. Following this assessment, a scope of work will be finalized and installation will be arranged. Following completion of the installation a 'project completion form' must be submitted to the program representative assigned to the project.

The contractor for Essex County is:

Lime Energy  
Tony McCoy  
Phone: 732-791-5380  
Email: [tmccoy@lime-energy.com](mailto:tmccoy@lime-energy.com)

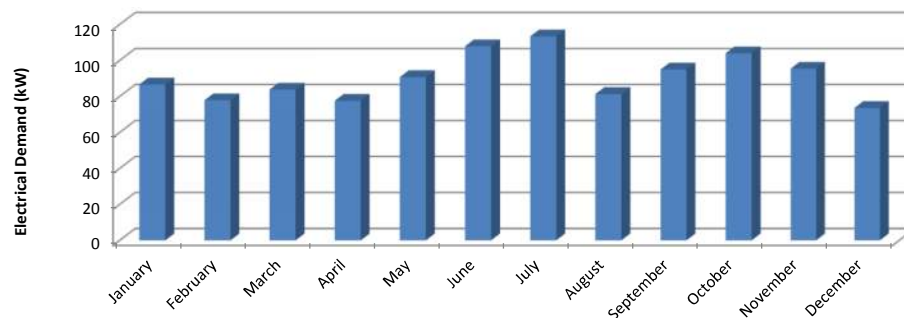
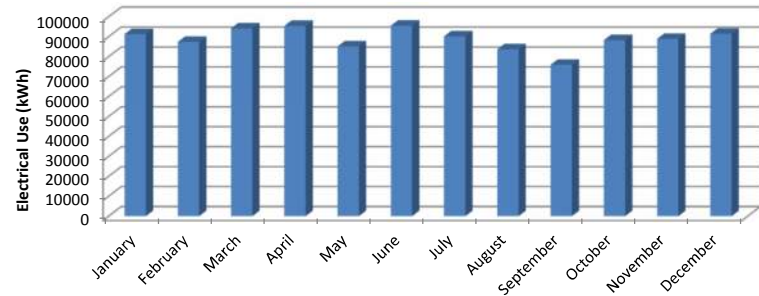
Any additional information on the Direct Install Program can be obtained by calling 866-NJSMART or by e-mail to [DirectInstall@trcsolutions.com](mailto:DirectInstall@trcsolutions.com)

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## Appendix A

|                       |                         |
|-----------------------|-------------------------|
| Energy Audit Building | JC Coldwell High School |
| Service Provider      | PSE & G                 |
| Account Number        | 4200845806              |
| Meter Number          | 92047403                |

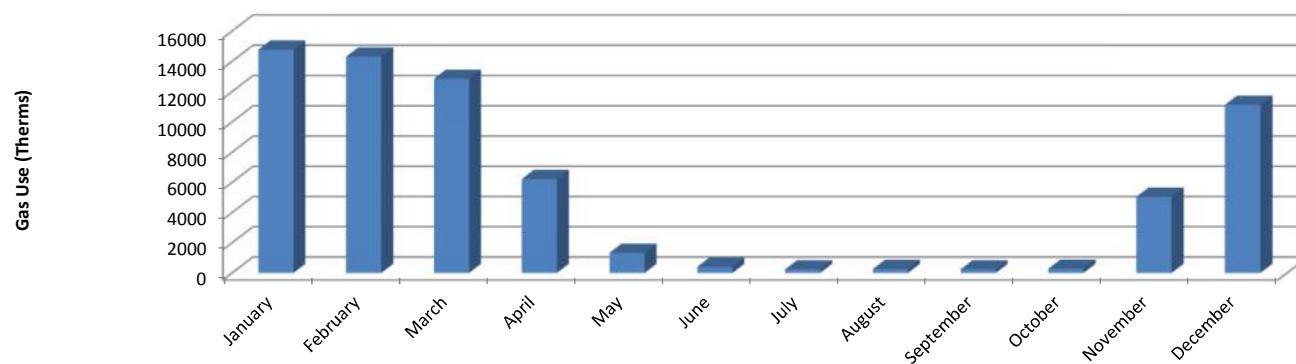
| 2014         |              |                 |               |              |             |              |           |         |             |
|--------------|--------------|-----------------|---------------|--------------|-------------|--------------|-----------|---------|-------------|
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | 45806       | Off Peak kWh | Total kWh | Peak kW | Off Peak kW |
| December-13  | January-14   |                 |               |              |             |              |           |         |             |
| January-14   | February-14  |                 |               |              |             |              |           |         |             |
| February-14  | March-14     |                 |               |              |             |              |           |         |             |
| March-14     | April-14     |                 |               |              |             |              |           |         |             |
| April-14     | May-14       |                 |               |              |             |              |           |         |             |
| May-14       | June-14      |                 |               |              |             |              |           |         |             |
| June-14      | July-14      | \$ 9,254.47     | \$ 6,879.07   | \$ 16,133.54 | 90211       |              |           | 340     |             |
| July-14      | August-14    | \$ 8,590.33     | \$ 5,614.16   | \$ 14,204.49 | 83737       |              |           | 244     |             |
| August-14    | September-14 | \$ 7,789.78     | \$ 5,898.30   | \$ 13,688.08 | 75933       |              |           | 285     |             |
| September-14 | October-14   | \$ 9,053.57     | \$ 3,890.05   | \$ 12,943.62 | 88253       |              |           | 312     |             |
| October-14   | November-14  | \$ 9,120.98     | \$ 3,779.72   | \$ 12,900.70 | 88910       |              |           | 286     |             |
| November-14  | December-14  | \$ 9,384.57     | \$ 3,942.41   | \$ 13,326.98 | 91479       |              |           | 221     |             |
| 2015         |              |                 |               |              |             |              |           |         |             |
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | On Peak kWh | Off Peak kWh | Total kWh | Peak kW | Off Peak kW |
| December-14  | January-15   | \$ 9,366.16     | \$ 3,749.70   | \$ 13,115.86 | 91302       |              |           | 260     |             |
| January-15   | February-15  | \$ 8,964.41     | \$ 3,554.61   | \$ 12,519.02 | 87383       |              |           | 234     |             |
| February-15  | March-15     | \$ 9,664.22     | \$ 3,802.07   | \$ 13,466.29 | 94205       |              |           | 251     |             |
| March-15     | April-15     | \$ 9,789.42     | \$ 3,768.34   | \$ 13,557.76 | 95425       |              |           | 233     |             |
| April-15     | May-15       | \$ 9,093.52     | \$ 3,635.17   | \$ 12,728.69 | 85116       |              |           | 272     |             |
| May-15       | June-15      | \$ 9,708.35     | \$ 6,864.76   | \$ 16,573.11 | 95517       |              |           | 324     |             |
| June-15      | July-15      |                 |               | \$ -         |             |              | 0         |         | 491.0       |
| July-15      | August-15    |                 |               | \$ -         |             |              | 0         |         | 591.8       |
| August-15    | September-15 |                 |               | \$ -         |             |              | 0         |         | 479.5       |
| September-15 | October-15   |                 |               | \$ -         |             |              | 0         |         | 452.2       |
| October-15   | November-15  |                 |               | \$ -         |             |              | 0         |         | 460.8       |
| November-15  | December-15  |                 |               | \$ -         |             |              | 0         |         | 460.8       |



|                       |                         |
|-----------------------|-------------------------|
| Energy Audit Building | JC Coldwell High School |
| Service Provider      | PSE & G                 |
| Account Number        | 4200845806              |
| Meter Number          | 3637654                 |

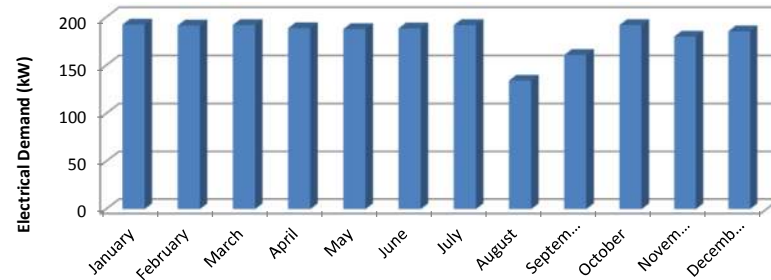
| 2014         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-13  | January-14   |                     |                     |               |              |            |            |              |
| January-14   | February-14  |                     |                     |               |              |            |            |              |
| February-14  | March-14     |                     |                     |               |              |            |            |              |
| March-14     | April-14     |                     |                     |               |              |            |            |              |
| April-14     | May-14       |                     |                     |               |              |            |            |              |
| May-14       | June-14      |                     |                     |               |              |            |            |              |
| June-14      | July-14      | \$ 128.24           |                     | \$ 130.33     | \$ 258.57    | 243.70     |            |              |
| July-14      | August-14    | \$ 122.85           |                     | \$ 181.67     | \$ 304.52    | 265.34     |            |              |
| August-14    | September-14 | \$ 116.95           |                     | \$ 127.88     | \$ 244.83    | 244.17     |            |              |
| September-14 | October-14   | \$ 139.46           |                     | \$ 132.05     | \$ 271.51    | 289.40     |            |              |
| October-14   | November-14  | \$ 2,293.82         |                     | \$ 2,778.68   | \$ 5,072.50  | 5048.46    |            |              |
| November-14  | December-14  | \$ 5,720.56         |                     | \$ 3,691.14   | \$ 9,411.70  | 11131.08   |            |              |

| 2015         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-14  | January-15   |                     |                     | \$ 13,306.16  | \$ 13,306.16 | 14773.40   |            |              |
| January-15   | February-15  |                     |                     | \$ 11,985.29  | \$ 11,985.29 | 14310.57   |            |              |
| February-15  | March-15     |                     |                     | \$ 10,604.30  | \$ 10,604.30 | 12849.38   |            |              |
| March-15     | April-15     |                     |                     | \$ 662.70     | \$ 662.70    | 6223.57    |            |              |
| April-15     | May-15       |                     |                     | \$ 231.90     | \$ 231.90    | 1340.81    |            |              |
| May-15       | June-15      |                     |                     | \$ 143.95     | \$ 143.95    | 412.23     |            |              |
| June-15      | July-15      |                     |                     |               | \$ -         |            |            | 0.0          |
| July-15      | August-15    |                     |                     |               | \$ -         |            |            | 0.0          |
| August-15    | September-15 |                     |                     |               | \$ -         |            |            | 0.0          |
| September-15 | October-15   |                     |                     |               | \$ -         |            |            | 0.0          |
| October-15   | November-15  |                     |                     |               | \$ -         |            |            | 0.0          |
| November-15  | December-15  |                     |                     |               | \$ -         |            |            | 0            |



|                       |                     |
|-----------------------|---------------------|
| Energy Audit Building | GC Middle School    |
| Service Provider      | PSE & G             |
| Account Number        | 4200002108          |
| Meter Number          | 9211409 / 778014616 |

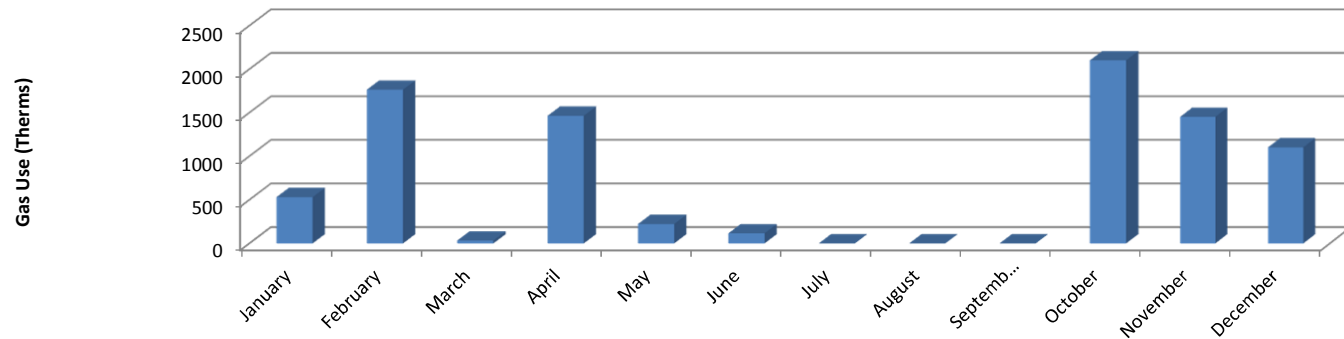
| 2014         |              |                 |               |              |         |           |           |         |
|--------------|--------------|-----------------|---------------|--------------|---------|-----------|-----------|---------|
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | 9211409 | 778014616 | Total kWh | Peak kW |
| December-13  | January-14   |                 |               | \$ -         |         |           | 0         |         |
| January-14   | February-14  |                 |               | \$ -         |         |           | 0         |         |
| February-14  | March-14     |                 |               | \$ -         |         |           | 0         |         |
| March-14     | April-14     |                 |               | \$ -         |         |           | 0         |         |
| April-14     | May-14       |                 |               | \$ -         |         |           | 0         |         |
| May-14       | June-14      |                 |               | \$ -         |         |           | 0         |         |
| June-14      | July-14      | \$ 6,213.03     | \$ 4,325.37   | \$ 10,538.40 | 0       | 61440     | 61440     | 192     |
| July-14      | August-14    | \$ 3,422.07     | \$ 5,287.17   | \$ 8,709.24  |         | 51840     | 51840     | 134     |
| August-14    | September-14 | \$ 4,678.05     | \$ 3,580.09   | \$ 8,258.14  |         | 46080     | 46080     | 161.0   |
| September-14 | October-14   | \$ 5,099.98     | \$ 4,468.11   | \$ 9,568.09  | 40080   | 61920     | 102000    | 192     |
| October-14   | October-14   | \$ 2,209.97     | \$ 920.78     | \$ 3,130.75  | 21769   |           | 21769     | 180     |
| October-14   | December-14  | \$ 7,518.75     | \$ 3,020.57   | \$ 10,539.32 | 74062   |           | 74062     | 186     |
| 2015         |              |                 |               |              |         |           |           |         |
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | 9211409 | 778014616 | Total kWh | Peak kW |
| December-14  | January-15   | \$ 7,953.72     | \$ 3,160.63   | \$ 11,114.35 | 78347   |           | 78347     | 193     |
| January-15   | February-15  | \$ 7,896.74     | \$ 3,146.55   | \$ 11,043.29 | 77785   |           | 77785     | 192     |
| February-15  | March-15     | \$ 8,536.97     | \$ 3,317.53   | \$ 11,854.50 | 84092   |           | 84092     | 192     |
| March-15     | April-15     | \$ 3,196.63     | \$ 8,121.39   | \$ 11,318.02 | 79997   |           | 79997     | 189     |
| April-15     | May-15       | \$ 7,620.44     | \$ 3,001.84   | \$ 10,622.28 | 72827   |           | 72827     | 188     |
| May-15       | June-15      | \$ 6,733.65     | \$ 4,438.55   | \$ 11,172.20 | 66250   |           | 66250     | 189     |
| June-15      | July-15      | \$ 6,515.33     | \$ 4,280.61   | \$ 10,795.94 | 64102   |           | 64102     | 185     |
| July-15      | August-15    | \$ 5,287.17     | \$ 3,422.07   | \$ 8,709.24  |         | 51840     | 51840     | 134     |
| August-15    | September-15 |                 |               | \$ -         |         |           | 0         |         |
| September-15 | October-15   |                 |               | \$ -         |         |           | 0         |         |
| October-15   | November-15  |                 |               | \$ -         |         |           | 0         |         |
| November-15  | December-15  |                 |               | \$ -         |         |           | 0         |         |



|                       |                  |
|-----------------------|------------------|
| Energy Audit Building | GC Middle School |
| Service Provider      | PSE & G          |
| Account Number        | 4200002108       |
| Meter Number          | 1687423          |

| 2014      |            |                     |                     |               |              |            |            |              |
|-----------|------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month     | Day        | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| 12/1/2013 | 1/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 1/1/2014  | 2/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 2/1/2014  | 3/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 3/1/2014  | 4/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 4/1/2014  | 5/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 5/1/2014  | 6/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 6/1/2014  | 7/1/2014   |                     |                     | \$ 11.01      | \$ 11.01     | -          |            | 0            |
| 7/1/2014  | 7/31/2014  |                     |                     | \$ 11.17      | \$ 11.17     | -          |            | 0            |
| 7/31/2014 | 8/29/2014  |                     |                     | \$ 11.17      | \$ 11.17     | -          |            | 0            |
| 8/29/2014 | 9/30/2014  |                     |                     | \$ 656.42     | \$ 656.42    | 2,101.72   |            | 2102         |
| 9/30/2014 | 12/1/2014  |                     |                     | \$ 493.12     | \$ 493.12    | 1,451.10   |            | 1451         |
| 12/1/2014 | 12/31/2014 |                     |                     | \$ 1,129.12   | \$ 1,129.12  | 1,101.96   |            | 1102         |

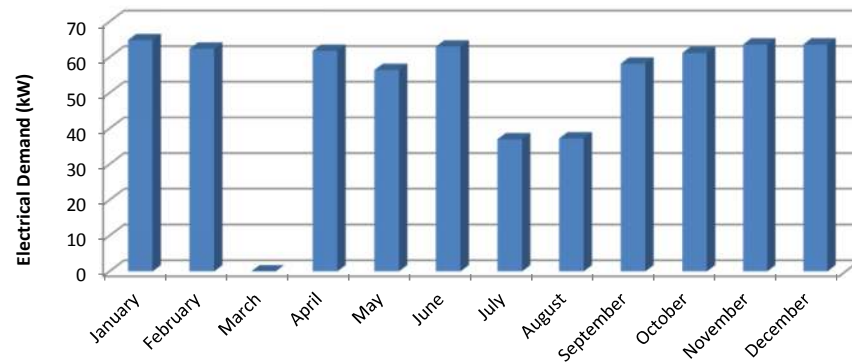
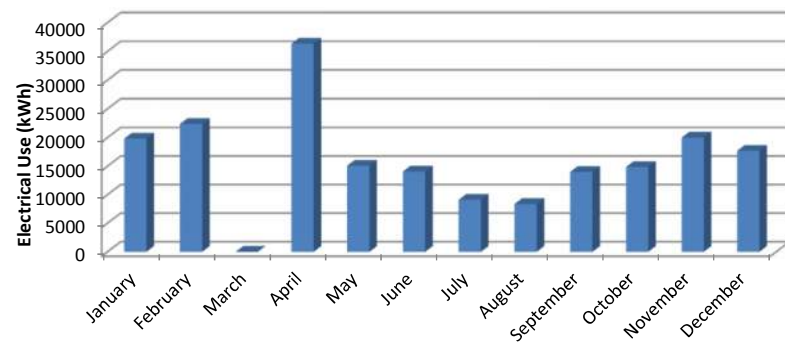
| 2015       |           |                     |                     |               |              |            |            |              |
|------------|-----------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month      | Day       | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| 12/31/2014 | 1/29/2015 |                     |                     | \$ 474.26     | \$ 474.26    | 530.38     |            | 530          |
| 1/29/2015  | 3/3/2015  |                     |                     | \$ 1,559.21   | \$ 1,559.21  | 1,763.98   |            | 1764         |
| 3/3/2015   | 4/6/2015  |                     |                     | \$ 21.16      | \$ 21.16     | 32.82      |            | 33           |
| 4/6/2015   | 5/1/2015  |                     |                     | \$ 456.95     | \$ 456.95    | 1,463.97   |            | 1464         |
| 5/1/2015   | 6/2/2015  |                     |                     | \$ 78.98      | \$ 78.98     | 222.30     |            | 222          |
| 6/2/2015   | 7/6/2015  |                     |                     | \$ 46.48      | \$ 46.48     | 115.77     |            | 116          |
| 7/6/2015   | 8/5/2015  |                     |                     |               | \$ -         |            |            | 0.0          |
| 8/5/2015   | 9/4/2015  |                     |                     |               | \$ -         |            |            | 0.0          |
| 9/4/2015   | 10/4/2015 |                     |                     |               | \$ -         |            |            | 0.0          |
| 10/4/2015  | 11/3/2015 |                     |                     |               | \$ -         |            |            | 0.0          |
| 11/3/2015  | 12/3/2015 |                     |                     |               | \$ -         |            |            | 0.0          |
| 12/3/2015  | 1/2/2016  |                     |                     |               | \$ -         |            |            | 0            |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Jefferson  |
| Service Provider      | PSE & G    |
| Account Number        | 6515720505 |
| Meter Number          | 278007642  |

| 2014       |            |                 |               |              |       |     |           |         |
|------------|------------|-----------------|---------------|--------------|-------|-----|-----------|---------|
| Month      | Day        | Delivery Charge | Supply Charge | Total Charge | kWh   | kWh | Total kWh | Peak kW |
| 1/1/2014   | 2/1/2014   |                 |               | \$ -         |       |     | 0         |         |
| 2/1/2014   | 3/1/2014   |                 |               | \$ -         |       |     | 0         |         |
| 3/1/2014   | 4/1/2014   |                 |               | \$ -         |       |     | 0         |         |
| 4/1/2014   | 5/1/2014   |                 |               | \$ -         |       |     | 0         |         |
| 5/1/2014   | 6/1/2014   |                 |               | \$ -         |       |     | 0         |         |
| 6/1/2014   | 7/1/2014   | \$ 1,434.89     | \$ 1,293.02   | \$ 2,727.91  | 14070 |     | 14070     | 63      |
| 7/1/2014   | 7/31/2014  | \$ 930.08       | \$ 805.58     | \$ 1,735.66  | 9120  |     | 9120      | 37      |
| 7/31/2014  | 8/29/2014  | \$ 853.58       | \$ 777.56     | \$ 1,631.14  | 8370  |     | 8370      | 37      |
| 8/29/2014  | 9/30/2014  | \$ 1,428.77     | \$ 1,248.30   | \$ 2,677.07  | 14010 |     | 14010     | 58      |
| 9/30/2014  | 10/29/2014 | \$ 1,514.43     | \$ 719.83     | \$ 2,234.26  | 14850 |     | 14850     | 61      |
| 10/29/2014 | 12/1/2014  | \$ 2,040.66     | \$ 886.69     | \$ 2,927.35  | 20010 |     | 20010     | 64      |
| 12/1/2014  | 12/31/2014 | \$ 1,805.09     | \$ 816.65     | \$ 2,621.74  | 17700 |     | 17700     | 64      |

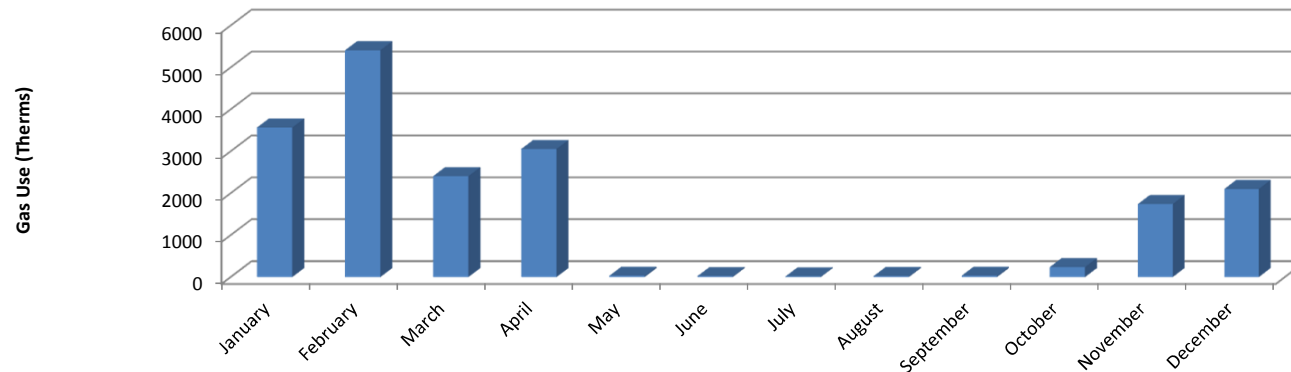
| 2015       |           |                 |               |              |       |     |           |         |
|------------|-----------|-----------------|---------------|--------------|-------|-----|-----------|---------|
| Month      | Day       | Delivery Charge | Supply Charge | Total Charge | kWh   | kWh | Total kWh | Peak kW |
| 12/31/2014 | 1/29/2015 | \$ 2,022.30     | \$ 887.67     | \$ 2,909.97  | 19830 |     | 19830     | 65      |
| 1/29/2015  | 3/3/2015  | \$ 2,282.36     | \$ 954.77     | \$ 3,237.13  | 22380 |     | 22380     | 62      |
| 3/3/2015   | 4/1/2015  | \$ 2,025.36     | \$ 895.52     | \$ 2,920.88  | 0     |     | 0         | 0       |
| 4/1/2015   | 5/1/2015  | \$ 3,839.26     | \$ 1,649.91   | \$ 5,489.17  | 36360 |     | 36360     | 62      |
| 5/1/2015   | 6/2/2015  | \$ 1,533.75     | \$ 707.49     | \$ 2,241.24  | 15090 |     | 15090     | 56      |
| 6/2/2015   | 7/1/2015  | \$ 1,430.07     | \$ 1,292.85   | \$ 2,722.92  | 14070 |     | 14070     | 63      |
| 7/1/2015   | 8/1/2015  |                 |               | \$ -         |       |     | 0         |         |
| 8/1/2015   | 9/1/2015  |                 |               | \$ -         |       |     | 0         |         |
| 9/1/2015   | 10/1/2015 |                 |               | \$ -         |       |     | 0         |         |
| 10/1/2015  | 11/1/2015 |                 |               | \$ -         |       |     | 0         |         |
| 11/1/2015  | 12/1/2015 |                 |               | \$ -         |       |     | 0         |         |
| 12/1/2015  | 1/1/2016  |                 |               | \$ -         |       |     | 0         |         |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Jefferson  |
| Service Provider      | PSE & G    |
| Account Number        | 6515720505 |
| Meter Number          | 2283633    |

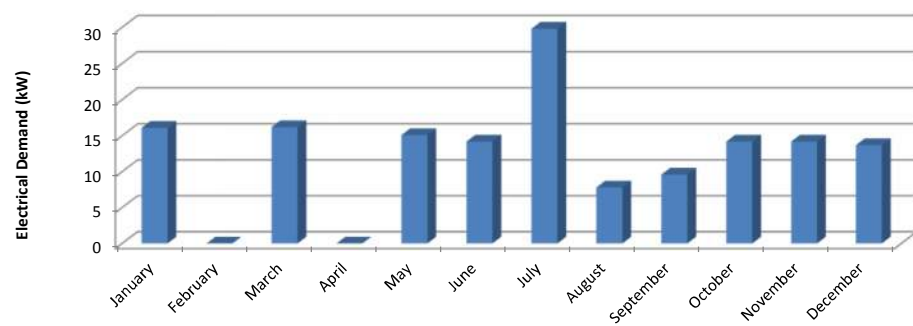
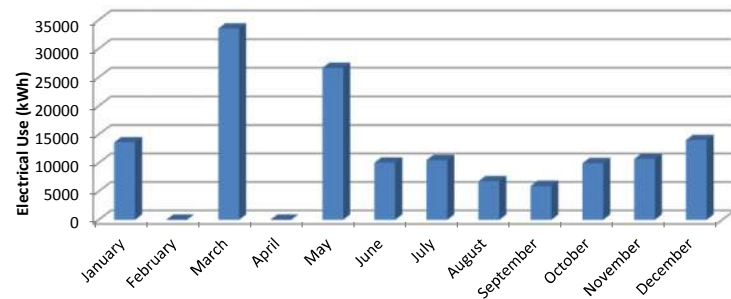
| 2014       |            |                     |                     |               |              |            |            |              |
|------------|------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month      | Day        | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| 1/1/2014   | 2/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 2/1/2014   | 3/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 3/1/2014   | 4/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 4/1/2014   | 5/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 5/1/2014   | 6/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 6/1/2014   | 7/1/2014   |                     | \$ 14.12            | \$ 104.95     | \$ 119.07    | 27         |            | 27           |
| 7/1/2014   | 7/31/2014  |                     | \$ 8.44             | \$ 104.93     | \$ 113.37    | 16         |            | 16           |
| 7/31/2014  | 8/29/2014  |                     | \$ 10.92            | \$ 105.68     | \$ 116.60    | 24         |            | 24           |
| 8/29/2014  | 9/30/2014  |                     | \$ 15.98            | \$ 106.67     | \$ 122.65    | 33         |            | 33           |
| 9/30/2014  | 10/29/2014 |                     | \$ 115.25           | \$ 126.77     | \$ 242.02    | 239        |            | 239          |
| 10/29/2014 | 12/1/2014  |                     | \$ 895.22           | \$ 573.07     | \$ 1,468.29  | 1742       |            | 1,742        |
| 12/1/2014  | 12/31/2014 |                     |                     | \$ 2,116.97   | \$ 2,116.97  | 2102       |            | 2,102        |

| 2015       |           |                     |                     |               |              |            |            |              |
|------------|-----------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month      | Day       | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| 12/31/2014 | 1/29/2015 |                     |                     | \$ 3,133.73   | \$ 3,133.73  | 3568       |            | 3,568        |
| 1/29/2015  | 3/3/2015  |                     |                     | \$ 4,419.88   | \$ 4,419.88  | 5411       |            | 5,411        |
| 3/3/2015   | 4/1/2015  |                     |                     | \$ 1,094.45   | \$ 1,094.45  | 2408       |            | 2,408        |
| 4/1/2015   | 5/1/2015  |                     |                     | \$ 1,261.31   | \$ 1,261.31  | 3056       |            | 3,056        |
| 5/1/2015   | 6/2/2015  |                     |                     | \$ 106.40     | \$ 106.40    | 31         |            | 31           |
| 6/2/2015   | 7/1/2015  |                     |                     | \$ 105.11     | \$ 105.11    | 18         |            | 18           |
| 7/1/2015   | 8/1/2015  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 8/1/2015   | 9/1/2015  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 9/1/2015   | 10/1/2015 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 10/1/2015  | 11/1/2015 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 11/1/2015  | 12/1/2015 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 12/1/2015  | 1/1/2016  |                     |                     | \$ -          | \$ -         |            |            | 0            |



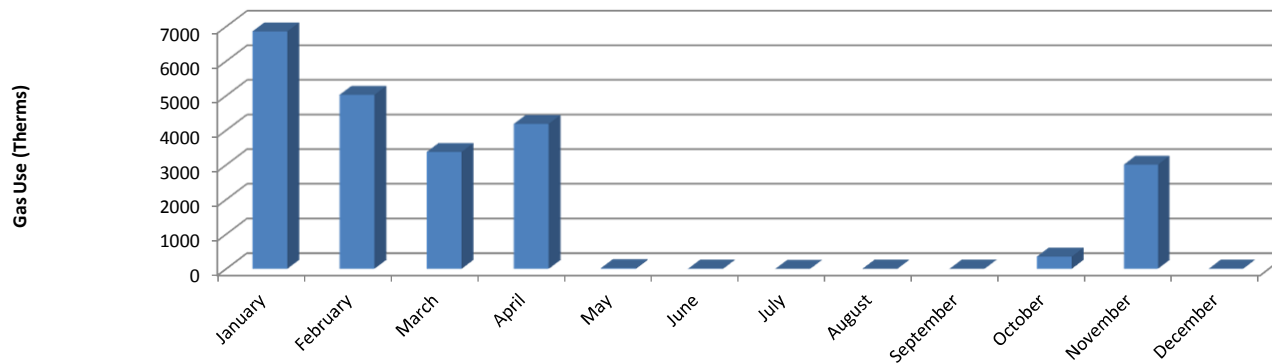
|                       |            |
|-----------------------|------------|
| Energy Audit Building | Lincoln    |
| Service Provider      | PSE & G    |
| Account Number        | 6616544907 |
| Meter Number          | 278006321  |

| 2014         |              |                 |               |              |             |              |           |         |             |
|--------------|--------------|-----------------|---------------|--------------|-------------|--------------|-----------|---------|-------------|
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | 6321        |              | Total kWh | Peak kW | Off Peak kW |
| December-13  | January-14   |                 |               |              |             |              |           |         |             |
| January-14   | February-14  |                 |               |              |             |              |           |         |             |
| February-14  | March-14     |                 |               |              |             |              |           |         |             |
| March-14     | April-14     |                 |               |              |             |              |           |         |             |
| April-14     | May-14       |                 |               |              |             |              |           |         |             |
| May-14       | June-14      |                 |               |              |             |              |           |         |             |
| June-14      | July-14      | \$ 1,062.27     | \$ 937.88     | \$ 2,000.15  | 10500       |              |           | 45      |             |
| July-14      | July-14      | \$ 685.92       | \$ 547.28     | \$ 1,233.20  | 6780        |              |           | 23      |             |
| July-14      | August-14    | \$ 600.95       | \$ 582.76     | \$ 1,183.71  | 5940        |              |           | 29      |             |
| August-14    | September-14 | \$ 1,007.65     | \$ 903.82     | \$ 1,911.47  | 9960        |              |           | 43      |             |
| September-14 | October-14   | \$ 1,083.52     | \$ 513.67     | \$ 1,597.19  | 10710       |              |           | 43      |             |
| October-14   | December-14  | \$ 1,417.38     | \$ 607.23     | \$ 2,024.61  | 14010       |              |           | 41      |             |
| December-14  | December-14  | \$ 1,377.92     | \$ 639.62     | \$ 2,017.54  | 0           |              |           | 0       |             |
| 2015         |              |                 |               |              |             |              |           |         |             |
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | On Peak kWh | Off Peak kWh | Total kWh | Peak kW | Off Peak kW |
| December-14  | January-15   | \$ 1,377.92     | \$ 626.61     | \$ 2,004.53  | 13620       |              |           | 48      |             |
| January-15   | March-15     | \$ 1,575.20     | \$ 708.82     | \$ 2,284.02  | 0           |              |           | 0       |             |
| March-15     | April-15     | \$ 3,390.18     | \$ 1,448.04   | \$ 4,838.22  | 33510       |              |           | 49      |             |
| April-15     | May-15       | \$ 1,541.82     | \$ 688.72     | \$ 2,230.54  | 0           |              |           | 0       |             |
| May-15       | June-15      | \$ 2,768.29     | \$ 1,211.27   | \$ 3,979.56  | 26640       |              |           | 45      |             |
| June-15      | July-15      | \$ 1,021.48     | \$ 494.48     | \$ 1,515.96  | 10050       |              |           | 43      |             |
| July-15      | July-15      | \$ 1,067.22     | \$ 937.19     | \$ 2,004.41  | 10500       |              |           | 45      |             |
| July-15      | August-15    |                 |               | \$ -         |             |              | 0         |         | 591.8       |
| August-15    | September-15 |                 |               | \$ -         |             |              | 0         |         | 479.5       |
| September-15 | October-15   |                 |               | \$ -         |             |              | 0         |         | 452.2       |
| October-15   | November-15  |                 |               | \$ -         |             |              | 0         |         | 460.8       |
| November-15  | December-15  |                 |               | \$ -         |             |              | 0         |         | 460.8       |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Lincoln    |
| Service Provider      | PSE & G    |
| Account Number        | 6616544907 |
| Meter Number          | 2523698    |

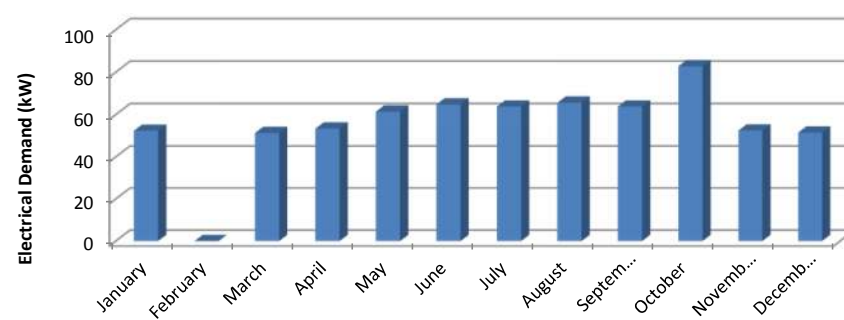
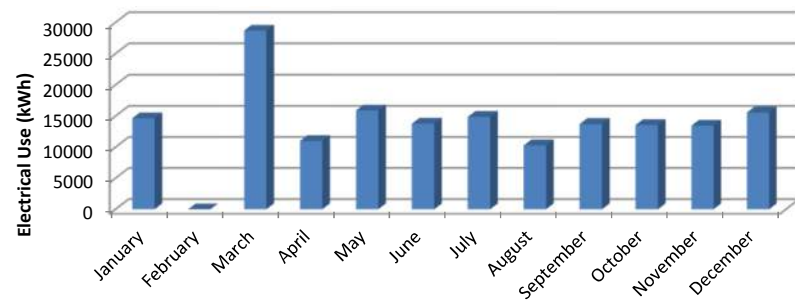
| 2014         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-13  | January-14   |                     |                     |               | \$ -         |            |            | 0            |
| January-14   | February-14  |                     |                     |               | \$ -         |            |            | 0            |
| February-14  | March-14     |                     |                     |               | \$ -         |            |            | 0            |
| March-14     | April-14     |                     |                     |               | \$ -         |            |            | 0            |
| April-14     | May-14       |                     |                     |               | \$ -         |            |            | 0            |
| May-14       | June-14      |                     | \$ 2.82             | \$ 102.43     | \$ 105.25    | 5.36       |            | 5            |
| June-14      | July-14      |                     |                     | \$ 103.31     | \$ 103.31    | 0.00       |            | 0            |
| July-14      | July-14      |                     | \$ 1.49             | \$ 103.63     | \$ 105.12    | 3.22       |            | 3            |
| July-14      | August-14    |                     | \$ 1.55             | \$ 103.63     | \$ 105.18    | 3.23       |            | 3            |
| August-14    | September-14 |                     | \$ 169.73           | \$ 137.86     | \$ 307.59    | 352.29     |            | 352          |
| September-14 | October-14   |                     | \$ 1,544.53         | \$ 1,081.33   | \$ 2,625.86  | 3005.34    |            | 3005         |
| October-14   | November-14  |                     |                     | \$ 103.95     | \$ 103.95    | 6.45       |            | 6            |
| November-14  | December-14  |                     |                     | \$ 3,174.28   | \$ 3,174.28  | 3073.61    |            | 3074         |
| 2015         |              |                     |                     |               |              |            |            |              |
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-14  | January-15   |                     |                     | \$ 6,513.99   | \$ 6,513.99  | 6856.87    |            | 6857         |
| January-15   | March-15     |                     |                     | \$ 4,113.38   | \$ 4,113.38  | 5023.98    |            | 5024         |
| March-15     | April-15     |                     |                     | \$ 1,196.19   | \$ 1,196.19  | 3371.99    |            | 3372         |
| April-15     | May-15       |                     |                     | \$ 1,379.19   | \$ 1,379.19  | 4184.17    |            | 4184         |
| May-15       | June-15      |                     |                     | \$ 105.55     | \$ 105.55    | 22.71      |            | 23           |
| June-15      | July-15      |                     |                     | \$ 103.95     | \$ 103.95    | 6.45       |            | 6            |
| July-15      | July-15      |                     |                     | \$ -          | \$ -         |            |            | 0            |
| July-15      | August-15    |                     |                     | \$ -          | \$ -         |            |            | 0            |
| August-15    | September-15 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| September-15 | October-15   |                     |                     | \$ -          | \$ -         |            |            | 0            |
| October-15   | November-15  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| November-15  | December-15  |                     |                     | \$ -          | \$ -         |            |            | 0            |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Washington |
| Service Provider      | PSE & G    |
| Account Number        | 6583645408 |
| Meter Number          | 278000086  |

| 2014       |            |                 |               |              |       |  |           |         |
|------------|------------|-----------------|---------------|--------------|-------|--|-----------|---------|
| From       | To         | Delivery Charge | Supply Charge | Total Charge | kWh   |  | Total kWh | Peak kW |
| 12/1/2013  | 1/1/2014   |                 |               | \$ -         |       |  | 0         |         |
| 1/1/2014   | 2/1/2014   |                 |               | \$ -         |       |  | 0         |         |
| 2/1/2014   | 3/1/2014   |                 |               | \$ -         |       |  | 0         |         |
| 3/1/2014   | 4/1/2014   |                 |               | \$ -         |       |  | 0         |         |
| 4/1/2014   | 5/1/2014   |                 |               | \$ -         |       |  | 0         |         |
| 5/1/2014   | 6/1/2014   |                 |               | \$ -         |       |  | 0         |         |
| 6/1/2014   | 7/3/2014   | \$ 1,521.64     | \$ 1,334.10   | \$ 2,855.74  | 14880 |  | 14880     | 64      |
| 7/3/2014   | 8/15/2014  | \$ 1,052.27     | \$ 1,554.78   | \$ 2,607.05  | 10290 |  | 10290     | 66      |
| 8/15/2014  | 9/16/2014  | \$ 1,403.53     | \$ 1,307.00   | \$ 2,710.53  | 13725 |  | 13725     | 64      |
| 9/16/2014  | 10/15/2014 | \$ 1,388.19     | \$ 777.69     | \$ 2,165.88  | 13575 |  | 13575     | 83      |
| 10/15/2014 | 11/13/2014 | \$ 1,375.92     | \$ 639.81     | \$ 2,015.73  | 13455 |  | 13455     | 53      |
| 11/13/2014 | 12/16/2014 | \$ 1,593.74     | \$ 700.06     | \$ 2,293.80  | 15585 |  | 15585     | 52      |

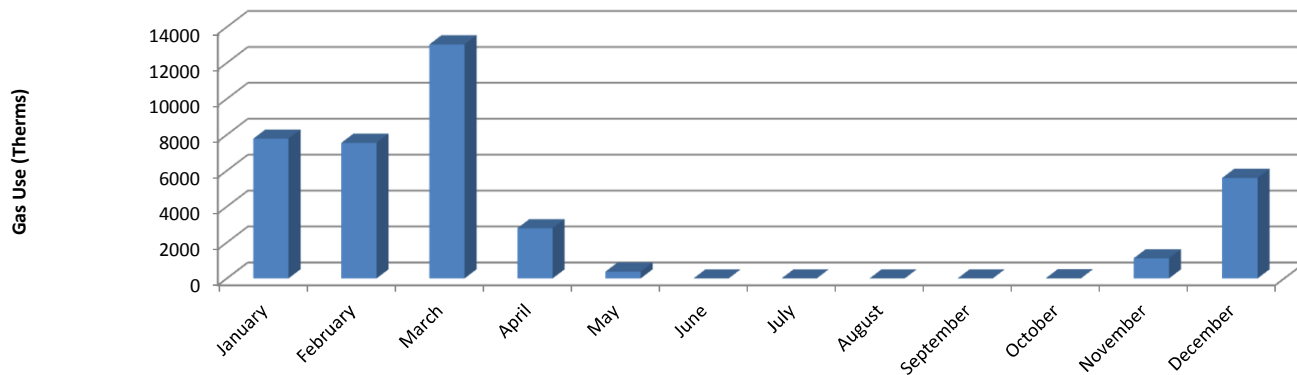
| 2015       |            |                 |               |              |             |              |           |         |
|------------|------------|-----------------|---------------|--------------|-------------|--------------|-----------|---------|
| Month      | Day        | Delivery Charge | Supply Charge | Total Charge | On Peak kWh | Off Peak kWh | Total kWh | Peak kW |
| 12/16/2014 | 1/20/2015  | \$ 1,498.64     | \$ 676.30     | \$ 2,174.94  | 14655       |              | 14655     | 52      |
| 1/20/2015  | 2/17/2015  | \$ 1,494.03     | \$ 677.04     | \$ 2,171.07  | 0           |              | 0         | 0       |
| 2/17/2015  | 3/19/2015  | \$ 2,934.37     | \$ 1,325.34   | \$ 4,259.71  | 28695       |              | 28695     | 51      |
| 3/19/2015  | 4/17/2015  | \$ 631.67       | \$ 1,382.25   | \$ 2,013.92  | 11000       |              | 11000     | 53      |
| 4/17/2015  | 5/18/2015  | \$ 1,688.01     | \$ 754.43     | \$ 2,442.44  | 15900       |              | 15900     | 61      |
| 5/18/2015  | 6/15/2015  | \$ 1,401.11     | \$ 1,311.09   | \$ 2,712.20  | 13785       |              | 13785     | 65      |
| 6/15/2015  | 7/15/2015  |                 |               | \$ -         |             |              | 0         |         |
| 7/15/2015  | 8/14/2015  |                 |               | \$ -         |             |              | 0         |         |
| 8/14/2015  | 9/13/2015  |                 |               | \$ -         |             |              | 0         |         |
| 9/13/2015  | 10/13/2015 |                 |               | \$ -         |             |              | 0         |         |
| 10/13/2015 | 11/12/2015 |                 |               | \$ -         |             |              | 0         |         |
| 11/12/2015 | 12/12/2015 |                 |               | \$ -         |             |              | 0         |         |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Washington |
| Service Provider      | PSE & G    |
| Account Number        | 6583645408 |
| Meter Number          | 2344809    |

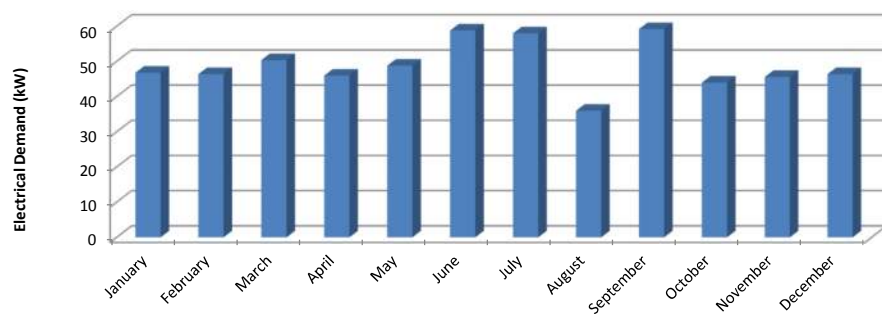
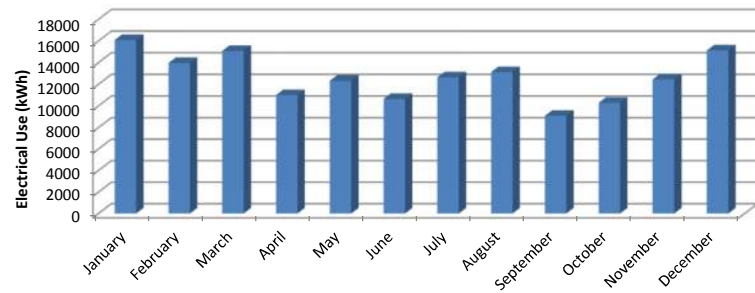
| 2014       |            |                     |                     |               |              |            |            |              |
|------------|------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| From       | To         | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| 12/1/2013  | 1/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 1/1/2014   | 2/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 2/1/2014   | 3/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 3/1/2014   | 4/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 4/1/2014   | 5/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 5/1/2014   | 6/1/2014   |                     |                     |               | \$ -         |            |            | 0            |
| 6/1/2014   | 7/3/2014   |                     |                     | \$ 101.92     | \$ 101.92    | 0.00       |            | 0            |
| 7/3/2014   | 8/15/2014  |                     |                     | \$ 148.08     | \$ 148.08    | 0.00       |            | 0            |
| 8/15/2014  | 9/16/2014  |                     |                     | \$ 103.31     | \$ 103.31    | 0.00       |            | 0            |
| 9/16/2014  | 10/15/2014 |                     | \$ 2.08             | \$ 103.74     | \$ 105.82    | 4.31       |            | 4            |
| 10/15/2014 | 11/13/2014 |                     | \$ 509.07           | \$ 1,056.25   | \$ 1,565.32  | 1120.42    |            | 1120         |
| 11/13/2014 | 12/15/2014 |                     | \$ 2,875.19         | \$ 1,728.71   | \$ 4,603.90  | 5594.56    |            | 5595         |

| 2015       |            |                     |                     |               |              |            |            |              |
|------------|------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| From       | To         | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| 12/15/2014 | 1/20/2015  |                     |                     | \$ 6,901.01   | \$ 6,901.01  | 7781.43    |            | 7781         |
| 1/20/2015  | 2/17/2015  |                     |                     | \$ 6,203.97   | \$ 6,203.97  | 7550.01    |            | 7550         |
| 2/17/2015  | 3/18/2015  |                     |                     | \$ 10,811.67  | \$ 10,811.67 | 13027.61   |            | 13028        |
| 3/18/2015  | 4/17/2015  |                     |                     | \$ 359.97     | \$ 359.97    | 2795.57    |            | 2796         |
| 4/17/2015  | 5/14/2015  |                     |                     | \$ 140.56     | \$ 140.56    | 378.51     |            | 379          |
| 5/14/2015  | 6/15/2015  |                     |                     | \$ 103.31     | \$ 103.31    | 0.00       |            | 0            |
| 6/15/2015  | 7/15/2015  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 7/15/2015  | 8/14/2015  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 8/14/2015  | 9/13/2015  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 9/13/2015  | 10/13/2015 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 10/13/2015 | 11/12/2015 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| 11/12/2015 | 12/12/2015 |                     |                     | \$ -          | \$ -         |            |            | 0            |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Wilson     |
| Service Provider      | PSE & G    |
| Account Number        | 6638982508 |
| Meter Number          | 728013290  |

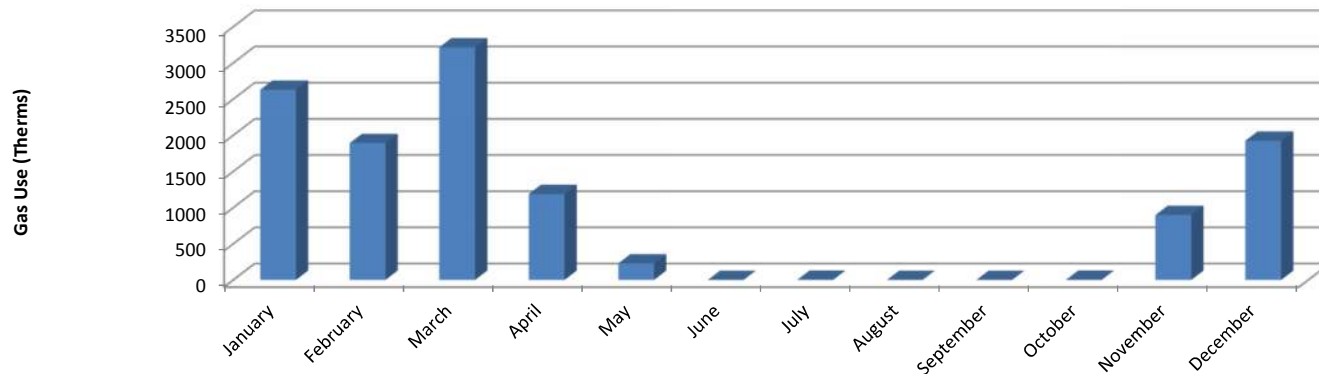
| 2014         |              |                 |               |              |             |              |           |         |             |
|--------------|--------------|-----------------|---------------|--------------|-------------|--------------|-----------|---------|-------------|
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | 3290        |              | Total kWh | Peak kW | Off Peak kW |
| December-13  | January-14   |                 |               | \$ -         |             |              | -         |         |             |
| January-14   | February-14  |                 |               | \$ -         |             |              | -         |         |             |
| February-14  | March-14     |                 |               | \$ -         |             |              | -         |         |             |
| March-14     | April-14     |                 |               | \$ -         |             |              | -         |         |             |
| April-14     | May-14       |                 |               | \$ -         |             |              | -         |         |             |
| May-14       | June-14      |                 |               | \$ -         |             |              | -         |         |             |
| June-14      | July-14      | \$ 1,290.26     | \$ 1,179.08   | \$ 2,469.34  | 12,640      |              | 12,640    | 58      |             |
| July-14      | August-14    | \$ 1,339.26     | \$ 1,165.16   | \$ 2,504.42  | 13,120      |              | 13,120    | 36      |             |
| August-14    | September-14 | \$ 926.87       | \$ 1,076.50   | \$ 2,003.37  | 9,080       |              | 9,080     | 59      |             |
| September-14 | October-14   | \$ 1,049.36     | \$ 508.87     | \$ 1,558.23  | 10,280      |              | 10,280    | 44      |             |
| October-14   | November-14  | \$ 1,269.86     | \$ 579.13     | \$ 1,848.99  | 12,440      |              | 12,440    | 46      |             |
| November-14  | December-14  | \$ 1,543.42     | \$ 663.86     | \$ 2,207.28  | 15,120      |              | 15,120    | 46      |             |
| 2015         |              |                 |               |              |             |              |           |         |             |
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | On Peak kWh | Off Peak kWh | Total kWh | Peak kW | Off Peak kW |
| December-14  | January-15   | \$ 1,641.42     | \$ 695.26     | \$ 2,336.68  | 16,080      |              | 16,080    | 47      |             |
| January-15   | February-15  | \$ 1,425.01     | \$ 629.55     | \$ 2,054.56  | 13,960      |              | 13,960    | 46      |             |
| February-15  | March-15     | \$ 1,539.34     | \$ 681.13     | \$ 2,220.47  | 15,080      |              | 15,080    | 50.4    |             |
| March-15     | April-15     | \$ 1,163.66     | \$ 538.17     | \$ 1,701.83  | 11,000      |              | 11,000    | 46.0    |             |
| April-15     | May-15       | \$ 1,303.30     | \$ 590.84     | \$ 1,894.14  | 12,320      |              | 12,320    | 48.8    |             |
| May-15       | June-15      | \$ 1,081.45     | \$ 1,121.82   | \$ 2,203.27  | 10,640      |              | 10,640    | 58.8    |             |
| June-15      | July-15      |                 |               | \$ -         |             |              | -         |         |             |
| July-15      | August-15    |                 |               | \$ -         |             |              | -         |         |             |
| August-15    | September-15 |                 |               | \$ -         |             |              | -         |         |             |
| September-15 | October-15   |                 |               | \$ -         |             |              | -         |         |             |
| October-15   | November-15  |                 |               | \$ -         |             |              | -         |         |             |
| November-15  | December-15  |                 |               | \$ -         |             |              | -         |         |             |



|                       |            |
|-----------------------|------------|
| Energy Audit Building | Wison      |
| Service Provider      | PSE & G    |
| Account Number        | 6638982508 |
| Meter Number          | 2279690    |

| 2014         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-13  | January-14   |                     |                     |               |              |            |            | 0            |
| January-14   | February-14  |                     |                     |               |              |            |            | 0            |
| February-14  | March-14     |                     |                     |               |              |            |            | 0            |
| March-14     | April-14     |                     |                     |               |              |            |            | 0            |
| April-14     | May-14       |                     |                     |               |              |            |            | 0            |
| May-14       | June-14      |                     |                     |               |              |            |            | 0            |
| June-14      | July-14      |                     | \$ 1.13             | \$ 11.67      | \$ 12.80     | 2          |            | 2            |
| July-14      | August-14    |                     |                     | \$ 16.76      | \$ 16.76     | 0          |            | 0            |
| August-14    | September-14 |                     |                     | \$ 11.17      | \$ 11.17     | 0          |            | 0            |
| September-14 | October-14   |                     | \$ 0.52             | \$ 11.49      | \$ 12.01     | 1          |            | 1            |
| October-14   | November-14  |                     | \$ 407.85           | \$ 340.09     | \$ 747.94    | 898        |            | 898          |
| November-14  | December-14  |                     | \$ 988.45           | \$ 715.97     | \$ 1,704.42  | 1923       |            | 1923         |

| 2015         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-14  | January-15   |                     |                     | \$ 2,587.30   | \$ 2,587.30  | 2628       |            | 2628         |
| January-15   | February-15  |                     |                     | \$ 1,735.32   | \$ 1,735.32  | 1892       |            | 1892         |
| February-15  | March-15     |                     |                     | \$ 2,850.21   | \$ 2,850.21  | 3215       |            | 3215         |
| March-15     | April-15     |                     |                     | \$ 372.72     | \$ 372.72    | 1187       |            | 1187         |
| April-15     | May-15       |                     |                     | \$ 81.04      | \$ 81.04     | 229        |            | 229          |
| May-15       | June-15      |                     |                     | \$ 11.17      | \$ 11.17     | 0          |            | 0            |
| June-15      | July-15      |                     |                     | \$ -          | \$ -         |            |            | 0            |
| July-15      | August-15    |                     |                     | \$ -          | \$ -         |            |            | 0            |
| August-15    | September-15 |                     |                     | \$ -          | \$ -         |            |            | 0            |
| September-15 | October-15   |                     |                     | \$ -          | \$ -         |            |            | 0            |
| October-15   | November-15  |                     |                     | \$ -          | \$ -         |            |            | 0            |
| November-15  | December-15  |                     |                     | \$ -          | \$ -         |            |            | 0            |

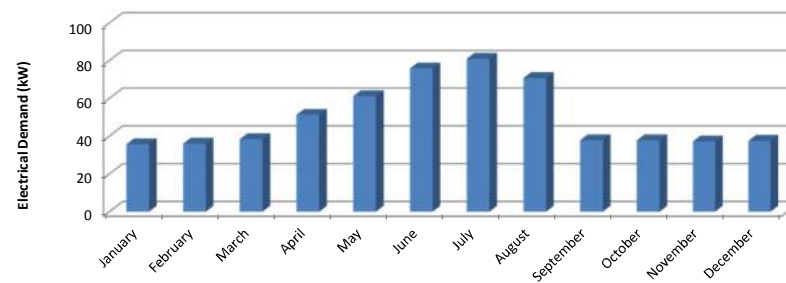
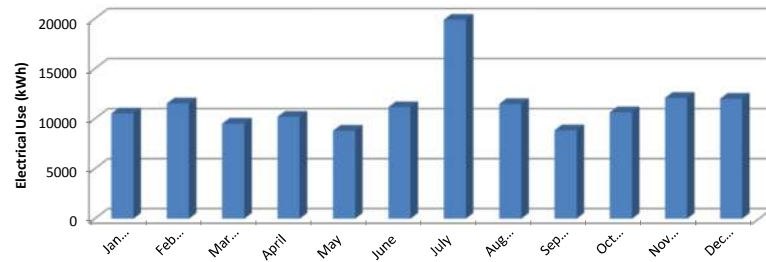


ENTER UTILITY BILL DATA ON THIS SHEET

PRINT THIS PAGE FOR APPENDIX A

|                       |            |
|-----------------------|------------|
| Energy Audit Building | Harrison   |
| Service Provider      | PSE & G    |
| Account Number        | 6616545709 |
| Meter Number          | 678005186  |

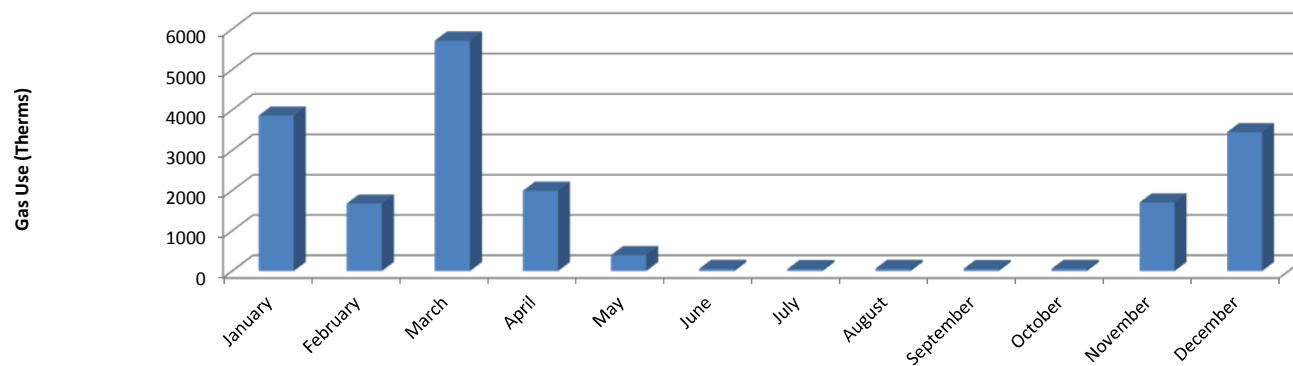
| 2014         |              |                 |               |              |             |              |           |         |             |
|--------------|--------------|-----------------|---------------|--------------|-------------|--------------|-----------|---------|-------------|
| From         | To           | Delivery Charge | Supply Charge | Total Charge | Usage (kwh) |              | Total kWh | Peak kW | Off Peak kW |
| December-13  | January-14   |                 |               |              |             |              |           |         |             |
| January-14   | February-14  |                 |               |              |             |              |           |         |             |
| February-14  | March-14     |                 |               |              |             |              |           |         |             |
| March-14     | April-14     |                 |               |              |             |              |           |         |             |
| April-14     | May-14       |                 |               |              |             |              |           |         |             |
| May-14       | June-14      | \$ 1,161.04     | \$ 1,341.64   | \$ 2,502.68  | 11160       |              | 11160     | 76      |             |
| June-14      | July-14      | \$ 2,069.28     | \$ 2,253.89   | \$ 4,323.17  | 19890       |              | 19890     | 81      |             |
| July-14      | August-14    | \$ 1,192.26     | \$ 1,309.04   | \$ 2,501.30  | 11460       |              | 11460     | 71      |             |
| August-14    | September-14 | \$ 920.72       | \$ 438.32     | \$ 1,359.04  | 8850        |              | 8850      | 38      |             |
| September-14 | October-14   | \$ 1,107.99     | \$ 491.04     | \$ 1,599.03  | 10650       |              | 10650     | 38      |             |
| October-14   | November-14  | \$ 1,257.79     | \$ 532.00     | \$ 1,789.79  | 12090       |              | 12090     | 37      |             |
| November-14  | December-14  | \$ 1,248.43     | \$ 531.09     | \$ 1,779.52  | 12000       |              | 12000     | 38      |             |
| 2015         |              |                 |               |              |             |              |           |         |             |
| Month        | Day          | Delivery Charge | Supply Charge | Total Charge | On Peak kWh | Off Peak kWh | Total kWh | Peak kW | Off Peak kW |
| December-14  | January-15   | \$ 1,095.50     | \$ 478.94     | \$ 1,574.44  | 10530       |              | 10530     | 36      |             |
| January-15   | March-15     | \$ 1,198.49     | \$ 510.47     | \$ 1,708.96  | 11520       |              | 11520     | 36      |             |
| March-15     | April-15     | \$ 1,044.41     | \$ 459.90     | \$ 1,504.31  | 9510        |              | 9510      | 38      |             |
| April-15     | May-15       | \$ 1,120.19     | \$ 537.20     | \$ 1,657.39  | 10200       |              | 10200     | 51      |             |
| May-15       | June-15      | \$ 893.42       | \$ 1,084.01   | \$ 1,977.43  | 8790        |              | 8790      | 61      |             |
| June-15      | July-15      |                 |               | \$ -         |             |              | 0         |         |             |
| July-15      | July-15      |                 |               | \$ -         |             |              | 0         |         |             |
| July-15      | August-15    |                 |               | \$ -         |             |              | 0         |         |             |
| August-15    | September-15 |                 |               | \$ -         |             |              | 0         |         |             |
| September-15 | October-15   |                 |               | \$ -         |             |              | 0         |         |             |
| October-15   | November-15  |                 |               | \$ -         |             |              | 0         |         |             |
| November-15  | December-15  |                 |               | \$ -         |             |              | 0         |         |             |

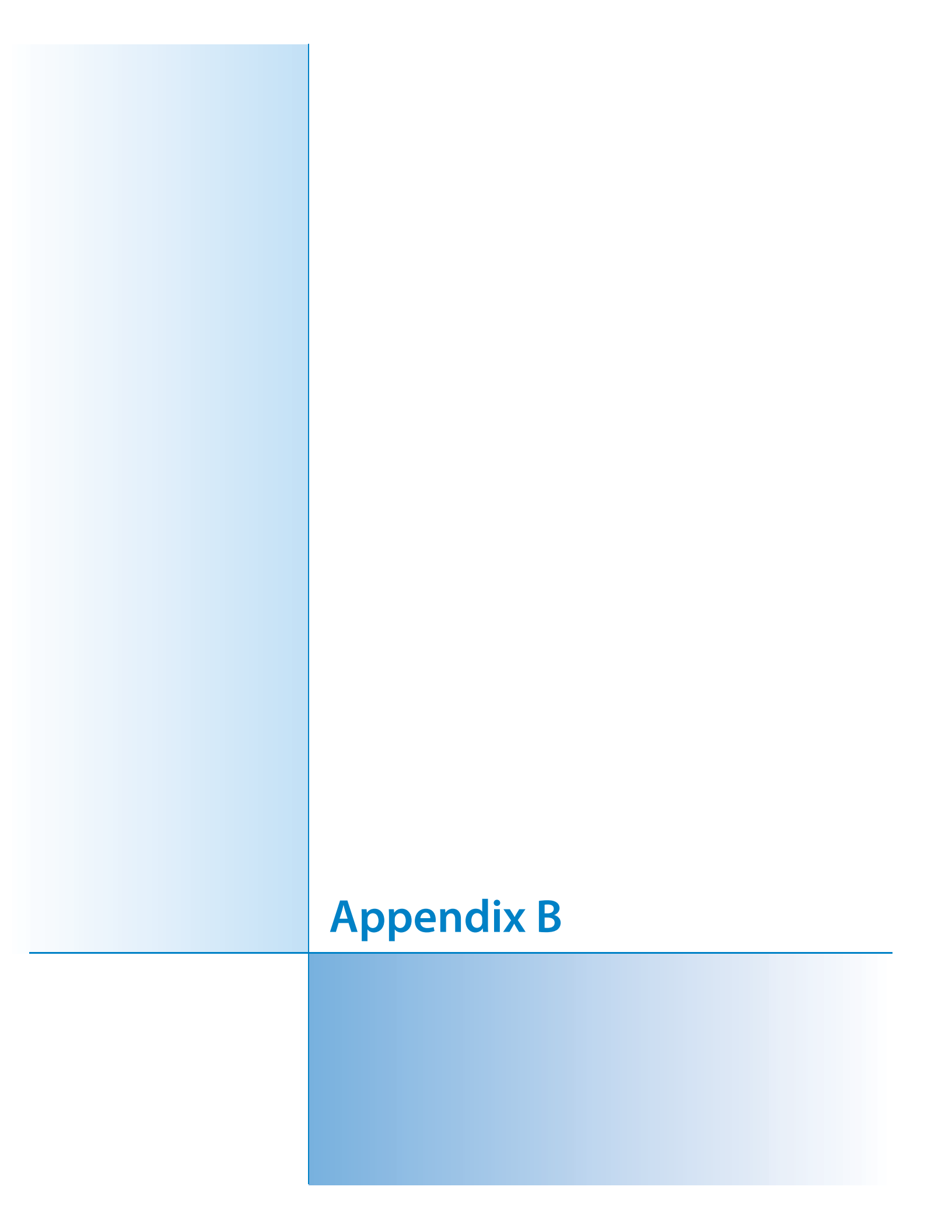


|                       |                 |
|-----------------------|-----------------|
| Energy Audit Building | Harrison School |
| Service Provider      | PSE & G         |
| Account Number        | 6616545709      |
| Meter Number          | 3275557         |

| 2014         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-13  | January-14   |                     |                     |               |              |            |            |              |
| January-14   | February-14  |                     |                     |               |              |            |            |              |
| February-14  | March-14     |                     |                     |               |              |            |            |              |
| March-14     | April-14     |                     |                     |               |              |            |            |              |
| April-14     | May-14       |                     |                     |               |              |            |            |              |
| May-14       | June-14      |                     |                     |               |              |            |            |              |
| June-14      | July-14      | \$ 25.41            |                     | \$ 107.44     | \$ 132.85    | 48.25      |            | 48           |
| July-14      | August-14    | \$ 27.75            |                     | \$ 161.00     | \$ 188.75    | 59.93      |            | 60           |
| August-14    | September-14 | \$ 25.21            |                     | \$ 108.61     | \$ 133.82    | 52.64      |            | 53           |
| September-14 | October-14   | \$ 27.51            |                     | \$ 108.98     | \$ 136.49    | 57.10      |            | 57           |
| October-14   | November-14  | \$ 775.59           |                     | \$ 903.75     | \$ 1,679.34  | 1,707.00   |            | 1707         |
| November-14  | December-14  | \$ 1,775.56         |                     | \$ 1,166.09   | \$ 2,941.65  | 3,454.89   |            | 3455         |

| 2015         |              |                     |                     |               |              |            |            |              |
|--------------|--------------|---------------------|---------------------|---------------|--------------|------------|------------|--------------|
| Month        | Day          | Delivery Charge (1) | Delivery Charge (2) | Supply Charge | Total Charge | Therms (1) | Therms (2) | Total Therms |
| December-14  | January-15   |                     |                     | \$ 3,595.71   | \$ 3,595.71  | 3,859.44   |            | 3859         |
| January-15   | March-15     |                     |                     | \$ 1,767.34   | \$ 1,767.34  | 1,680.06   |            | 1680         |
| March-15     | April-15     |                     |                     | \$ 4,338.62   | \$ 4,338.62  | 5,714.43   |            | 5714         |
| April-15     | May-15       |                     |                     | \$ 289.50     | \$ 289.50    | 1,997.46   |            | 1997         |
| May-15       | June-15      |                     |                     | \$ 142.36     | \$ 142.36    | 396.90     |            | 397          |
| June-15      | July-15      |                     |                     | \$ 108.84     | \$ 108.84    | 56.08      |            | 56           |
| July-15      | July-15      |                     |                     |               | \$ -         |            |            | 0.0          |
| July-15      | August-15    |                     |                     |               | \$ -         |            |            | 0.0          |
| August-15    | September-15 |                     |                     |               | \$ -         |            |            | 0.0          |
| September-15 | October-15   |                     |                     |               | \$ -         |            |            | 0.0          |
| October-15   | November-15  |                     |                     |               | \$ -         |            |            | 0.0          |
| November-15  | December-15  |                     |                     |               | \$ -         |            |            | 0            |



The graphic consists of a large light blue rectangle on the left side of the page. A horizontal line extends from the right edge of this rectangle across the page. A vertical line extends from the bottom edge of the light blue rectangle down to the bottom of the page. These two lines intersect at the bottom right corner of the light blue rectangle. In the bottom right corner of the page, there is a smaller, darker blue rectangle. The text "Appendix B" is positioned at the intersection of the horizontal and vertical lines, just above the darker blue rectangle.

## Appendix B



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# ENERGY STAR® Progress & Goals Report

# 86

ENERGY STAR®  
Score<sup>1</sup>

## Grover Cleveland Middle School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 103,520  
**Built:** 1950

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**

Grover Cleveland Middle School  
36 Academy Rd  
West Caldwell, New Jersey 07006

**Property ID:** 4543926

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

## Performance Comparison

|                                     | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                                     | Year Ending<br>6/30/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score                   | 86                                     | 86                                     | 0        | N/A                  | 50                 | 75                         |
| <b>Energy</b>                       |                                        |                                        |          |                      |                    |                            |
| Site EUI (kBtu/ft²)                 | 33.9                                   | 33.9                                   | 0        | N/A                  | 51.4               | 40.2                       |
| Source EUI (kBtu/ft²)               | 90.3                                   | 90.3                                   | 0        | N/A                  | 136.8              | 107                        |
| \$                                  | 129,479.4                              | 129,479.4                              | 0        | N/A                  | 196,202.07         | 153,434.12                 |
| \$/ft²                              | 1.25                                   | 1.25                                   | 0        | N/A                  | 1.9                | 1.48                       |
| <b>Greenhouse Gas Emissions</b>     |                                        |                                        |          |                      |                    |                            |
| Metric Tons CO2e/year               | 405.1                                  | 405.1                                  | 0        | N/A                  | 613.8              | 480                        |
| kgCO2e/ ft2/year                    | 3.9                                    | 3.9                                    | 0        | N/A                  | 5.9                | 4.6                        |
| <b>Water</b>                        |                                        |                                        |          |                      |                    |                            |
| All Water Consumption (kgal)        | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal)     | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal/ft²) | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| \$                                  | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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## ENERGY STAR® Scorecard

# 86

ENERGY STAR®  
Score

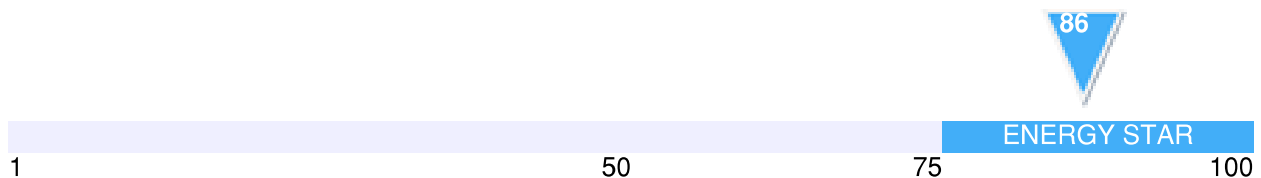
### Grover Cleveland Middle School

**Primary Function:** K-12 School  
**Gross Floor Area (ft²):** 103,520  
**Built:** 1950

**Property Address:**  
Grover Cleveland Middle School  
36 Academy Rd  
West Caldwell, New Jersey 07006

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

For the year ending in June 2015, this building used 90.3 (kBtu/ft²) on a source energy basis. The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# 86

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

## Grover Cleveland Middle School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft<sup>2</sup>):** 103,520  
**Built:** 1950

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

Grover Cleveland Middle School  
36 Academy Rd  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_

**Primary Contact**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_  
\_\_\_\_\_

**Property ID:** 4543926

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

33.9 kBtu/ft<sup>2</sup>

**Annual Energy by Fuel**

Electric - Grid (kBtu) 2,704,812 (77%)  
Natural Gas (kBtu) 809,636 (23%)

**National Median Comparison**

National Median Site EUI (kBtu/ft<sup>2</sup>) 51.4  
National Median Source EUI (kBtu/ft<sup>2</sup>) 136.8  
% Diff from National Median Source EUI -34%

**Source EUI**

90.3 kBtu/ft<sup>2</sup>

**Annual Emissions**

Greenhouse Gas Emissions (Metric Tons CO<sub>2</sub>e/year) 405

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)



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# ENERGY STAR® Progress & Goals Report

# 88

ENERGY STAR®  
Score<sup>1</sup>

## Harrison School Building

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 31,825  
**Built:** 1967

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**  
Harrison School Building  
104 Gray St  
West Caldwell, New Jersey 07006

**Property ID:** 4543931

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

## Performance Comparison

|                   | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                   | Year Ending<br>6/30/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score | 88                                     | 88                                     | 0        | N/A                  | 50                 | 75                         |

### Energy

|                       |           |           |   |     |           |           |
|-----------------------|-----------|-----------|---|-----|-----------|-----------|
| Site EUI (kBtu/ft²)   | 68.8      | 68.8      | 0 | N/A | 107.9     | 84.4      |
| Source EUI (kBtu/ft²) | 100.4     | 100.4     | 0 | N/A | 157.6     | 123.2     |
| \$                    | 36,621.97 | 36,621.97 | 0 | N/A | 57,461.34 | 44,935.97 |
| \$/ft²                | 1.15      | 1.15      | 0 | N/A | 1.81      | 1.41      |

### Greenhouse Gas Emissions

|                       |     |     |   |     |       |       |
|-----------------------|-----|-----|---|-----|-------|-------|
| Metric Tons CO2e/year | 151 | 151 | 0 | N/A | 236.9 | 185.2 |
| kgCO2e/ ft2/year      | 4.7 | 4.7 | 0 | N/A | 7.4   | 5.8   |

### Water

|                                     |     |     |     |   |   |   |
|-------------------------------------|-----|-----|-----|---|---|---|
| All Water Consumption (kgal)        | N/A | N/A | N/A | * | * | * |
| Indoor Water Consumption (kgal)     | N/A | N/A | N/A | * | * | * |
| Indoor Water Consumption (kgal/ft²) | N/A | N/A | N/A | * | * | * |
| \$                                  | N/A | N/A | N/A | * | * | * |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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# ENERGY STAR<sup>®</sup> Scorecard

# 88

ENERGY STAR<sup>®</sup>  
Score

## Harrison School Building

**Primary Function:** K-12 School

**Gross Floor Area (ft<sup>2</sup>):** 31,825

**Built:** 1967

**For Year Ending:** June 30, 2015

**Date Generated:** September 14, 2015

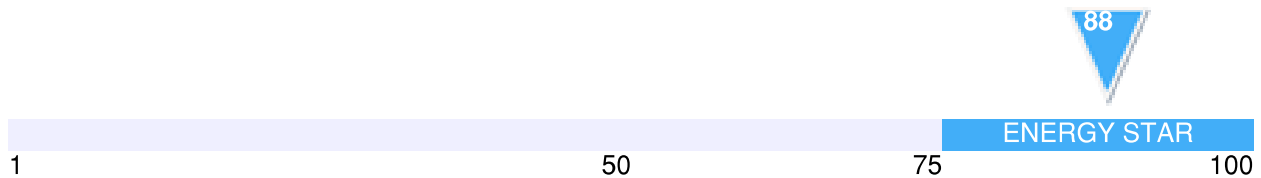
**Property Address:**

Harrison School Building

104 Gray St

West Caldwell, New Jersey 07006

**For the year ending in June 2015, this building used 100.4 (kBtu/ft<sup>2</sup>) on a source energy basis.** The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# 88

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

## Harrison School Building

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft<sup>2</sup>):** 31,825  
**Built:** 1967

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

Harrison School Building  
104 Gray St  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_

**Primary Contact**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_  
\_\_\_\_\_

**Property ID:** 4543931

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

68.8 kBtu/ft<sup>2</sup>

**Annual Energy by Fuel**

|                        |                 |
|------------------------|-----------------|
| Electric - Grid (kBtu) | 429,750 (20%)   |
| Natural Gas (kBtu)     | 1,759,005 (80%) |

**National Median Comparison**

|                                                    |       |
|----------------------------------------------------|-------|
| National Median Site EUI (kBtu/ft <sup>2</sup> )   | 107.9 |
| National Median Source EUI (kBtu/ft <sup>2</sup> ) | 157.6 |
| % Diff from National Median Source EUI             | -36%  |

**Source EUI**

100.4 kBtu/ft<sup>2</sup>

**Annual Emissions**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year) | 151 |
|---------------------------------------------------------------|-----|

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)



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# ENERGY STAR® Progress & Goals Report

# 53

ENERGY STAR®  
Score<sup>1</sup>

## James Caldwell High School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 140,251  
**Built:** 1959

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**  
James Caldwell High School  
265 Westville Ave  
West Caldwell, New Jersey 07006

**Property ID:** 4543925

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

## Performance Comparison

|                                     | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                                     | Year Ending<br>6/30/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score                   | 53                                     | 53                                     | 0        | N/A                  | 50                 | 75                         |
| <b>Energy</b>                       |                                        |                                        |          |                      |                    |                            |
| Site EUI (kBtu/ft²)                 | 70                                     | 70                                     | 0        | N/A                  | 72.1               | 56.4                       |
| Source EUI (kBtu/ft²)               | 127.6                                  | 127.6                                  | 0        | N/A                  | 131.4              | 102.8                      |
| \$                                  | 213,095.1                              | 213,095.1                              | 0        | N/A                  | 219,370.54         | 171,552.34                 |
| \$/ft²                              | 1.52                                   | 1.52                                   | 0        | N/A                  | 1.56               | 1.22                       |
| <b>Greenhouse Gas Emissions</b>     |                                        |                                        |          |                      |                    |                            |
| Metric Tons CO2e/year               | 814.9                                  | 814.9                                  | 0        | N/A                  | 838.9              | 656                        |
| kgCO2e/ ft2/year                    | 5.8                                    | 5.8                                    | 0        | N/A                  | 6                  | 4.7                        |
| <b>Water</b>                        |                                        |                                        |          |                      |                    |                            |
| All Water Consumption (kgal)        | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal)     | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal/ft²) | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| \$                                  | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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## ENERGY STAR® Scorecard

# 53

ENERGY STAR®  
Score

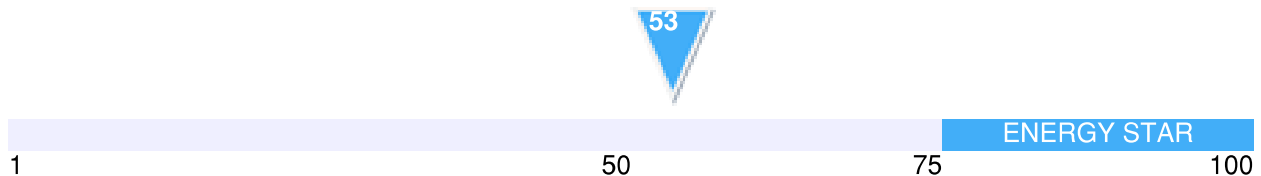
### James Caldwell High School

**Primary Function:** K-12 School  
**Gross Floor Area (ft²):** 140,251  
**Built:** 1959

**Property Address:**  
James Caldwell High School  
265 Westville Ave  
West Caldwell, New Jersey 07006

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

For the year ending in June 2015, this building used 127.6 (kBtu/ft²) on a source energy basis. The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# 53

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

## James Caldwell High School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft<sup>2</sup>):** 140,251  
**Built:** 1959

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

James Caldwell High School  
265 Westville Ave  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_

**Primary Contact**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_  
\_\_\_\_\_

**Property ID:** 4543925

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

70 kBtu/ft<sup>2</sup>

**Annual Energy by Fuel**

|                        |                 |
|------------------------|-----------------|
| Electric - Grid (kBtu) | 3,632,260 (37%) |
| Natural Gas (kBtu)     | 6,187,681 (63%) |

**National Median Comparison**

|                                                    |       |
|----------------------------------------------------|-------|
| National Median Site EUI (kBtu/ft <sup>2</sup> )   | 72.1  |
| National Median Source EUI (kBtu/ft <sup>2</sup> ) | 131.4 |
| % Diff from National Median Source EUI             | -3%   |

**Source EUI**

127.6 kBtu/ft<sup>2</sup>

**Annual Emissions**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year) | 815 |
|---------------------------------------------------------------|-----|

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
' ( ) - \_\_\_\_\_  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)



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# ENERGY STAR® Progress & Goals Report

# 51

ENERGY STAR®  
Score<sup>1</sup>

## Jefferson Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 25,055  
**Built:** 1920

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**  
Jefferson Elementary School  
85 Prospect St  
West Caldwell, New Jersey 07006

**Property ID:** 4543927

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

## Performance Comparison

|                                     | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                                     | Year Ending<br>6/30/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score                   | 51                                     | 51                                     | 0        | N/A                  | 50                 | 75                         |
| <b>Energy</b>                       |                                        |                                        |          |                      |                    |                            |
| Site EUI (kBtu/ft²)                 | 96.7                                   | 96.7                                   | 0        | N/A                  | 97.8               | 76.5                       |
| Source EUI (kBtu/ft²)               | 159.9                                  | 159.9                                  | 0        | N/A                  | 161.8              | 126.5                      |
| \$                                  | 49,268.89                              | 49,268.89                              | 0        | N/A                  | 49,848.94          | 38,982.9                   |
| \$/ft²                              | 1.97                                   | 1.97                                   | 0        | N/A                  | 1.99               | 1.56                       |
| <b>Greenhouse Gas Emissions</b>     |                                        |                                        |          |                      |                    |                            |
| Metric Tons CO2e/year               | 185.2                                  | 185.2                                  | 0        | N/A                  | 187.4              | 146.5                      |
| kgCO2e/ ft2/year                    | 7.4                                    | 7.4                                    | 0        | N/A                  | 7.5                | 5.8                        |
| <b>Water</b>                        |                                        |                                        |          |                      |                    |                            |
| All Water Consumption (kgal)        | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal)     | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal/ft²) | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| \$                                  | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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# ENERGY STAR® Scorecard

# 51

ENERGY STAR®  
Score

## Jefferson Elementary School

**Primary Function:** K-12 School

**Gross Floor Area (ft²):** 25,055

**Built:** 1920

**For Year Ending:** June 30, 2015

**Date Generated:** September 14, 2015

**Property Address:**

Jefferson Elementary School

85 Prospect St

West Caldwell, New Jersey 07006

**For the year ending in June 2015, this building used 159.9 (kBtu/ft²) on a source energy basis.** The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# 51

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

## Jefferson Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft<sup>2</sup>):** 25,055  
**Built:** 1920

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

Jefferson Elementary School  
85 Prospect St  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
' ( ) -

**Primary Contact**

\_\_\_\_\_  
' ( ) -  
\_\_\_\_\_

**Property ID:** 4543927

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

96.7 kBtu/ft<sup>2</sup>

**Annual Energy by Fuel**

|                        |                 |
|------------------------|-----------------|
| Electric - Grid (kBtu) | 700,475 (29%)   |
| Natural Gas (kBtu)     | 1,721,420 (71%) |

**National Median Comparison**

|                                                    |       |
|----------------------------------------------------|-------|
| National Median Site EUI (kBtu/ft <sup>2</sup> )   | 97.8  |
| National Median Source EUI (kBtu/ft <sup>2</sup> ) | 161.8 |
| % Diff from National Median Source EUI             | -1%   |

**Source EUI**

159.9 kBtu/ft<sup>2</sup>

**Annual Emissions**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year) | 185 |
|---------------------------------------------------------------|-----|

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
' ( ) -  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)



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# ENERGY STAR® Progress & Goals Report

# 69

ENERGY STAR®  
Score<sup>1</sup>

## Lincoln Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 31,509  
**Built:** 1920

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**  
Lincoln Elementary School  
18 Crane St  
West Caldwell, New Jersey 07006

**Property ID:** 4543928

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

## Performance Comparison

|                   | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                   | Year Ending<br>5/31/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score | 72                                     | 69                                     | 4        | N/A                  | 50                 | 75                         |

### Energy

|                       |           |           |      |     |           |           |
|-----------------------|-----------|-----------|------|-----|-----------|-----------|
| Site EUI (kBtu/ft²)   | 90.9      | 92.2      | 1.5  | N/A | 110.9     | 86.7      |
| Source EUI (kBtu/ft²) | 127       | 131.2     | 3.3  | N/A | 157.8     | 123.4     |
| \$                    | 46,688.02 | 49,214.67 | 5.41 | N/A | 59,173.95 | 46,275.27 |
| \$/ft²                | 1.48      | 1.56      | 5.41 | N/A | 1.88      | 1.47      |

### Greenhouse Gas Emissions

|                       |       |       |      |     |       |       |
|-----------------------|-------|-------|------|-----|-------|-------|
| Metric Tons CO2e/year | 190.5 | 196.2 | 2.99 | N/A | 235.9 | 184.5 |
| kgCO2e/ ft2/year      | 6     | 6.2   | 2.99 | N/A | 7.5   | 5.9   |

### Water

|                                     |     |     |     |   |   |   |
|-------------------------------------|-----|-----|-----|---|---|---|
| All Water Consumption (kgal)        | N/A | N/A | N/A | * | * | * |
| Indoor Water Consumption (kgal)     | N/A | N/A | N/A | * | * | * |
| Indoor Water Consumption (kgal/ft²) | N/A | N/A | N/A | * | * | * |
| \$                                  | N/A | N/A | N/A | * | * | * |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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## ENERGY STAR® Scorecard

# 69

ENERGY STAR®  
Score

### Lincoln Elementary School

**Primary Function:** K-12 School

**Gross Floor Area (ft²):** 31,509

**Built:** 1920

**Property Address:**

Lincoln Elementary School

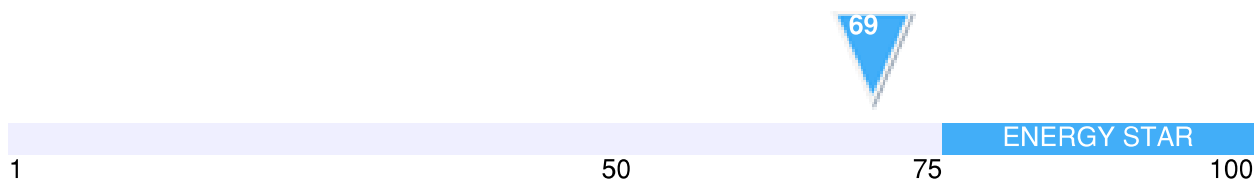
18 Crane St

West Caldwell, New Jersey 07006

**For Year Ending:** June 30, 2015

**Date Generated:** September 14, 2015

**For the year ending in June 2015, this building used 131.2 (kBtu/ft²) on a source energy basis.** The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR® Statement of Energy Performance

# 69

ENERGY STAR®  
Score<sup>1</sup>

## Lincoln Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 31,509  
**Built:** 1920

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

Lincoln Elementary School  
18 Crane St  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
' ( ) -

**Primary Contact**

\_\_\_\_\_  
' ( ) -  
\_\_\_\_\_

**Property ID:** 4543928

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

92.2 kBtu/ft²

**Annual Energy by Fuel**

|                        |                 |
|------------------------|-----------------|
| Electric - Grid (kBtu) | 517,955 (18%)   |
| Natural Gas (kBtu)     | 2,388,538 (82%) |

**National Median Comparison**

|                                        |       |
|----------------------------------------|-------|
| National Median Site EUI (kBtu/ft²)    | 110.9 |
| National Median Source EUI (kBtu/ft²)  | 157.8 |
| % Diff from National Median Source EUI | -17%  |

**Source EUI**

131.2 kBtu/ft²

**Annual Emissions**

|                                                  |     |
|--------------------------------------------------|-----|
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 196 |
|--------------------------------------------------|-----|

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
' ( ) -  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)



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# ENERGY STAR® Progress & Goals Report

# 73

ENERGY STAR®  
Score<sup>1</sup>

## Washington Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 44,340  
**Built:** 1949

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**  
Washington Elementary School  
201 Central Ave  
West Caldwell, New Jersey 07006

**Property ID:** 4543929

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

## Performance Comparison

|                                     | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                                     | Year Ending<br>5/31/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score                   | 73                                     | 73                                     | 0        | N/A                  | 50                 | 75                         |
| <b>Energy</b>                       |                                        |                                        |          |                      |                    |                            |
| Site EUI (kBtu/ft²)                 | 91.3                                   | 91.3                                   | 0        | N/A                  | 115                | 90                         |
| Source EUI (kBtu/ft²)               | 120.4                                  | 120.4                                  | 0        | N/A                  | 151.7              | 118.7                      |
| \$                                  | 56,751.83                              | 56,751.83                              | 0        | N/A                  | 71,543.17          | 55,948.25                  |
| \$/ft²                              | 1.28                                   | 1.28                                   | 0        | N/A                  | 1.61               | 1.26                       |
| <b>Greenhouse Gas Emissions</b>     |                                        |                                        |          |                      |                    |                            |
| Metric Tons CO2e/year               | 257                                    | 257                                    | 0        | N/A                  | 323.9              | 253.3                      |
| kgCO2e/ ft2/year                    | 5.8                                    | 5.8                                    | 0        | N/A                  | 7.3                | 5.7                        |
| <b>Water</b>                        |                                        |                                        |          |                      |                    |                            |
| All Water Consumption (kgal)        | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal)     | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal/ft²) | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| \$                                  | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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## ENERGY STAR® Scorecard

# 73

ENERGY STAR®  
Score

### Washington Elementary School

**Primary Function:** K-12 School

**Gross Floor Area (ft²):** 44,340

**Built:** 1949

**For Year Ending:** June 30, 2015

**Date Generated:** September 14, 2015

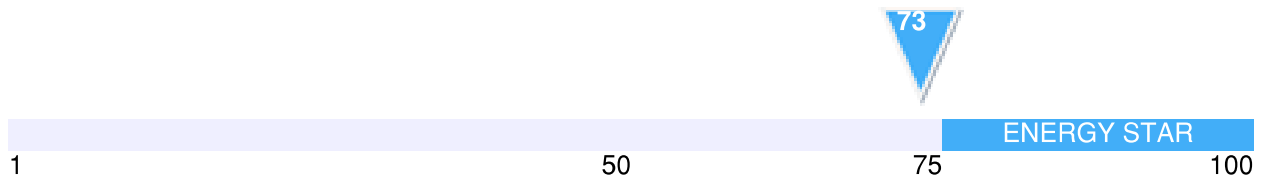
**Property Address:**

Washington Elementary School

201 Central Ave

West Caldwell, New Jersey 07006

**For the year ending in June 2015, this building used 120.4 (kBtu/ft²) on a source energy basis.** The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# 73

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

## Washington Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft<sup>2</sup>):** 44,340  
**Built:** 1949

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

Washington Elementary School  
201 Central Ave  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
' ( ) -

**Primary Contact**

\_\_\_\_\_  
' ( ) -  
\_\_\_\_\_

**Property ID:** 4543929

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

91.3 kBtu/ft<sup>2</sup>

**Annual Energy by Fuel**

|                        |                 |
|------------------------|-----------------|
| Electric - Grid (kBtu) | 520,622 (13%)   |
| Natural Gas (kBtu)     | 3,525,844 (87%) |

**National Median Comparison**

|                                                    |       |
|----------------------------------------------------|-------|
| National Median Site EUI (kBtu/ft <sup>2</sup> )   | 115   |
| National Median Source EUI (kBtu/ft <sup>2</sup> ) | 151.7 |
| % Diff from National Median Source EUI             | -21%  |

**Source EUI**

120.4 kBtu/ft<sup>2</sup>

**Annual Emissions**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year) | 257 |
|---------------------------------------------------------------|-----|

### Signature & Stamp of Verifying Professional

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
' ( ) -  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)



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# ENERGY STAR® Progress & Goals Report

# 94

ENERGY STAR®  
Score<sup>1</sup>

## Wilson Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft²):** 30,650  
**Built:** 1967

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**Property Address:**  
Wilson Elementary School  
71 Orton Rd  
West Caldwell, New Jersey 07006

**Property ID:** 4543930

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

## Performance Comparison

|                                     | Progress                               |                                        |          | Performance Goals    |                    |                            |
|-------------------------------------|----------------------------------------|----------------------------------------|----------|----------------------|--------------------|----------------------------|
|                                     | Year Ending<br>5/31/2015<br>(Baseline) | Year Ending<br>6/30/2015<br>(Selected) | % Change | Property's<br>Target | National<br>Median | ENERGY STAR<br>Score of 75 |
| ENERGY STAR Score                   | 94                                     | 94                                     | 0        | N/A                  | 50                 | 75                         |
| <b>Energy</b>                       |                                        |                                        |          |                      |                    |                            |
| Site EUI (kBtu/ft²)                 | 51.6                                   | 51.6                                   | 0        | N/A                  | 94.1               | 73.6                       |
| Source EUI (kBtu/ft²)               | 86.7                                   | 86.7                                   | 0        | N/A                  | 158.3              | 123.8                      |
| \$                                  | 32,393.97                              | 32,393.97                              | 0        | N/A                  | 59,123.3           | 46,235.65                  |
| \$/ft²                              | 1.06                                   | 1.06                                   | 0        | N/A                  | 1.93               | 1.51                       |
| <b>Greenhouse Gas Emissions</b>     |                                        |                                        |          |                      |                    |                            |
| Metric Tons CO2e/year               | 122.5                                  | 122.5                                  | 0        | N/A                  | 223.6              | 174.9                      |
| kgCO2e/ ft2/year                    | 4                                      | 4                                      | 0        | N/A                  | 7.3                | 5.7                        |
| <b>Water</b>                        |                                        |                                        |          |                      |                    |                            |
| All Water Consumption (kgal)        | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal)     | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| Indoor Water Consumption (kgal/ft²) | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |
| \$                                  | N/A                                    | N/A                                    | N/A      | *                    | *                  | *                          |

\*Setting and managing water targets is not yet available in Portfolio Manager.



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## ENERGY STAR® Scorecard

# 94

ENERGY STAR®  
Score

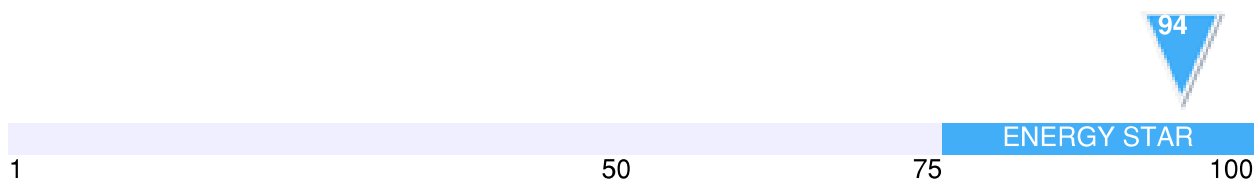
### Wilson Elementary School

**Primary Function:** K-12 School  
**Gross Floor Area (ft²):** 30,650  
**Built:** 1967

**Property Address:**  
Wilson Elementary School  
71 Orton Rd  
West Caldwell, New Jersey 07006

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

**For the year ending in June 2015, this building used 86.7 (kBtu/ft²) on a source energy basis.** The Environmental Protection Agency's (EPA's) ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.



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

### Signature of Verifying Professional

I \_\_\_\_\_ (Name) verify that the information regarding energy use and property use details is true and correct to the best of my knowledge.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# ENERGY STAR<sup>®</sup> Statement of Energy Performance

# 94

ENERGY STAR<sup>®</sup>  
Score<sup>1</sup>

## Wilson Elementary School

**Primary Property Function:** K-12 School  
**Gross Floor Area (ft<sup>2</sup>):** 30,650  
**Built:** 1967

**For Year Ending:** June 30, 2015  
**Date Generated:** September 14, 2015

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

### Property & Contact Information

**Property Address**

Wilson Elementary School  
71 Orton Rd  
West Caldwell, New Jersey 07006

**Property Owner**

\_\_\_\_\_  
, \_\_\_\_\_  
(\_\_\_\_)\_\_\_\_-\_\_\_\_

**Primary Contact**

\_\_\_\_\_  
, \_\_\_\_\_  
(\_\_\_\_)\_\_\_\_-\_\_\_\_  
\_\_\_\_\_

**Property ID:** 4543930

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**

51.6 kBtu/ft<sup>2</sup>

**Annual Energy by Fuel**

|                        |                 |
|------------------------|-----------------|
| Electric - Grid (kBtu) | 477,270 (30%)   |
| Natural Gas (kBtu)     | 1,103,756 (70%) |

**National Median Comparison**

|                                                    |       |
|----------------------------------------------------|-------|
| National Median Site EUI (kBtu/ft <sup>2</sup> )   | 94.1  |
| National Median Source EUI (kBtu/ft <sup>2</sup> ) | 158.3 |
| % Diff from National Median Source EUI             | -45%  |

**Source EUI**

86.7 kBtu/ft<sup>2</sup>

**Annual Emissions**

|                                                               |     |
|---------------------------------------------------------------|-----|
| Greenhouse Gas Emissions (Metric Tons CO <sub>2</sub> e/year) | 122 |
|---------------------------------------------------------------|-----|

### Signature & Stamp of Verifying Professional

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

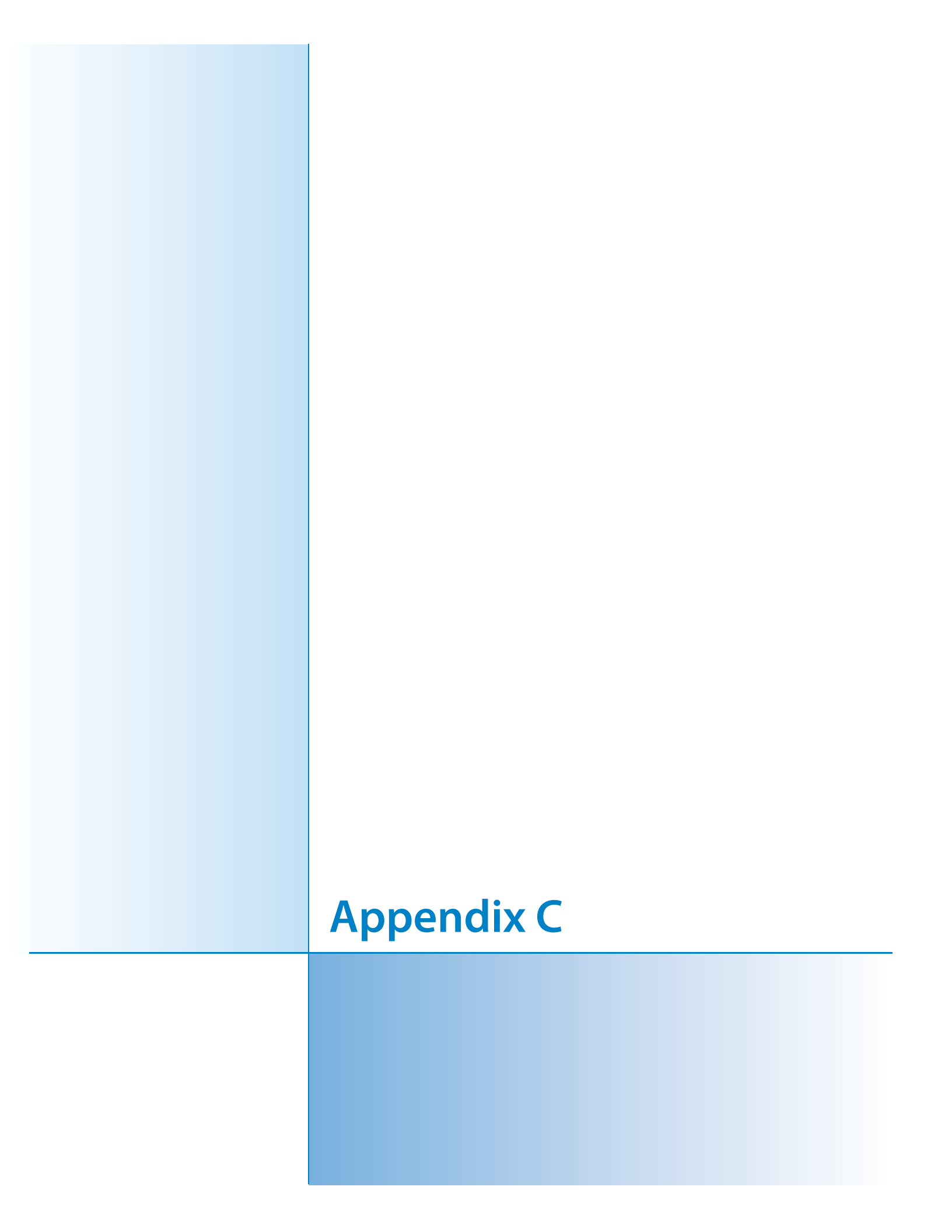
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Licensed Professional**

\_\_\_\_\_  
, \_\_\_\_\_  
(\_\_\_\_)\_\_\_\_-\_\_\_\_  
\_\_\_\_\_



**Professional Engineer Stamp**  
(if applicable)

The graphic consists of a large light blue rectangle on the left side of the page. A horizontal line extends from the right edge of this rectangle across the page. A vertical line extends from the bottom of the light blue rectangle down to the bottom of the page. These two lines intersect at the bottom right corner of the light blue rectangle, forming an L-shape. The text "Appendix C" is positioned at this intersection point, with the "A" and "C" being larger and bolder than the word "Appendix".

## Appendix C

James Caldwell High School  
Window Upgrade

|                |                                               |        |
|----------------|-----------------------------------------------|--------|
| Building       | James Caldwell High School                    |        |
| Address        | 265 Westville Avenue, West Caldwell, NJ 07006 |        |
| Heating Fuel   | Gas                                           | 100000 |
| Cooling System | DX                                            |        |

| Existing Building Envelope |             |         |
|----------------------------|-------------|---------|
| Wall Area                  | 33942       | sqft    |
| Wall Conductivity          | 0.25        | u Value |
| Window Area                | 8570        | sqft    |
| Window Conductivity        | 1           | u Value |
| Roof Area                  | 82635       | sqft    |
| Roof Conductivity          | 0.052631579 | u Value |
| Floor Area                 | 140251      | sqft    |
| Volume                     | 1122008     | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |            |            |
|------------------------|------------|------------|
| Lighting Density       | 0.50       | w/sqft     |
| Equipment Density      | 0.20       | w/sqft     |
| Occupancy              | 785        | people     |
| Occupant Sensible Load | 250        | btu/person |
| Infiltration           | 28,050.2   | cfm        |
| Exhaust                | 10000      | cfm        |
| Equipment Density      | 0.02       | therms     |
| Building Equipment     |            |            |
| Heating System         | 19,000,000 | Btuh       |
| Heating Efficiency     | 92         | %          |
| Cooling System         | 1,212,000  | Btuh       |
| Cooling Efficiency     | 9.0        | SEER       |
| Vent Cooling           | 0          | CFM        |
| Vent Power             | 0          | kW         |

| Existing Load Summaries |       |         |         |            |               |                  |               |  |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|--|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |  |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |  |
| 102.5                   | 2     | 0       | 1       | -524,415   | -532,824      | -1,006,808       | -2,064,047    |  |
| 97.5                    | 23    | 0       | 1       | -417,392   | -532,824      | -801,337         | -1,751,553    |  |
| 92.5                    | 93    | 0       | 1       | -310,368   | -532,824      | -595,866         | -1,439,058    |  |
| 87.5                    | 237   | 0       | 1       | -203,345   | -532,824      | -390,395         | -1,126,563    |  |
| 82.5                    | 452   | 0       | 1       | -96,321    | -532,824      | -184,924         | -814,069      |  |
| 77.5                    | 692   | 0       | 1       | 10,702     | -532,824      | 20,547           | -501,574      |  |
| 72.5                    | 858   | 0       | 1       | 117,726    | -532,824      | 226,018          | -189,080      |  |
| 67.5                    | 753   | 1       | 0       | 96,321     | -532,824      | 184,924          | 0             |  |
| 62.5                    | 735   | 1       | 0       | 203,345    | -532,824      | 390,395          | 60,916        |  |
| 57.5                    | 671   | 1       | 0       | 310,368    | -532,824      | 595,866          | 373,411       |  |
| 52.5                    | 736   | 1       | 0       | 417,392    | -532,824      | 801,337          | 685,905       |  |
| 47.5                    | 708   | 1       | 0       | 524,415    | -532,824      | 1,006,808        | 998,400       |  |
| 42.5                    | 756   | 1       | 0       | 631,439    | -532,824      | 1,212,279        | 1,310,895     |  |
| 37.5                    | 705   | 1       | 0       | 738,463    | -532,824      | 1,417,750        | 1,623,389     |  |
| 32.5                    | 546   | 1       | 0       | 845,486    | -532,824      | 1,623,222        | 1,935,884     |  |
| 27.5                    | 340   | 1       | 0       | 952,510    | -532,824      | 1,828,693        | 2,248,379     |  |
| 22.5                    | 229   | 1       | 0       | 1,059,533  | -532,824      | 2,034,164        | 2,560,873     |  |
| 17.5                    | 134   | 1       | 0       | 1,166,557  | -532,824      | 2,239,635        | 2,873,368     |  |
| 12.5                    | 57    | 1       | 0       | 1,273,580  | -532,824      | 2,445,106        | 3,185,862     |  |
| 7.5                     | 22    | 1       | 0       | 1,380,604  | -532,824      | 2,650,577        | 3,498,357     |  |
| 2.5                     | 9     | 1       | 0       | 1,487,627  | -532,824      | 2,856,048        | 3,810,852     |  |
| -2.5                    | 2     | 1       | 0       | 1,594,651  | -532,824      | 3,061,519        | 4,123,346     |  |
| -7.5                    | 0     | 1       | 0       | 1,701,674  | -532,824      | 3,266,990        | 4,435,841     |  |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |  |

| Existing Heating System |               |        | Existing Cooling System |                |         | Existing Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|----------------|---------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage          | Usage   | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu            | kWh     | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -1,616,000              | -3,802,353     | 317     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,616,000              | -41,297,778    | 3,441   | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,616,000              | -158,197,895   | 13,183  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,502,085              | -355,994,055   | 29,666  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,085,425              | -446,011,046   | 37,168  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -668,766                | -385,654,830   | 32,138  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -252,106                | -166,390,020   | 13,866  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 66,213                  | 48,666,697    | 487    | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 405,881                 | 272,346,334   | 2,723  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 745,549                 | 548,724,323   | 5,487  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 1,085,217               | 768,333,941   | 7,683  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 1,424,886               | 1,077,213,445 | 10,772 | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 1,764,554               | 1,244,010,280 | 12,440 | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,104,222               | 1,148,905,030 | 11,489 | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,443,890               | 830,922,514   | 8,309  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,783,558               | 637,434,742   | 6,374  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 3,123,226               | 418,512,271   | 4,185  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 3,462,894               | 197,384,957   | 1,974  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 3,802,562               | 83,656,365    | 837    | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 4,142,230               | 37,280,071    | 373    | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 4,481,898               | 8,963,796     | 90     | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 4,821,566               | 0             | 0      | 0                       | 0              | 0       | 0                            | 0       | 0     |
|                         | 7,322,354,765 | 73,224 |                         | -1,557,347,976 | 129,779 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Existing       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 73,224 |
| Cooling        | 129,779 | 0      |
| Vent Cooling   | 0       | 0      |
| Lighting       | 614,299 | 0      |
| Equipment      | 245,720 | 131    |
| Total          | 989,798 | 73,355 |

1,068,169  
7%  
67132.1  
-9%

| Proposed Building Envelope |             |         |
|----------------------------|-------------|---------|
| Wall Area                  | 33942       | sqft    |
| Wall Conductivity          | 0.25        | u Value |
| Window Area                | 8570        | sqft    |
| Window Conductivity        | 0.352003112 | u Value |
| Roof Area                  | 82875       | sqft    |
| Roof Conductivity          | 0.052631579 | u Value |
| Floor Area                 | 140251      | sqft    |
| Volume                     | 1122008     | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |            |             |
|------------------------|------------|-------------|
| Lighting Density       | 0.50       | w/sqft      |
| Equipment Density      | 0.20       | w/sqft      |
| Occupancy              | 785        | people      |
| Occupant Sensible Load | 250        | btu/person  |
| Infiltration           | 26,180.2   | cfm         |
| Exhaust                | 10000      | cfm         |
| Equipment Density      | 0.02       | therms/sqft |
| Building Equipment     |            |             |
| Heating System         | 19,000,000 | Btuh        |
| Heating Efficiency     | 92         | %           |
| Cooling System         | 1,212,000  | Btuh        |
| Cooling Efficiency     | 9.0        | SEER        |
| Vent Cooling           | 0          | CFM         |
| Vent Power             | 0          | kW          |

| Proposed Load Summaries |       |         |         |            |               |                  |               |  |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|--|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |  |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |  |
| 102.5                   | 2     | 0       | 1       | -388,668   | -532,824      | -957,328         | -1,878,820    |  |
| 97.5                    | 23    | 0       | 1       | -309,348   | -532,824      | -761,955         | -1,604,127    |  |
| 92.5                    | 93    | 0       | 1       | -230,028   | -532,824      | -566,582         | -1,329,434    |  |
| 87.5                    | 237   | 0       | 1       | -150,708   | -532,824      | -371,209         | -1,054,740    |  |
| 82.5                    | 452   | 0       | 1       | -71,388    | -532,824      | -175,836         | -780,047      |  |
| 77.5                    | 692   | 0       | 1       | 7,932      | -532,824      | 19,537           | -505,354      |  |
| 72.5                    | 858   | 0       | 1       | 87,252     | -532,824      | 214,910          | -230,661      |  |
| 67.5                    | 753   | 1       | 0       | 71,388     | -532,824      | 175,836          | 0             |  |
| 62.5                    | 735   | 1       | 0       | 150,708    | -532,824      | 371,209          | 0             |  |
| 57.5                    | 671   | 1       | 0       | 230,028    | -532,824      | 566,582          | 263,786       |  |
| 52.5                    | 736   | 1       | 0       | 309,348    | -532,824      | 761,955          | 538,479       |  |
| 47.5                    | 708   | 1       | 0       | 388,668    | -532,824      | 957,328          | 813,172       |  |
| 42.5                    | 756   | 1       | 0       | 467,988    | -532,824      | 1,152,701        | 1,087,865     |  |
| 37.5                    | 705   | 1       | 0       | 547,308    | -532,824      | 1,348,074        | 1,362,558     |  |
| 32.5                    | 546   | 1       | 0       | 626,628    | -532,824      | 1,543,447        | 1,637,251     |  |
| 27.5                    | 340   | 1       | 0       | 705,948    | -532,824      | 1,738,820        | 1,911,944     |  |
| 22.5                    | 229   | 1       | 0       | 785,268    | -532,824      | 1,934,193        | 2,186,638     |  |
| 17.5                    | 134   | 1       | 0       | 864,588    | -532,824      | 2,129,566        | 2,461,331     |  |
| 12.5                    | 57    | 1       | 0       | 943,909    | -532,824      | 2,324,939        | 2,736,024     |  |
| 7.5                     | 22    | 1       | 0       | 1,023,229  | -532,824      | 2,520,312        | 3,010,717     |  |
| 2.5                     | 9     | 1       | 0       | 1,102,549  | -532,824      | 2,715,685        | 3,285,410     |  |
| -2.5                    | 2     | 1       | 0       | 1,181,869  | -532,824      | 2,911,058        | 3,560,103     |  |
| -7.5                    | 0     | 1       | 0       | 1,261,189  | -532,824      | 3,106,431        | 3,834,796     |  |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |  |

| Proposed Heating System |               |        | Proposed Cooling System |                |         | Proposed Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|----------------|---------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage          | Usage   | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu            | kWh     | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -1,616,000              | -3,802,353     | 317     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,616,000              | -41,297,778    | 3,441   | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,616,000              | -158,197,895   | 13,183  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,406,321              | -333,297,986   | 27,775  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -1,040,063              | -427,371,430   | 35,614  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -673,806                | -388,561,352   | 32,380  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -307,548                | -202,981,950   | 16,915  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 0                       | 0             | 0      | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 286,724                 | 192,391,882   | 1,924  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 585,304                 | 430,783,391   | 4,308  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 883,883                 | 625,789,110   | 6,258  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 1,182,462               | 893,941,520   | 8,939  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 1,481,042               | 1,044,134,421 | 10,441 | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 1,779,621               | 971,673,141   | 9,717  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,078,201               | 706,588,184   | 7,066  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,376,780               | 544,282,607   | 5,443  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,675,359               | 358,498,153   | 3,585  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 2,973,939               | 169,514,509   | 1,695  | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 3,272,518               | 71,995,399    | 720    | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 3,571,098               | 32,139,878    | 321    | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 3,869,677               | 7,739,354     | 77     | 0                       | 0              | 0       | 0                            | 0       | 0     |
| 4,168,256               | 0             | 0      | 0                       | 0              | 0       | 0                            | 0       | 0     |
|                         | 6,049,471,548 | 60,495 |                         | -1,555,510,743 | 129,626 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Proposed       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 60,495 |
| Cooling        | 129,626 | 0      |
| Vent Cooling   | 0       | 0      |
| Lighting       | 614,299 | 0      |
| Equipment      | 245,720 | 131    |
| Total          | 989,645 | 60,626 |

| Proposed Savings  |     |        |
|-------------------|-----|--------|
| Estimated Savings | kWh | therms |
|                   | 153 | 12,729 |

James Caldwell High School  
Window Upgrade

| Newark, NJ |       | Day Time Hours |          |          |
|------------|-------|----------------|----------|----------|
| Deg F      | Hours | 01 to 08       | 09 to 16 | 17 to 00 |
| 102.5      | 2     |                | 2        | 0        |
| 97.5       | 23    |                | 19       | 4        |
| 92.5       | 93    | 1              | 68       | 24       |
| 87.5       | 237   | 5              | 160      | 72       |
| 82.5       | 452   | 41             | 253      | 158      |
| 77.5       | 692   | 163            | 274      | 255      |
| 72.5       | 858   | 306            | 254      | 298      |
| 67.5       | 753   | 285            | 227      | 241      |
| 62.5       | 735   | 258            | 226      | 251      |
| 57.5       | 671   | 231            | 215      | 225      |
| 52.5       | 736   | 259            | 225      | 252      |
| 47.5       | 708   | 245            | 225      | 238      |
| 42.5       | 756   | 266            | 230      | 260      |
| 37.5       | 705   | 273            | 199      | 233      |
| 32.5       | 546   | 229            | 144      | 173      |
| 27.5       | 340   | 139            | 93       | 108      |
| 22.5       | 229   | 104            | 55       | 70       |
| 17.5       | 134   | 69             | 25       | 40       |
| 12.5       | 57    | 34             | 9        | 14       |
| 7.5        | 22    | 13             | 4        | 5        |
| 2.5        | 9     | 5              | 2        | 2        |
| -2.5       | 2     | 2              | 0        | 0        |
| -7.5       | 0     | 0              | 0        |          |
| 8760       |       |                |          |          |

This page is for ease of changing weather data. If building scheduling is a factor the bin hours by day time have been included for reference.

James Caldwell High School  
Window Upgrade

| Existing Envelope        |             |          |          |          |          |          |                   |
|--------------------------|-------------|----------|----------|----------|----------|----------|-------------------|
|                          | Wall 1 - Wa | Wall 2   | Window 1 | Window 2 | Window 3 | Window 4 | Wall Window Total |
| Height (ft)              | 12          | 3        | 5        | 2        | 10       | 7        |                   |
| Width (ft)               | 2792        | 707      | 3        | 2        | 10       | 6        |                   |
| Count                    | 1           | 1        | 39       | 26       | 7        | 7        | 79                |
| R-value                  | 4           | 4        | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.25        | 0.25     | 1        | 1        | 1        | 1        | 1                 |
| Area                     | 31821       | 2121     | 585      | 104      | 700      | 294      | 1683              |
|                          | Wall 3      | Wall 4   | Window 1 | Window 2 | Window 3 | Window 4 | Wall Window Total |
| Height (ft)              | 8           | 15       | 3        | 4        | 3        | 4        |                   |
| Width (ft)               | 0           | 0        | 10       | 6        | 3        | 4        |                   |
| Count                    | 0           | 0        | 13       | 2        | 9        | 383      | 407               |
| R-value                  | 4           | 4        | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.25        | 0.25     | 1        | 1        | 1        | 1        | 1                 |
| Area                     | 0           | 0        | 390      | 48       | 81       | 6128     | 6647              |
|                          |             |          |          |          |          |          |                   |
| Total Wall Area (sqft)   |             | 33942    |          |          |          |          |                   |
| Average U-value          |             | 0.25     |          |          |          |          |                   |
|                          | Roof 1      | Roof 2   | Window 1 | Window 2 | Window 3 | Window 4 | Roof Window Total |
| Length (ft)              | 425         | 0        | 12       | 0        | 0        | 0        |                   |
| Width (ft)               | 195         | 0        | 4        | 0        | 0        | 0        |                   |
| Count                    | 1           | 0        | 5        | 0        | 0        | 0        | 5                 |
| R-value                  | 19          | 19       | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.0526316   | 0.052632 | 1        | 1        | 1        | 1        | 1                 |
| Area                     | 82635       | 0        | 240      | 0        | 0        | 0        | 240               |
|                          | Roof 3      | Roof 4   | Window 1 | Window 2 | Window 3 | Window 4 | Roof Window Total |
| Length (ft)              | 0           | 0        | 0        | 0        | 0        | 0        |                   |
| Width (ft)               | 0           | 0        | 0        | 0        | 0        | 0        |                   |
| Count                    | 0           | 0        | 0        | 0        | 0        | 0        | 0                 |
| R-value                  | 19          | 19       | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.0526316   | 0.052632 | 1        | 1        | 1        | 1        | 0                 |
| Area                     | 0           | 0        | 0        | 0        | 0        | 0        | 0                 |
|                          |             |          |          |          |          |          |                   |
| Total Roof Area (sqft)   |             | 82635    |          |          |          |          |                   |
| Average U-value          |             | 0.052632 |          |          |          |          |                   |
|                          |             |          |          |          |          |          |                   |
| Total Window Area (sqft) |             | 8570     |          |          |          |          |                   |
| Average U-value          |             | 1        |          |          |          |          |                   |

| Proposed Envelope        |             |             |             |             |             |           |                   |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-----------|-------------------|
|                          | Wall 1      | Wall 2      | Window 1    | Window 2    | Window 3    | Window 4  | Wall Window Total |
| Height (ft)              | 12          | 3           | 5           | 2           | 10          | 7         |                   |
| Width (ft)               | 2792        | 707         | 3           | 2           | 10          | 6         |                   |
| Count                    | 1           | 1           | 39          | 26          | 7           | 7         | 79                |
| R-value                  | 4           | 4           | 3           | 3           | 3           | 3         |                   |
| U-value                  | 0.25        | 0.25        | 0.333333333 | 0.333333333 | 0.333333333 | 0.3333333 | 0.333333333       |
| Area                     | 31821       | 2121        | 585         | 104         | 700         | 294       | 1683              |
|                          | Wall 3      | Wall 4      | Window 1    | Window 2    | Window 3    | Window 4  | Wall Window Total |
| Height (ft)              | 8           | 15          | 3           | 4           | 3           | 4         |                   |
| Width (ft)               | 0           | 0           | 10          | 6           | 3           | 4         |                   |
| Count                    | 0           | 0           | 13          | 2           | 9           | 383       | 407               |
| R-value                  | 4           | 4           | 3           | 3           | 3           | 3         |                   |
| U-value                  | 0.25        | 0.25        | 0.333333333 | 0.333333333 | 0.333333333 | 0.3333333 | 0.333333333       |
| Area                     | 0           | 0           | 390         | 48          | 81          | 6128      | 6647              |
|                          |             |             |             |             |             |           |                   |
| Total Wall Area (sqft)   |             | 33942       |             |             |             |           |                   |
| Average U-value          |             | 0.25        |             |             |             |           |                   |
|                          | Roof 1      | Roof 2      | Window 1    | Window 2    | Window 3    | Window 4  | Roof Window Total |
| Length (ft)              | 425         | 0           | 12          | 0           | 0           | 0         |                   |
| Width (ft)               | 195         | 0           | 4           | 0           | 0           | 0         |                   |
| Count                    | 1           | 0           | 5           | 0           | 0           | 0         | 5                 |
| R-value                  | 19          | 19          | 1           | 1           | 1           | 1         |                   |
| U-value                  | 0.052631579 | 0.052631579 | 1           | 1           | 1           | 1         | 1                 |
| Area                     | 82875       | 0           | 240         | 0           | 0           | 0         | 240               |
|                          | Roof 3      | Roof 4      | Window 1    | Window 2    | Window 3    | Window 4  | Roof Window Total |
| Length (ft)              | 0           | 0           | 0           | 0           | 0           | 0         |                   |
| Width (ft)               | 0           | 0           | 0           | 0           | 0           | 0         |                   |
| Count                    | 0           | 0           | 0           | 0           | 0           | 0         | 0                 |
| R-value                  | 19          | 19          | 1           | 1           | 1           | 1         |                   |
| U-value                  | 0.052631579 | 0.052631579 | 1           | 1           | 1           | 1         | 0                 |
| Area                     | 0           | 0           | 0           | 0           | 0           | 0         | 0                 |
|                          |             |             |             |             |             |           |                   |
| Total Roof Area (sqft)   |             | 82875       |             |             |             |           |                   |
| Average U-value          |             | 0.052631579 |             |             |             |           |                   |
|                          |             |             |             |             |             |           |                   |
| Total Window Area (sqft) |             | 8570        |             |             |             |           |                   |
| Average U-value          |             | 0.352003112 |             |             |             |           |                   |

Grover Cleveland Middle School  
Condensing Boiler

|                |                                     |        |
|----------------|-------------------------------------|--------|
| Building       | Grover Cleveland Middle School      |        |
| Address        | 36 Academy Road, Caldwell, NJ 07006 |        |
| Heating Fuel   | Gas                                 | 100000 |
| Cooling System | DX                                  |        |

| Existing Building Envelope |             |         |
|----------------------------|-------------|---------|
| Wall Area                  | 34720       | sqft    |
| Wall Conductivity          | 0.25        | u Value |
| Window Area                | 2940        | sqft    |
| Window Conductivity        | 0.66666667  | u Value |
| Roof Area                  | 58900       | sqft    |
| Roof Conductivity          | 0.052631579 | u Value |
| Floor Area                 | 103520      | sqft    |
| Volume                     | 828160      | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |            |
|------------------------|-----------|------------|
| Lighting Density       | 0.50      | w/sqft     |
| Equipment Density      | 0.31      | w/sqft     |
| Occupancy              | 617       | people     |
| Occupant Sensible Load | 250       | btu/person |
| Infiltration           | 3,450.7   | cfm        |
| Exhaust                | 1000      | cfm        |
| Equipment Density      | 0.02      | therms     |
| Building Equipment     |           |            |
| Heating System         | 5,950,000 | Btuh       |
| Heating Efficiency     | 85        | %          |
| Cooling System         | 224,000   | Btuh       |
| Cooling Efficiency     | 9.0       | SEER       |
| Vent Cooling           | 0         | CFM        |
| Vent Power             | 0         | kW         |

| Existing Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -336,630   | -441,934      | -117,765         | -896,329      |
| 97.5                    | 23    | 0       | 1       | -267,930   | -441,934      | -93,731          | -803,595      |
| 92.5                    | 93    | 0       | 1       | -199,230   | -441,934      | -69,697          | -710,862      |
| 87.5                    | 237   | 0       | 1       | -130,530   | -441,934      | -45,664          | -618,128      |
| 82.5                    | 452   | 0       | 1       | -61,830    | -441,934      | -21,630          | -525,394      |
| 77.5                    | 692   | 0       | 1       | 6,870      | -441,934      | 2,403            | -432,661      |
| 72.5                    | 858   | 0       | 1       | 75,570     | -441,934      | 26,437           | -339,927      |
| 67.5                    | 753   | 1       | 0       | 61,830     | -441,934      | 21,630           | 0             |
| 62.5                    | 735   | 1       | 0       | 130,530    | -441,934      | 45,664           | 0             |
| 57.5                    | 671   | 1       | 0       | 199,230    | -441,934      | 69,697           | 0             |
| 52.5                    | 736   | 1       | 0       | 267,930    | -441,934      | 93,731           | 0             |
| 47.5                    | 708   | 1       | 0       | 336,630    | -441,934      | 117,765          | 12,460        |
| 42.5                    | 756   | 1       | 0       | 405,330    | -441,934      | 141,798          | 105,194       |
| 37.5                    | 705   | 1       | 0       | 474,030    | -441,934      | 165,832          | 197,928       |
| 32.5                    | 546   | 1       | 0       | 542,730    | -441,934      | 189,865          | 290,661       |
| 27.5                    | 340   | 1       | 0       | 611,430    | -441,934      | 213,899          | 383,395       |
| 22.5                    | 229   | 1       | 0       | 680,130    | -441,934      | 237,933          | 476,128       |
| 17.5                    | 134   | 1       | 0       | 748,830    | -441,934      | 261,966          | 568,862       |
| 12.5                    | 57    | 1       | 0       | 817,530    | -441,934      | 286,000          | 661,596       |
| 7.5                     | 22    | 1       | 0       | 886,230    | -441,934      | 310,033          | 754,329       |
| 2.5                     | 9     | 1       | 0       | 954,930    | -441,934      | 334,067          | 847,063       |
| -2.5                    | 2     | 1       | 0       | 1,023,630  | -441,934      | 358,101          | 939,796       |
| -7.5                    | 0     | 1       | 0       | 1,092,330  | -441,934      | 382,134          | 1,032,530     |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Existing Heating System |             |        | Existing Cooling System |              |        | Existing Ventilation Cooling |         |       |
|-------------------------|-------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage       | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu         | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0           | 0      | -298,667                | -702,745     | 59     | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -7,632,593   | 636    | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -29,237,895  | 2,436  | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -70,784,000  | 5,899  | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -122,724,848 | 10,227 | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -172,231,111 | 14,353 | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -197,120,000 | 16,427 | 0                            | 100     | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 14,659                  | 10,378,859  | 104    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 123,758                 | 93,560,865  | 936    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 232,856                 | 164,163,558 | 1,642  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 341,954                 | 186,707,137 | 1,867  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 451,053                 | 153,357,958 | 1,534  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 560,151                 | 128,274,618 | 1,283  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 669,250                 | 89,679,436  | 897    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 778,348                 | 44,365,829  | 444    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 887,446                 | 19,523,817  | 195    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 996,545                 | 8,968,901   | 90     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,105,643               | 2,211,286   | 22     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,214,741               | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 901,192,264 | 9,012  |                         | -600,433,192 | 50,036 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Existing       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 9,012  |
| Cooling        | 50,036  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 453,418 | 0      |
| Equipment      | 281,119 | 131    |
|                |         |        |
| Total          | 784,573 | 9,143  |

819,151  
4%

8784  
-4%

| Proposed Building Envelope |             |         |
|----------------------------|-------------|---------|
| Wall Area                  | 34720       | sqft    |
| Wall Conductivity          | 0.25        | u Value |
| Window Area                | 2940        | sqft    |
| Window Conductivity        | 0.66666667  | u Value |
| Roof Area                  | 58900       | sqft    |
| Roof Conductivity          | 0.052631579 | u Value |
| Floor Area                 | 103520      | sqft    |
| Volume                     | 828160      | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |             |
|------------------------|-----------|-------------|
| Lighting Density       | 0.50      | w/sqft      |
| Equipment Density      | 0.31      | w/sqft      |
| Occupancy              | 617       | people      |
| Occupant Sensible Load | 250       | btu/person  |
| Infiltration           | 3,450.7   | cfm         |
| Exhaust                | 1000      | cfm         |
| Equipment Density      | 0.02      | therms/sqft |
| Building Equipment     |           |             |
| Heating System         | 5,950,000 | Btuh        |
| Heating Efficiency     | 92        | %           |
| Cooling System         | 224,000   | Btuh        |
| Cooling Efficiency     | 9.0       | SEER        |
| Vent Cooling           | 0         | CFM         |
| Vent Power             | 0         | kW          |

| Proposed Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -336,630   | -441,934      | -117,765         | -896,329      |
| 97.5                    | 23    | 0       | 1       | -267,930   | -441,934      | -93,731          | -803,595      |
| 92.5                    | 93    | 0       | 1       | -199,230   | -441,934      | -69,697          | -710,862      |
| 87.5                    | 237   | 0       | 1       | -130,530   | -441,934      | -45,664          | -618,128      |
| 82.5                    | 452   | 0       | 1       | -61,830    | -441,934      | -21,630          | -525,394      |
| 77.5                    | 692   | 0       | 1       | 6,870      | -441,934      | 2,403            | -432,661      |
| 72.5                    | 858   | 0       | 1       | 75,570     | -441,934      | 26,437           | -339,927      |
| 67.5                    | 753   | 1       | 0       | 61,830     | -441,934      | 21,630           | 0             |
| 62.5                    | 735   | 1       | 0       | 130,530    | -441,934      | 45,664           | 0             |
| 57.5                    | 671   | 1       | 0       | 199,230    | -441,934      | 69,697           | 0             |
| 52.5                    | 736   | 1       | 0       | 267,930    | -441,934      | 93,731           | 0             |
| 47.5                    | 708   | 1       | 0       | 336,630    | -441,934      | 117,765          | 12,460        |
| 42.5                    | 756   | 1       | 0       | 405,330    | -441,934      | 141,798          | 105,194       |
| 37.5                    | 705   | 1       | 0       | 474,030    | -441,934      | 165,832          | 197,928       |
| 32.5                    | 546   | 1       | 0       | 542,730    | -441,934      | 189,865          | 290,661       |
| 27.5                    | 340   | 1       | 0       | 611,430    | -441,934      | 213,899          | 383,395       |
| 22.5                    | 229   | 1       | 0       | 680,130    | -441,934      | 237,933          | 476,128       |
| 17.5                    | 134   | 1       | 0       | 748,830    | -441,934      | 261,966          | 568,862       |
| 12.5                    | 57    | 1       | 0       | 817,530    | -441,934      | 286,000          | 661,596       |
| 7.5                     | 22    | 1       | 0       | 886,230    | -441,934      | 310,033          | 754,329       |
| 2.5                     | 9     | 1       | 0       | 954,930    | -441,934      | 334,067          | 847,063       |
| -2.5                    | 2     | 1       | 0       | 1,023,630  | -441,934      | 358,101          | 939,796       |
| -7.5                    | 0     | 1       | 0       | 1,092,330  | -441,934      | 382,134          | 1,032,530     |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Proposed Heating System |             |        | Proposed Cooling System |              |        | Proposed Ventilation Cooling |         |       |
|-------------------------|-------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage       | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu         | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0           | 0      | -298,667                | -702,745     | 59     | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -7,632,593   | 636    | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -29,237,895  | 2,436  | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -70,784,000  | 5,899  | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -122,724,848 | 10,227 | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -172,231,111 | 14,353 | 0                            | 100     | 0     |
| 0                       | 0           | 0      | -298,667                | -197,120,000 | 16,427 | 0                            | 100     | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 13,544                  | 9,589,163   | 96     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 114,341                 | 86,442,104  | 864    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 215,139                 | 151,672,853 | 1,517  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 315,936                 | 172,501,160 | 1,725  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 416,734                 | 141,689,417 | 1,417  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 517,531                 | 118,514,593 | 1,185  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 618,328                 | 82,856,001  | 829    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 719,126                 | 40,990,168  | 410    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 819,923                 | 18,038,309  | 180    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 920,721                 | 8,286,485   | 83     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,021,518               | 2,043,036   | 20     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,122,315               | 0           | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 832,623,288 | 8,326  |                         | -600,433,192 | 50,036 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Proposed       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 8,326  |
| Cooling        | 50,036  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 453,418 | 0      |
| Equipment      | 281,119 | 131    |
|                |         |        |
| Total          | 784,573 | 8,458  |

| Proposed Savings |     |        |
|------------------|-----|--------|
| Estimated        | kWh | therms |
| Savings          | 0   | 686    |

- Notes:
1. Negative Numbers indicate heat needs to be removed from the space
  2. Heating and Cooling columns determine if the building should be heating or cooling
  3. Vent Power is the ventilation fan motor horse power.

Grover Cleveland Middle School  
Condensing Boiler

| Newark, NJ |       | Day Time Hours |          |          |
|------------|-------|----------------|----------|----------|
| Deg F      | Hours | 01 to 08       | 09 to 16 | 17 to 00 |
| 102.5      | 2     |                | 2        | 0        |
| 97.5       | 23    |                | 19       | 4        |
| 92.5       | 93    | 1              | 68       | 24       |
| 87.5       | 237   | 5              | 160      | 72       |
| 82.5       | 452   | 41             | 253      | 158      |
| 77.5       | 692   | 163            | 274      | 255      |
| 72.5       | 858   | 306            | 254      | 298      |
| 67.5       | 753   | 285            | 227      | 241      |
| 62.5       | 735   | 258            | 226      | 251      |
| 57.5       | 671   | 231            | 215      | 225      |
| 52.5       | 736   | 259            | 225      | 252      |
| 47.5       | 708   | 245            | 225      | 238      |
| 42.5       | 756   | 266            | 230      | 260      |
| 37.5       | 705   | 273            | 199      | 233      |
| 32.5       | 546   | 229            | 144      | 173      |
| 27.5       | 340   | 139            | 93       | 108      |
| 22.5       | 229   | 104            | 55       | 70       |
| 17.5       | 134   | 69             | 25       | 40       |
| 12.5       | 57    | 34             | 9        | 14       |
| 7.5        | 22    | 13             | 4        | 5        |
| 2.5        | 9     | 5              | 2        | 2        |
| -2.5       | 2     | 2              | 0        | 0        |
| -7.5       | 0     | 0              | 0        |          |
|            | 8760  |                |          |          |

This page is for ease of changing weather data. If building scheduling is a factor the bin hours by day time have been included for reference.

Harrison School Building  
Window Upgrade

|                |                          |        |
|----------------|--------------------------|--------|
| Building       | Harrison School Building |        |
| Address        | 104 Gray St              |        |
| Heating Fuel   | Gas                      | 100000 |
| Cooling System | DX                       |        |

| Existing Building Envelope |         |         |
|----------------------------|---------|---------|
| Wall Area                  | 9335    | sqft    |
| Wall Conductivity          | 0.25    | u Value |
| Window Area                | 2505    | sqft    |
| Window Conductivity        | 1       | u Value |
| Roof Area                  | 35145.6 | sqft    |
| Roof Conductivity          | 0.1     | u Value |
| Floor Area                 | 31825   | sqft    |
| Volume                     | 254600  | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |            |
|------------------------|-----------|------------|
| Lighting Density       | 0.23      | w/sqft     |
| Equipment Density      | 0.15      | w/sqft     |
| Occupancy              | 318       | people     |
| Occupant Sensible Load | 150       | btu/person |
| Infiltration           | 4,243.3   | cfm        |
| Exhaust                | 2000      | cfm        |
| Equipment Density      | 0.07      | therms     |
| Building Equipment     |           |            |
| Heating System         | 3,000,000 | Btuh       |
| Heating Efficiency     | 95        | %          |
| Cooling System         | 364,000   | Btuh       |
| Cooling Efficiency     | 9.0       | SEER       |
| Vent Cooling           | 0         | CFM        |
| Vent Power             | 0         | kW         |

| Existing Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -204,656   | -95,975       | -165,199         | -465,830      |
| 97.5                    | 23    | 0       | 1       | -162,890   | -95,975       | -131,485         | -390,349      |
| 92.5                    | 93    | 0       | 1       | -121,123   | -95,975       | -97,771          | -314,869      |
| 87.5                    | 237   | 0       | 1       | -79,356    | -95,975       | -64,057          | -239,388      |
| 82.5                    | 452   | 0       | 1       | -37,590    | -95,975       | -30,343          | -163,908      |
| 77.5                    | 692   | 0       | 1       | 4,177      | -95,975       | 3,371            | -88,427       |
| 72.5                    | 858   | 0       | 1       | 45,943     | -95,975       | 37,085           | -12,947       |
| 67.5                    | 753   | 1       | 0       | 37,590     | -95,975       | 30,343           | 0             |
| 62.5                    | 735   | 1       | 0       | 79,356     | -95,975       | 64,057           | 47,438        |
| 57.5                    | 671   | 1       | 0       | 121,123    | -95,975       | 97,771           | 122,918       |
| 52.5                    | 736   | 1       | 0       | 162,890    | -95,975       | 131,485          | 198,399       |
| 47.5                    | 708   | 1       | 0       | 204,656    | -95,975       | 165,199          | 273,880       |
| 42.5                    | 756   | 1       | 0       | 246,423    | -95,975       | 198,913          | 349,360       |
| 37.5                    | 705   | 1       | 0       | 288,189    | -95,975       | 232,627          | 424,841       |
| 32.5                    | 546   | 1       | 0       | 329,956    | -95,975       | 266,341          | 500,321       |
| 27.5                    | 340   | 1       | 0       | 371,722    | -95,975       | 300,055          | 575,802       |
| 22.5                    | 229   | 1       | 0       | 413,489    | -95,975       | 333,769          | 651,282       |
| 17.5                    | 134   | 1       | 0       | 455,255    | -95,975       | 367,483          | 726,763       |
| 12.5                    | 57    | 1       | 0       | 497,022    | -95,975       | 401,197          | 802,243       |
| 7.5                     | 22    | 1       | 0       | 538,788    | -95,975       | 434,911          | 877,724       |
| 2.5                     | 9     | 1       | 0       | 580,555    | -95,975       | 468,625          | 953,205       |
| -2.5                    | 2     | 1       | 0       | 622,322    | -95,975       | 502,339          | 1,028,685     |
| -7.5                    | 0     | 1       | 0       | 664,088    | -95,975       | 536,053          | 1,104,166     |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Existing Heating System |               |        | Existing Cooling System |              |        | Existing Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -485,333                | -1,141,961   | 95     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -485,333                | -12,402,963  | 1,034  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -419,825                | -41,098,653  | 3,425  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -319,184                | -75,646,659  | 6,304  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -218,543                | -89,801,503  | 7,483  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -117,903                | -67,990,584  | 5,666  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -17,262                 | -11,392,929  | 949    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 49,935                  | 36,701,977    | 367    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 129,388                 | 86,819,263    | 868    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 208,841                 | 153,707,038   | 1,537  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 288,294                 | 204,112,360   | 2,041  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 367,748                 | 278,017,114   | 2,780  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 447,201                 | 315,276,504   | 3,153  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 526,654                 | 287,553,043   | 2,876  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 606,107                 | 206,076,426   | 2,061  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 685,560                 | 156,993,319   | 1,570  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 765,014                 | 102,511,817   | 1,025  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 844,467                 | 48,134,606    | 481    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 923,920                 | 20,326,240    | 203    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,003,373               | 9,030,359     | 90     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,082,826               | 2,165,653     | 22     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,162,280               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 1,907,425,718 | 19,074 |                         | -299,475,252 | 24,956 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Existing       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 19,074 |
| Cooling        | 24,956  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 64,121  | 0      |
| Equipment      | 41,818  | 613    |
|                |         |        |
| Total          | 130,895 | 19,687 |

| Proposed Building Envelope |            |         |
|----------------------------|------------|---------|
| Wall Area                  | 9335       | sqft    |
| Wall Conductivity          | 0.25       | u Value |
| Window Area                | 2505       | sqft    |
| Window Conductivity        | 0.33333333 | u Value |
| Roof Area                  | 35145.6    | sqft    |
| Roof Conductivity          | 0.1        | u Value |
| Floor Area                 | 31825      | sqft    |
| Volume                     | 254600     | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |             |
|------------------------|-----------|-------------|
| Lighting Density       | 0.23      | w/sqft      |
| Equipment Density      | 0.15      | w/sqft      |
| Occupancy              | 318       | people      |
| Occupant Sensible Load | 150       | btu/person  |
| Infiltration           | 4,243.3   | cfm         |
| Exhaust                | 2000      | cfm         |
| Equipment Density      | 0.07      | therms/sqft |
| Building Equipment     |           |             |
| Heating System         | 3,000,000 | Btuh        |
| Heating Efficiency     | 95        | %           |
| Cooling System         | 364,000   | Btuh        |
| Cooling Efficiency     | 9.0       | SEER        |
| Vent Cooling           | 0         | CFM         |
| Vent Power             | 0         | kW          |

| Proposed Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -163,741   | -95,975       | -165,199         | -424,915      |
| 97.5                    | 23    | 0       | 1       | -130,325   | -95,975       | -131,485         | -357,784      |
| 92.5                    | 93    | 0       | 1       | -96,908    | -95,975       | -97,771          | -290,654      |
| 87.5                    | 237   | 0       | 1       | -63,491    | -95,975       | -64,057          | -223,523      |
| 82.5                    | 452   | 0       | 1       | -30,075    | -95,975       | -30,343          | -156,393      |
| 77.5                    | 692   | 0       | 1       | 3,342      | -95,975       | 3,371            | -89,262       |
| 72.5                    | 858   | 0       | 1       | 36,758     | -95,975       | 37,085           | -22,132       |
| 67.5                    | 753   | 1       | 0       | 30,075     | -95,975       | 30,343           | 0             |
| 62.5                    | 735   | 1       | 0       | 63,491     | -95,975       | 64,057           | 31,573        |
| 57.5                    | 671   | 1       | 0       | 96,908     | -95,975       | 97,771           | 98,703        |
| 52.5                    | 736   | 1       | 0       | 130,325    | -95,975       | 131,485          | 165,834       |
| 47.5                    | 708   | 1       | 0       | 163,741    | -95,975       | 165,199          | 232,965       |
| 42.5                    | 756   | 1       | 0       | 197,158    | -95,975       | 198,913          | 300,095       |
| 37.5                    | 705   | 1       | 0       | 230,574    | -95,975       | 232,627          | 367,226       |
| 32.5                    | 546   | 1       | 0       | 263,991    | -95,975       | 266,341          | 434,356       |
| 27.5                    | 340   | 1       | 0       | 297,407    | -95,975       | 300,055          | 501,487       |
| 22.5                    | 229   | 1       | 0       | 330,824    | -95,975       | 333,769          | 568,617       |
| 17.5                    | 134   | 1       | 0       | 364,240    | -95,975       | 367,483          | 635,748       |
| 12.5                    | 57    | 1       | 0       | 397,657    | -95,975       | 401,197          | 702,878       |
| 7.5                     | 22    | 1       | 0       | 431,073    | -95,975       | 434,911          | 770,009       |
| 2.5                     | 9     | 1       | 0       | 464,490    | -95,975       | 468,625          | 837,140       |
| -2.5                    | 2     | 1       | 0       | 497,907    | -95,975       | 502,339          | 904,270       |
| -7.5                    | 0     | 1       | 0       | 531,323    | -95,975       | 536,053          | 971,401       |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Proposed Heating System |               |        | Proposed Cooling System |              |        | Proposed Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -485,333                | -1,141,961   | 95     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -477,046                | -12,191,167  | 1,016  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -387,538                | -37,937,958  | 3,161  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -298,031                | -70,633,319  | 5,886  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -208,523                | -85,684,194  | 7,140  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -119,016                | -68,632,607  | 5,719  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -29,509                 | -19,475,729  | 1,623  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 33,235                  | 24,427,477    | 244    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 103,898                 | 69,715,826    | 697    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 174,562                 | 128,477,732   | 1,285  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 245,226                 | 173,619,918   | 1,736  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 315,890                 | 238,812,545   | 2,388  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 386,553                 | 272,520,110   | 2,725  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 457,217                 | 249,640,528   | 2,496  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 527,881                 | 179,479,479   | 1,795  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 598,545                 | 137,066,704   | 1,371  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 669,208                 | 89,673,911    | 897    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 739,872                 | 42,172,706    | 422    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 810,536                 | 17,831,787    | 178    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 881,200                 | 7,930,796     | 79     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 951,863                 | 1,903,726     | 19     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,022,527               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 1,633,273,245 | 16,333 |                         | -295,696,935 | 24,641 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Proposed       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 16,333 |
| Cooling        | 24,641  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 64,121  | 0      |
| Equipment      | 41,818  | 613    |
|                |         |        |
| Total          | 130,580 | 16,946 |

| Proposed Savings  |     |        |
|-------------------|-----|--------|
| Estimated Savings | kWh | therms |
|                   | 315 | 2,742  |

Notes:

1. Negative Numbers indicate heat needs to be removed from the space
2. Heating and Cooling columns determine if the building should be heating or cooling
3. Vent Power is the ventilation fan motor horse power.

Harrison School Building  
Window Upgrade

| Newark, NJ |       | Day Time Hours |          |          |
|------------|-------|----------------|----------|----------|
| Deg F      | Hours | 01 to 08       | 09 to 16 | 17 to 00 |
| 102.5      | 2     |                | 2        | 0        |
| 97.5       | 23    |                | 19       | 4        |
| 92.5       | 93    | 1              | 68       | 24       |
| 87.5       | 237   | 5              | 160      | 72       |
| 82.5       | 452   | 41             | 253      | 158      |
| 77.5       | 692   | 163            | 274      | 255      |
| 72.5       | 858   | 306            | 254      | 298      |
| 67.5       | 753   | 285            | 227      | 241      |
| 62.5       | 735   | 258            | 226      | 251      |
| 57.5       | 671   | 231            | 215      | 225      |
| 52.5       | 736   | 259            | 225      | 252      |
| 47.5       | 708   | 245            | 225      | 238      |
| 42.5       | 756   | 266            | 230      | 260      |
| 37.5       | 705   | 273            | 199      | 233      |
| 32.5       | 546   | 229            | 144      | 173      |
| 27.5       | 340   | 139            | 93       | 108      |
| 22.5       | 229   | 104            | 55       | 70       |
| 17.5       | 134   | 69             | 25       | 40       |
| 12.5       | 57    | 34             | 9        | 14       |
| 7.5        | 22    | 13             | 4        | 5        |
| 2.5        | 9     | 5              | 2        | 2        |
| -2.5       | 2     | 2              | 0        | 0        |
| -7.5       | 0     | 0              | 0        |          |
|            | 8760  |                |          |          |

This page is for ease of changing weather data. If building scheduling is a factor the bin hours by day time have been included for reference.

## Harrison School Building Window Upgrade

| Existing Envelope        |         |          |          |          |          |                   |
|--------------------------|---------|----------|----------|----------|----------|-------------------|
|                          | Wall 1  | Window 1 | Window 2 | Window 3 | Window 4 | Wall Window Total |
| Height (ft)              | 10      | 5        | 5        | 5        | 5        |                   |
| Width (ft)               | 709.5   | 3        | 3        | 3        | 3        |                   |
| Count                    | 1       | 27       | 6        | 27       | 107      | 167               |
| R-value                  | 4       | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.25    | 1        | 1        | 1        | 1        | 1                 |
| Area                     | 7095    | 405      | 90       | 405      | 1605     | 2505              |
|                          |         |          |          |          |          |                   |
|                          | Wall 2  | Window 1 | Window 2 | Window 3 | Window 4 | Wall Window Total |
| Height (ft)              | 8       | 0        | 0        | 0        | 0        |                   |
| Width (ft)               | 280     | 0        | 0        | 0        | 0        |                   |
| Count                    | 1       | 0        | 0        | 0        | 0        | 0                 |
| R-value                  | 4       | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.25    | 1        | 1        | 1        | 1        | 0                 |
| Area                     | 2240    | 0        | 0        | 0        | 0        | 0                 |
|                          |         |          |          |          |          |                   |
| Total Wall Area (sqft)   |         | 9335     |          |          |          |                   |
| Average U-value          |         | 0.25     |          |          |          |                   |
|                          |         |          |          |          |          |                   |
|                          | Roof 1  | Window 1 | Window 2 | Window 3 | Window 4 | Roof Window Total |
| Length (ft)              | 960     | 0        | 0        | 0        | 0        |                   |
| Width (ft)               | 31.61   | 0        | 0        | 0        | 0        |                   |
| Count                    | 1       | 0        | 0        | 0        | 0        | 0                 |
| R-value                  | 10      | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.1     | 1        | 1        | 1        | 1        | 0                 |
| Area                     | 30345.6 | 0        | 0        | 0        | 0        | 0                 |
|                          |         |          |          |          |          |                   |
|                          | Roof 2  | Window 1 | Window 2 | Window 3 | Window 4 | Roof Window Total |
| Length (ft)              | 80      | 0        | 0        | 0        | 0        |                   |
| Width (ft)               | 60      | 0        | 0        | 0        | 0        |                   |
| Count                    | 1       | 0        | 0        | 0        | 0        | 0                 |
| R-value                  | 10      | 1        | 1        | 1        | 1        |                   |
| U-value                  | 0.1     | 1        | 1        | 1        | 1        | 0                 |
| Area                     | 4800    | 0        | 0        | 0        | 0        | 0                 |
|                          |         |          |          |          |          |                   |
| Total Roof Area (sqft)   |         | 35145.6  |          |          |          |                   |
| Average U-value          |         | 0.1      |          |          |          |                   |
|                          |         |          |          |          |          |                   |
| Total Window Area (sqft) |         | 2505     |          |          |          |                   |
| Average U-value          |         | 1        |          |          |          |                   |

| Proposed Envelope                                                   |         |            |            |            |            |                   |
|---------------------------------------------------------------------|---------|------------|------------|------------|------------|-------------------|
|                                                                     | Wall 1  | Window 1   | Window 2   | Window 3   | Window 4   | Wall Window Total |
| Height (ft)                                                         | 10      | 5          | 5          | 5          | 5          |                   |
| Width (ft)                                                          | 709.5   | 3          | 3          | 3          | 3          |                   |
| Count                                                               | 1       | 27         | 6          | 27         | 107        | 167               |
| R-value                                                             | 4       | 3          | 3          | 3          | 3          |                   |
| U-value                                                             | 0.25    | 0.33333333 | 0.33333333 | 0.33333333 | 0.33333333 | 0.33333333        |
| Area                                                                | 7095    | 405        | 90         | 405        | 1605       | 2505              |
|                                                                     |         |            |            |            |            |                   |
|                                                                     | Wall 2  | Window 1   | Window 2   | Window 3   | Window 4   | Wall Window Total |
| Height (ft)                                                         | 8       | 0          | 0          | 0          | 0          |                   |
| Width (ft)                                                          | 280     | 0          | 0          | 0          | 0          |                   |
| Count                                                               | 1       | 0          | 0          | 0          | 0          | 0                 |
| R-value                                                             | 4       | 3          | 3          | 3          | 3          |                   |
| U-value                                                             | 0.25    | 0.33333333 | 0.33333333 | 0.33333333 | 0.33333333 | 0                 |
| Area                                                                | 2240    | 0          | 0          | 0          | 0          | 0                 |
| <b>Total Wall Area (sqft)</b> 9335<br><b>Average U-value</b> 0.25   |         |            |            |            |            |                   |
|                                                                     | Roof 1  | Window 1   | Window 2   | Window 3   | Window 4   | Roof Window Total |
| Length (ft)                                                         | 960     | 0          | 0          | 0          | 0          |                   |
| Width (ft)                                                          | 31.61   | 0          | 0          | 0          | 0          |                   |
| Count                                                               | 1       | 0          | 0          | 0          | 0          | 0                 |
| R-value                                                             | 10      | 1          | 1          | 1          | 1          |                   |
| U-value                                                             | 0.1     | 1          | 1          | 1          | 1          | 0                 |
| Area                                                                | 30345.6 | 0          | 0          | 0          | 0          | 0                 |
|                                                                     |         |            |            |            |            |                   |
|                                                                     | Roof 2  | Window 1   | Window 2   | Window 3   | Window 4   | Roof Window Total |
| Length (ft)                                                         | 80      | 0          | 0          | 0          | 0          |                   |
| Width (ft)                                                          | 60      | 0          | 0          | 0          | 0          |                   |
| Count                                                               | 1       | 0          | 0          | 0          | 0          | 0                 |
| R-value                                                             | 10      | 1          | 1          | 1          | 1          |                   |
| U-value                                                             | 0.1     | 1          | 1          | 1          | 1          | 0                 |
| Area                                                                | 4800    | 0          | 0          | 0          | 0          | 0                 |
| <b>Total Roof Area (sqft)</b> 35145.6<br><b>Average U-value</b> 0.1 |         |            |            |            |            |                   |
|                                                                     |         |            |            |            |            |                   |
| <b>Total Window Area (sqft)</b>                                     |         | 2505       |            |            |            |                   |
| <b>Average U-value</b>                                              |         | 0.33333333 |            |            |            |                   |

Lincoln Elementary School  
Condensing Boiler Upgrade

|                |                 |        |
|----------------|-----------------|--------|
| Building       | Sample Building | 100000 |
| Address        | Enter Here      |        |
| Heating Fuel   | Gas             |        |
| Cooling System | DX              |        |

| Existing Building Envelope |            |         |
|----------------------------|------------|---------|
| Wall Area                  | 15410      | sqft    |
| Wall Conductivity          | 0.25       | u Value |
| Window Area                | 860        | sqft    |
| Window Conductivity        | 0.66666667 | u Value |
| Roof Area                  | 35098      | sqft    |
| Roof Conductivity          | 0.05263158 | u Value |
| Floor Area                 | 31509      | sqft    |
| Volume                     | 252072     | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |            |
|------------------------|-----------|------------|
| Lighting Density       | 0.20      | w/sqft     |
| Equipment Density      | 0.22      | w/sqft     |
| Occupancy              | 232       | people     |
| Occupant Sensible Load | 250       | btu/person |
| Infiltration           | 6,301.8   | cfm        |
| Exhaust                | 3700      | cfm        |
| Equipment Density      | 0.07      | therms     |
| Building Equipment     |           |            |
| Heating System         | 3,000,000 | Btuh       |
| Heating Efficiency     | 85        | %          |
| Cooling System         | 190,000   | Btuh       |
| Cooling Efficiency     | 9.4       | SEER       |
| Vent Cooling           | 0         | CFM        |
| Vent Power             | 0         | kW         |

| Existing Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -153,691   | -110,167      | -264,648         | -528,505      |
| 97.5                    | 23    | 0       | 1       | -122,325   | -110,167      | -210,638         | -443,130      |
| 92.5                    | 93    | 0       | 1       | -90,960    | -110,167      | -156,628         | -357,755      |
| 87.5                    | 237   | 0       | 1       | -59,594    | -110,167      | -102,618         | -272,380      |
| 82.5                    | 452   | 0       | 1       | -28,229    | -110,167      | -48,609          | -187,005      |
| 77.5                    | 692   | 0       | 1       | 3,137      | -110,167      | 5,401            | -101,629      |
| 72.5                    | 858   | 0       | 1       | 34,502     | -110,167      | 59,411           | -16,254       |
| 67.5                    | 753   | 1       | 0       | 28,229     | -110,167      | 48,609           | 0             |
| 62.5                    | 735   | 1       | 0       | 59,594     | -110,167      | 102,618          | 52,046        |
| 57.5                    | 671   | 1       | 0       | 90,960     | -110,167      | 156,628          | 137,421       |
| 52.5                    | 736   | 1       | 0       | 122,325    | -110,167      | 210,638          | 222,796       |
| 47.5                    | 708   | 1       | 0       | 153,691    | -110,167      | 264,648          | 308,172       |
| 42.5                    | 756   | 1       | 0       | 185,056    | -110,167      | 318,657          | 393,547       |
| 37.5                    | 705   | 1       | 0       | 216,422    | -110,167      | 372,667          | 478,922       |
| 32.5                    | 546   | 1       | 0       | 247,787    | -110,167      | 426,677          | 564,297       |
| 27.5                    | 340   | 1       | 0       | 279,153    | -110,167      | 480,687          | 649,672       |
| 22.5                    | 229   | 1       | 0       | 310,518    | -110,167      | 534,696          | 735,048       |
| 17.5                    | 134   | 1       | 0       | 341,884    | -110,167      | 588,706          | 820,423       |
| 12.5                    | 57    | 1       | 0       | 373,249    | -110,167      | 642,716          | 905,798       |
| 7.5                     | 22    | 1       | 0       | 404,615    | -110,167      | 696,725          | 991,173       |
| 2.5                     | 9     | 1       | 0       | 435,980    | -110,167      | 750,735          | 1,076,548     |
| -2.5                    | 2     | 1       | 0       | 467,346    | -110,167      | 804,745          | 1,161,924     |
| -7.5                    | 0     | 1       | 0       | 498,711    | -110,167      | 858,755          | 1,247,299     |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Existing Heating System |               |        | Existing Cooling System |              |        | Existing Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -242,553                | -570,713     | 48     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -242,553                | -6,198,582   | 517    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -242,553                | -23,744,681  | 1,979  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -242,553                | -57,485,106  | 4,790  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,729                | -98,096,016  | 8,175  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -129,740                | -74,816,516  | 6,235  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -20,750                 | -13,695,001  | 1,141  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 61,231                  | 45,004,477    | 450    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 161,672                 | 108,481,909   | 1,085  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 262,113                 | 192,915,470   | 1,929  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 362,555                 | 256,688,816   | 2,567  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 462,996                 | 350,025,157   | 3,500  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 563,438                 | 397,223,546   | 3,972  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 663,879                 | 362,477,971   | 3,625  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 764,320                 | 259,868,964   | 2,599  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 864,762                 | 198,030,475   | 1,980  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 965,203                 | 129,337,244   | 1,293  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,065,645               | 60,741,749    | 607    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,166,086               | 25,653,895    | 257    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,266,528               | 11,398,748    | 114    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,366,969               | 2,733,938     | 27     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,467,410               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 2,400,582,359 | 24,006 |                         | -274,606,615 | 22,884 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Existing       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 24,006 |
| Cooling        | 22,884  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 55,204  | 0      |
| Equipment      | 60,724  | 613    |
|                |         |        |
| Total          | 138,812 | 24,619 |

141,720  
2%

25903  
5%

| Proposed Building Envelope |            |         |
|----------------------------|------------|---------|
| Wall Area                  | 15410      | sqft    |
| Wall Conductivity          | 0.25       | u Value |
| Window Area                | 860        | sqft    |
| Window Conductivity        | 0.66666667 | u Value |
| Roof Area                  | 1248       | sqft    |
| Roof Conductivity          | 0.03137652 | u Value |
| Floor Area                 | 31509      | sqft    |
| Volume                     | 252072     | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |             |
|------------------------|-----------|-------------|
| Lighting Density       | 0.20      | w/sqft      |
| Equipment Density      | 0.22      | w/sqft      |
| Occupancy              | 232       | people      |
| Occupant Sensible Load | 250       | btu/person  |
| Infiltration           | 6,301.8   | cfm         |
| Exhaust                | 3700      | cfm         |
| Equipment Density      | 0.07      | therms/sqft |
| Building Equipment     |           |             |
| Heating System         | 3,000,000 | Btuh        |
| Heating Efficiency     | 92        | %           |
| Cooling System         | 190,000   | Btuh        |
| Cooling Efficiency     | 9.4       | SEER        |
| Vent Cooling           | 0         | CFM         |
| Vent Power             | 0         | kW          |

| Proposed Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -109,392   | -110,167      | -264,648         | -484,207      |
| 97.5                    | 23    | 0       | 1       | -87,067    | -110,167      | -210,638         | -407,872      |
| 92.5                    | 93    | 0       | 1       | -64,742    | -110,167      | -156,628         | -331,537      |
| 87.5                    | 237   | 0       | 1       | -42,417    | -110,167      | -102,618         | -255,203      |
| 82.5                    | 452   | 0       | 1       | -20,092    | -110,167      | -48,609          | -178,868      |
| 77.5                    | 692   | 0       | 1       | 2,232      | -110,167      | 5,401            | -102,533      |
| 72.5                    | 858   | 0       | 1       | 24,557     | -110,167      | 59,411           | -26,199       |
| 67.5                    | 753   | 1       | 0       | 20,092     | -110,167      | 48,609           | 0             |
| 62.5                    | 735   | 1       | 0       | 42,417     | -110,167      | 102,618          | 34,869        |
| 57.5                    | 671   | 1       | 0       | 64,742     | -110,167      | 156,628          | 111,204       |
| 52.5                    | 736   | 1       | 0       | 87,067     | -110,167      | 210,638          | 187,538       |
| 47.5                    | 708   | 1       | 0       | 109,392    | -110,167      | 264,648          | 263,873       |
| 42.5                    | 756   | 1       | 0       | 131,717    | -110,167      | 318,657          | 340,208       |
| 37.5                    | 705   | 1       | 0       | 154,042    | -110,167      | 372,667          | 416,542       |
| 32.5                    | 546   | 1       | 0       | 176,367    | -110,167      | 426,677          | 492,877       |
| 27.5                    | 340   | 1       | 0       | 198,692    | -110,167      | 480,687          | 569,212       |
| 22.5                    | 229   | 1       | 0       | 221,017    | -110,167      | 534,696          | 645,546       |
| 17.5                    | 134   | 1       | 0       | 243,342    | -110,167      | 588,706          | 721,881       |
| 12.5                    | 57    | 1       | 0       | 265,667    | -110,167      | 642,716          | 798,216       |
| 7.5                     | 22    | 1       | 0       | 287,992    | -110,167      | 696,725          | 874,550       |
| 2.5                     | 9     | 1       | 0       | 310,317    | -110,167      | 750,735          | 950,885       |
| -2.5                    | 2     | 1       | 0       | 332,642    | -110,167      | 804,745          | 1,027,220     |
| -7.5                    | 0     | 1       | 0       | 354,967    | -110,167      | 858,755          | 1,103,554     |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Proposed Heating System |               |        | Proposed Cooling System |              |        | Proposed Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -242,553                | -570,713     | 48     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -242,553                | -6,198,582   | 517    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -242,553                | -23,744,681  | 1,979  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -242,553                | -57,485,106  | 4,790  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -228,342                | -93,827,908  | 7,819  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -130,894                | -75,482,052  | 6,290  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -33,445                 | -22,073,838  | 1,839  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 37,901                  | 27,857,294    | 279    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 120,874                 | 81,106,155    | 811    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 203,846                 | 150,030,677   | 1,500  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 286,819                 | 203,067,499   | 2,031  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 369,791                 | 279,561,978   | 2,796  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 452,763                 | 319,198,232   | 3,192  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 535,736                 | 292,511,815   | 2,925  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 618,708                 | 210,360,855   | 2,104  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 701,681                 | 160,684,920   | 1,607  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 784,653                 | 105,143,548   | 1,051  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 867,626                 | 49,454,672    | 495    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 950,598                 | 20,913,162    | 209    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,033,571               | 9,302,137     | 93     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,116,543               | 2,233,086     | 22     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,199,516               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 1,911,426,031 | 19,114 |                         | -279,382,881 | 23,282 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Proposed       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 19,114 |
| Cooling        | 23,282  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 55,204  | 0      |
| Equipment      | 60,724  | 613    |
|                |         |        |
| Total          | 139,210 | 19,727 |

| Proposed Savings  |      |        |
|-------------------|------|--------|
| Estimated Savings | kWh  | therms |
|                   | -398 | 4,892  |

Notes:

- Negative Numbers indicate heat needs to be removed from the space
- Heating and Cooling columns determine if the building should be heating or cooling
- Vent Power is the ventilation fan motor horse power.

Lincoln Elementary School  
Condensing Boiler Upgrade

| Newark, NJ |       | Day Time Hours |          |          |
|------------|-------|----------------|----------|----------|
| Deg F      | Hours | 01 to 08       | 09 to 16 | 17 to 00 |
| 102.5      | 2     |                | 2        | 0        |
| 97.5       | 23    |                | 19       | 4        |
| 92.5       | 93    | 1              | 68       | 24       |
| 87.5       | 237   | 5              | 160      | 72       |
| 82.5       | 452   | 41             | 253      | 158      |
| 77.5       | 692   | 163            | 274      | 255      |
| 72.5       | 858   | 306            | 254      | 298      |
| 67.5       | 753   | 285            | 227      | 241      |
| 62.5       | 735   | 258            | 226      | 251      |
| 57.5       | 671   | 231            | 215      | 225      |
| 52.5       | 736   | 259            | 225      | 252      |
| 47.5       | 708   | 245            | 225      | 238      |
| 42.5       | 756   | 266            | 230      | 260      |
| 37.5       | 705   | 273            | 199      | 233      |
| 32.5       | 546   | 229            | 144      | 173      |
| 27.5       | 340   | 139            | 93       | 108      |
| 22.5       | 229   | 104            | 55       | 70       |
| 17.5       | 134   | 69             | 25       | 40       |
| 12.5       | 57    | 34             | 9        | 14       |
| 7.5        | 22    | 13             | 4        | 5        |
| 2.5        | 9     | 5              | 2        | 2        |
| -2.5       | 2     | 2              | 0        | 0        |
| -7.5       | 0     | 0              | 0        |          |
| 8760       |       |                |          |          |

This page is for ease of changing weather data. If building scheduling is a factor the bin hours by day time have been included for reference.

Jefferson Elementary School  
Condensing Boiler

|                |                                             |        |
|----------------|---------------------------------------------|--------|
| Building       | Jefferson Elementary School                 |        |
| Address        | 85 Prospect Street, West Caldwell, NJ 07006 |        |
| Heating Fuel   | Gas                                         | 100000 |
| Cooling System | DX                                          |        |

| Existing Building Envelope |        |         |
|----------------------------|--------|---------|
| Wall Area                  | 16736  | sqft    |
| Wall Conductivity          | 0.25   | u Value |
| Window Area                | 2902   | sqft    |
| Window Conductivity        | 0.5    | u Value |
| Roof Area                  | 28125  | sqft    |
| Roof Conductivity          | 0.1    | u Value |
| Floor Area                 | 22055  | sqft    |
| Volume                     | 176440 | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |            |
|------------------------|-----------|------------|
| Lighting Density       | 0.50      | w/sqft     |
| Equipment Density      | 0.31      | w/sqft     |
| Occupancy              | 308       | people     |
| Occupant Sensible Load | 150       | btu/person |
| Infiltration           | 1,764.4   | cfm        |
| Exhaust                | 2000      | cfm        |
| Equipment Density      | 0.50      | therms     |
| Building Equipment     |           |            |
| Heating System         | 3,000,000 | Btuh       |
| Heating Efficiency     | 80        | %          |
| Cooling System         | 199,000   | Btuh       |
| Cooling Efficiency     | 10.0      | SEER       |
| Vent Cooling           | 0         | CFM        |
| Vent Power             | 0         | kW         |

| Existing Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -206,964   | -157,172      | -99,606          | -463,741      |
| 97.5                    | 23    | 0       | 1       | -164,726   | -157,172      | -79,278          | -401,176      |
| 92.5                    | 93    | 0       | 1       | -122,489   | -157,172      | -58,951          | -338,611      |
| 87.5                    | 237   | 0       | 1       | -80,251    | -157,172      | -38,623          | -276,046      |
| 82.5                    | 452   | 0       | 1       | -38,014    | -157,172      | -18,295          | -213,480      |
| 77.5                    | 692   | 0       | 1       | 4,224      | -157,172      | 2,033            | -150,915      |
| 72.5                    | 858   | 0       | 1       | 46,461     | -157,172      | 22,361           | -88,350       |
| 67.5                    | 753   | 1       | 0       | 38,014     | -157,172      | 18,295           | 0             |
| 62.5                    | 735   | 1       | 0       | 80,251     | -157,172      | 38,623           | 0             |
| 57.5                    | 671   | 1       | 0       | 122,489    | -157,172      | 58,951           | 24,268        |
| 52.5                    | 736   | 1       | 0       | 164,726    | -157,172      | 79,278           | 86,833        |
| 47.5                    | 708   | 1       | 0       | 206,964    | -157,172      | 99,606           | 149,398       |
| 42.5                    | 756   | 1       | 0       | 249,201    | -157,172      | 119,934          | 211,963       |
| 37.5                    | 705   | 1       | 0       | 291,439    | -157,172      | 140,262          | 274,529       |
| 32.5                    | 546   | 1       | 0       | 333,676    | -157,172      | 160,589          | 337,094       |
| 27.5                    | 340   | 1       | 0       | 375,914    | -157,172      | 180,917          | 399,659       |
| 22.5                    | 229   | 1       | 0       | 418,151    | -157,172      | 201,245          | 462,224       |
| 17.5                    | 134   | 1       | 0       | 460,389    | -157,172      | 221,573          | 524,790       |
| 12.5                    | 57    | 1       | 0       | 502,626    | -157,172      | 241,900          | 587,355       |
| 7.5                     | 22    | 1       | 0       | 544,864    | -157,172      | 262,228          | 649,920       |
| 2.5                     | 9     | 1       | 0       | 587,101    | -157,172      | 282,556          | 712,485       |
| -2.5                    | 2     | 1       | 0       | 629,339    | -157,172      | 302,884          | 775,051       |
| -7.5                    | 0     | 1       | 0       | 671,576    | -157,172      | 323,211          | 837,616       |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Existing Heating System |               |        | Existing Cooling System |              |        | Existing Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -238,800                | -561,882     | 47     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -6,102,667   | 509    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -23,377,263  | 1,948  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -56,595,600  | 4,716  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -98,125,091  | 8,177  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -181,098                | -104,433,307 | 8,703  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -106,020                | -69,973,139  | 5,831  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 30,334                  | 20,354,403    | 204    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 108,541                 | 79,886,180    | 799    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 186,748                 | 132,217,287   | 1,322  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 264,954                 | 200,305,342   | 2,003  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 343,161                 | 241,928,315   | 2,419  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 421,367                 | 230,066,549   | 2,301  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 499,574                 | 169,855,120   | 1,699  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 577,780                 | 132,311,724   | 1,323  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 655,987                 | 87,902,262    | 879    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 734,194                 | 41,849,036    | 418    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 812,400                 | 17,872,804    | 179    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 890,607                 | 8,015,461     | 80     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 968,813                 | 1,937,627     | 19     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,047,020               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 1,364,502,111 | 13,645 |                         | -359,168,949 | 29,931 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Existing       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 13,645 |
| Cooling        | 29,931  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 96,601  | 0      |
| Equipment      | 59,893  | 4,380  |
|                |         |        |
| Total          | 186,424 | 18,025 |

191,790      18654  
3%              3%

| Proposed Building Envelope |        |         |
|----------------------------|--------|---------|
| Wall Area                  | 16736  | sqft    |
| Wall Conductivity          | 0.25   | u Value |
| Window Area                | 2902   | sqft    |
| Window Conductivity        | 0.5    | u Value |
| Roof Area                  | 28125  | sqft    |
| Roof Conductivity          | 0.1    | u Value |
| Floor Area                 | 22055  | sqft    |
| Volume                     | 176440 | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 78 | deg F |

| Internal Loads         |           |             |
|------------------------|-----------|-------------|
| Lighting Density       | 0.50      | w/sqft      |
| Equipment Density      | 0.31      | w/sqft      |
| Occupancy              | 308       | people      |
| Occupant Sensible Load | 150       | btu/person  |
| Infiltration           | 1,764.4   | cfm         |
| Exhaust                | 2000      | cfm         |
| Equipment Density      | 0.50      | therms/sqft |
| Building Equipment     |           |             |
| Heating System         | 3,000,000 | Btuh        |
| Heating Efficiency     | 92        | %           |
| Cooling System         | 199,000   | Btuh        |
| Cooling Efficiency     | 10.0      | SEER        |
| Vent Cooling           | 0         | CFM         |
| Vent Power             | 0         | kW          |

| Proposed Load Summaries |       |         |         |            |               |                  |               |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |
| 102.5                   | 2     | 0       | 1       | -206,964   | -157,172      | -99,606          | -463,741      |
| 97.5                    | 23    | 0       | 1       | -164,726   | -157,172      | -79,278          | -401,176      |
| 92.5                    | 93    | 0       | 1       | -122,489   | -157,172      | -58,951          | -338,611      |
| 87.5                    | 237   | 0       | 1       | -80,251    | -157,172      | -38,623          | -276,046      |
| 82.5                    | 452   | 0       | 1       | -38,014    | -157,172      | -18,295          | -213,480      |
| 77.5                    | 692   | 0       | 1       | 4,224      | -157,172      | 2,033            | -150,915      |
| 72.5                    | 858   | 0       | 1       | 46,461     | -157,172      | 22,361           | -88,350       |
| 67.5                    | 753   | 1       | 0       | 38,014     | -157,172      | 18,295           | 0             |
| 62.5                    | 735   | 1       | 0       | 80,251     | -157,172      | 38,623           | 0             |
| 57.5                    | 671   | 1       | 0       | 122,489    | -157,172      | 58,951           | 24,268        |
| 52.5                    | 736   | 1       | 0       | 164,726    | -157,172      | 79,278           | 86,833        |
| 47.5                    | 708   | 1       | 0       | 206,964    | -157,172      | 99,606           | 149,398       |
| 42.5                    | 756   | 1       | 0       | 249,201    | -157,172      | 119,934          | 211,963       |
| 37.5                    | 705   | 1       | 0       | 291,439    | -157,172      | 140,262          | 274,529       |
| 32.5                    | 546   | 1       | 0       | 333,676    | -157,172      | 160,589          | 337,094       |
| 27.5                    | 340   | 1       | 0       | 375,914    | -157,172      | 180,917          | 399,659       |
| 22.5                    | 229   | 1       | 0       | 418,151    | -157,172      | 201,245          | 462,224       |
| 17.5                    | 134   | 1       | 0       | 460,389    | -157,172      | 221,573          | 524,790       |
| 12.5                    | 57    | 1       | 0       | 502,626    | -157,172      | 241,900          | 587,355       |
| 7.5                     | 22    | 1       | 0       | 544,864    | -157,172      | 262,228          | 649,920       |
| 2.5                     | 9     | 1       | 0       | 587,101    | -157,172      | 282,556          | 712,485       |
| -2.5                    | 2     | 1       | 0       | 629,339    | -157,172      | 302,884          | 775,051       |
| -7.5                    | 0     | 1       | 0       | 671,576    | -157,172      | 323,211          | 837,616       |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |

| Proposed Heating System |               |        | Proposed Cooling System |              |        | Proposed Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -238,800                | -561,882     | 47     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -6,102,667   | 509    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -23,377,263  | 1,948  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -56,595,600  | 4,716  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -238,800                | -98,125,091  | 8,177  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -181,098                | -104,433,307 | 8,703  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -106,020                | -69,973,139  | 5,831  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 26,378                  | 17,699,481    | 177    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 94,383                  | 69,466,244    | 695    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 162,389                 | 114,971,554   | 1,150  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 230,395                 | 174,178,558   | 1,742  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 298,401                 | 210,372,448   | 2,104  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 366,406                 | 200,057,869   | 2,001  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 434,412                 | 147,700,104   | 1,477  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 502,418                 | 115,053,673   | 1,151  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 570,424                 | 76,436,750    | 764    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 638,429                 | 36,390,466    | 364    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 706,435                 | 15,541,569    | 155    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 774,441                 | 6,969,966     | 70     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 842,446                 | 1,684,893     | 17     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 910,452                 | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 1,186,523,575 | 11,865 |                         | -359,168,949 | 29,931 |                              | 235,700 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Proposed       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 11,865 |
| Cooling        | 29,931  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 96,601  | 0      |
| Equipment      | 59,893  | 4,380  |
|                |         |        |
| Total          | 186,424 | 16,245 |

| Proposed Savings  |     |        |
|-------------------|-----|--------|
| Estimated Savings | kWh | therms |
|                   | 0   | 1,780  |

Notes:

1. Negative Numbers indicate heat needs to be removed from the space
2. Heating and Cooling columns determine if the building should be heating or cooling
3. Vent Power is the ventilation fan motor horse power.

Jefferson Elementary School  
Condensing Boiler

| Newark, NJ |       | Day Time Hours |          |          |
|------------|-------|----------------|----------|----------|
| Deg F      | Hours | 01 to 08       | 09 to 16 | 17 to 00 |
| 102.5      | 2     |                | 2        | 0        |
| 97.5       | 23    |                | 19       | 4        |
| 92.5       | 93    | 1              | 68       | 24       |
| 87.5       | 237   | 5              | 160      | 72       |
| 82.5       | 452   | 41             | 253      | 158      |
| 77.5       | 692   | 163            | 274      | 255      |
| 72.5       | 858   | 306            | 254      | 298      |
| 67.5       | 753   | 285            | 227      | 241      |
| 62.5       | 735   | 258            | 226      | 251      |
| 57.5       | 671   | 231            | 215      | 225      |
| 52.5       | 736   | 259            | 225      | 252      |
| 47.5       | 708   | 245            | 225      | 238      |
| 42.5       | 756   | 266            | 230      | 260      |
| 37.5       | 705   | 273            | 199      | 233      |
| 32.5       | 546   | 229            | 144      | 173      |
| 27.5       | 340   | 139            | 93       | 108      |
| 22.5       | 229   | 104            | 55       | 70       |
| 17.5       | 134   | 69             | 25       | 40       |
| 12.5       | 57    | 34             | 9        | 14       |
| 7.5        | 22    | 13             | 4        | 5        |
| 2.5        | 9     | 5              | 2        | 2        |
| -2.5       | 2     | 2              | 0        | 0        |
| -7.5       | 0     | 0              | 0        |          |
| 8760       |       |                |          |          |

This page is for ease of changing weather data. If building scheduling is a factor the bin hours by day time have been included for reference.

Washington Elementary School  
Window Upgrade

|                |                                    |        |
|----------------|------------------------------------|--------|
| Building       | Washington Elementary School       |        |
| Address        | 201 Central Avenue, West Caldwell, |        |
| Heating Fuel   | Gas                                | 100000 |
| Cooling System | DX                                 |        |

| Existing Building Envelope |             |         |
|----------------------------|-------------|---------|
| Wall Area                  | 16425       | sqft    |
| Wall Conductivity          | 0.25        | u Value |
| Window Area                | 2175        | sqft    |
| Window Conductivity        | 1           | u Value |
| Roof Area                  | 24367.5     | sqft    |
| Roof Conductivity          | 0.052631579 | u Value |
| Floor Area                 | 44340       | sqft    |
| Volume                     | 354720      | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 80 | deg F |

| Internal Loads         |           |            |
|------------------------|-----------|------------|
| Lighting Density       | 0.21      | w/sqft     |
| Equipment Density      | 0.17      | w/sqft     |
| Occupancy              | 360       | people     |
| Occupant Sensible Load | 250       | btu/person |
| Infiltration           | 11,824.0  | cfm        |
| Exhaust                | 4500      | cfm        |
| Equipment Density      | 0.07      | therms     |
| Building Equipment     |           |            |
| Heating System         | 1,000,000 | Btuh       |
| Heating Efficiency     | 80        | %          |
| Cooling System         | 242,000   | Btuh       |
| Cooling Efficiency     | 9.0       | SEER       |
| Vent Cooling           | 0         | CFM        |
| Vent Power             | 0         | kW         |

| Existing Load Summaries |       |         |         |            |               |                  |               |  |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|--|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |  |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |  |
| 102.5                   | 2     | 0       | 1       | -170,184   | -154,506      | -396,673         | -721,364      |  |
| 97.5                    | 23    | 0       | 1       | -132,366   | -154,506      | -308,524         | -595,396      |  |
| 92.5                    | 93    | 0       | 1       | -94,547    | -154,506      | -220,374         | -469,427      |  |
| 87.5                    | 237   | 0       | 1       | -56,728    | -154,506      | -132,224         | -343,459      |  |
| 82.5                    | 452   | 0       | 1       | -18,909    | -154,506      | -44,075          | -217,490      |  |
| 77.5                    | 692   | 0       | 1       | 18,909     | -154,506      | 44,075           | -91,522       |  |
| 72.5                    | 858   | 0       | 1       | 56,728     | -154,506      | 132,224          | 0             |  |
| 67.5                    | 753   | 1       | 0       | 34,037     | -154,506      | 79,335           | 0             |  |
| 62.5                    | 735   | 1       | 0       | 71,856     | -154,506      | 167,484          | 84,834        |  |
| 57.5                    | 671   | 1       | 0       | 109,674    | -154,506      | 255,634          | 210,802       |  |
| 52.5                    | 736   | 1       | 0       | 147,493    | -154,506      | 343,783          | 336,770       |  |
| 47.5                    | 708   | 1       | 0       | 185,312    | -154,506      | 431,933          | 462,739       |  |
| 42.5                    | 756   | 1       | 0       | 223,131    | -154,506      | 520,083          | 588,707       |  |
| 37.5                    | 705   | 1       | 0       | 260,949    | -154,506      | 608,232          | 714,675       |  |
| 32.5                    | 546   | 1       | 0       | 298,768    | -154,506      | 696,382          | 840,644       |  |
| 27.5                    | 340   | 1       | 0       | 336,587    | -154,506      | 784,531          | 966,612       |  |
| 22.5                    | 229   | 1       | 0       | 374,406    | -154,506      | 872,681          | 1,092,580     |  |
| 17.5                    | 134   | 1       | 0       | 412,224    | -154,506      | 960,831          | 1,218,549     |  |
| 12.5                    | 57    | 1       | 0       | 450,043    | -154,506      | 1,048,980        | 1,344,517     |  |
| 7.5                     | 22    | 1       | 0       | 487,862    | -154,506      | 1,137,130        | 1,470,485     |  |
| 2.5                     | 9     | 1       | 0       | 525,681    | -154,506      | 1,225,279        | 1,596,454     |  |
| -2.5                    | 2     | 1       | 0       | 563,499    | -154,506      | 1,313,429        | 1,722,422     |  |
| -7.5                    | 0     | 1       | 0       | 601,318    | -154,506      | 1,401,579        | 1,848,390     |  |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |  |

| Existing Heating System |               |        | Existing Cooling System |              |        | Existing Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -322,667                | -759,216     | 63     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -322,667                | -8,245,926   | 687    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -322,667                | -31,587,368  | 2,632  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -322,667                | -76,472,000  | 6,373  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -289,987                | -119,158,429 | 9,930  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -122,030                | -70,370,360  | 5,864  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 106,042                 | 77,940,820    | 779    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 263,502                 | 176,810,090   | 1,768  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 420,963                 | 309,828,626   | 3,098  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 578,423                 | 409,523,657   | 4,095  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 735,884                 | 556,328,063   | 5,563  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 893,344                 | 629,807,604   | 6,298  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,050,805               | 573,739,288   | 5,737  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,208,265               | 410,810,098   | 4,108  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 286,250,000   | 2,863  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 167,500,000   | 1,675  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 71,250,000    | 713    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 27,500,000    | 275    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 11,250,000    | 113    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 2,500,000     | 25     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 3,711,038,246 | 37,110 |                         | -306,593,299 | 25,549 |                              | 149,900 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Existing       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 37,110 |
| Cooling        | 25,549  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 81,568  | 0      |
| Equipment      | 66,031  | 613    |
|                |         |        |
| Total          | 173,148 | 37,724 |

165,545 38252.42  
-5% 1%

| Proposed Building Envelope |             |         |
|----------------------------|-------------|---------|
| Wall Area                  | 16425       | sqft    |
| Wall Conductivity          | 0.25        | u Value |
| Window Area                | 2175        | sqft    |
| Window Conductivity        | 0.333333333 | u Value |
| Roof Area                  | 24367.5     | sqft    |
| Roof Conductivity          | 0.052631579 | u Value |
| Floor Area                 | 44340       | sqft    |
| Volume                     | 354720      | cuft    |

| Set Points        |    |       |
|-------------------|----|-------|
| Heating Set Point | 72 | deg F |
| Cooling Set Point | 80 | deg F |

| Internal Loads         |           |             |
|------------------------|-----------|-------------|
| Lighting Density       | 0.21      | w/sqft      |
| Equipment Density      | 0.17      | w/sqft      |
| Occupancy              | 360       | people      |
| Occupant Sensible Load | 250       | btu/person  |
| Infiltration           | 11,232.8  | cfm         |
| Exhaust                | 4500      | cfm         |
| Equipment Density      | 0.07      | therms/sqft |
| Building Equipment     |           |             |
| Heating System         | 1,000,000 | Btuh        |
| Heating Efficiency     | 80        | %           |
| Cooling System         | 242,000   | Btuh        |
| Cooling Efficiency     | 9.0       | SEER        |
| Vent Cooling           | 0         | CFM         |
| Vent Power             | 0         | kW          |

| Proposed Load Summaries |       |         |         |            |               |                  |               |  |
|-------------------------|-------|---------|---------|------------|---------------|------------------|---------------|--|
| Bin Temp                | Bin   | Heating | Cooling | Shell Load | Internal Load | Ventilation Load | Combined Load |  |
| deg F                   | Hours |         |         | btuh       | btuh          | btuh             | btuh          |  |
| 102.5                   | 2     | 0       | 1       | -137,559   | -154,506      | -382,307         | -674,373      |  |
| 97.5                    | 23    | 0       | 1       | -106,991   | -154,506      | -297,350         | -558,847      |  |
| 92.5                    | 93    | 0       | 1       | -76,422    | -154,506      | -212,393         | -443,321      |  |
| 87.5                    | 237   | 0       | 1       | -45,853    | -154,506      | -127,436         | -327,795      |  |
| 82.5                    | 452   | 0       | 1       | -15,284    | -154,506      | -42,479          | -212,269      |  |
| 77.5                    | 692   | 0       | 1       | 15,284     | -154,506      | 42,479           | -96,743       |  |
| 72.5                    | 858   | 0       | 1       | 45,853     | -154,506      | 127,436          | 0             |  |
| 67.5                    | 753   | 1       | 0       | 27,512     | -154,506      | 76,461           | 0             |  |
| 62.5                    | 735   | 1       | 0       | 58,081     | -154,506      | 161,419          | 64,993        |  |
| 57.5                    | 671   | 1       | 0       | 88,649     | -154,506      | 246,376          | 180,519       |  |
| 52.5                    | 736   | 1       | 0       | 119,218    | -154,506      | 331,333          | 296,045       |  |
| 47.5                    | 708   | 1       | 0       | 149,787    | -154,506      | 416,290          | 411,570       |  |
| 42.5                    | 756   | 1       | 0       | 180,356    | -154,506      | 501,247          | 527,096       |  |
| 37.5                    | 705   | 1       | 0       | 210,924    | -154,506      | 586,204          | 642,622       |  |
| 32.5                    | 546   | 1       | 0       | 241,493    | -154,506      | 671,161          | 758,148       |  |
| 27.5                    | 340   | 1       | 0       | 272,062    | -154,506      | 756,118          | 873,674       |  |
| 22.5                    | 229   | 1       | 0       | 302,631    | -154,506      | 841,075          | 989,200       |  |
| 17.5                    | 134   | 1       | 0       | 333,199    | -154,506      | 926,033          | 1,104,726     |  |
| 12.5                    | 57    | 1       | 0       | 363,768    | -154,506      | 1,010,990        | 1,220,252     |  |
| 7.5                     | 22    | 1       | 0       | 394,337    | -154,506      | 1,095,947        | 1,335,777     |  |
| 2.5                     | 9     | 1       | 0       | 424,906    | -154,506      | 1,180,904        | 1,451,303     |  |
| -2.5                    | 2     | 1       | 0       | 455,474    | -154,506      | 1,265,861        | 1,566,829     |  |
| -7.5                    | 0     | 1       | 0       | 486,043    | -154,506      | 1,350,818        | 1,682,355     |  |
| Total                   | 8,760 | 6,403   | 2,357   |            |               |                  |               |  |

| Proposed Heating System |               |        | Proposed Cooling System |              |        | Proposed Ventilation Cooling |         |       |
|-------------------------|---------------|--------|-------------------------|--------------|--------|------------------------------|---------|-------|
| Output                  | Usage         | Usage  | Output                  | Usage        | Usage  | Cooling                      | On Time | Usage |
| Btuh                    | Btu           | therms | Btuh                    | Btu          | kWh    | Btuh                         | %       | kWh   |
| 0                       | 0             | 0      | -322,667                | -759,216     | 63     | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -322,667                | -8,245,926   | 687    | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -322,667                | -31,587,368  | 2,632  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -322,667                | -76,472,000  | 6,373  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -283,026                | -116,297,822 | 9,691  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | -128,991                | -74,384,913  | 6,199  | 0                            | 100     | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 0                       | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 81,241                  | 59,712,166    | 597    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 225,648                 | 151,410,062   | 1,514  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 370,056                 | 272,361,008   | 2,724  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 514,463                 | 364,239,842   | 3,642  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 658,870                 | 498,106,016   | 4,981  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 803,278                 | 566,310,799   | 5,663  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 947,685                 | 517,436,046   | 5,174  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,092,092               | 371,311,417   | 3,713  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,236,500               | 283,158,441   | 2,832  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 167,500,000   | 1,675  | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 71,250,000    | 713    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 27,500,000    | 275    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 11,250,000    | 113    | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 2,500,000     | 25     | 0                       | 0            | 0      | 0                            | 0       | 0     |
| 1,250,000               | 0             | 0      | 0                       | 0            | 0      | 0                            | 0       | 0     |
|                         | 3,364,045,798 | 33,640 |                         | -307,747,245 | 25,646 |                              | 149,900 | 0     |

| System Summary |         |        |
|----------------|---------|--------|
| Proposed       | Usage   |        |
| System         | kWh     | therms |
| Heating        | 0       | 33,640 |
| Cooling        | 25,646  | 0      |
| Vent Cooling   | 0       | 0      |
|                |         |        |
| Lighting       | 81,568  | 0      |
| Equipment      | 66,031  | 613    |
|                |         |        |
| Total          | 173,245 | 34,254 |

| Proposed Savings  |     |        |
|-------------------|-----|--------|
| Estimated Savings | kWh | therms |
|                   | -96 | 3,470  |

Notes:

1. Negative Numbers indicate heat needs to be removed from the space
2. Heating and Cooling columns determine if the building should be heating or cooling
3. Vent Power is the ventilation fan motor horse power.

Washington Elementary School  
Window Upgrade

| Newark, NJ |       | Day Time Hours |          |          |
|------------|-------|----------------|----------|----------|
| Deg F      | Hours | 01 to 08       | 09 to 16 | 17 to 00 |
| 102.5      | 2     |                | 2        | 0        |
| 97.5       | 23    |                | 19       | 4        |
| 92.5       | 93    | 1              | 68       | 24       |
| 87.5       | 237   | 5              | 160      | 72       |
| 82.5       | 452   | 41             | 253      | 158      |
| 77.5       | 692   | 163            | 274      | 255      |
| 72.5       | 858   | 306            | 254      | 298      |
| 67.5       | 753   | 285            | 227      | 241      |
| 62.5       | 735   | 258            | 226      | 251      |
| 57.5       | 671   | 231            | 215      | 225      |
| 52.5       | 736   | 259            | 225      | 252      |
| 47.5       | 708   | 245            | 225      | 238      |
| 42.5       | 756   | 266            | 230      | 260      |
| 37.5       | 705   | 273            | 199      | 233      |
| 32.5       | 546   | 229            | 144      | 173      |
| 27.5       | 340   | 139            | 93       | 108      |
| 22.5       | 229   | 104            | 55       | 70       |
| 17.5       | 134   | 69             | 25       | 40       |
| 12.5       | 57    | 34             | 9        | 14       |
| 7.5        | 22    | 13             | 4        | 5        |
| 2.5        | 9     | 5              | 2        | 2        |
| -2.5       | 2     | 2              | 0        | 0        |
| -7.5       | 0     | 0              | 0        |          |
| 8760       |       |                |          |          |

This page is for ease of changing weather data. If building scheduling is a factor the bin hours by day time have been included for reference.

## Window Upgrade

|                          |           |
|--------------------------|-----------|
| Total Roof Area (sqft)   | 24367.5   |
| Average U-value          | 0.0526316 |
|                          |           |
| Total Window Area (sqft) | 2175      |
| Average U-value          | 1         |

|                          |             |
|--------------------------|-------------|
| Total Roof Area (sqft)   | 24367.5     |
| Average U-value          | 0.052631579 |
|                          |             |
| Total Window Area (sqft) | 2175        |
| Average U-value          | 0.333333333 |

### Domestic Hot Water Analysis

|                        |                                |      |
|------------------------|--------------------------------|------|
| Building Name          | Grover Cleveland Middle School |      |
| Building Squarefootage | 103,520                        | sqft |
| Water Heater Count     | 1                              |      |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Baseline                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 168     |             |
| Baseline Usage per Person per Day | 2.0     | gallons     |
| Baseline People                   | 617     |             |
| Baseline Building Usage per Day   | 1,234   | gallons     |
| Baseline Building Usage Per Year  | 450,355 | gallons     |
| Baseline DHW System Efficiency    | 80%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 262.6   | mmbtu       |
| Heater input required             | 328.3   | mmbtu       |
| Heater Fuel Usage                 | 3,283   | Therm       |
| Estimated Usage Per Heater        | 3,283   | Therm       |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Proposed                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 168     |             |
| Baseline Usage per Person per Day | 2.0     | gallons     |
| Baseline People                   | 617     |             |
| Baseline Building Usage per Day   | 1,234   | gallons     |
| Baseline Building Usage Per Year  | 450,355 | gallons     |
| Baseline DHW System Efficiency    | 95%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 262.6   | mmbtu       |
| Heater input required             | 276.4   | mmbtu       |
| Heater Fuel Usage                 | 2,764   | Therm       |

### Domestic Hot Water Analysis

|                        |                           |      |
|------------------------|---------------------------|------|
| Building Name          | Lincoln Elementary School |      |
| Building Squarefootage | 31,509                    | sqft |
| Water Heater Count     | 2                         |      |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Baseline                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 136     |             |
| Baseline Usage per Person per Day | 1.8     | gallons     |
| Baseline People                   | 232     |             |
| Baseline Building Usage per Day   | 406     | gallons     |
| Baseline Building Usage Per Year  | 148,206 | gallons     |
| Baseline DHW System Efficiency    | 80%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 86.4    | mmbtu       |
| Heater input required             | 108.0   | mmbtu       |
| Heater Fuel Usage                 | 1,080   | Therm       |
| Estimated Usage Per Heater        | 540     | Therm       |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Proposed                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 136     |             |
| Baseline Usage per Person per Day | 1.8     | gallons     |
| Baseline People                   | 232     |             |
| Baseline Building Usage per Day   | 406     | gallons     |
| Baseline Building Usage Per Year  | 148,206 | gallons     |
| Baseline DHW System Efficiency    | 95%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 86.4    | mmbtu       |
| Heater input required             | 91.0    | mmbtu       |
| Heater Fuel Usage                 | 910     | Therm       |

### Domestic Hot Water Analysis

|                        |                              |      |
|------------------------|------------------------------|------|
| Building Name          | Washington Elementary School |      |
| Building Squarefootage | 44,340                       | sqft |
| Water Heater Count     | 1                            |      |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Baseline                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 123     |             |
| Baseline Usage per Person per Day | 5.0     | gallons     |
| Baseline People                   | 360     |             |
| Baseline Building Usage per Day   | 1,800   | gallons     |
| Baseline Building Usage Per Year  | 656,822 | gallons     |
| Baseline DHW System Efficiency    | 80%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 383.0   | mmbtu       |
| Heater input required             | 478.7   | mmbtu       |
| Heater Fuel Usage                 | 4,787   | Therm       |
| Estimated Usage Per Heater        | 4,787   | Therm       |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Proposed                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 123     |             |
| Baseline Usage per Person per Day | 5.0     | gallons     |
| Baseline People                   | 360     |             |
| Baseline Building Usage per Day   | 1,800   | gallons     |
| Baseline Building Usage Per Year  | 656,822 | gallons     |
| Baseline DHW System Efficiency    | 95%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 383.0   | mmbtu       |
| Heater input required             | 403.2   | mmbtu       |
| Heater Fuel Usage                 | 4,032   | Therm       |

### Domestic Hot Water Analysis

|                        |                          |      |
|------------------------|--------------------------|------|
| Building Name          | Wilson Elementary School |      |
| Building Squarefootage | 30,650                   | sqft |
| Water Heater Count     | 1                        |      |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Baseline                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 85      |             |
| Baseline Usage per Person per Day | 1.5     | gallons     |
| Baseline People                   | 360     |             |
| Baseline Building Usage per Day   | 540     | gallons     |
| Baseline Building Usage Per Year  | 197,097 | gallons     |
| Baseline DHW System Efficiency    | 80%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 114.9   | mmbtu       |
| Heater input required             | 143.7   | mmbtu       |
| Heater Fuel Usage                 | 1,437   | Therm       |
| Estimated Usage Per Heater        | 1,437   | Therm       |

|                                   |         |             |
|-----------------------------------|---------|-------------|
| Proposed                          |         |             |
| Baseline DHW System Fuel          | Therm   | 100,000 btu |
| Baseline squarefeet per Person    | 85      |             |
| Baseline Usage per Person per Day | 1.5     | gallons     |
| Baseline People                   | 360     |             |
| Baseline Building Usage per Day   | 540     | gallons     |
| Baseline Building Usage Per Year  | 197,097 | gallons     |
| Baseline DHW System Efficiency    | 95%     |             |
| Estimated cold water temperature  | 50      | °F          |
| Estimated hot water temperature   | 120     | °F          |
| Temperature Rise                  | 70.0    | °F          |
| Heater output required            | 114.9   | mmbtu       |
| Heater input required             | 121.0   | mmbtu       |
| Heater Fuel Usage                 | 1,210   | Therm       |

### Domestic Hot Water Analysis

|                        |                          |      |
|------------------------|--------------------------|------|
| Building Name          | Harrison School Building |      |
| Building Squarefootage | 31,825                   | sqft |
| Water Heater Count     | 1                        |      |

|                                   |        |             |
|-----------------------------------|--------|-------------|
| Baseline                          |        |             |
| Baseline DHW System Fuel          | Therm  | 100,000 btu |
| Baseline squarefeet per Person    | 212    |             |
| Baseline Usage per Person per Day | 1.5    | gallons     |
| Baseline People                   | 150    |             |
| Baseline Building Usage per Day   | 225    | gallons     |
| Baseline Building Usage Per Year  | 82,112 | gallons     |
| Baseline DHW System Efficiency    | 80%    |             |
| Estimated cold water temperature  | 50     | °F          |
| Estimated hot water temperature   | 120    | °F          |
| Temperature Rise                  | 70     | °F          |
| Heater output required            | 47.9   | mmbtu       |
| Heater input required             | 59.8   | mmbtu       |
| Heater Fuel Usage                 | 598    | Therm       |
| Estimated Usage Per Heater        | 598    | Therm       |

|                                   |        |             |
|-----------------------------------|--------|-------------|
| Proposed                          |        |             |
| Baseline DHW System Fuel          | Therm  | 100,000 btu |
| Baseline squarefeet per Person    | 212    |             |
| Baseline Usage per Person per Day | 1.5    | gallons     |
| Baseline People                   | 150    |             |
| Baseline Building Usage per Day   | 225    | gallons     |
| Baseline Building Usage Per Year  | 82,112 | gallons     |
| Baseline DHW System Efficiency    | 95%    |             |
| Estimated cold water temperature  | 50     | °F          |
| Estimated hot water temperature   | 120    | °F          |
| Temperature Rise                  | 70     | °F          |
| Heater output required            | 47.9   | mmbtu       |
| Heater input required             | 50.4   | mmbtu       |
| Heater Fuel Usage                 | 504    | Therm       |

| Building Premium Efficiency Motors |                |          |            |       |             |          |            |       |             |         |          |
|------------------------------------|----------------|----------|------------|-------|-------------|----------|------------|-------|-------------|---------|----------|
| Location                           | Motor Use      | Existing |            |       |             | Proposed |            |       |             | Savings | Cost     |
|                                    |                | HP       | Efficiency | Hours | Usage (kWh) | HP       | Efficiency | Hours | Usage (kWh) | kWh     |          |
| Grover Cleveland Middle School     | Hot Water Pump | 15       | 91.0%      | 2500  | 30,742      | 15       | 92.4%      | 2500  | 30,276      | 466     | \$ 1,942 |
| Grover Cleveland Middle School     | Hot Water Pump | 7.5      | 84.0%      | 2500  | 16,652      | 7.5      | 91.7%      | 2500  | 15,254      | 1,398   | \$ 1,171 |
| Lincoln Elementary School          | Hot Water Pump | 3        | 82.5%      | 2500  | 6,782       | 3        | 89.5%      | 2500  | 6,251       | 530     | \$ 656   |
| Washington Elementary School       | Supply Fan     | 3        | 86.5%      | 2000  | 5,175       | 3        | 89.5%      | 2000  | 5,001       | 173     | \$ 656   |
| Washington Elementary School       | Return Fan     | 2        | 86.5%      | 2000  | 3,450       | 2        | 86.5%      | 2000  | 3,450       | -       | \$ 656   |
| Wilson Elementary School           | Air Compressor | 1        | 80.0%      | 1000  | 933         | 1        | 85.5%      | 1000  | 873         | 60      | \$ 656   |
| Harrison School Building           | Hot Water Pump | 5        | 87.5%      | 2500  | 10,657      | 5        | 89.5%      | 2500  | 10,419      | 238     | \$ 921   |
| Harrison School Building           | Air Compressor | 1        | 80.0%      | 1000  | 933         | 1        | 85.5%      | 1000  | 873         | 60      | \$ 656   |
| Harrison School Building           | Air Compressor | 1        | 80.0%      | 1000  | 933         | 1        | 85.5%      | 1000  | 873         | 60      | \$ 656   |

| Variable Speed Drives                                                                                        |                |     |             |                |          |
|--------------------------------------------------------------------------------------------------------------|----------------|-----|-------------|----------------|----------|
| Location                                                                                                     | Motor Use      | HP  | VFD Savings | Annual Savings | Cost     |
|                                                                                                              |                |     | kwh/hp/year | kWh/year       |          |
| Grover Cleveland Middle School                                                                               | Hot Water Pump | 15  | 44          | 660            | \$ 5,500 |
| Grover Cleveland Middle School                                                                               | Hot Water Pump | 7.5 | 44          | 330            | \$ 3,825 |
| Lincoln Elementary School                                                                                    | Hot Water Pump | 3   | 44          | 132            | \$ 3,200 |
| Washington Elementary School                                                                                 | Supply Fan     | 3   | 707         | 2121           | \$ 3,200 |
| Washington Elementary School                                                                                 | Return Fan     | 2   | 531         | 1062           | \$ 3,200 |
| Harrison School Building                                                                                     | Hot Water Pump | 5   | 44          | 220            | \$ 3,475 |
| Savings from NYPA calculations manual for a VFD on HW pump, Supply Fan, Return Fan for a High School in NYC. |                |     |             |                |          |

| <b>Combined heat and power Analysis</b> | - (system usage) + (system production) |               |              |                |                    |               |
|-----------------------------------------|----------------------------------------|---------------|--------------|----------------|--------------------|---------------|
| <b>James Caldwell High School</b>       | <b>kwh</b>                             | <b>Therms</b> | <b>Kbtuh</b> | <b>\$ Cost</b> | <b>\$ Produced</b> | <b>\$ Net</b> |
| Hourly Generator Production*            | 65                                     | -8            | 275          | -\$11.62       | \$13.60            | \$1.98        |
| Hourly Boiler Production **             | 0                                      | -5            | 408          | -\$7.04        | \$5.71             | -\$1.33       |

|                                     |      |  |  |              |         |        |
|-------------------------------------|------|--|--|--------------|---------|--------|
| Annual Hours of Generator operation | 4320 |  |  | -\$50,197    | -36,374 | therms |
| Electrical used                     | 100% |  |  | \$42,120     | 280,800 | kWh    |
| Thermal used                        | 50%  |  |  | \$8,316      | 594,000 | kBtuh  |
| Annual Generator Savings            |      |  |  | \$239        |         |        |
| Estimate Cost of 65 kW Generator    |      |  |  | \$143,000    |         |        |
| Incentive                           |      |  |  | \$42,900     |         |        |
| Final Cost                          |      |  |  | \$100,100    |         |        |
| Annual Maintenance***               |      |  |  | \$2,527      |         |        |
| Simple Payback                      |      |  |  | <b>-43.8</b> |         |        |

|                     |        |
|---------------------|--------|
| <b>Utility Cost</b> |        |
| Therm               | \$1.38 |
| kWh                 | \$0.15 |
| kBtuh               | \$0.01 |

\* Based upon 65 kW generator

\*\* Based upon existing plant running on Natural Gas at the plant measured 80% efficient

\*\*\* \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)

| <b>Combined heat and power Analysis</b> | - (system usage) + (system production) |               |              |                |                    |               |
|-----------------------------------------|----------------------------------------|---------------|--------------|----------------|--------------------|---------------|
| <b>Jefferson Elementary School</b>      | <b>kwh</b>                             | <b>Therms</b> | <b>Kbtuh</b> | <b>\$ Cost</b> | <b>\$ Produced</b> | <b>\$ Net</b> |
| Hourly Generator Production*            | 65                                     | -8            | 275          | -\$11.62       | \$13.60            | \$1.98        |
| Hourly Boiler Production **             | 0                                      | -5            | 408          | -\$7.04        | \$5.71             | -\$1.33       |

|                                     |      |  |  |             |         |        |
|-------------------------------------|------|--|--|-------------|---------|--------|
| Annual Hours of Generator operation | 4320 |  |  | -\$49,833   | -36,374 | therms |
| Electrical used                     | 100% |  |  | \$50,544    | 280,800 | kWh    |
| Thermal used                        | 50%  |  |  | \$8,316     | 594,000 | kBtuh  |
| Annual Generator Savings            |      |  |  | \$9,027     |         |        |
| Estimate Cost of 65 kW Generator    |      |  |  | \$143,000   |         |        |
| Incentive                           |      |  |  | \$42,900    |         |        |
| Final Cost                          |      |  |  | \$100,100   |         |        |
| Annual Maintenance***               |      |  |  | \$2,527     |         |        |
| Simple Payback                      |      |  |  | <b>15.4</b> |         |        |

|                     |        |
|---------------------|--------|
| <b>Utility Cost</b> |        |
| Therm               | \$1.37 |
| kWh                 | \$0.18 |
| kBtuh               | \$0.01 |

\* Based upon 65 kW generator

\*\* Based upon existing plant running on Natural Gas at the plant measured 80% efficient

\*\*\* \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)

| <b>Combined heat and power Analysis</b> | - (system usage) + (system production) |               |              |                |                    |               |
|-----------------------------------------|----------------------------------------|---------------|--------------|----------------|--------------------|---------------|
| <b>Washington Elementary School</b>     | <b>kwh</b>                             | <b>Therms</b> | <b>Kbtuh</b> | <b>\$ Cost</b> | <b>\$ Produced</b> | <b>\$ Net</b> |
| Hourly Generator Production*            | 65                                     | -8            | 275          | -\$11.62       | \$13.60            | \$1.98        |
| Hourly Boiler Production **             | 0                                      | -5            | 408          | -\$7.04        | \$5.71             | -\$1.33       |

|                                     |      |  |  |             |         |        |
|-------------------------------------|------|--|--|-------------|---------|--------|
| Annual Hours of Generator operation | 4320 |  |  | -\$51,288   | -36,374 | therms |
| Electrical used                     | 100% |  |  | \$50,544    | 280,800 | kWh    |
| Thermal used                        | 50%  |  |  | \$8,316     | 594,000 | kBtuh  |
| Annual Generator Savings            |      |  |  | \$7,572     |         |        |
| Estimate Cost of 65 kW Generator    |      |  |  | \$143,000   |         |        |
| Incentive                           |      |  |  | \$42,900    |         |        |
| Final Cost                          |      |  |  | \$100,100   |         |        |
| Annual Maintenance***               |      |  |  | \$2,527     |         |        |
| Simple Payback                      |      |  |  | <b>19.8</b> |         |        |

| <b>Utility Cost</b> |        |
|---------------------|--------|
| Therm               | \$1.41 |
| kWh                 | \$0.18 |
| kBtuh               | \$0.01 |

\* Based upon 65 kW generator

\*\* Based upon existing plant running on Natural Gas at the plant measured 80% efficient

\*\*\* \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)

| <b>Combined heat and power Analysis</b> | - (system usage) + (system production) |               |              |                |                    |               |
|-----------------------------------------|----------------------------------------|---------------|--------------|----------------|--------------------|---------------|
| <b>Harrison School Building</b>         | <b>kwh</b>                             | <b>Therms</b> | <b>Kbtuh</b> | <b>\$ Cost</b> | <b>\$ Produced</b> | <b>\$ Net</b> |
| Hourly Generator Production*            | 65                                     | -8            | 275          | -\$11.87       | \$15.55            | \$3.68        |
| Hourly Boiler Production **             | 0                                      | -5            | 408          | -\$7.19        | \$5.71             | -\$1.48       |

|                                     |      |  |  |             |         |        |
|-------------------------------------|------|--|--|-------------|---------|--------|
| Annual Hours of Generator operation | 4320 |  |  | -\$51,288   | -36,374 | therms |
| Electrical used                     | 100% |  |  | \$50,544    | 280,800 | kWh    |
| Thermal used                        | 50%  |  |  | \$8,316     | 594,000 | kBtuh  |
| Annual Generator Savings            |      |  |  | \$7,572     |         |        |
| Estimate Cost of 65 kW Generator    |      |  |  | \$143,000   |         |        |
| Incentive                           |      |  |  | \$42,900    |         |        |
| Final Cost                          |      |  |  | \$100,100   |         |        |
| Annual Maintenance***               |      |  |  | \$2,527     |         |        |
| Simple Payback                      |      |  |  | <b>19.8</b> |         |        |

| <b>Utility Cost</b> |        |
|---------------------|--------|
| Therm               | \$1.41 |
| kWh                 | \$0.18 |
| kBtuh               | \$0.01 |

\* Based upon 65 kW generator

\*\* Based upon existing plant running on Natural Gas at the plant measured 80% efficient

\*\*\* \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)

| <b>Combined heat and power Analysis</b> | - (system usage) + (system production) |               |              |                |                    |               |
|-----------------------------------------|----------------------------------------|---------------|--------------|----------------|--------------------|---------------|
| <b>Grover Cleveland Middle School</b>   | <b>kwh</b>                             | <b>Therms</b> | <b>Kbtuh</b> | <b>\$ Cost</b> | <b>\$ Produced</b> | <b>\$ Net</b> |
| Hourly Generator Production*            | 65                                     | -8            | 275          | -\$11.62       | \$13.60            | \$1.98        |
| Hourly Boiler Production **             | 0                                      | -5            | 408          | -\$7.04        | \$5.71             | -\$1.33       |

|                                     |      |  |  |             |         |        |
|-------------------------------------|------|--|--|-------------|---------|--------|
| Annual Hours of Generator operation | 4320 |  |  | -\$42,194   | -36,374 | therms |
| Electrical used                     | 100% |  |  | \$42,120    | 280,800 | kWh    |
| Thermal used                        | 50%  |  |  | \$8,316     | 594,000 | kBtuh  |
| Annual Generator Savings            |      |  |  | \$8,242     |         |        |
| Estimate Cost of 65 kW Generator    |      |  |  | \$143,000   |         |        |
| Incentive                           |      |  |  | \$42,900    |         |        |
| Final Cost                          |      |  |  | \$100,100   |         |        |
| Annual Maintenance***               |      |  |  | \$2,527     |         |        |
| Simple Payback                      |      |  |  | <b>17.5</b> |         |        |

| <b>Utility Cost</b> |        |
|---------------------|--------|
| Therm               | \$1.16 |
| kWh                 | \$0.15 |
| kBtuh               | \$0.01 |

\* Based upon 65 kW generator

\*\* Based upon existing plant running on Natural Gas at the plant measured 80% efficient

\*\*\* \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)

| <b>Combined heat and power Analysis</b> | - (system usage) + (system production) |               |              |                |                    |               |
|-----------------------------------------|----------------------------------------|---------------|--------------|----------------|--------------------|---------------|
| <b>Lincoln Elementary School</b>        | <b>kwh</b>                             | <b>Therms</b> | <b>Kbtuh</b> | <b>\$ Cost</b> | <b>\$ Produced</b> | <b>\$ Net</b> |
| Hourly Generator Production*            | 65                                     | -8            | 275          | -\$11.62       | \$13.60            | \$1.98        |
| Hourly Boiler Production **             | 0                                      | -5            | 408          | -\$7.04        | \$5.71             | -\$1.33       |

|                                     |      |  |  |            |         |        |
|-------------------------------------|------|--|--|------------|---------|--------|
| Annual Hours of Generator operation | 4320 |  |  | -\$49,833  | -36,374 | therms |
| Electrical used                     | 100% |  |  | \$56,160   | 280,800 | kWh    |
| Thermal used                        | 50%  |  |  | \$8,316    | 594,000 | kBtuh  |
| Annual Generator Savings            |      |  |  | \$14,643   |         |        |
| Estimate Cost of 65 kW Generator    |      |  |  | \$143,000  |         |        |
| Incentive                           |      |  |  | \$42,900   |         |        |
| Final Cost                          |      |  |  | \$100,100  |         |        |
| Annual Maintenance***               |      |  |  | \$2,527    |         |        |
| Simple Payback                      |      |  |  | <b>8.3</b> |         |        |

| <b>Utility Cost</b> |        |
|---------------------|--------|
| Therm               | \$1.37 |
| kWh                 | \$0.20 |
| kBtuh               | \$0.01 |

\* Based upon 65 kW generator

\*\* Based upon existing plant running on Natural Gas at the plant measured 80% efficient

\*\*\* \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)

| Combined heat and power Analysis                                                                                                                                                                                                                          |        | - (system usage) + (system production) |           |          |             |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------|-----------|----------|-------------|---------|
| Wilson Elementary School                                                                                                                                                                                                                                  | kwh    | Therms                                 | Kbtuh     | \$ Cost  | \$ Produced | \$ Net  |
| Hourly Generator Production*                                                                                                                                                                                                                              | 65     | -8                                     | 275       | -\$11.62 | \$13.60     | \$1.98  |
| Hourly Boiler Production **                                                                                                                                                                                                                               | 0      | -5                                     | 408       | -\$7.04  | \$5.71      | -\$1.33 |
|                                                                                                                                                                                                                                                           |        |                                        |           |          |             |         |
| Annual Hours of Generator operation                                                                                                                                                                                                                       | 4320   |                                        | -\$52,743 |          | -36,374     | therms  |
| Electrical used                                                                                                                                                                                                                                           | 100%   |                                        | \$44,928  |          | 280,800     | kWh     |
| Thermal used                                                                                                                                                                                                                                              | 50%    |                                        | \$8,316   |          | 594,000     | kBtuh   |
| Annual Generator Savings                                                                                                                                                                                                                                  |        |                                        | \$501     |          |             |         |
| Estimate Cost of 65 kW Generator                                                                                                                                                                                                                          |        |                                        | \$143,000 |          |             |         |
| Incentive                                                                                                                                                                                                                                                 |        |                                        | \$42,900  |          |             |         |
| Final Cost                                                                                                                                                                                                                                                |        |                                        | \$100,100 |          |             |         |
| Annual Maintenance***                                                                                                                                                                                                                                     |        |                                        | \$2,527   |          |             |         |
| Simple Payback                                                                                                                                                                                                                                            |        |                                        | -49.4     |          |             |         |
|                                                                                                                                                                                                                                                           |        |                                        |           |          |             |         |
| Utility Cost                                                                                                                                                                                                                                              |        |                                        |           |          |             |         |
| Therm                                                                                                                                                                                                                                                     | \$1.45 |                                        |           |          |             |         |
| kWh                                                                                                                                                                                                                                                       | \$0.16 |                                        |           |          |             |         |
| kBtuh                                                                                                                                                                                                                                                     | \$0.01 |                                        |           |          |             |         |
| <p>* Based upon 65 kW generator</p> <p>** Based upon existing plant running on Natural Gas at the plant measured 80% efficient</p> <p>*** \$0.009/kWh operation and maintenance cost (National Renewable Energy Laboratory 2003 data for 1 Mw system)</p> |        |                                        |           |          |             |         |

# WindCad Turbine Performance Model

## Endurance S-343 Wind Turbine, Grid - Intertie

Prepared For: **West Caldwell**  
Site Location: **West Caldwell, NJ**  
Data Source: **NASA Atmospheric Science Data Center**  
Date: **9/24/2015**

**35 kW**

### Inputs:

Ave. Wind (m/s) = 3  
Weibull K = 1  
Site Altitude (m) = 0  
Wind Shear Exp. = 0.180  
Anem. Height (m) = 42.7  
Tower Height (m) = 42.7  
Turbulence Factor = 2.0%

### Results:

Hub Average Wind Speed (m/s) = 3.00  
Air Density Factor = 0%  
Average Output Power (kW) = 6.32  
Daily Energy Output (kWh) = 151.6  
Annual Energy Output (kWh) = **55,334**  
Monthly Energy Output = 4,611  
Percent Operating Time = 35.0%

### Weibull Performance Calculations

| Wind Speed Bin (m/s) | Power (kW) | Wind Probability (f) | Net kW @ V |
|----------------------|------------|----------------------|------------|
| 1                    | 0.00       | 22.05%               | 0.000      |
| 2                    | 0.00       | 16.39%               | 0.000      |
| 3                    | 0.00       | 12.18%               | 0.000      |
| 4                    | 2.45       | 9.06%                | 0.222      |
| 5                    | 7.45       | 6.73%                | 0.501      |
| 6                    | 14.70      | 5.00%                | 0.735      |
| 7                    | 24.50      | 3.72%                | 0.911      |
| 8                    | 35.28      | 2.76%                | 0.975      |
| 9                    | 38.22      | 2.05%                | 0.785      |
| 10                   | 38.22      | 1.53%                | 0.584      |
| 11                   | 38.22      | 1.14%                | 0.434      |
| 12                   | 38.22      | 0.84%                | 0.322      |
| 13                   | 38.22      | 0.63%                | 0.240      |
| 14                   | 38.22      | 0.47%                | 0.178      |
| 15                   | 38.22      | 0.35%                | 0.132      |
| 16                   | 38.22      | 0.26%                | 0.098      |
| 17                   | 38.22      | 0.19%                | 0.073      |
| 18                   | 38.22      | 0.14%                | 0.054      |
| 19                   | 38.22      | 0.11%                | 0.040      |
| 20                   | 38.22      | 0.08%                | 0.030      |

2008, BWC

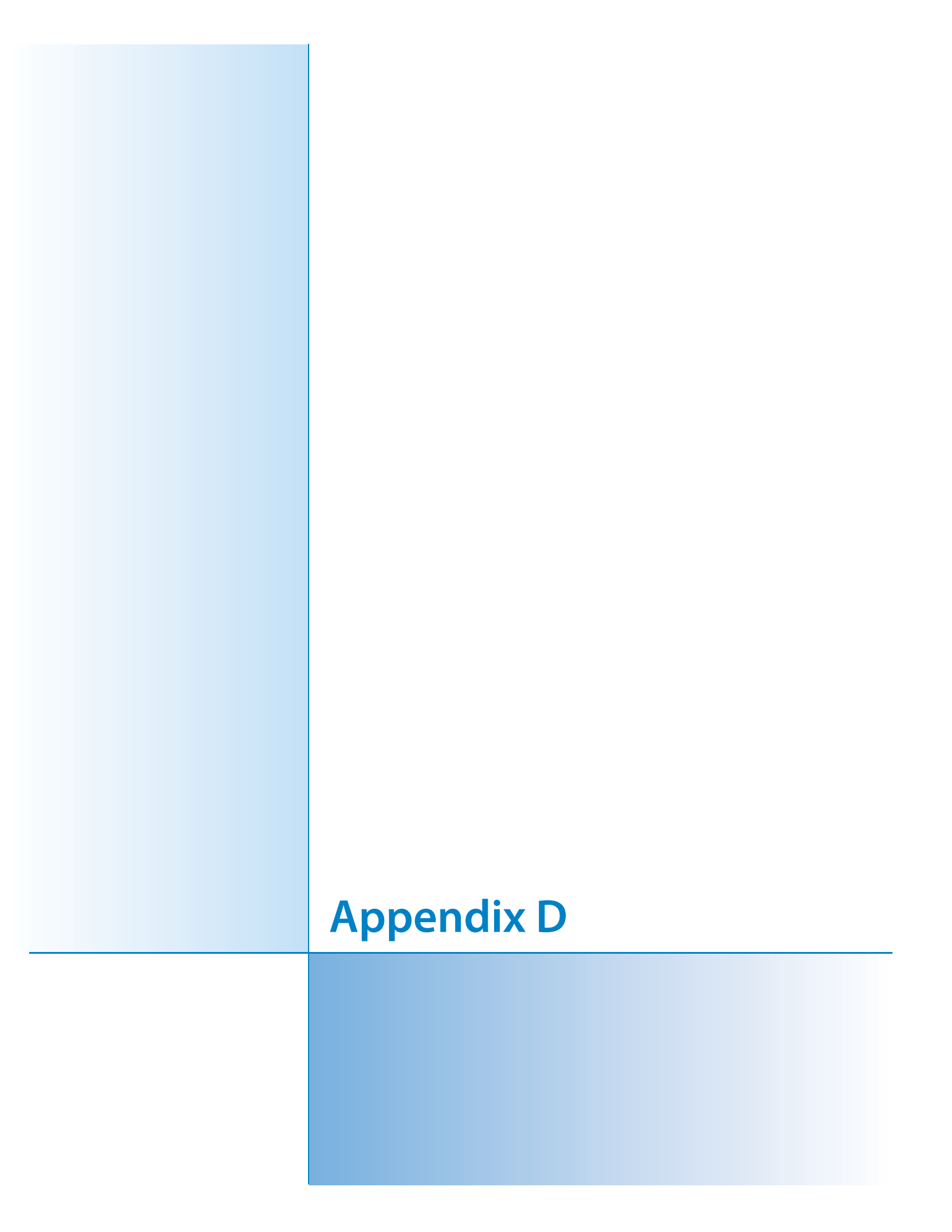
Totals:

85.67%

6.317

### Weibull Calculations:

Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis. Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

The graphic consists of a large light blue rectangle on the left side of the page. A horizontal line extends from the right edge of this rectangle across the page. A vertical line extends from the bottom of the light blue rectangle down to the bottom of the page. The intersection of these two lines is where the text 'Appendix D' is located. The area to the right of the vertical line and below the horizontal line is a darker blue rectangle.

## Appendix D

Appendix D - Lighting Upgrades

| Building                            | Location | Location/Room #       | Existing Fixture/Lamp & Ballast Description                 | Qty of Existing Fixtures | Occ Sensor | Existing Fixture Watts | Approximate Measured Lighting Level (Footcandles) "NR" = Not Recorded | Operating Hours | Existing kWh | Existing Annual Energy Cost | Proposed Replacement Solution                        | Qty of Proposed Fixtures | Proposed Fixture Watts | Proposed Operational Hours Without Sensors | Proposed Operational Hours With Sensors | Proposed kWh Without Sensors | Proposed kWh With Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor Quantity | Total kW Saved | Total kWh Saved | Energy Cost Savings | Ballast/Fixture/Reflector Per Unit Price | Bulb (Per Unit Price) | Labor (Per Unit Price) | Occupancy Sensor (Per Unit Price) | Occupancy Sensor (Per Unit Labor Price) | Labor Subtotal | Materials Subtotal | Labor & Materials Subtotal | Labor Total | Materials Total | Labor & Materials Total | Maintenance Cost Savings | ID | Incentive      |                   |                    |              | Total Incentive |
|-------------------------------------|----------|-----------------------|-------------------------------------------------------------|--------------------------|------------|------------------------|-----------------------------------------------------------------------|-----------------|--------------|-----------------------------|------------------------------------------------------|--------------------------|------------------------|--------------------------------------------|-----------------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------|----------------|-----------------|---------------------|------------------------------------------|-----------------------|------------------------|-----------------------------------|-----------------------------------------|----------------|--------------------|----------------------------|-------------|-----------------|-------------------------|--------------------------|----|----------------|-------------------|--------------------|--------------|-----------------|
|                                     |          |                       |                                                             |                          |            |                        |                                                                       |                 |              |                             |                                                      |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                          |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          |    | Incentive Code | Incentive Code DS | Lighting Incentive | OS Incentive |                 |
| Wilson Elementary School - Interior | B        | Boiler Room           | 4' T5 Fixture w/2 T5FO28 Lamps                              | 2                        | 0          | 120                    | 15                                                                    | 2160            | 259.2        | \$33.7                      | None Proposed                                        | 2                        | 120                    | 2160                                       | 2160                                    | 259.2                        | 259.2                     | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | 19                       | 0  | 0              | 0                 | 0                  | \$0          |                 |
| Wilson Elementary School - Interior | B        | Boiler Room           | 4' T5 Fixture w/2 T5FO28 Lamps                              | 2                        | 0          | 120                    | 15                                                                    | 2160            | 259.2        | \$33.7                      | None Proposed                                        | 2                        | 120                    | 2160                                       | 2160                                    | 259.2                        | 259.2                     | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 19 | 0              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | B        | Boiler Room           | 65W Incandescent Fixture                                    | 1                        | 0          | 65                     | 15                                                                    | 2160            | 140.4        | \$18.3                      | Replace 65W Incandescent Fixture with 13W CFL        | 1                        | 13                     | 2160                                       | 2160                                    | 28.08                        | 28.08                     | None Proposed                  | 0                         | 0.052          | 112.32          | 14.6                | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$4.0       | \$6.3           | \$10.3                  | \$21.3                   | 19 | N              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | B        | Custodial Bathroom    | 13W CFL Fixture                                             | 1                        | 0          | 13                     | 5                                                                     | 500             | 6.5          | \$0.8                       | None Proposed                                        | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 19 | N              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | B        | Custodial Closet      | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                        | 0          | 60                     | 15                                                                    | 500             | 30           | \$3.9                       | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 1                        | 34                     | 500                                        | 500                                     | 17                           | 17                        | None Proposed                  | 0                         | 0.026          | 13              | 1.7                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 19 | K              | 0                 | 5                  | 0            | \$5             |
| Wilson Elementary School - Interior | B        | Custodial Closet      | 65W Incandescent Fixture                                    | 1                        | 0          | 65                     | 5                                                                     | 500             | 32.5         | \$4.2                       | Replace 65W Incandescent Fixture with 13W CFL        | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  | 0                         | 0.052          | 26              | 3.4                 | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$4.0       | \$6.3           | \$10.3                  | \$21.3                   | 19 | N              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | B        | Custodial Closet      | 13W CFL Fixture                                             | 1                        | 0          | 13                     | 3                                                                     | 500             | 6.5          | \$0.8                       | None Proposed                                        | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 19 | N              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | B        | Custodial Office      | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 2                        | 0          | 176                    | 48                                                                    | 2160            | 380.16       | \$49.4                      | Remove Ballast, Install 3-17W LED Tube Retrofit Bubs | 2                        | 102                    | 2160                                       | 2160                                    | 220.32                       | 220.32                    | None Proposed                  | 0                         | 0.074          | 159.84          | 20.8                | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$130.0     | \$348.0         | \$478.0                 | \$15.6                   | 19 | K              | 0                 | 5                  | 0            | \$10            |
| Wilson Elementary School - Interior | B        | Basement Hall         | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 62                       | 0          | 3844                   | 40                                                                    | 2160            | 8303.04      | \$1,079.4                   | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 62                       | 2108                   | 2160                                       | 2160                                    | 4933.28                      | 4933.28                   | None Proposed                  | 0                         | 1.736          | 3749.76         | 487.5               | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$4,030.0   | \$7,686.0       | \$11,716.0              | \$322.4                  | 19 | K              | 0                 | 5                  | 0            | \$310           |
| Wilson Elementary School - Interior | A        | Back Stairs           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 2                        | 0          | 120                    | 12                                                                    | 2160            | 259.2        | \$33.7                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  | 0                         | 0.052          | 112.32          | 14.6                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$246.0         | \$378.0                 | \$10.4                   | 19 | K              | 0                 | 5                  | 0            | \$10            |
| Wilson Elementary School - Interior | A        | Back Stairs           | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 12                                                                    | 2160            | 259.2        | \$33.7                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  | 0                         | 0.052          | 112.32          | 14.6                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$246.0         | \$378.0                 | \$10.4                   | 19 | K              | 0                 | 5                  | 0            | \$10            |
| Wilson Elementary School - Interior | A        | Back Stairs           | 13W CFL Fixture                                             | 1                        | 0          | 13                     | 4                                                                     | 2160            | 28.08        | \$3.7                       | None Proposed                                        | 1                        | 13                     | 2160                                       | 2160                                    | 28.08                        | 28.08                     | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 19 | N              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | A        | Front Stairs          | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 3                        | 0          | 180                    | 16                                                                    | 2160            | 388.8        | \$50.5                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 3                        | 102                    | 2160                                       | 2160                                    | 220.32                       | 220.32                    | None Proposed                  | 0                         | 0.078          | 168.48          | 21.9                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$195.0     | \$372.0         | \$567.0                 | \$15.6                   | 19 | K              | 0                 | 5                  | 0            | \$15            |
| Wilson Elementary School - Interior | A        | Front Stairs          | 36" BXAX Fixture                                            | 1                        | 0          | 38                     | 13                                                                    | 2160            | 82.08        | \$10.7                      | None Proposed                                        | 1                        | 38                     | 2160                                       | 2160                                    | 82.08                        | 82.08                     | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 19 | 0              | 0                 | 0                  | 0            | \$0             |
| Wilson Elementary School - Interior | B        | Resource Room         | 1X4 Suspended Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 11                       | 0          | 1232                   | 40                                                                    | 2160            | 2661.12      | \$345.9                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 11                       | 748                    | 2160                                       | 2160                                    | 1615.68                      | 1615.68                   | None Proposed                  | 0                         | 0.484          | 1045.44         | 135.9               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$715.0     | \$2,464.0       | \$3,179.0               | \$114.4                  | 19 | K              | 0                 | 5                  | 0            | \$55            |
| Wilson Elementary School - Interior | B        | Resource Room         | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 7                        | 0          | 434                    | 40                                                                    | 2160            | 937.44       | \$121.9                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bubs | 7                        | 238                    | 2160                                       | 2160                                    | 514.08                       | 514.08                    | None Proposed                  | 0                         | 0.196          | 423.36          | 55.0                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$455.0     | \$865.0         | \$1,323.0               | \$36.4                   | 19 | K              | 0                 | 5                  | 0            | \$35            |
| Wilson Elementary School - Interior | B        | Resource Room Storage | 1X4 Suspended Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 4                        | 0          | 448                    | 40                                                                    | 500             | 224          | \$29.1                      | Remove Ballast, Install 4-17W LED Tube Retrofit Bubs | 4                        | 272                    | 500                                        | 500                                     | 136                          | 136                       | None Proposed                  | 0                         | 0.176          | 88              | 11.4                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$260.0     | \$896.0         | \$1,156.0               | \$41.6                   | 19 | K              | 0                 | 5                  | 0            | \$20            |
| Wilson Elementary School - Interior | B        | Faculty Room          | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 9                        | 0          | 1008                   | 50                                                                    | 2160            | 2177.28      | \$283.0                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bubs | 9                        | 612                    | 2160                                       | 2160                                    | 1321.92                      | 1321.92                   | None Proposed                  | 0                         | 0.386          | 855.36          | 111.2               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$585.0     | \$2,016.0       | \$2,601.0               | \$93.6                   | 19 | K              | 0                 | 5                  | 0            | \$45            |
| Wilson Elementary School - Interior | B        | Faculty Room          | 2X2 Fixtures w/ 4-17W T8 Lamps w/ Electronic Ballasts       | 1                        | 0          | 63                     | 50                                                                    | 2160            | 136.08       | \$17.7                      | None Proposed                                        | 1                        | 63                     | 2160                                       | 2160                                    | 136.08                       | 136.08                    | None Proposed                  | 0                         | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$16.0                 | \$0.0                             | \$0.0                                   | \$16.0         | \$0.0              | \$16.0                     | \$0.0       | \$16.0          | \$0.0                   | 19                       | N  | 0              | 0                 | 0                  | \$0          |                 |
| Wilson Elementary School - Interior | B        | Faculty Bathroom      | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 1                        | 0          | 112                    | 50                                                                    | 500             | 56           | \$7.3                       | Remove Ballast, Install 4-17W LED Tube Retrofit Bubs | 1                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  | 0                         | 0.044          | 22              | 2.9                 | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$             |                    |                            |             |                 |                         |                          |    |                |                   |                    |              |                 |

## Appendix D - Lighting Upgrades

| Building                               | Location | Location/Room #    | Existing Fixture/Lamp & Ballast Description                 | Qty of Existing Fixtures | Circ Sensor | Existing Fixture Watts | Approximate Measured Lighting Level (Footcandles) N/A If Not Recorded | Operating Hours | Existing Annual kWh | Existing Annual Energy Cost | Proposed Replacement Solution                         | Qty of Proposed Fixtures | Proposed Fixture Watts | Proposed Operational Hours Without Sensors | Proposed Operational Hours With Sensors | Proposed kWh Without Sensors | Proposed kWh With Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor Quantity | Total kW Saved | Total kWh Saved | Energy Cost Savings | Ballast/Fixture/Reflector Per Unit Price | Bulb (Per Unit Price) | Labor (Per Unit Price) | Occupancy Sensor (Per Unit Price) | Occupancy Sensor (Per Unit Labor Price) | Labor Subtotal | Materials Subtotal | Labor & Materials Subtotal | Labor Total | Materials Total | Labor & Materials Total | Maintenance Cost Savings | ID             |                   |                    |              |   | Total Incentive |      |      |
|----------------------------------------|----------|--------------------|-------------------------------------------------------------|--------------------------|-------------|------------------------|-----------------------------------------------------------------------|-----------------|---------------------|-----------------------------|-------------------------------------------------------|--------------------------|------------------------|--------------------------------------------|-----------------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------|----------------|-----------------|---------------------|------------------------------------------|-----------------------|------------------------|-----------------------------------|-----------------------------------------|----------------|--------------------|----------------------------|-------------|-----------------|-------------------------|--------------------------|----------------|-------------------|--------------------|--------------|---|-----------------|------|------|
|                                        |          |                    |                                                             |                          |             |                        |                                                                       |                 |                     |                             |                                                       |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                          |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          | Incentive Code | Incentive Code OS | Lighting Incentive | OS Incentive |   |                 |      |      |
| Wilson Elementary School - Interior    | 001      | Library            | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                       | 0           | 1056                   | 65                                                                    | 2160            | 2280.96             | \$296.5                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                       | 612                    | 2160                                       | 2160                                    | 1321.92                      | 1321.92                   | None Proposed                  | 0                         | 0.444          | 959.04          | 124.7               | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$780.0     | \$2,088.0       | \$2,868.0               | \$93.6                   | 19             | K                 | 0                  | 5            | 0 | \$60            |      |      |
| Wilson Elementary School - Interior    | 001      | Library            | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 5                        | 0           | 300                    | 65                                                                    | 2160            | 648                 | \$84.2                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 5                        | 170                    | 2160                                       | 2160                                    | 367.2                        | 367.2                     | None Proposed                  | 0                         | 0.13           | 280.8           | 36.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$325.0     | \$620.0         | \$945.0                 | \$26.0                   | 19             | K                 | 0                  | 5            | 0 | \$25            |      |      |
| Wilson Elementary School - Interior    | 001      | Computer Lab       | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 9                        | 0           | 792                    | 65                                                                    | 2160            | 1710.72             | \$222.4                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 9                        | 459                    | 2160                                       | 2160                                    | 991.44                       | 991.44                    | None Proposed                  | 0                         | 0.333          | 719.28          | 93.5                | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$685.0     | \$1,566.0       | \$2,151.0               | \$70.2                   | 19             | K                 | 0                  | 5            | 0 | \$45            |      |      |
| Wilson Elementary School - Interior    | 001      | Computer Lab       | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                        | 0           | 240                    | 65                                                                    | 2160            | 518.4               | \$67.4                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  | 0                         | 0.104          | 224.64          | 29.2                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$260.0     | \$496.0         | \$756.0                 | \$20.8                   | 19             | K                 | 0                  | 5            | 0 | \$20            |      |      |
| Wilson Elementary School - Interior    | 001      | ADA Bathroom       | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                        | 1           | 62                     | 37                                                                    | 500             | 31                  | \$4.0                       | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 500                                        | 350                                     | 17                           | 11.9                      | None Proposed                  | 1                         | 0.028          | 19.1            | 2.5                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 19             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Wilson Elementary School - Interior    | 001      | Boys' Bathroom     | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 3                        | 0           | 90                     | 12                                                                    | 500             | 45                  | \$5.9                       | 0                                                     | 3                        | 0                      | 500                                        | 500                                     | 0                            | 0                         | None Proposed                  | 0                         | 0.09           | 45              | 5.9                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | 19                | K                  | 0            | 5 | 0               | \$15 |      |
| Wilson Elementary School - Interior    | 001      | Girls' Bathroom    | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 3                        | 0           | 90                     | 12                                                                    | 500             | 45                  | \$5.9                       | 0                                                     | 3                        | 0                      | 500                                        | 500                                     | 0                            | 0                         | None Proposed                  | 0                         | 0.09           | 45              | 5.9                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | \$0.0             | 19                 | K            | 0 | 5               | 0    | \$15 |
| Wilson Elementary School - Interior    | 001      | Custodial Closet   | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                        | 0           | 60                     | 33                                                                    | 500             | 30                  | \$3.9                       | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 500                                        | 500                                     | 17                           | 17                        | None Proposed                  | 0                         | 0.026          | 13              | 1.7                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 19             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Wilson Elementary School - Interior    | 001      | Custodial Closet   | 60W Incandescent Fixture                                    | 1                        | 0           | 60                     | 2                                                                     | 500             | 30                  | \$3.9                       | Replace 60W Incandescent Fixture with 13W CFL         | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  | 0                         | 0.047          | 23.5            | 3.1                 | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$4.0       | \$6.3           | \$10.3                  | \$21.3                   | 19             | N                 | 0                  | 0            | 0 | \$0             |      |      |
| Jefferson Elementary School - Interior | B        | Boiler Room        | 4' T5 Fixture w/4 T5FO28 Lamps                              | 3                        | 0           | 360                    | 20                                                                    | 2160            | 777.6               | \$124.4                     | None Proposed                                         | 3                        | 360                    | 2160                                       | 2160                                    | 777.6                        | 777.6                     | None Proposed                  | 0                         | 0              | 0               | 0                   | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | \$0.0             | 10                 | 0            | 0 | 0               | \$0  |      |
| Jefferson Elementary School - Interior | B        | Boiler Room        | 36" BXHX Fixture                                            | 6                        | 0           | 228                    | 20                                                                    | 2160            | 492.48              | \$78.8                      | None Proposed                                         | 6                        | 228                    | 2160                                       | 2160                                    | 492.48                       | 492.48                    | None Proposed                  | 0                         | 0              | 0               | 0                   | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | \$0.0             | 10                 | 0            | 0 | 0               | \$0  |      |
| Jefferson Elementary School - Interior | B        | Storage            | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 5                        | 0           | 300                    | 17                                                                    | 500             | 150                 | \$24.0                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 5                        | 170                    | 500                                        | 500                                     | 85                           | 85                        | None Proposed                  | 0                         | 0.13           | 65              | 10.4                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$325.0     | \$620.0         | \$945.0                 | \$26.0                   | 10             | K                 | 0                  | 5            | 0 | \$25            |      |      |
| Jefferson Elementary School - Interior | B        | Storage            | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 2                        | 0           | 224                    | 17                                                                    | 500             | 112                 | \$17.9                      | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                        | 136                    | 500                                        | 500                                     | 68                           | 68                        | None Proposed                  | 0                         | 0.088          | 44              | 7.0                 | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$130.0     | \$448.0         | \$578.0                 | \$20.8                   | 10             | K                 | 0                  | 5            | 0 | \$10            |      |      |
| Jefferson Elementary School - Interior | B        | Custodial Closet   | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0           | 120                    | 17                                                                    | 500             | 60                  | \$9.6                       | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  | 0                         | 0.052          | 26              | 4.2                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 10             | K                 | 0                  | 5            | 0 | \$10            |      |      |
| Jefferson Elementary School - Interior | B        | Custodial Bathroom | 60W Incandescent Fixture                                    | 1                        | 0           | 60                     | 26                                                                    | 500             | 30                  | \$4.8                       | Replace 60W Incandescent Fixture with 13W CFL         | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  | 0                         | 0.047          | 23.5            | 3.8                 | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$4.0       | \$6.3           | \$10.3                  | \$21.3                   | 10             | N                 | 0                  | 0            | 0 | \$0             |      |      |
| Jefferson Elementary School - Interior | B        | Back Hallway       | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 3                        | 0           | 180                    | 10                                                                    | 2160            | 388.8               | \$62.2                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 3                        | 102                    | 2160                                       | 2160                                    | 220.32                       | 220.32                    | None Proposed                  | 0                         | 0.078          | 168.48          | 27.0                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$195.0     | \$372.0         | \$567.0                 | \$15.6                   | 10             | K                 | 0                  | 5            | 0 | \$15            |      |      |
| Jefferson Elementary School - Interior | B        | Room 18            | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 6                        | 0           | 672                    | 30                                                                    | 2160            | 1451.52             | \$232.2                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 6                        | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  | 0                         | 0.264          | 570.24          | 91.2                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$390.0     | \$1,344.0       | \$1,734.0               | \$62.4                   | 10             | K                 | 0                  | 5            | 0 | \$30            |      |      |
| Jefferson Elementary School - Interior | B        | Faculty Lounge     | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 6                        | 0           | 528                    | 46                                                                    | 2160            | 1140.48             | \$182.5                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 6                        | 306                    | 2160                                       | 2160                                    | 660.96                       | 660.96                    | None Proposed                  | 0                         | 0.222          | 479.52          | 76.7                | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$390.0     | \$1,044.0       | \$1,434.0               | \$46.8                   | 10             | K                 | 0                  | 5            | 0 | \$30            |      |      |
| Jefferson Elementary School - Interior | B        | SG 2 (Room 2)      | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 9                        | 1           | 456.3                  | 46                                                                    | 2160            | 985.608             | \$157.7                     | Replace T8 Fixture with 36W Linear Panel LED Fixture  | 9                        | 324                    | 2160                                       | 2160                                    | 699.84                       | 699.84                    | None Proposed                  | 0                         | 0.1323         | 285.768         | 45.7                | \$230.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$230.0            | \$295.0                    | \$585.0     | \$2,070.0       | \$2,655.0               | \$105.7                  | 10             | 0                 | 0                  | 0            | 0 | \$0             |      |      |
| Jefferson Elementary School - Interior | B        | SG 2 Bathroom      | 13W CFL Fixture                                             | 1                        | 0           | 13                     | 8                                                                     | 500             | 6.5                 | \$1.0                       | None Proposed                                         | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  | 0                         | 0              | 0               | 0                   | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | \$0.0             | 10                 | N            | 0 | 0               | 0    | \$0  |
| Jefferson Elementary School - Interior | B        | Room 17            | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 15                       | 0           | 1680                   | 51                                                                    | 2160            | 3628.8              | \$590.6                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 15                       | 1020                   | 2160                                       | 2160                                    | 2293.2                       | 2293.2                    | None Proposed                  | 0                         | 0.66           | 1425.6          | 228.1               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$975.0     | \$3,360.0       | \$4,335.0               | \$196.0                  | 10             | K                 | 0                  | 5            | 0 | \$75            |      |      |
| Jefferson Elementary School - Interior | B        | Gym Hall           | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 10                       | 0           | 1120                   | 23                                                                    | 2160            | 2419.2              | \$387.1                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 10                       | 680                    | 2160                                       | 2160                                    | 1468.8                       | 1468.8                    | None Proposed                  | 0                         | 0.44           | 950.4           | 152.1               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$650.0     | \$2,240.0       | \$2,890.0               | \$104.0                  | 10             | K                 | 0                  | 5            | 0 | \$50            |      |      |
| Jefferson Elementary School - Interior | B        | Storage            | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                        | 0           | 60                     | 10                                                                    | 2160            | 129.6               | \$20.7                      | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 2160                                       | 2160                                    | 73.44                        | 73.44                     | None Proposed                  | 0                         | 0.026          | 56.16           | 9.0                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 10             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Jefferson Elementary School - Interior | B        | Gym                | 400W Metal Halide Fixture                                   | 12                       | 0           | 5496                   | 13                                                                    | 500             | 2748                | \$439.7                     | None Proposed                                         | 12                       | 5496                   | 500                                        | 500                                     | 2748                         | 2748                      | None Proposed                  | 0                         | 0              | 0               | 0                   | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | \$0.0             | 10                 | 0            | 0 | 0               | \$0  |      |
| Jefferson Elementary School - Interior | B        | Stage              | 60W Incandescent Fixture                                    | 3                        | 0           | 180                    | 7                                                                     | 2160            | 388.8               | \$62.2                      | Replace 60W Incandescent Fixture with 13W CFL         | 3                        | 39                     | 2160                                       | 2160                                    | 84.24                        | 84.24                     | None Proposed                  | 0                         | 0.141          | 304.56          | 48.7                | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$12.0      | \$18.8          | \$30.8                  | \$64.0                   | 10             | N                 | 0                  | 0            | 0 | \$0             |      |      |
| Jefferson Elementary School - Interior | B        | SG 3               | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 8                        | 1           | 704                    | 32                                                                    | 2160            | 1529.64             | \$243.3                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 8                        | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  | 0                         | 0.296          | 639.36          | 102.3               | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$520.0     | \$1,392.0       | \$1,912.0               | \$62.4                   | 10             | K                 | 0                  | 5            | 0 | \$40            |      |      |
| Jefferson Elementary School - Interior | B        | SG 3               | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                        | 0           | 62                     | 32                                                                    | 2160            | 133.92              | \$21.4                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 2160                                       | 2160                                    | 73.44                        | 73.44                     | None Proposed                  | 0                         | 0.028          | 60.48           | 9.7                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 10             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Jefferson Elementary School - Interior | B        | Boys' Bathroom     | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 1                        | 1           | 88                     | 16                                                                    | 500             | 44                  | \$7.0                       | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 1                        | 51                     | 500                                        | 500                                     | 25.5                         | 25.5                      | None Proposed                  | 0                         | 0.037          | 18.5            | 3.0                 | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$65.0      | \$174.0         | \$239.0                 | \$7.8                    | 10             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Jefferson Elementary School - Interior | B        | Girls' Bathroom    | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 1                        | 1           | 88                     | 16                                                                    | 500             | 44                  | \$7.0                       | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 1                        | 51                     | 500                                        | 500                                     | 25.5                         | 25.5                      | None Proposed                  | 0                         | 0.037          | 18.5            | 3.0                 | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$65.0      | \$174.0         | \$239.0                 | \$7.8                    | 10             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Jefferson Elementary School - Interior | B        | Gym Office         | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 2                        | 0           | 224                    | 45                                                                    | 2160            | 483.84              | \$77.4                      | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  | 0                         | 0.088          | 190.08          | 30.4                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$130.0     | \$448.0         | \$578.0                 | \$20.8                   | 10             | K                 | 0                  | 5            | 0 | \$10            |      |      |
| Jefferson Elementary School - Interior | B        | Gym Storage        | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 1                        | 0           | 112                    | 10                                                                    | 500             | 56                  | \$9.0                       | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 1                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  | 0                         | 0.044          | 22              | 3.5                 | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$65.0      | \$224.0         | \$289.0                 | \$10.4                   | 10             | K                 | 0                  | 5            | 0 | \$5             |      |      |
| Jefferson Elementary School - Interior | A        | Staircase          | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 4                        | 0           | 448                    | 30                                                                    | 2160            | 967.68              | \$154.8                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 4                        | 272                    | 2160                                       | 2160                                    | 587.52                       | 587.52                    | None Proposed                  | 0                         | 0.176          | 380.16          | 60.8                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$260.0     | \$886.0         | \$1,156.0               | \$41.6                   | 10             | K                 | 0                  | 5            | 0 | \$20            |      |      |
| Jefferson Elementary School - Interior | 001      | Faculty Bathroom   | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 2                        | 0           | 60                     | 12                                                                    | 500             | 30                  | \$4.8                       | 0                                                     | 2                        | 0                      | 500                                        | 500                                     | 0                            | 0                         | None Proposed                  | 0                         | 0.06           | 30              | 4.8                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0          | \$0.0             | 10                 | K            | 0 | 5               | 0    | \$10 |
| Jefferson Elementary School - Interior | 001      | Room 10            | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 9                        | 0           | 792                    | 33                                                                    | 2               |                     |                             |                                                       |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                          |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          |                |                   |                    |              |   |                 |      |      |

Appendix D - Lighting Upgrades

| Building                               | Location | Location/Room #          | Existing Fixture/Lamp & Ballast Description                 | Qty of Existing<br>Fixtures | Cct<br>Sensor | Existing Fixture<br>Watts | Approximate<br>Measured Lighting<br>Level<br>(Footcandles)<br>N/A - Not<br>Recorded | Operating<br>Hours | Existing Annual<br>kWh | Existing Annual<br>Energy Cost | Proposed Replacement Solution                         | Qty of Proposed<br>Fixtures | Proposed Fixture<br>Watts | Proposed Operational Hours<br>Without Sensors | Proposed Operational<br>Hours With Sensors | Proposed kWh Without<br>Sensors | Proposed kWh With<br>Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor<br>Quantity | Total kW Saved | Total kWh Saved | Energy Cost<br>Savings | Ballast/Fixture/Reflector<br>Per Unit Price | Bulb (Per Unit<br>Price) | Labor (Per Unit<br>Price) | Occupancy<br>Sensor (Per<br>Unit Price) | Occupancy Sensor<br>(Per Unit Labor<br>Price) | Labor Subtotal | Materials Subtotal | Labor & Materials<br>Subtotal | Labor Total | Materials Total | Labor & Materials<br>Total | Maintenance<br>Cost Savings | ID                |                      |                    |              |   | Total Incentive |     |     |
|----------------------------------------|----------|--------------------------|-------------------------------------------------------------|-----------------------------|---------------|---------------------------|-------------------------------------------------------------------------------------|--------------------|------------------------|--------------------------------|-------------------------------------------------------|-----------------------------|---------------------------|-----------------------------------------------|--------------------------------------------|---------------------------------|------------------------------|--------------------------------|------------------------------|----------------|-----------------|------------------------|---------------------------------------------|--------------------------|---------------------------|-----------------------------------------|-----------------------------------------------|----------------|--------------------|-------------------------------|-------------|-----------------|----------------------------|-----------------------------|-------------------|----------------------|--------------------|--------------|---|-----------------|-----|-----|
|                                        |          |                          |                                                             |                             |               |                           |                                                                                     |                    |                        |                                |                                                       |                             |                           |                                               |                                            |                                 |                              |                                |                              |                |                 |                        |                                             |                          |                           |                                         |                                               |                |                    |                               |             |                 |                            |                             | Incentive<br>Code | Incentive<br>Code OS | Lighting Incentive | OS Incentive |   |                 |     |     |
| Jefferson Elementary School - Interior | 001      | Room 4                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                          | 0             | 1056                      | 50                                                                                  | 2160               | 2280.96                | \$365.0                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.444          | 959.04          | 153.4                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$780.0     | \$2,088.0       | \$2,868.0                  | \$93.6                      | 10                | K                    | 0                  | 5            | 0 | \$60            |     |     |
| Jefferson Elementary School - Interior | 001      | Room 4 Bathroom          | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 1                           | 0             | 30                        | 15                                                                                  | 500                | 15                     | \$2.4                          | 0                                                     | 1                           | 0                         | 500                                           | 500                                        | 0                               | 0                            | None Proposed                  |                              | 0.03           | 15              | 2.4                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | \$0.0             | 10                   | K                  | 0            | 5 | 0               | \$5 |     |
| Jefferson Elementary School - Interior | 001      | Room 5                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                          | 0             | 1056                      | 50                                                                                  | 2160               | 2280.96                | \$365.0                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.444          | 959.04          | 153.4                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$780.0     | \$2,088.0       | \$2,868.0                  | \$93.6                      | 10                | K                    | 0                  | 5            | 0 | \$60            |     |     |
| Jefferson Elementary School - Interior | 001      | Room 5 Bathroom          | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 1                           | 0             | 30                        | 15                                                                                  | 500                | 15                     | \$2.4                          | 0                                                     | 1                           | 0                         | 500                                           | 500                                        | 0                               | 0                            | None Proposed                  |                              | 0.03           | 15              | 2.4                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | \$0.0             | 10                   | K                  | 0            | 5 | 0               | \$5 |     |
| Jefferson Elementary School - Interior | 001      | Room 6                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                          | 0             | 1056                      | 50                                                                                  | 2160               | 2280.96                | \$365.0                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.444          | 959.04          | 153.4                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$780.0     | \$2,088.0       | \$2,868.0                  | \$93.6                      | 10                | K                    | 0                  | 5            | 0 | \$60            |     |     |
| Jefferson Elementary School - Interior | 001      | Room 6 Bathroom          | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 1                           | 0             | 30                        | 15                                                                                  | 500                | 15                     | \$2.4                          | 0                                                     | 1                           | 0                         | 500                                           | 500                                        | 0                               | 0                            | None Proposed                  |                              | 0.03           | 15              | 2.4                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | \$0.0             | 10                   | K                  | 0            | 5 | 0               | \$5 |     |
| Jefferson Elementary School - Interior | 001      | Room 15                  | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 23                          | 0             | 2576                      | 92                                                                                  | 2160               | 5564.16                | \$890.3                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 23                          | 1564                      | 2160                                          | 2160                                       | 3378.24                         | 3378.24                      | None Proposed                  |                              | 1.012          | 2185.92         | 349.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$1,495.0   | \$5,152.0       | \$6,647.0                  | \$239.2                     | 10                | K                    | 0                  | 5            | 0 | \$115           |     |     |
| Jefferson Elementary School - Interior | 001      | Room 15 Bathroom         | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts         | 1                           | 0             | 30                        | 15                                                                                  | 500                | 15                     | \$2.4                          | 0                                                     | 1                           | 0                         | 500                                           | 500                                        | 0                               | 0                            | None Proposed                  |                              | 0.03           | 15              | 2.4                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | \$0.0             | \$0.0                | 10                 | K            | 0 | 5               | 0   | \$5 |
| Jefferson Elementary School - Interior | 001      | Nurse's Office           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 4                           | 0             | 352                       | 70                                                                                  | 2160               | 760.32                 | \$121.7                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 4                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.148          | 319.68          | 51.1                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$260.0     | \$696.0         | \$956.0                    | \$31.2                      | 10                | K                    | 0                  | 5            | 0 | \$20            |     |     |
| Jefferson Elementary School - Interior | 001      | Nurse's Bathroom         | 60W Incandescent Fixture                                    | 1                           | 0             | 60                        | 28                                                                                  | 500                | 500                    | \$4.8                          | Replace 60W Incandescent Fixture with 13W CFL         | 1                           | 13                        | 500                                           | 500                                        | 6.5                             | 6.5                          | None Proposed                  |                              | 0.047          | 23.5            | 3.8                    | \$0.0                                       | \$6.3                    | \$4.0                     | \$0.0                                   | \$0.0                                         | \$4.0          | \$6.3              | \$10.3                        | \$4.0       | \$6.3           | \$10.3                     | \$21.3                      | 10                | N                    | 0                  | 0            | 0 | \$5             |     |     |
| Jefferson Elementary School - Interior | 001      | Faculty Lounge           | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 64                        | 30                                                                                  | 2160               | 138.24                 | \$22.1                         | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 2                           | 34                        | 2160                                          | 2160                                       | 73.44                           | 73.44                        | None Proposed                  |                              | 0.03           | 64.8            | 10.4                   | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$130.0     | \$148.0         | \$278.0                    | \$5.2                       | 10                | K                    | 0                  | 5            | 0 | \$10            |     |     |
| Jefferson Elementary School - Interior | 001      | Main Office              | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 4                           | 0             | 352                       | 52                                                                                  | 2160               | 760.32                 | \$121.7                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 4                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.148          | 319.68          | 51.1                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$260.0     | \$696.0         | \$956.0                    | \$31.2                      | 10                | K                    | 0                  | 5            | 0 | \$20            |     |     |
| Jefferson Elementary School - Interior | 001      | Copy Room                | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 4                           | 0             | 240                       | 25                                                                                  | 2160               | 518.4                  | \$82.9                         | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                           | 136                       | 2160                                          | 2160                                       | 293.76                          | 293.76                       | None Proposed                  |                              | 0.104          | 224.64          | 35.9                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$260.0     | \$496.0         | \$756.0                    | \$20.8                      | 10                | K                    | 0                  | 5            | 0 | \$20            |     |     |
| Jefferson Elementary School - Interior | 001      | Principal's Office       | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 4                           | 0             | 352                       | 60                                                                                  | 2160               | 760.32                 | \$121.7                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 4                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.148          | 319.68          | 51.1                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$260.0     | \$696.0         | \$956.0                    | \$31.2                      | 10                | K                    | 0                  | 5            | 0 | \$20            |     |     |
| Jefferson Elementary School - Interior | 001      | Hallway Display Case     | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                           | 0             | 60                        | 50                                                                                  | 2160               | 129.6                  | \$20.7                         | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                           | 34                        | 2160                                          | 2160                                       | 73.44                           | 73.44                        | None Proposed                  |                              | 0.026          | 56.16           | 9.0                    | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$65.0      | \$124.0         | \$189.0                    | \$5.2                       | 10                | K                    | 0                  | 5            | 0 | \$5             |     |     |
| Jefferson Elementary School - Interior | 001      | Library                  | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 23                          | 0             | 2576                      | 96                                                                                  | 2160               | 5564.16                | \$890.3                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 23                          | 1564                      | 2160                                          | 2160                                       | 3378.24                         | 3378.24                      | None Proposed                  |                              | 1.012          | 2185.92         | 349.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$1,495.0   | \$5,152.0       | \$6,647.0                  | \$239.2                     | 10                | K                    | 0                  | 5            | 0 | \$115           |     |     |
| Lincoln Elementary School - Interior   | 001      | Boiler Room              | 1x4 Fixtures w/ 2-T12 Lamp Fixture w/ Magnetic Ballast      | 5                           | 0             | 428                       | 23                                                                                  | 2160               | 924.48                 | \$147.9                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 5                           | 170                       | 2160                                          | 2160                                       | 367.2                           | 367.2                        | None Proposed                  |                              | 0.258          | 557.28          | 89.2                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$325.0     | \$620.0         | \$945.0                    | \$26.0                      | 13                | N                    | 0                  | 0            | 0 | \$0             |     |     |
| Lincoln Elementary School - Interior   | 001      | Boiler Room              | 60W Incandescent Fixture                                    | 1                           | 0             | 60                        | 23                                                                                  | 2160               | 129.6                  | \$20.7                         | Replace 60W Incandescent Fixture with 13W CFL         | 1                           | 13                        | 2160                                          | 2160                                       | 28.08                           | 28.08                        | None Proposed                  |                              | 0.047          | 101.52          | 16.2                   | \$0.0                                       | \$6.3                    | \$4.0                     | \$0.0                                   | \$0.0                                         | \$4.0          | \$6.3              | \$10.3                        | \$4.0       | \$6.3           | \$10.3                     | \$21.3                      | 13                | N                    | 0                  | 0            | 0 | \$0             |     |     |
| Lincoln Elementary School - Interior   | 001      | Boiler Room              | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                           | 0             | 60                        | 23                                                                                  | 2160               | 129.6                  | \$20.7                         | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                           | 34                        | 2160                                          | 2160                                       | 73.44                           | 73.44                        | None Proposed                  |                              | 0.026          | 56.16           | 9.0                    | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$65.0      | \$124.0         | \$189.0                    | \$5.2                       | 13                | K                    | 0                  | 5            | 0 | \$5             |     |     |
| Lincoln Elementary School - Interior   | 001      | Library                  | 1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 52                          | 0             | 1664                      | 19                                                                                  | 2160               | 3594.24                | \$575.1                        | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 52                          | 884                       | 2160                                          | 2160                                       | 1909.44                         | 1909.44                      | None Proposed                  |                              | 0.78           | 1684.8          | 269.6                  | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$3,380.0   | \$3,848.0       | \$7,228.0                  | \$135.2                     | 13                | K                    | 0                  | 5            | 0 | \$280           |     |     |
| Lincoln Elementary School - Interior   | 001      | Library Hall             | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 5                           | 0             | 300                       | 15                                                                                  | 2160               | 648                    | \$103.7                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 5                           | 170                       | 2160                                          | 2160                                       | 367.2                           | 367.2                        | None Proposed                  |                              | 0.13           | 280.8           | 44.9                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$325.0     | \$620.0         | \$945.0                    | \$26.0                      | 13                | K                    | 0                  | 5            | 0 | \$25            |     |     |
| Lincoln Elementary School - Interior   | 001      | Paper Room               | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 8                           | 0             | 480                       | 12                                                                                  | 2160               | 1036.8                 | \$165.9                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 8                           | 272                       | 2160                                          | 2160                                       | 587.52                          | 587.52                       | None Proposed                  |                              | 0.208          | 449.28          | 71.9                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$520.0     | \$992.0         | \$1,512.0                  | \$41.6                      | 13                | K                    | 0                  | 5            | 0 | \$40            |     |     |
| Lincoln Elementary School - Interior   | 001      | Room 2                   | 36" BXAX Fixture                                            | 2                           | 1             | 76                        | 28                                                                                  | 2160               | 164.16                 | \$26.3                         | None Proposed.                                        | 2                           | 76                        | 2160                                          | 1512                                       | 164.16                          | 114.912                      | None Proposed                  | 1                            | 0              | 49.248          | 7.9                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | \$0.0             | \$0.0                | 13                 | 0            | 0 | 0               | 0   | \$0 |
| Lincoln Elementary School - Interior   | 001      | Room 2                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 4                           | 1             | 352                       | 28                                                                                  | 2160               | 760.32                 | \$121.7                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 4                           | 204                       | 2160                                          | 1512                                       | 440.64                          | 308.448                      | None Proposed                  | 1                            | 0.148          | 451.872         | 72.3                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$260.0     | \$696.0         | \$956.0                    | \$31.2                      | 13                | K                    | 0                  | 5            | 0 | \$20            |     |     |
| Lincoln Elementary School - Interior   | 001      | Room 3                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 4                           | 1             | 352                       | 35                                                                                  | 2160               | 760.32                 | \$121.7                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 4                           | 204                       | 2160                                          | 1512                                       | 440.64                          | 308.448                      | None Proposed                  | 1                            | 0.148          | 451.872         | 72.3                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$260.0     | \$696.0         | \$956.0                    | \$31.2                      | 13                | K                    | 0                  | 5            | 0 | \$20            |     |     |
| Lincoln Elementary School - Interior   | 001      | Faculty Room w/ Bathroom | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 10                          | 0             | 620                       | 48                                                                                  | 2160               | 1339.2                 | \$214.3                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 10                          | 340                       | 2160                                          | 2160                                       | 734.4                           | 734.4                        | None Proposed                  |                              | 0.28           | 604.8           | 96.8                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$650.0     | \$1,240.0       | \$1,890.0                  | \$52.0                      | 13                | K                    | 0                  | 5            | 0 | \$30            |     |     |
| Lincoln Elementary School - Interior   | 001      | Faculty Room w/ Bathroom | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 5                           | 0             | 560                       | 48                                                                                  | 2160               | 1209.6                 | \$193.5                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 5                           | 340                       | 2160                                          | 2160                                       | 734.4                           | 734.4                        | None Proposed                  |                              | 0.22           | 475.2           | 76.0                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$325.0     | \$1,120.0       | \$1,445.0                  | \$52.0                      | 13                | K                    | 0                  | 5            | 0 | \$25            |     |     |
| Lincoln Elementary School - Interior   | 001      | Basement Hall            | 36" BXAX Fixture                                            | 3                           | 0             | 114                       | 25                                                                                  | 2160               | 246.24                 | \$39.4                         | None Proposed.                                        | 3                           | 114                       | 2160                                          | 2160                                       | 246.24                          | 246.24                       | None Proposed                  |                              | 0              | 0               | 0.0                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | \$0.0             | \$0.0                | 13                 | 0            | 0 | 0               | 0   | \$0 |
| Lincoln Elementary School - Interior   | 001      | Basement Hall            | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 224                       | 25                                                                                  | 2160               | 483.84                 | \$77.4                         | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                           | 136                       | 2160                                          | 2160                                       | 293.76                          | 293.76                       | None Proposed                  |                              | 0.088          | 190.08          | 30.4                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$130.0     | \$448.0         | \$578.0                    | \$20.8                      | 13                | K                    | 0                  | 5            | 0 | \$10            |     |     |
| Lincoln Elementary School - Interior   | 001      | Basement Hall            | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts           | 1                           | 0             | 32                        | 30                                                                                  | 500                | 16                     | \$2.6                          | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 1                           | 17                        | 500                                           | 500                                        | 8.5                             | 8.5                          | None Proposed                  |                              | 0.015          | 7.5             | 1.2                    | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$65.0      | \$74.0          | \$139.0                    | \$2.6                       | 13                | K                    | 0                  | 5            | 0 | \$5             |     |     |
| Lincoln Elementary School - Interior   | 001      | Girls Bathroom           | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 224                       | 30                                                                                  | 500                | 112                    | \$17.9                         | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                           | 136                       | 500                                           | 500                                        | 68                              | 68                           | None Proposed                  |                              | 0.088          | 44              | 7.0                    | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$130.0     | \$448.0         | \$578.0                    | \$20.8                      | 13                | K                    | 0                  | 5            | 0 | \$10            |     |     |
| Lincoln Elementary School - Interior   | 001      | Girls Bathroom           | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 120                       | 30                                                                                  | 500                | 60                     | \$9.6                          | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                           | 68                        | 500                                           | 500                                        | 34                              | 34                           | None Proposed                  |                              | 0.052          | 26              | 4.2                    | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$130.0     | \$248.0         | \$378.0                    | \$10.4                      | 13                | K                    | 0                  | 5            | 0 | \$10            |     |     |
| Lincoln Elementary School - Interior   | 001      | Boys Bathroom            | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 224                       | 30                                                                                  | 500                | 112                    | \$17.9                         | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                           | 136                       |                                               |                                            |                                 |                              |                                |                              |                |                 |                        |                                             |                          |                           |                                         |                                               |                |                    |                               |             |                 |                            |                             |                   |                      |                    |              |   |                 |     |     |

Appendix D - Lighting Upgrades

| Building                             | Location | Location Room #      | Existing Fixture Lamp & Ballast Description       | Qty of Existing Fixtures | Circ Sensor | Existing Fixture Watts | Approximate Measured Lighting Level (Footcandles) NTP Not Recorded | Operating Hours | Existing Annual kWh | Existing Annual Energy Cost | Proposed Replacement Solution                         | Qty of Proposed Fixtures | Proposed Fixture Watts | Proposed Operational Hours Without Sensors | Proposed Operational Hours With Sensors | Proposed kWh Without Sensors | Proposed kWh With Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor Quantity | Total kW Saved | Total kWh Saved | Energy Cost Savings | Ballast/Fixture/Reflector Per Unit Price | Bulb (Per Unit Price) | Labor (Per Unit Price) | Occupancy Sensor (Per Unit Price) | Occupancy Sensor (Per Unit Labor Price) | Labor Subtotal | Materials Subtotal | Labor & Materials Subtotal | Labor Total | Materials Total | Labor & Materials Total | Maintenance Cost Savings | ID    | Incentive Code |                   |                    |              | Total Incentive |     |
|--------------------------------------|----------|----------------------|---------------------------------------------------|--------------------------|-------------|------------------------|--------------------------------------------------------------------|-----------------|---------------------|-----------------------------|-------------------------------------------------------|--------------------------|------------------------|--------------------------------------------|-----------------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------|----------------|-----------------|---------------------|------------------------------------------|-----------------------|------------------------|-----------------------------------|-----------------------------------------|----------------|--------------------|----------------------------|-------------|-----------------|-------------------------|--------------------------|-------|----------------|-------------------|--------------------|--------------|-----------------|-----|
|                                      |          |                      |                                                   |                          |             |                        |                                                                    |                 |                     |                             |                                                       |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                          |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          |       | Incentive Code | Incentive Code OS | Lighting Incentive | OS Incentive |                 |     |
| Lincoln Elementary School - Interior | 002      | Principal's Office   | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 2                        | 0           | 224                    | 42                                                                 | 2160            | 483.84              | \$77.4                      | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 2                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.088          | 190.08          | 30.4                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$130.0     | \$448.0         | \$578.0                 | \$20.8                   | 13    | K              | 0                 | 5                  | 0            | \$10            |     |
| Lincoln Elementary School - Interior | 003      | Room 301             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                        | 0           | 672                    | 37                                                                 | 2160            | 1451.52             | \$232.2                     | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 6                        | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  |                           | 0.264          | 570.24          | 91.2                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$390.0     | \$1,344.0       | \$1,734.0               | \$62.4                   | 13    | K              | 0                 | 5                  | 0            | \$30            |     |
| Lincoln Elementary School - Interior | 003      | Room 302             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                        | 0           | 672                    | 35                                                                 | 2160            | 1451.52             | \$232.2                     | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 6                        | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  |                           | 0.264          | 570.24          | 91.2                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$390.0     | \$1,344.0       | \$1,734.0               | \$62.4                   | 13    | K              | 0                 | 5                  | 0            | \$30            |     |
| Lincoln Elementary School - Interior | 003      | Room 303             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                        | 0           | 672                    | 30                                                                 | 2160            | 1451.52             | \$232.2                     | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 6                        | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  |                           | 0.264          | 570.24          | 91.2                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$390.0     | \$1,344.0       | \$1,734.0               | \$62.4                   | 13    | K              | 0                 | 5                  | 0            | \$30            |     |
| Lincoln Elementary School - Interior | 003      | Room 304             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                        | 0           | 672                    | 30                                                                 | 2160            | 1451.52             | \$232.2                     | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 6                        | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  |                           | 0.264          | 570.24          | 91.2                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$390.0     | \$1,344.0       | \$1,734.0               | \$62.4                   | 13    | K              | 0                 | 5                  | 0            | \$30            |     |
| Lincoln Elementary School - Interior | 003      | Stair Room           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                        | 0           | 60                     | 18                                                                 | 2160            | 129.6               | \$20.7                      | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 1                        | 34                     | 2160                                       | 2160                                    | 73.44                        | 73.44                     | None Proposed                  |                           | 0.026          | 56.16           | 9.0                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 13    | K              | 0                 | 5                  | 0            | \$5             |     |
| Lincoln Elementary School - Interior | 003      | 3rd Floor Hall       | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 5                        | 0           | 560                    | 35                                                                 | 2160            | 1209.6              | \$193.5                     | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 5                        | 340                    | 2160                                       | 2160                                    | 734.4                        | 734.4                     | None Proposed                  |                           | 0.22           | 475.2           | 76.0                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$325.0     | \$1,120.0       | \$1,445.0               | \$52.0                   | 13    | K              | 0                 | 5                  | 0            | \$25            |     |
| Lincoln Elementary School - Interior | A        | Front Stairs         | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 5                        | 0           | 300                    | 25                                                                 | 2160            | 648                 | \$103.7                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 5                        | 170                    | 2160                                       | 2160                                    | 367.2                        | 367.2                     | None Proposed                  |                           | 0.13           | 280.8           | 44.9                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$325.0     | \$620.0         | \$945.0                 | \$26.0                   | 13    | K              | 0                 | 5                  | 0            | \$25            |     |
| Lincoln Elementary School - Interior | A        | Front Stairs         | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 2                        | 0           | 224                    | 25                                                                 | 2160            | 483.84              | \$77.4                      | Remove Ballast, Install 4-T1W LED Tube Retrofit Bulbs | 2                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.088          | 190.08          | 30.4                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$130.0     | \$448.0         | \$578.0                 | \$20.8                   | 13    | K              | 0                 | 5                  | 0            | \$10            |     |
| Harrison School Building - Interior  | 001      | Board Room           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 27                       | 1           | 1420                   | 60                                                                 | 500             | 810                 | \$121.5                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 27                       | 918                    | 500                                        | 350                                     | 459                          | 321.3                     | None Proposed                  | 1                         | 0.702          | 488.7           | 73.3                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$1,756.0   | \$3,348.0       | \$5,103.0               | \$140.4                  | 7     | K              | 0                 | 5                  | 0            | \$135           |     |
| Harrison School Building - Interior  | 001      | Boiler Room          | 4 T5 Fixture w/4 T5FQ28 Lamps                     | 2                        | 1           | 240                    | 60                                                                 | 500             | 120                 | \$18.0                      | None Proposed.                                        | 2                        | 240                    | 500                                        | 500                                     | 120                          | 120                       | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 7     | 0              | 0                 | 0                  | 0            | \$0             |     |
| Harrison School Building - Interior  | 001      | Boiler Room          | 4 T5 Fixture w/2 T5FQ28 Lamps                     | 2                        | 1           | 120                    | 60                                                                 | 500             | 60                  | \$9.0                       | None Proposed.                                        | 2                        | 120                    | 500                                        | 500                                     | 60                           | 60                        | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0 | 7              | 0                 | 0                  | 0            | 0               | \$0 |
| Harrison School Building - Interior  | 001      | Maintenance Office   | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 11                       | 1           | 660                    | 49                                                                 | 2160            | 1425.6              | \$213.8                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 11                       | 374                    | 2160                                       | 2160                                    | 807.84                       | 807.84                    | None Proposed                  |                           | 0.286          | 617.76          | 92.7                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$715.0     | \$1,354.0       | \$2,079.0               | \$57.2                   | 7     | K              | 0                 | 5                  | 0            | \$55            |     |
| Harrison School Building - Interior  | 001      | Main Office          | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 8                        | 1           | 480                    | 47                                                                 | 2160            | 1036.8              | \$155.5                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 8                        | 272                    | 2160                                       | 2160                                    | 587.52                       | 587.52                    | None Proposed                  |                           | 0.208          | 449.28          | 67.4                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$520.0     | \$962.0         | \$1,512.0               | \$41.6                   | 7     | K              | 0                 | 5                  | 0            | \$40            |     |
| Harrison School Building - Interior  | 001      | Printer Room         | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                        | 1           | 240                    | 43                                                                 | 2160            | 518.4               | \$77.8                      | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 4                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.104          | 234.64          | 33.7                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$260.0     | \$496.0         | \$756.0                 | \$20.8                   | 7     | K              | 0                 | 5                  | 0            | \$20            |     |
| Harrison School Building - Interior  | 001      | Office               | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 1           | 120                    | 39                                                                 | 2160            | 259.2               | \$38.9                      | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 16.8                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 7     | K              | 0                 | 5                  | 0            | \$10            |     |
| Harrison School Building - Interior  | 001      | Women's Bathroom     | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                        | 1           | 62                     | 30                                                                 | 500             | 31                  | \$4.7                       | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 1                        | 34                     | 500                                        | 500                                     | 17                           | 17                        | None Proposed                  |                           | 0.028          | 14              | 2.1                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 7     | K              | 0                 | 5                  | 0            | \$5             |     |
| Harrison School Building - Interior  | 001      | Men's Bathroom       | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                        | 1           | 62                     | 30                                                                 | 500             | 31                  | \$4.7                       | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 1                        | 34                     | 500                                        | 500                                     | 17                           | 17                        | None Proposed                  |                           | 0.028          | 14              | 2.1                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 7     | K              | 0                 | 5                  | 0            | \$5             |     |
| Harrison School Building - Interior  | 001      | Nurse's Office       | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 6                        | 1           | 360                    | 52                                                                 | 2160            | 777.6               | \$116.6                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 6                        | 204                    | 2160                                       | 2160                                    | 440.64                       | 440.64                    | None Proposed                  |                           | 0.156          | 336.96          | 50.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$390.0     | \$744.0         | \$1,134.0               | \$31.2                   | 7     | K              | 0                 | 5                  | 0            | \$30            |     |
| Harrison School Building - Interior  | 001      | Nurse's Bathroom     | 13W CFL Fixture                                   | 1                        | 1           | 13                     | 8                                                                  | 500             | 6.5                 | \$1.0                       | None Proposed                                         | 1                        | 13                     | 500                                        | 500                                     | 6.5                          | 6.5                       | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 7     | N              | 0                 | 0                  | 0            | \$0             |     |
| Harrison School Building - Interior  | 001      | Gym                  | 2x4 LED Fixture Recessed                          | 25                       | 1           | 1050                   | 60                                                                 | 500             | 525                 | \$78.8                      | None Proposed.                                        | 25                       | 1050                   | 500                                        | 500                                     | 525                          | 525                       | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | \$0.0 | 7              | 0                 | 0                  | 0            | 0               | \$0 |
| Harrison School Building - Interior  | 001      | Gym Stage            | 60W Incandescent Fixture                          | 3                        | 1           | 180                    | 15                                                                 | 500             | 90                  | \$13.5                      | Replace 60W Incandescent Fixture with 13W CFL         | 3                        | 39                     | 500                                        | 500                                     | 19.5                         | 19.5                      | None Proposed                  |                           | 0.141          | 70.5            | 10.6                | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$12.0      | \$18.8          | \$30.8                  | \$64.0                   | 7     | N              | 0                 | 0                  | 0            | \$0             |     |
| Harrison School Building - Interior  | 001      | Gym Hall             | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 1           | 120                    | 68                                                                 | 2160            | 259.2               | \$38.9                      | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 16.8                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 7     | K              | 0                 | 5                  | 0            | \$10            |     |
| Harrison School Building - Interior  | 001      | Gym Storage          | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 1           | 120                    | 38                                                                 | 500             | 60                  | \$9.0                       | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 2                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  |                           | 0.052          | 26              | 3.9                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 7     | K              | 0                 | 5                  | 0            | \$10            |     |
| Harrison School Building - Interior  | 001      | Gym Storage          | 100W Incandescent Fixture                         | 2                        | 1           | 200                    | 10                                                                 | 500             | 100                 | \$15.0                      | Replace 100W Incandescent Fixture with 25W CFL        | 2                        | 50                     | 500                                        | 500                                     | 25                           | 25                        | None Proposed                  |                           | 0.15           | 75              | 11.3                | \$0.0                                    | \$7.0                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$7.0              | \$11.0                     | \$8.0       | \$14.0          | \$22.0                  | \$67.2                   | 7     | N              | 0                 | 0                  | 0            | \$0             |     |
| Harrison School Building - Interior  | 001      | Office Hallway       | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 17                       | 1           | 1020                   | 18                                                                 | 2160            | 2203.2              | \$330.5                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 17                       | 578                    | 2160                                       | 2160                                    | 1248.48                      | 1248.48                   | None Proposed                  |                           | 0.442          | 954.72          | 143.2               | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$1,106.0   | \$2,108.0       | \$3,213.0               | \$88.4                   | 7     | K              | 0                 | 5                  | 0            | \$85            |     |
| Harrison School Building - Interior  | 001      | Girls Bathroom       | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 1           | 120                    | 24                                                                 | 500             | 60                  | \$9.0                       | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 2                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  |                           | 0.052          | 26              | 3.9                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 7     | K              | 0                 | 5                  | 0            | \$10            |     |
| Harrison School Building - Interior  | 001      | Boys Bathroom        | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 1           | 120                    | 36                                                                 | 500             | 60                  | \$9.0                       | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 2                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  |                           | 0.052          | 26              | 3.9                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 7     | K              | 0                 | 5                  | 0            | \$10            |     |
| Harrison School Building - Interior  | 001      | Room 14              | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 11                       | 1           | 660                    | 24                                                                 | 2160            | 1425.6              | \$213.8                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 11                       | 374                    | 2160                                       | 2160                                    | 807.84                       | 807.84                    | None Proposed                  |                           | 0.286          | 617.76          | 92.7                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$715.0     | \$1,354.0       | \$2,079.0               | \$57.2                   | 7     | K              | 0                 | 5                  | 0            | \$55            |     |
| Harrison School Building - Interior  | 001      | Room 13              | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 11                       | 0           | 660                    | 30                                                                 | 2160            | 1425.6              | \$213.8                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 11                       | 374                    | 2160                                       | 2160                                    | 807.84                       | 807.84                    | None Proposed                  |                           | 0.286          | 617.76          | 92.7                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$715.0     | \$1,354.0       | \$2,079.0               | \$57.2                   | 7     | K              | 0                 | 5                  | 0            | \$55            |     |
| Harrison School Building - Interior  | 001      | Room 12              | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 10                       | 0           | 600                    | 30                                                                 | 2160            | 1296                | \$194.4                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 10                       | 340                    | 2160                                       | 2160                                    | 734.4                        | 734.4                     | None Proposed                  |                           | 0.26           | 561.6           | 84.2                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$650.0     | \$1,240.0       | \$1,890.0               | \$52.0                   | 7     | K              | 0                 | 5                  | 0            | \$50            |     |
| Harrison School Building - Interior  | 001      | Custodial Closet     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 8                        | 0           | 480                    | 32                                                                 | 500             | 240                 | \$36.0                      | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 8                        | 272                    | 500                                        | 500                                     | 136                          | 136                       | None Proposed                  |                           | 0.208          | 104             | 15.6                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$520.0     | \$962.0         | \$1,512.0               | \$41.6                   | 7     | K              | 0                 | 5                  | 0            | \$40            |     |
| Harrison School Building - Interior  | 001      | Continuing Education | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 11                       | 0           | 660                    | 48                                                                 | 2160            | 1425.6              | \$213.8                     | Remove Ballast, Install 2-T1W LED Tube Retrofit Bulbs | 11                       | 374                    | 2160                                       | 2160                                    | 807.84                       | 807.84                    | None Proposed                  |                           | 0.286          | 617.76          | 92.7                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$715.0     | \$1,354.0       | \$2,079.0</             |                          |       |                |                   |                    |              |                 |     |

Appendix D - Lighting Upgrades

| Building                              | Location | Location/Room #      | Existing Fixture/Lamp & Ballast Description       | Qty of Existing Fixtures | Occ Sensor | Existing Fixture Watts | Approximate Measured Lighting Level (Footcandles) "NR" = Not Recorded | Operating Hours | Existing kWh | Existing Annual Energy Cost | Proposed Replacement Solution                         | Qty of Proposed Fixtures | Proposed Fixture Watts | Proposed Operational Hours Without Sensors | Proposed Operational Hours With Sensors | Proposed kWh Without Sensors | Proposed kWh With Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor Quantity | Total kW Saved | Total kWh Saved | Energy Cost Savings | Ballast/Fixture/Reflector Per Unit Price | Bulb (Per Unit Price) | Labor (Per Unit Price) | Occupancy Sensor (Per Unit Price) | Occupancy Sensor (Per Unit Labor Price) | Labor Subtotal | Materials Subtotal | Labor & Materials Subtotal | Labor Total | Materials Total | Labor & Materials Total | Maintenance Cost Savings | ID | Incentive      |                   |                    |              | Total Incentive |
|---------------------------------------|----------|----------------------|---------------------------------------------------|--------------------------|------------|------------------------|-----------------------------------------------------------------------|-----------------|--------------|-----------------------------|-------------------------------------------------------|--------------------------|------------------------|--------------------------------------------|-----------------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------|----------------|-----------------|---------------------|------------------------------------------|-----------------------|------------------------|-----------------------------------|-----------------------------------------|----------------|--------------------|----------------------------|-------------|-----------------|-------------------------|--------------------------|----|----------------|-------------------|--------------------|--------------|-----------------|
|                                       |          |                      |                                                   |                          |            |                        |                                                                       |                 |              |                             |                                                       |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                          |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          |    | Incentive Code | Incentive Code OS | Lighting Incentive | OS Incentive |                 |
| James Caldwell High School - Interior | 001      | Kitchen Bathroom     | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                        | 1          | 248                    | 36                                                                    | 500             | 124          | \$14.9                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                        | 136                    | 500                                        | 500                                     | 68                           | 68                        | None Proposed                  |                           | 0.112          | 56              | 6.7                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$260.0     | \$496.0         | \$756.0                 | \$20.8                   | 1  | K              | 0                 | 5                  | 0            | \$20            |
| James Caldwell High School - Interior | 001      | Kitchen Office       | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                        | 1          | 62                     | 48                                                                    | 2160            | 133.92       | \$16.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 2160                                       | 2160                                    | 73.44                        | 73.44                     | None Proposed                  |                           | 0.028          | 60.48           | 7.3                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 1  | K              | 0                 | 5                  | 0            | \$5             |
| James Caldwell High School - Interior | 001      | Library Office 1     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 32                                                                    | 2160            | 259.2        | \$31.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 13.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Library Office 2     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 44                                                                    | 2160            | 259.2        | \$31.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 13.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Library Office 3     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                        | 0          | 240                    |                                                                       | 2160            | 518.4        | \$62.2                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.104          | 224.64          | 27.0                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$260.0     | \$496.0         | \$756.0                 | \$20.8                   | 1  | K              | 0                 | 5                  | 0            | \$20            |
| James Caldwell High School - Interior | 001      | Library Office 4     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 31                                                                    | 2160            | 259.2        | \$31.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 13.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Library Office 4     | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 124                    | 31                                                                    | 2160            | 267.84       | \$32.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.056          | 120.96          | 14.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Storage              | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 5                        | 0          | 160                    | 28                                                                    | 500             | 80           | \$9.6                       | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 5                        | 85                     | 500                                        | 500                                     | 42.5                         | 42.5                      | None Proposed                  |                           | 0.075          | 37.5            | 4.5                 | \$24.0                                   | \$50.0                | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$74.0             | \$139.0                    | \$325.0     | \$370.0         | \$695.0                 | \$13.0                   | 1  | K              | 0                 | 5                  | 0            | \$25            |
| James Caldwell High School - Interior | 001      | AV Room              | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 5                        | 0          | 300                    | 34                                                                    | 500             | 150          | \$18.0                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 5                        | 170                    | 500                                        | 500                                     | 85                           | 85                        | None Proposed                  |                           | 0.13           | 65              | 7.8                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$325.0     | \$620.0         | \$945.0                 | \$26.0                   | 1  | K              | 0                 | 5                  | 0            | \$25            |
| James Caldwell High School - Interior | 001      | Office               | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 45                                                                    | 2160            | 259.2        | \$31.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 13.5                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Circuit Breaker Room | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 8                        | 0          | 896                    | 45                                                                    | 500             | 448          | \$53.8                      | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 8                        | 544                    | 500                                        | 500                                     | 272                          | 272                       | None Proposed                  |                           | 0.352          | 176             | 21.1                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$520.0     | \$1,792.0       | \$2,312.0               | \$83.2                   | 1  | K              | 0                 | 5                  | 0            | \$40            |
| James Caldwell High School - Interior | 001      | 406                  | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 16                       | 0          | 1792                   | 36                                                                    | 2160            | 3870.72      | \$464.5                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 16                       | 1088                   | 2160                                       | 2160                                    | 2350.08                      | 2350.08                   | None Proposed                  |                           | 0.704          | 1520.64         | 182.5               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$1,040.0   | \$3,584.0       | \$4,624.0               | \$168.4                  | 1  | K              | 0                 | 5                  | 0            | \$80            |
| James Caldwell High School - Interior | 001      | 406A                 | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                        | 0          | 240                    | 35                                                                    | 2160            | 518.4        | \$62.2                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.104          | 224.64          | 27.0                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$260.0     | \$496.0         | \$756.0                 | \$20.8                   | 1  | K              | 0                 | 5                  | 0            | \$20            |
| James Caldwell High School - Interior | 001      | 407                  | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 16                       | 0          | 960                    | 35                                                                    | 2160            | 2073.6       | \$248.8                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 16                       | 544                    | 2160                                       | 2160                                    | 1175.04                      | 1175.04                   | None Proposed                  |                           | 0.416          | 898.56          | 107.8               | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$1,040.0   | \$1,984.0       | \$3,024.0               | \$83.2                   | 1  | K              | 0                 | 5                  | 0            | \$80            |
| James Caldwell High School - Interior | 001      | 400 Hallway          | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 18                       | 0          | 2016                   | 35                                                                    | 2160            | 4354.56      | \$522.5                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 18                       | 1224                   | 2160                                       | 2160                                    | 2643.84                      | 2643.84                   | None Proposed                  |                           | 0.792          | 1710.72         | 205.3               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$1,170.0   | \$4,032.0       | \$5,202.0               | \$187.2                  | 1  | K              | 0                 | 5                  | 0            | \$90            |
| James Caldwell High School - Interior | 001      | Stage Entry          | 13W CFL Fixture                                   | 2                        | 0          | 26                     | 40                                                                    | 2160            | 56.16        | \$6.7                       | None Proposed                                         | 2                        | 26                     | 2160                                       | 2160                                    | 56.16                        | 56.16                     | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 1  | N              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | Stage Storage        | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 3                        | 0          | 180                    | 18                                                                    | 500             | 90           | \$10.8                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 3                        | 102                    | 500                                        | 500                                     | 51                           | 51                        | None Proposed                  |                           | 0.078          | 39              | 4.7                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$195.0     | \$372.0         | \$567.0                 | \$15.6                   | 1  | K              | 0                 | 5                  | 0            | \$15            |
| James Caldwell High School - Interior | 001      | Auditorium Lobby     | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 15                       | 0          | 930                    | 27                                                                    | 2160            | 2008.8       | \$241.1                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 15                       | 510                    | 2160                                       | 2160                                    | 1101.6                       | 1101.6                    | None Proposed                  |                           | 0.42           | 907.2           | 108.9               | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$975.0     | \$1,860.0       | \$2,835.0               | \$78.0                   | 1  | K              | 0                 | 5                  | 0            | \$75            |
| James Caldwell High School - Interior | 001      | Auditorium Lobby     | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 25                       | 0          | 800                    | 45                                                                    | 2160            | 1728         | \$207.4                     | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 25                       | 425                    | 2160                                       | 2160                                    | 916                          | 918                       | None Proposed                  |                           | 0.375          | 810             | 97.2                | \$24.0                                   | \$50.0                | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$74.0             | \$139.0                    | \$1,625.0   | \$1,850.0       | \$3,475.0               | \$65.0                   | 1  | K              | 0                 | 5                  | 0            | \$125           |
| James Caldwell High School - Interior | 001      | Computer Lab         | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 10                       | 0          | 620                    | 45                                                                    | 2160            | 1339.2       | \$160.7                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 10                       | 340                    | 2160                                       | 2160                                    | 734.4                        | 734.4                     | None Proposed                  |                           | 0.28           | 604.8           | 72.6                | \$24.0                                   | \$100.0               | \$65.0</               |                                   |                                         |                |                    |                            |             |                 |                         |                          |    |                |                   |                    |              |                 |

Appendix D - Lighting Upgrades

| Building                              | Location | Location/Room #               | Existing Fixture/Lamp & Ballast Description       | Qty of Existing Fixtures | Occ Sensor | Existing Fixture Watts | Approximate Measured Lighting Level (Footcandle) "NR" - Not Recorded | Operating Hours | Existing kWh | Existing Annual Energy Cost | Proposed Replacement Solution                         | Qty of Proposed Fixtures | Proposed Fixture Watts | Proposed Operational Hours Without Sensors | Proposed Operational Hours With Sensors | Proposed kWh Without Sensors | Proposed kWh With Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor Quantity | Total kW Saved | Total kWh Saved | Energy Cost Savings | Ballast/Future/Reflector Per Unit Price | Bulb (Per Unit Price) | Labor (Per Unit Price) | Occupancy Sensor (Per Unit Price) | Occupancy Sensor (Per Unit Labor Price) | Labor Subtotal | Materials Subtotal | Labor & Materials Subtotal | Labor Total | Materials Total | Labor & Materials Total | Maintenance Cost Savings | ID | Incentive      |                   |                    |              | Total Incentive |
|---------------------------------------|----------|-------------------------------|---------------------------------------------------|--------------------------|------------|------------------------|----------------------------------------------------------------------|-----------------|--------------|-----------------------------|-------------------------------------------------------|--------------------------|------------------------|--------------------------------------------|-----------------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------|----------------|-----------------|---------------------|-----------------------------------------|-----------------------|------------------------|-----------------------------------|-----------------------------------------|----------------|--------------------|----------------------------|-------------|-----------------|-------------------------|--------------------------|----|----------------|-------------------|--------------------|--------------|-----------------|
|                                       |          |                               |                                                   |                          |            |                        |                                                                      |                 |              |                             |                                                       |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                         |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          |    | Incentive Code | Incentive Code OS | Lighting Incentive | OS Incentive |                 |
| James Caldwell High School - Interior | 001      | 301                           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 10                       | 0          | 600                    | 25                                                                   | 2160            | 1296         | \$155.5                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 10                       | 340                    | 2160                                       | 2160                                    | 734.4                        | 734.4                     | None Proposed                  |                           | 0.26           | 561.6           | 67.4                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$650.0     | \$1,240.0       | \$1,890.0               | \$52.0                   | 1  | K              | 0                 | 5                  | 0            | \$50            |
| James Caldwell High School - Interior | 001      | 303                           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 12                       | 0          | 720                    | 30                                                                   | 2160            | 1555.2       | \$186.6                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 12                       | 408                    | 2160                                       | 2160                                    | 881.28                       | 881.28                    | None Proposed                  |                           | 0.312          | 673.92          | 80.9                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$780.0     | \$1,488.0       | \$2,268.0               | \$62.4                   | 1  | K              | 0                 | 5                  | 0            | \$80            |
| James Caldwell High School - Interior | 001      | 300                           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 5                        | 0          | 300                    | 35                                                                   | 2160            | 648          | \$77.8                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 5                        | 170                    | 2160                                       | 2160                                    | 367.2                        | 367.2                     | None Proposed                  |                           | 0.13           | 280.8           | 33.7                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$325.0     | \$620.0         | \$945.0                 | \$26.0                   | 1  | K              | 0                 | 5                  | 0            | \$25            |
| James Caldwell High School - Interior | 001      | Storage Room 3 (No Access)    | No Access                                         | 0                        | 0          | 0                      | NR                                                                   | 2160            | 0            | \$0.0                       | None Proposed                                         | 0                        | 0                      | 2160                                       | 2160                                    | 0                            | 0                         | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                   | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 1  | N              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | Custodial (200)               | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 12                                                                   | 2160            | 259.2        | \$31.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 13.5                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$246.0         | \$376.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Storage Room (Near Receiving) | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 3                        | 0          | 180                    | 12                                                                   | 500             | 90           | \$10.8                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 3                        | 102                    | 500                                        | 500                                     | 51                           | 51                        | None Proposed                  |                           | 0.078          | 39              | 4.7                 | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$195.0     | \$372.0         | \$567.0                 | \$15.6                   | 1  | K              | 0                 | 5                  | 0            | \$15            |
| James Caldwell High School - Interior | 001      | Receiving                     | 60W Incandescent Fixture                          | 2                        | 0          | 120                    | 12                                                                   | 2160            | 259.2        | \$31.1                      | Replace 60W Incandescent Fixture with 13W CFL         | 2                        | 26                     | 2160                                       | 2160                                    | 56.16                        | 56.16                     | None Proposed                  |                           | 0.084          | 203.04          | 24.4                | \$0.0                                   | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$8.0       | \$12.5          | \$20.5                  | \$42.7                   | 1  | N              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | Receiving                     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                        | 0          | 60                     | 12                                                                   | 2160            | 129.6        | \$15.6                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 2160                                       | 2160                                    | 73.44                        | 73.44                     | None Proposed                  |                           | 0.026          | 56.16           | 6.7                 | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 1  | K              | 0                 | 5                  | 0            | \$5             |
| James Caldwell High School - Interior | 001      | 206                           | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 16                       | 0          | 960                    | 35                                                                   | 2160            | 2073.6       | \$248.8                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 16                       | 544                    | 2160                                       | 2160                                    | 1175.04                      | 1175.04                   | None Proposed                  |                           | 0.416          | 898.56          | 107.8               | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$1,040.0   | \$1,984.0       | \$3,024.0               | \$83.2                   | 1  | K              | 0                 | 5                  | 0            | \$80            |
| James Caldwell High School - Interior | 001      | 208A                          | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 24                       | 0          | 1440                   | 20                                                                   | 2160            | 3110.4       | \$373.2                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 24                       | 816                    | 2160                                       | 2160                                    | 1762.56                      | 1762.56                   | None Proposed                  |                           | 0.624          | 1347.84         | 161.7               | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$1,560.0   | \$2,976.0       | \$4,536.0               | \$124.8                  | 1  | K              | 0                 | 5                  | 0            | \$120           |
| James Caldwell High School - Interior | 001      | 208                           | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 16                       | 0          | 811.2                  | 25                                                                   | 2160            | 1752.192     | \$210.3                     | Replace T8 Fixture with 36W Linear Panel LED Fixture  | 16                       | 576                    | 2160                                       | 2160                                    | 1244.16                      | 1244.16                   | None Proposed                  |                           | 0.2352         | 508.032         | 61.0                | \$230.0                                 | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$230.0            | \$295.0                    | \$1,040.0   | \$3,680.0       | \$4,720.0               | \$187.8                  | 1  | O              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | Woodshop Hall                 | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 10                       | 0          | 600                    | 40                                                                   | 2160            | 1296         | \$155.5                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 10                       | 340                    | 2160                                       | 2160                                    | 734.4                        | 734.4                     | None Proposed                  |                           | 0.26           | 561.6           | 67.4                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$650.0     | \$1,240.0       | \$1,890.0               | \$52.0                   | 1  | K              | 0                 | 5                  | 0            | \$50            |
| James Caldwell High School - Interior | 001      | 207                           | 1x6 Fixture w/ 2-T12 Lamps w/ Magnetic Ballasts   | 16                       | 0          | 2739.2                 | 15                                                                   | 2160            | 5916.672     | \$710.0                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 16                       | 1088                   | 2160                                       | 2160                                    | 2350.08                      | 2350.08                   | None Proposed                  |                           | 1.6512         | 3566.592        | 428.0               | \$24.0                                  | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$1,040.0   | \$3,584.0       | \$4,624.0               | \$166.4                  | 1  | N              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | 207 (Storage Room)            | 4' T8 Fixture w/4 T5FC028 Lamps                   | 1                        | 0          | 120                    | 40                                                                   | 500             | 60           | \$7.2                       | None Proposed                                         | 1                        | 120                    | 500                                        | 500                                     | 60                           | 60                        | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                   | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 1  | O              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | 207 (Office)                  | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                        | 0          | 240                    | 30                                                                   | 2160            | 518.4        | \$62.2                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.104          | 224.64          | 27.0                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$260.0     | \$496.0         | \$756.0                 | \$20.8                   | 1  | K              | 0                 | 5                  | 0            | \$20            |
| James Caldwell High School - Interior | 001      | 207 (Storage Room)            | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 22                                                                   | 500             | 60           | \$7.2                       | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 500                                        | 500                                     | 34                           | 34                        | None Proposed                  |                           | 0.052          | 26              | 3.1                 | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              | 0                 | 5                  | 0            | \$10            |
| James Caldwell High School - Interior | 001      | Men's Bathroom (200)          | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 3                        | 0          | 180                    | 29                                                                   | 500             | 90           | \$10.8                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 3                        | 102                    | 500                                        | 500                                     | 51                           | 51                        | None Proposed                  |                           | 0.078          | 39              | 4.7                 | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$195.0     | \$372.0         | \$567.0                 | \$15.6                   | 1  | K              | 0                 | 5                  | 0            | \$15            |
| James Caldwell High School - Interior | 001      | Women's Bathroom (200)        | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 3                        | 0          | 180                    | 29                                                                   | 500             | 90           | \$10.8                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 3                        | 102                    | 500                                        | 500                                     | 51                           | 51                        | None Proposed                  |                           | 0.078          | 39              | 4.7                 | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$195.0     | \$372.0         | \$567.0                 | \$15.6                   | 1  | K              | 0                 | 5                  | 0            | \$15            |
| James Caldwell High School - Interior | 001      | Gym                           | 2x4 LED Fixture Recessed                          | 46                       | 0          | 1932                   | 43                                                                   | 2160            | 4173.12      | \$500.8                     | None Proposed                                         | 46                       | 1932                   | 2160                                       | 2160                                    | 4173.12                      | 4173.12                   | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                   | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | \$0.0                    | 1  | O              | 0                 | 0                  | 0            | \$0             |
| James Caldwell High School - Interior | 001      | Auxiliary Gym Vestibule #1    | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 120                    | 50                                                                   | 2160            | 259.2        | \$31.1                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 2160                                       | 2160                                    | 146.88                       | 146.88                    | None Proposed                  |                           | 0.052          | 112.32          | 13.5                | \$24.0                                  | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 1  | K              |                   |                    |              |                 |

Appendix D - Lighting Upgrades

| Building                                  | Location | Location/Room #       | Existing Fixture/Lamp & Ballast Description                 | Qty of Existing<br>Fixtures | Cct<br>Sensor | Existing Fixture<br>Watts | Approximate<br>Measured Lighting<br>Level<br>(Footcandles)<br>NTP Not<br>Recorded | Operating<br>Hours | Existing Annual<br>kWh | Existing Annual<br>Energy Cost | Proposed Replacement Solution                         | Qty of Proposed<br>Fixtures | Proposed Fixture<br>Watts | Proposed Operational Hours<br>Without Sensors | Proposed Operational<br>Hours With Sensors | Proposed kWh Without<br>Sensors | Proposed kWh With<br>Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor<br>Quantity | Total kW Saved | Total kWh Saved | Energy Cost<br>Savings | Ballast/Fixture/Reflector<br>Per Unit Price | Bulb (Per Unit<br>Price) | Labor (Per Unit<br>Price) | Occupancy<br>Sensor (Per<br>Unit Price) | Occupancy Sensor<br>(Per Unit Labor<br>Price) | Labor Subtotal | Materials Subtotal | Labor & Materials<br>Subtotal | Labor Total | Materials Total | Labor & Materials<br>Total | Maintenance<br>Cost Savings | ID | Incentive         |                      |                    |              | Total Incentive |
|-------------------------------------------|----------|-----------------------|-------------------------------------------------------------|-----------------------------|---------------|---------------------------|-----------------------------------------------------------------------------------|--------------------|------------------------|--------------------------------|-------------------------------------------------------|-----------------------------|---------------------------|-----------------------------------------------|--------------------------------------------|---------------------------------|------------------------------|--------------------------------|------------------------------|----------------|-----------------|------------------------|---------------------------------------------|--------------------------|---------------------------|-----------------------------------------|-----------------------------------------------|----------------|--------------------|-------------------------------|-------------|-----------------|----------------------------|-----------------------------|----|-------------------|----------------------|--------------------|--------------|-----------------|
|                                           |          |                       |                                                             |                             |               |                           |                                                                                   |                    |                        |                                |                                                       |                             |                           |                                               |                                            |                                 |                              |                                |                              |                |                 |                        |                                             |                          |                           |                                         |                                               |                |                    |                               |             |                 |                            |                             |    | Incentive<br>Code | Incentive<br>Code OS | Lighting Incentive | OS Incentive |                 |
| James Caldwell High School - Interior     | 001      | Auditorium            | 26W CFL Fixture                                             | 20                          | 0             | 520                       | 17                                                                                | 2160               | 1123.2                 | \$134.8                        | None Proposed                                         | 20                          | 520                       | 2160                                          | 2160                                       | 1123.2                          | 1123.2                       | None Proposed                  |                              | 0              | 0               | 0.0                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | 1                           | N  | 0                 | 0                    | \$0                |              |                 |
| James Caldwell High School - Interior     | 001      | Auditorium Hall/Lobby | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 21                          | 0             | 2352                      | 70                                                                                | 2160               | 5080.32                | \$609.6                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 21                          | 1428                      | 2160                                          | 2160                                       | 3084.48                         | 3084.48                      | None Proposed                  |                              | 0.024          | 1995.84         | 239.5                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$224.0        | \$289.0            | \$1,365.0                     | \$4,704.0   | \$6,069.0       | \$216.4                    | 1                           | K  | 0                 | 5                    | 0                  | \$105        |                 |
| James Caldwell High School - Interior     | 001      | 101                   | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 10                          | 0             | 600                       | 35                                                                                | 2160               | 1296                   | \$155.5                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 10                          | 340                       | 2160                                          | 2160                                       | 734.4                           | 734.4                        | None Proposed                  |                              | 0.26           | 561.6           | 67.4                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$650.0                       | \$1,240.0   | \$1,890.0       | \$52.0                     | 1                           | K  | 0                 | 5                    | 0                  | \$50         |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 2              | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 176                       | 19                                                                                | 2160               | 360.16                 | \$79.8                         | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 2                           | 102                       | 2160                                          | 2160                                       | 220.32                          | 220.32                       | None Proposed                  |                              | 0.074          | 159.84          | 33.6                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$130.0                       | \$348.0     | \$478.0         | \$15.6                     | 4                           | K  | 0                 | 5                    | 0                  | \$10         |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 2              | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 3                           | 0             | 336                       | 19                                                                                | 2160               | 725.76                 | \$152.4                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 3                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.132          | 285.12          | 59.9                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$224.0        | \$289.0            | \$195.0                       | \$672.0     | \$867.0         | \$31.2                     | 4                           | K  | 0                 | 5                    | 0                  | \$15         |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 4              | 1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 1                           | 0             | 32                        | 10                                                                                | 2160               | 69.12                  | \$14.5                         | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 1                           | 17                        | 2160                                          | 2160                                       | 36.72                           | 36.72                        | None Proposed                  |                              | 0.015          | 32.4            | 6.8                    | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$65.0                                        | \$74.0         | \$139.0            | \$65.0                        | \$74.0      | \$139.0         | \$2.6                      | 4                           | K  | 0                 | 5                    | 0                  | \$5          |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 4              | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 120                       | 10                                                                                | 2160               | 259.2                  | \$54.4                         | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                           | 68                        | 2160                                          | 2160                                       | 146.88                          | 146.88                       | None Proposed                  |                              | 0.052          | 112.32          | 23.6                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$130.0                       | \$248.0     | \$378.0         | \$10.4                     | 4                           | K  | 0                 | 5                    | 0                  | \$10         |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 4              | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 1                           | 0             | 88                        | 20                                                                                | 2160               | 190.08                 | \$39.9                         | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 1                           | 51                        | 2160                                          | 2160                                       | 110.16                          | 110.16                       | None Proposed                  |                              | 0.037          | 79.92           | 16.8                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$65.0                        | \$174.0     | \$239.0         | \$7.8                      | 4                           | K  | 0                 | 5                    | 0                  | \$5          |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 4              | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 1                           | 0             | 112                       | 20                                                                                | 2160               | 241.92                 | \$50.8                         | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 1                           | 68                        | 2160                                          | 2160                                       | 146.88                          | 146.88                       | None Proposed                  |                              | 0.044          | 95.04           | 20.0                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$224.0        | \$289.0            | \$65.0                        | \$224.0     | \$289.0         | \$10.4                     | 4                           | K  | 0                 | 5                    | 0                  | \$5          |                 |
| Grover Cleveland Middle School - Interior | 001      | Stairs 4              | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 1                           | 0             | 60                        | 20                                                                                | 2160               | 129.6                  | \$27.4                         | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                           | 34                        | 2160                                          | 2160                                       | 73.44                           | 73.44                        | None Proposed                  |                              | 0.026          | 56.16           | 11.8                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$65.0                        | \$124.0     | \$189.0         | \$5.2                      | 4                           | K  | 0                 | 5                    | 0                  | \$5          |                 |
| Grover Cleveland Middle School - Interior | 002      | Auditorium            | 26W CFL Fixture                                             | 44                          | 0             | 1144                      | 6                                                                                 | 2160               | 2471.04                | \$518.9                        | None Proposed                                         | 44                          | 1144                      | 2160                                          | 2160                                       | 2471.04                         | 2471.04                      | None Proposed                  |                              | 0              | 0               | 0.0                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | 4                           | N  | 0                 | 0                    | 0                  | \$0          |                 |
| Grover Cleveland Middle School - Interior | 002      | Stage                 | LED - 400w Metal Halide Replacement                         | 1                           | 0             | 145                       | 10                                                                                | 2160               | 313.2                  | \$65.8                         | None Proposed                                         | 1                           | 145                       | 2160                                          | 2160                                       | 313.2                           | 313.2                        | None Proposed                  |                              | 0              | 0               | 0.0                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | 4                           | O  | 0                 | 0                    | 0                  | \$0          |                 |
| Grover Cleveland Middle School - Interior | 002      | Stage                 | 60W Incandescent Fixture                                    | 2                           | 0             | 120                       | 10                                                                                | 2160               | 259.2                  | \$54.4                         | Replace 60W Incandescent Fixture with 13W CFL         | 2                           | 25                        | 2160                                          | 2160                                       | 56.16                           | 56.16                        | None Proposed                  |                              | 0.094          | 203.04          | 42.6                   | \$0.0                                       | \$6.3                    | \$4.0                     | \$0.0                                   | \$0.0                                         | \$4.0          | \$6.3              | \$10.3                        | \$8.0       | \$12.5          | \$20.5                     | \$42.7                      | 4  | N                 | 0                    | 0                  | 0            | \$0             |
| Grover Cleveland Middle School - Interior | 002      | Guidance Office       | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 10                          | 0             | 600                       | 25                                                                                | 2160               | 1296                   | \$272.2                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 10                          | 340                       | 2160                                          | 2160                                       | 734.4                           | 734.4                        | None Proposed                  |                              | 0.26           | 561.6           | 117.9                  | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$650.0                       | \$1,240.0   | \$1,890.0       | \$52.0                     | 4                           | K  | 0                 | 5                    | 0                  | \$50         |                 |
| Grover Cleveland Middle School - Interior | 002      | Side Hall             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 7                           | 0             | 784                       | 19                                                                                | 2160               | 1693.44                | \$356.5                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 7                           | 476                       | 2160                                          | 2160                                       | 1028.16                         | 1028.16                      | None Proposed                  |                              | 0.308          | 665.28          | 139.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$224.0        | \$289.0            | \$455.0                       | \$1,568.0   | \$2,023.0       | \$72.8                     | 4                           | K  | 0                 | 5                    | 0                  | \$35         |                 |
| Grover Cleveland Middle School - Interior | 001      | 117                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 9                           | 0             | 792                       | 50                                                                                | 2160               | 1710.72                | \$359.3                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 9                           | 459                       | 2160                                          | 2160                                       | 991.44                          | 991.44                       | None Proposed                  |                              | 0.333          | 719.28          | 151.0                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$585.0                       | \$1,556.0   | \$2,151.0       | \$70.2                     | 4                           | K  | 0                 | 5                    | 0                  | \$45         |                 |
| Grover Cleveland Middle School - Interior | 001      | 117A (Lab Storage)    | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 4                           | 0             | 352                       | 22                                                                                | 2160               | 760.32                 | \$159.7                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 4                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.148          | 319.68          | 67.1                   | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$260.0                       | \$686.0     | \$956.0         | \$31.2                     | 4                           | K  | 0                 | 5                    | 0                  | \$20         |                 |
| Grover Cleveland Middle School - Interior | 001      | 115                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                          | 0             | 1056                      | 45                                                                                | 2160               | 2280.96                | \$479.0                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.444          | 959.04          | 201.4                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$780.0                       | \$2,088.0   | \$2,868.0       | \$93.6                     | 4                           | K  | 0                 | 5                    | 0                  | \$60         |                 |
| Grover Cleveland Middle School - Interior | 001      | 115A                  | 1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 4                           | 0             | 240                       | 40                                                                                | 2160               | 518.4                  | \$108.9                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 4                           | 136                       | 2160                                          | 2160                                       | 293.76                          | 293.76                       | None Proposed                  |                              | 0.104          | 224.64          | 47.2                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$260.0                       | \$496.0     | \$756.0         | \$20.8                     | 4                           | K  | 0                 | 5                    | 0                  | \$20         |                 |
| Grover Cleveland Middle School - Interior | 001      | Library               | 1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 82                          | 0             | 2624                      | 35                                                                                | 2160               | 5667.84                | \$1,190.2                      | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 82                          | 1394                      | 2160                                          | 2160                                       | 3011.04                         | 3011.04                      | None Proposed                  |                              | 1.23           | 2656.8          | 557.9                  | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$65.0                                        | \$74.0         | \$139.0            | \$5,330.0                     | \$6,068.0   | \$11,398.0      | \$213.2                    | 4                           | K  | 0                 | 5                    | 0                  | \$410        |                 |
| Grover Cleveland Middle School - Interior | 001      | Library               | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 9                           | 0             | 558                       | 35                                                                                | 2160               | 1205.28                | \$253.1                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 9                           | 306                       | 2160                                          | 2160                                       | 660.96                          | 660.96                       | None Proposed                  |                              | 0.252          | 544.32          | 114.3                  | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$585.0                       | \$1,116.0   | \$1,701.0       | \$46.8                     | 4                           | K  | 0                 | 5                    | 0                  | \$45         |                 |
| Grover Cleveland Middle School - Interior | 001      | Library Chandelier    | 42W CFL Fixture                                             | 3                           | 0             | 147                       | 35                                                                                | 2160               | 317.52                 | \$66.7                         | None Proposed                                         | 3                           | 147                       | 2160                                          | 2160                                       | 317.52                          | 317.52                       | None Proposed                  |                              | 0              | 0               | 0.0                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | 4                           | N  | 0                 | 0                    | 0                  | \$0          |                 |
| Grover Cleveland Middle School - Interior | 001      | Library Office        | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 18                          | 0             | 1116                      | 35                                                                                | 2160               | 2410.56                | \$506.2                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 18                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.504          | 1088.64         | 228.6                  | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$1,170.0                     | \$2,232.0   | \$3,402.0       | \$93.6                     | 4                           | K  | 0                 | 5                    | 0                  | \$90         |                 |
| Grover Cleveland Middle School - Interior | 001      | 114                   | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 11                          | 0             | 660                       | 38                                                                                | 2160               | 1425.6                 | \$299.4                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 11                          | 374                       | 2160                                          | 2160                                       | 807.84                          | 807.84                       | None Proposed                  |                              | 0.286          | 617.76          | 129.7                  | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$715.0                       | \$1,364.0   | \$2,079.0       | \$57.2                     | 4                           | K  | 0                 | 5                    | 0                  | \$55         |                 |
| Grover Cleveland Middle School - Interior | 001      | 112                   | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 11                          | 0             | 1232                      | 55                                                                                | 2160               | 2601.12                | \$558.8                        | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 11                          | 748                       | 2160                                          | 2160                                       | 1615.68                         | 1615.68                      | None Proposed                  |                              | 0.484          | 1045.44         | 219.5                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$224.0        | \$289.0            | \$715.0                       | \$2,454.0   | \$3,179.0       | \$114.4                    | 4                           | K  | 0                 | 5                    | 0                  | \$55         |                 |
| Grover Cleveland Middle School - Interior | 001      | Transformer Room      | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 3                           | 0             | 336                       | 38                                                                                | 500                | 168                    | \$35.3                         | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 3                           | 204                       | 500                                           | 500                                        | 102                             | 102                          | None Proposed                  |                              | 0.132          | 66              | 13.9                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$224.0        | \$289.0            | \$195.0                       | \$672.0     | \$867.0         | \$31.2                     | 4                           | K  | 0                 | 5                    | 0                  | \$15         |                 |
| Grover Cleveland Middle School - Interior | 001      | 113                   | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 8                           | 0             | 480                       | 47                                                                                | 2160               | 1036.8                 | \$217.7                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 8                           | 272                       | 2160                                          | 2160                                       | 587.52                          | 587.52                       | None Proposed                  |                              | 0.208          | 449.28          | 94.3                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$520.0                       | \$992.0     | \$1,512.0       | \$41.6                     | 4                           | K  | 0                 | 5                    | 0                  | \$40         |                 |
| Grover Cleveland Middle School - Interior | 001      | 110                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                          | 0             | 1056                      | 60                                                                                | 2160               | 2280.96                | \$479.0                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.444          | 959.04          | 201.4                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$780.0                       | \$2,088.0   | \$2,868.0       | \$93.6                     | 4                           | K  | 0                 | 5                    | 0                  | \$60         |                 |
| Grover Cleveland Middle School - Interior | 001      | 109                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts           | 12                          | 0             | 1056                      | 60                                                                                | 2160               | 2280.96                | \$479.0                        | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                          | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.444          | 959.04          | 201.4                  | \$24.0                                      | \$150.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$174.0        | \$239.0            | \$780.0                       | \$2,088.0   | \$2,868.0       | \$93.6                     | 4                           | K  | 0                 | 5                    | 0                  | \$60         |                 |
| Grover Cleveland Middle School - Interior | 001      | 111                   | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 6                           | 0             | 360                       | 45                                                                                | 2160               | 777.6                  | \$163.3                        | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 6                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.156          | 336.96          | 70.8                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$390.0                       | \$744.0     | \$1,134.0       | \$31.2                     | 4                           | K  | 0                 | 5                    | 0                  | \$30         |                 |
| Grover Cleveland Middle School - Interior | 001      | Back Band Room        | 2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts           | 37                          | 0             | 2294                      | 30                                                                                | 2160               | 4955.04                | \$1,040.6                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 37                          | 1256                      | 2160                                          | 2160                                       | 2717.28                         | 2717.28                      | None Proposed                  |                              | 1.036          | 2237.76         | 469.9                  | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$65.0                                        | \$124.0        | \$189.0            | \$2,405.0                     | \$4,588.0   | \$6,993.0       | \$192.4                    | 4                           | K  | 0                 | 5                    | 0                  | \$185        |                 |
| Grover Cleveland Middle School - Interior | 001      | Back Band Room        | 60W Incandescent Fixture                                    | 7                           | 0             | 420                       | 30                                                                                | 2160               | 907.2                  | \$190.5                        | Replace 60W Incandescent Fixture with 13W CFL         | 7                           | 91                        | 2160                                          | 2160                                       | 196.56                          | 196.56                       | None Proposed                  |                              | 0.329          | 710.64          | 149.2                  | \$0.0                                       | \$6.3                    | \$4.0                     | \$0.0                                   | \$0.0                                         | \$4.0          | \$6.3              | \$10.3                        | \$28.0      | \$43.8          | \$71.8                     | \$149.3                     | 4  | N                 | 0                    | 0                  | 0            | \$0             |
| Grover Cleveland Middle School - Interior | 001      | Costume Closet        | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts           | 2                           | 0             | 224                       | 40                                                                                | 500                | 112                    | \$23.5                         | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                           | 136                       | 500                                           | 500                                        | 68                              | 68                           | None Proposed</                |                              |                |                 |                        |                                             |                          |                           |                                         |                                               |                |                    |                               |             |                 |                            |                             |    |                   |                      |                    |              |                 |

## Appendix D - Lighting Upgrades

| Building                                  | Location | Location/Room # | Existing Fixture/Lamp & Ballast Description       | Qty of Existing<br>Fixtures | Cct<br>Sensor | Existing Fixture<br>Watts | Approximate<br>Measured Lighting<br>Level<br>(Footcandles)<br>NTP Not<br>Recorded | Operating<br>Hours | Existing Annual<br>kWh | Existing Annual<br>Energy Cost | Proposed Replacement Solution                         | Qty of Proposed<br>Fixtures | Proposed Fixture<br>Watts | Proposed Operational Hours<br>Without Sensors | Proposed Operational<br>Hours With Sensors | Proposed kWh Without<br>Sensors | Proposed kWh With<br>Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor<br>Quantity | Total kW Saved | Total kWh Saved | Energy Cost<br>Savings | Ballast/Fixture/Reflector<br>Per Unit Price | Bulb (Per Unit<br>Price) | Labor (Per Unit<br>Price) | Occupancy<br>Sensor (Per<br>Unit Price) | Occupancy Sensor<br>(Per Unit Labor<br>Price) | Labor Subtotal | Materials Subtotal | Labor & Materials<br>Subtotal | Labor Total | Materials Total | Labor & Materials<br>Total | Maintenance<br>Cost Savings | ID | Incentive         |                      |                    |              | Total Incentive |      |
|-------------------------------------------|----------|-----------------|---------------------------------------------------|-----------------------------|---------------|---------------------------|-----------------------------------------------------------------------------------|--------------------|------------------------|--------------------------------|-------------------------------------------------------|-----------------------------|---------------------------|-----------------------------------------------|--------------------------------------------|---------------------------------|------------------------------|--------------------------------|------------------------------|----------------|-----------------|------------------------|---------------------------------------------|--------------------------|---------------------------|-----------------------------------------|-----------------------------------------------|----------------|--------------------|-------------------------------|-------------|-----------------|----------------------------|-----------------------------|----|-------------------|----------------------|--------------------|--------------|-----------------|------|
|                                           |          |                 |                                                   |                             |               |                           |                                                                                   |                    |                        |                                |                                                       |                             |                           |                                               |                                            |                                 |                              |                                |                              |                |                 |                        |                                             |                          |                           |                                         |                                               |                |                    |                               |             |                 |                            |                             |    | Incentive<br>Code | Incentive<br>Code OR | Lighting Incentive | OS Incentive |                 |      |
| Grover Cleveland Middle School - Interior | 017      | Faculty Dining  | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 10                          | 0             | 1120                      | 93                                                                                | 2160               | 2419.2                 | \$508.0                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 10                          | 680                       | 2160                                          | 2160                                       | 1468.8                          | 1468.8                       | None Proposed                  |                              | 0.44           | 990.4           | 199.6                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$650.0     | \$2,240.0       | \$2,890.0                  | \$104.0                     | 4  | K                 | 0                    |                    | 5            | 0               | \$50 |
| Grover Cleveland Middle School - Interior | 018      | 209             | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts | 9                           | 0             | 792                       | 45                                                                                | 2160               | 1710.72                | \$359.3                        | Remove Ballast, Install 3-T8W LED Tube Retrofit Bulbs | 9                           | 459                       | 2160                                          | 2160                                       | 991.44                          | 991.44                       | None Proposed                  |                              | 0.333          | 719.28          | 151.0                  | \$24.0                                      | \$190.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$174.0            | \$239.0                       | \$585.0     | \$1,568.0       | \$2,151.0                  | \$70.2                      | 4  | K                 | 0                    |                    | 5            | 0               | \$45 |
| Grover Cleveland Middle School - Interior | 019      | Nurse Lobby     | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 50.8                      | 23                                                                                | 2160               | 109.728                | \$23.0                         | Replace T8 Fixture with 22W Linear Panel LED Fixture  | 2                           | 44                        | 2160                                          | 2160                                       | 95.04                           | 95.04                        | None Proposed                  |                              | 0.0068         | 14.688          | 3.1                    | \$225.0                                     | \$0.0                    | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$225.0            | \$290.0                       | \$130.0     | \$450.0         | \$580.0                    | \$8.2                       | 4  | O                 | 0                    |                    | 0            | 0               | \$0  |
| Grover Cleveland Middle School - Interior | 020      | Nurse Office    | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 3                           | 0             | 336                       | 42                                                                                | 2160               | 725.76                 | \$152.4                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 3                           | 204                       | 2160                                          | 2160                                       | 440.64                          | 440.64                       | None Proposed                  |                              | 0.132          | 285.12          | 59.9                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$195.0     | \$672.0         | \$867.0                    | \$31.2                      | 4  | K                 | 0                    |                    | 5            | 0               | \$15 |
| Grover Cleveland Middle School - Interior | 021      | 211             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                           | 0             | 672                       | 40                                                                                | 2160               | 1451.52                | \$304.8                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 6                           | 408                       | 2160                                          | 2160                                       | 881.28                          | 881.28                       | None Proposed                  |                              | 0.264          | 570.24          | 119.8                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$390.0     | \$1,344.0       | \$1,734.0                  | \$62.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$30 |
| Grover Cleveland Middle School - Interior | 022      | Girls Bathroom  | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 5                           | 0             | 160                       | 15                                                                                | 500                | 80                     | \$16.8                         | Remove Ballast, Install 1-T8W LED Tube Retrofit Bulbs | 5                           | 85                        | 500                                           | 500                                        | 42.5                            | 42.5                         | None Proposed                  |                              | 0.075          | 37.5            | 7.9                    | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$325.0     | \$370.0         | \$695.0                    | \$13.0                      | 4  | K                 | 0                    |                    | 5            | 0               | \$25 |
| Grover Cleveland Middle School - Interior | 023      | Supply Closet   | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 1                           | 0             | 60                        | 3                                                                                 | 500                | 30                     | \$6.3                          | Remove Ballast, Install 2-T8W LED Tube Retrofit Bulbs | 1                           | 34                        | 500                                           | 500                                        | 17                              | 17                           | None Proposed                  |                              | 0.026          | 13              | 2.7                    | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$65.0      | \$124.0         | \$189.0                    | \$5.2                       | 4  | K                 | 0                    |                    | 5            | 0               | \$5  |
| Grover Cleveland Middle School - Interior | 024      | 212             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                           | 0             | 672                       | 40                                                                                | 2160               | 1451.52                | \$304.8                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 6                           | 408                       | 2160                                          | 2160                                       | 881.28                          | 881.28                       | None Proposed                  |                              | 0.264          | 570.24          | 119.8                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$390.0     | \$1,344.0       | \$1,734.0                  | \$62.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$30 |
| Grover Cleveland Middle School - Interior | 025      | 214             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 8                           | 0             | 896                       | 42                                                                                | 2160               | 1935.36                | \$406.4                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 8                           | 544                       | 2160                                          | 2160                                       | 1175.04                         | 1175.04                      | None Proposed                  |                              | 0.362          | 760.32          | 159.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$520.0     | \$1,792.0       | \$2,312.0                  | \$83.2                      | 4  | K                 | 0                    |                    | 5            | 0               | \$40 |
| Grover Cleveland Middle School - Interior | 026      | Boys Bathroom   | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 5                           | 0             | 160                       | 15                                                                                | 500                | 80                     | \$16.8                         | Remove Ballast, Install 1-T8W LED Tube Retrofit Bulbs | 5                           | 85                        | 500                                           | 500                                        | 42.5                            | 42.5                         | None Proposed                  |                              | 0.075          | 37.5            | 7.9                    | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$325.0     | \$370.0         | \$695.0                    | \$13.0                      | 4  | K                 | 0                    |                    | 5            | 0               | \$25 |
| Grover Cleveland Middle School - Interior | 027      | Side Hall       | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 7                           | 0             | 784                       | 32                                                                                | 2160               | 1693.44                | \$355.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 7                           | 476                       | 2160                                          | 2160                                       | 1028.16                         | 1028.16                      | None Proposed                  |                              | 0.308          | 665.28          | 139.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$455.0     | \$1,568.0       | \$2,023.0                  | \$72.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$35 |
| Grover Cleveland Middle School - Interior | 028      | 213             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 7                           | 0             | 784                       | 35                                                                                | 2160               | 1693.44                | \$355.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 7                           | 476                       | 2160                                          | 2160                                       | 1028.16                         | 1028.16                      | None Proposed                  |                              | 0.308          | 665.28          | 139.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$455.0     | \$1,568.0       | \$2,023.0                  | \$72.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$35 |
| Grover Cleveland Middle School - Interior | 029      | 218             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                           | 0             | 672                       | 35                                                                                | 2160               | 1451.52                | \$304.8                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 6                           | 408                       | 2160                                          | 2160                                       | 881.28                          | 881.28                       | None Proposed                  |                              | 0.264          | 570.24          | 119.8                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$390.0     | \$1,344.0       | \$1,734.0                  | \$62.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$30 |
| Grover Cleveland Middle School - Interior | 030      | 215             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 7                           | 0             | 784                       | 43                                                                                | 2160               | 1693.44                | \$355.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 7                           | 476                       | 2160                                          | 2160                                       | 1028.16                         | 1028.16                      | None Proposed                  |                              | 0.308          | 665.28          | 139.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$455.0     | \$1,568.0       | \$2,023.0                  | \$72.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$35 |
| Grover Cleveland Middle School - Interior | 031      | 216             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 12                          | 0             | 1344                      | 42                                                                                | 2160               | 2903.04                | \$609.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 12                          | 816                       | 2160                                          | 2160                                       | 1762.56                         | 1762.56                      | None Proposed                  |                              | 0.528          | 1140.48         | 239.5                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$780.0     | \$2,688.0       | \$3,468.0                  | \$124.8                     | 4  | K                 | 0                    |                    | 5            | 0               | \$60 |
| Grover Cleveland Middle School - Interior | 032      | 217             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 224                       | 7                                                                                 | 2160               | 483.84                 | \$101.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 2                           | 136                       | 2160                                          | 2160                                       | 293.76                          | 293.76                       | None Proposed                  |                              | 0.088          | 190.08          | 39.9                   | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$130.0     | \$448.0         | \$578.0                    | \$20.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$10 |
| Grover Cleveland Middle School - Interior | 002      | Nurse Bathroom  | 13W CFL Fixture                                   | 1                           | 0             | 13                        | 10                                                                                | 500                | 6.5                    | \$1.4                          | None Proposed                                         | 1                           | 13                        | 500                                           | 500                                        | 6.5                             | 6.5                          | None Proposed                  |                              | 0              | 0               | 0.0                    | \$0.0                                       | \$0.0                    | \$0.0                     | \$0.0                                   | \$0.0                                         | \$0.0          | \$0.0              | \$0.0                         | \$0.0       | \$0.0           | \$0.0                      | \$0.0                       | 4  | N                 | 0                    |                    | 0            | 0               | \$0  |
| Grover Cleveland Middle School - Interior | 001      | Staircase 1     | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 8                           | 0             | 256                       | 20                                                                                | 2160               | 552.96                 | \$116.1                        | Remove Ballast, Install 1-T8W LED Tube Retrofit Bulbs | 8                           | 136                       | 2160                                          | 2160                                       | 293.76                          | 293.76                       | None Proposed                  |                              | 0.12           | 259.2           | 54.4                   | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$520.0     | \$592.0         | \$1,112.0                  | \$20.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$40 |
| Grover Cleveland Middle School - Interior | 001      | Staircase 1     | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 120                       | 20                                                                                | 2160               | 259.2                  | \$54.4                         | Remove Ballast, Install 2-T8W LED Tube Retrofit Bulbs | 2                           | 68                        | 2160                                          | 2160                                       | 146.88                          | 146.88                       | None Proposed                  |                              | 0.062          | 112.32          | 23.6                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$130.0     | \$248.0         | \$378.0                    | \$10.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$10 |
| Grover Cleveland Middle School - Interior | 001      | Copy Room       | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 120                       | 8                                                                                 | 2160               | 259.2                  | \$54.4                         | Remove Ballast, Install 2-T8W LED Tube Retrofit Bulbs | 2                           | 68                        | 2160                                          | 2160                                       | 146.88                          | 146.88                       | None Proposed                  |                              | 0.062          | 112.32          | 23.6                   | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$130.0     | \$248.0         | \$378.0                    | \$10.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$10 |
| Grover Cleveland Middle School - Interior | 001      | Staircase 2     | 2X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 1                           | 0             | 32                        | 19                                                                                | 2160               | 69.12                  | \$14.5                         | Remove Ballast, Install 1-T8W LED Tube Retrofit Bulbs | 1                           | 17                        | 2160                                          | 2160                                       | 36.72                           | 36.72                        | None Proposed                  |                              | 0.015          | 32.4            | 6.8                    | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$65.0      | \$74.0          | \$139.0                    | \$2.6                       | 4  | K                 | 0                    |                    | 5            | 0               | \$5  |
| Grover Cleveland Middle School - Interior | 003      | 302             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 6                           | 0             | 672                       | 25                                                                                | 2160               | 1451.52                | \$304.8                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 6                           | 408                       | 2160                                          | 2160                                       | 881.28                          | 881.28                       | None Proposed                  |                              | 0.264          | 570.24          | 119.8                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$390.0     | \$1,344.0       | \$1,734.0                  | \$62.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$30 |
| Grover Cleveland Middle School - Interior | 003      | Staircase 2     | 100W Incandescent Fixture                         | 1                           | 0             | 100                       | 15                                                                                | 2160               | 216                    | \$45.4                         | Replace 100W Incandescent Fixture with 25W CFL        | 1                           | 25                        | 2160                                          | 2160                                       | 54                              | 54                           | None Proposed                  |                              | 0.075          | 162             | 34.0                   | \$0.0                                       | \$7.0                    | \$4.0                     | \$0.0                                   | \$0.0                                         | \$4.0          | \$7.0              | \$11.0                        | \$4.0       | \$7.0           | \$11.0                     | \$33.6                      | 4  | N                 | 0                    |                    | 0            | 0               | \$0  |
| Grover Cleveland Middle School - Interior | 003      | Staircase 2     | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 64                        | 9                                                                                 | 2160               | 138.24                 | \$29.0                         | Remove Ballast, Install 1-T8W LED Tube Retrofit Bulbs | 2                           | 34                        | 2160                                          | 2160                                       | 73.44                           | 73.44                        | None Proposed                  |                              | 0.03           | 64.8            | 13.6                   | \$24.0                                      | \$50.0                   | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$74.0             | \$139.0                       | \$130.0     | \$148.0         | \$278.0                    | \$5.2                       | 4  | K                 | 0                    |                    | 5            | 0               | \$10 |
| Grover Cleveland Middle School - Interior | 003      | 301             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 7                           | 0             | 784                       | 50                                                                                | 2160               | 1693.44                | \$355.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 7                           | 476                       | 2160                                          | 2160                                       | 1028.16                         | 1028.16                      | None Proposed                  |                              | 0.308          | 665.28          | 139.7                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$455.0     | \$1,568.0       | \$2,023.0                  | \$72.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$35 |
| Grover Cleveland Middle School - Interior | 003      | 304             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 15                          | 0             | 1680                      | 50                                                                                | 2160               | 3628.8                 | \$762.0                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 15                          | 1020                      | 2160                                          | 2160                                       | 2203.2                          | 2203.2                       | None Proposed                  |                              | 0.66           | 1425.6          | 299.4                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$975.0     | \$3,360.0       | \$4,335.0                  | \$156.0                     | 4  | K                 | 0                    |                    | 5            | 0               | \$75 |
| Grover Cleveland Middle School - Interior | 003      | 303             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 12                          | 0             | 1344                      | 42                                                                                | 2160               | 2903.04                | \$609.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 12                          | 816                       | 2160                                          | 2160                                       | 1762.56                         | 1762.56                      | None Proposed                  |                              | 0.528          | 1140.48         | 239.5                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$780.0     | \$2,688.0       | \$3,468.0                  | \$124.8                     | 4  | K                 | 0                    |                    | 5            | 0               | \$60 |
| Grover Cleveland Middle School - Interior | 003      | 300 Hall        | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 18                          | 0             | 2016                      | 29                                                                                | 2160               | 4354.56                | \$914.5                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 18                          | 1224                      | 2160                                          | 2160                                       | 2643.84                         | 2643.84                      | None Proposed                  |                              | 0.792          | 1710.72         | 359.3                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$1,170.0   | \$4,032.0       | \$5,202.0                  | \$187.2                     | 4  | K                 | 0                    |                    | 5            | 0               | \$90 |
| Grover Cleveland Middle School - Interior | 003      | 306             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 9                           | 0             | 1008                      | 47                                                                                | 2160               | 2177.28                | \$457.2                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 9                           | 612                       | 2160                                          | 2160                                       | 1321.92                         | 1321.92                      | None Proposed                  |                              | 0.396          | 855.36          | 179.6                  | \$24.0                                      | \$200.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$224.0            | \$289.0                       | \$585.0     | \$2,016.0       | \$2,601.0                  | \$93.6                      | 4  | K                 | 0                    |                    | 5            | 0               | \$45 |
| Grover Cleveland Middle School - Interior | 003      | 306A            | 1X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts | 2                           | 0             | 224                       | 19                                                                                | 2160               | 483.84                 | \$101.6                        | Remove Ballast, Install 4-T8W LED Tube Retrofit Bulbs | 2                           | 136                       | 2160                                          | 2160                                       | 293.76                          | 293.76                       | None Proposed                  |                              | 0.088          | 190.08          | 39.9                   | \$24.0                                      | \$400.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$424.0            | \$489.0                       | \$130.0     | \$848.0         | \$978.0                    | \$20.8                      | 4  | K                 | 0                    |                    | 5            | 0               | \$10 |
| Grover Cleveland Middle School - Interior | 003      | 305             | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts | 12                          | 0             | 720                       | 55                                                                                | 2160               | 1555.2                 | \$326.6                        | Remove Ballast, Install 2-T8W LED Tube Retrofit Bulbs | 12                          | 408                       | 2160                                          | 2160                                       | 881.28                          | 881.28                       | None Proposed                  |                              | 0.312          | 673.92          | 141.5                  | \$24.0                                      | \$100.0                  | \$65.0                    | \$0.0                                   | \$0.0                                         | \$65.0         | \$124.0            | \$189.0                       | \$780.0     | \$1,488.0       | \$2,268.0                  | \$62.4                      | 4  | K                 | 0                    |                    | 5            | 0               | \$60 |
| Grover Cleveland Middle School - Interior | 003      | Boys Bathroom   | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts | 3                           | 0             | 96                        | 18                                                                                | 500                | 48                     | \$10.1                         | Remove Ballast,                                       |                             |                           |                                               |                                            |                                 |                              |                                |                              |                |                 |                        |                                             |                          |                           |                                         |                                               |                |                    |                               |             |                 |                            |                             |    |                   |                      |                    |              |                 |      |

Appendix D - Lighting Upgrades

| Building                                  | Location | Location/Room #               | Existing Fixture/Lamp & Ballast Description         | Qty of Existing Fixtures | Occ Sensor | Existing Fixture Watts | Approximate Measured Lighting Level (Footcandles) TYP. Not Recorded | Operating Hours | Existing kWh | Existing Annual Energy Cost | Proposed Replacement Solution                         | Qty of Proposed Fixtures | Proposed Fixture Watts | Proposed Operational Hours Without Sensors | Proposed Operational Hours With Sensors | Proposed kWh Without Sensors | Proposed kWh With Sensors | Proposed Occupancy Sensor Type | Occupancy Sensor Quantity | Total kW Saved | Total kWh Saved | Energy Cost Savings | Ballast/Fixture/Reflector Per Unit Price | Bulb (Per Unit Price) | Labor (Per Unit Price) | Occupancy Sensor (Per Unit Price) | Occupancy Sensor (Per Unit Labor Price) | Labor Subtotal | Materials Subtotal | Labor & Materials Subtotal | Labor Total | Materials Total | Labor & Materials Total | Maintenance Cost Savings | ID | Incentive Code |                   |                    |              |       | Total Incentive |
|-------------------------------------------|----------|-------------------------------|-----------------------------------------------------|--------------------------|------------|------------------------|---------------------------------------------------------------------|-----------------|--------------|-----------------------------|-------------------------------------------------------|--------------------------|------------------------|--------------------------------------------|-----------------------------------------|------------------------------|---------------------------|--------------------------------|---------------------------|----------------|-----------------|---------------------|------------------------------------------|-----------------------|------------------------|-----------------------------------|-----------------------------------------|----------------|--------------------|----------------------------|-------------|-----------------|-------------------------|--------------------------|----|----------------|-------------------|--------------------|--------------|-------|-----------------|
|                                           |          |                               |                                                     |                          |            |                        |                                                                     |                 |              |                             |                                                       |                          |                        |                                            |                                         |                              |                           |                                |                           |                |                 |                     |                                          |                       |                        |                                   |                                         |                |                    |                            |             |                 |                         |                          |    | Incentive Code | Incentive Code OS | Lighting Incentive | OS Incentive |       |                 |
| Grover Cleveland Middle School - Interior | 001      | 103                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 9                        | 0          | 792                    | 33                                                                  | 2160            | 1710.72      | \$399.3                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 9                        | 459                    | 2160                                       | 2160                                    | 991.44                       | 991.44                    | None Proposed                  |                           | 0.333          | 719.28          | 151.0               | \$24.0                                   | \$190.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$565.0     | \$1,568.0       | \$2,151.0               | \$70.2                   | 4  | K              | 0                 | 5                  | 0            | \$45  |                 |
| Grover Cleveland Middle School - Interior | 001      | Hallway                       | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts   | 5                        | 0          | 160                    | 33                                                                  | 2160            | 345.6        | \$72.6                      | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 5                        | 85                     | 2160                                       | 2160                                    | 183.6                        | 183.6                     | None Proposed                  |                           | 0.075          | 162             | 34.0                | \$24.0                                   | \$50.0                | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$74.0             | \$139.0                    | \$325.0     | \$370.0         | \$665.0                 | \$13.0                   | 4  | K              | 0                 | 5                  | 0            | \$25  |                 |
| Grover Cleveland Middle School - Interior | 001      | Hallway                       | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 1                        | 0          | 60                     | 25                                                                  | 2160            | 129.6        | \$27.2                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 1                        | 34                     | 2160                                       | 2160                                    | 73.44                        | 73.44                     | None Proposed                  |                           | 0.026          | 56.16           | 11.8                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$65.0      | \$124.0         | \$189.0                 | \$5.2                    | 4  | K              | 0                 | 5                  | 0            | \$5   |                 |
| Grover Cleveland Middle School - Interior | 001      | Hallway                       | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts   | 36                       | 0          | 4032                   | 25                                                                  | 2160            | 8708.12      | \$1,828.9                   | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 36                       | 2448                   | 2160                                       | 2160                                    | 5287.68                      | 5287.68                   | None Proposed                  |                           | 1.584          | 3421.44         | 718.5               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$2,340.0   | \$8,064.0       | \$10,404.0              | \$374.4                  | 4  | K              | 0                 | 5                  | 0            | \$180 |                 |
| Grover Cleveland Middle School - Interior | 001      | 105                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 9                        | 0          | 792                    | 25                                                                  | 2160            | 1710.72      | \$399.3                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 9                        | 459                    | 2160                                       | 2160                                    | 991.44                       | 991.44                    | None Proposed                  |                           | 0.333          | 719.28          | 151.0               | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$585.0     | \$1,566.0       | \$2,151.0               | \$70.2                   | 4  | K              | 0                 | 5                  | 0            | \$45  |                 |
| Grover Cleveland Middle School - Interior | 001      | Custodial Office              | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts   | 2                        | 0          | 224                    | 22                                                                  | 2160            | 483.84       | \$101.6                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 2                        | 136                    | 2160                                       | 2160                                    | 293.76                       | 293.76                    | None Proposed                  |                           | 0.088          | 190.08          | 38.9                | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$130.0     | \$448.0         | \$578.0                 | \$20.8                   | 4  | K              | 0                 | 5                  | 0            | \$10  |                 |
| Grover Cleveland Middle School - Interior | 001      | Custodial Storage             | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts   | 1                        | 0          | 112                    | 22                                                                  | 900             | 56           | \$11.8                      | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 1                        | 68                     | 900                                        | 900                                     | 34                           | 34                        | None Proposed                  |                           | 0.044          | 22              | 4.6                 | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$65.0      | \$224.0         | \$289.0                 | \$10.4                   | 4  | K              | 0                 | 5                  | 0            | \$5   |                 |
| Grover Cleveland Middle School - Interior | 001      | Custodial Storage             | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 2                        | 0          | 120                    | 17                                                                  | 900             | 60           | \$12.6                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 2                        | 68                     | 900                                        | 900                                     | 34                           | 34                        | None Proposed                  |                           | 0.052          | 26              | 5.5                 | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$130.0     | \$248.0         | \$378.0                 | \$10.4                   | 4  | K              | 0                 | 5                  | 0            | \$10  |                 |
| Grover Cleveland Middle School - Interior | 001      | 106                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 12                       | 0          | 1056                   | 33                                                                  | 2160            | 2280.96      | \$479.0                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                       | 612                    | 2160                                       | 2160                                    | 121.92                       | 121.92                    | None Proposed                  |                           | 0.444          | 959.04          | 201.4               | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$780.0     | \$2,088.0       | \$2,868.0               | \$93.6                   | 4  | K              | 0                 | 5                  | 0            | \$60  |                 |
| Grover Cleveland Middle School - Interior | 001      | 108                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 12                       | 0          | 1056                   | 37                                                                  | 2160            | 2280.96      | \$479.0                     | Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs | 12                       | 612                    | 2160                                       | 2160                                    | 121.92                       | 121.92                    | None Proposed                  |                           | 0.444          | 959.04          | 201.4               | \$24.0                                   | \$150.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$174.0            | \$239.0                    | \$780.0     | \$2,088.0       | \$2,868.0               | \$93.6                   | 4  | K              | 0                 | 5                  | 0            | \$60  |                 |
| Grover Cleveland Middle School - Interior | 001      | Girls Bathroom                | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts   | 4                        | 0          | 128                    | 12                                                                  | 900             | 64           | \$13.4                      | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 4                        | 68                     | 900                                        | 900                                     | 34                           | 34                        | None Proposed                  |                           | 0.06           | 30              | 6.3                 | \$24.0                                   | \$50.0                | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$74.0             | \$139.0                    | \$260.0     | \$296.0         | \$556.0                 | \$10.4                   | 4  | K              | 0                 | 5                  | 0            | \$20  |                 |
| Grover Cleveland Middle School - Interior | 001      | Girls Bathroom Entry way      | 2x2 LED Fixture Recessed                            | 1                        | 0          | 42                     | 30                                                                  | 900             | 21           | \$4.4                       | None Proposed                                         | 1                        | 42                     | 900                                        | 900                                     | 21                           | 21                        | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | 4                        | O  | 0              | 0                 | 0                  | \$0          |       |                 |
| Grover Cleveland Middle School - Interior | 001      | Storage Closet                | 1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 9                        | 0          | 540                    | 15                                                                  | 900             | 270          | \$56.7                      | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 9                        | 306                    | 900                                        | 900                                     | 153                          | 153                       | None Proposed                  |                           | 0.234          | 117             | 24.6                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$585.0     | \$1,116.0       | \$1,701.0               | \$46.8                   | 4  | K              | 0                 | 5                  | 0            | \$45  |                 |
| Grover Cleveland Middle School - Interior | 001      | Girls Bathroom Storage Closet | 13W CFL Fixture                                     | 1                        | 0          | 13                     | 15                                                                  | 900             | 6.5          | \$1.4                       | None Proposed                                         | 1                        | 13                     | 900                                        | 900                                     | 6.5                          | 6.5                       | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | 4                        | N  | 0              | 0                 | 0                  | \$0          |       |                 |
| Grover Cleveland Middle School - Interior | 001      | Woodward Room                 | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 8                        | 0          | 480                    | 67                                                                  | 2160            | 1036.8       | \$217.7                     | Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs | 8                        | 272                    | 2160                                       | 2160                                    | 587.52                       | 587.52                    | None Proposed                  |                           | 0.208          | 449.28          | 94.3                | \$24.0                                   | \$100.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$124.0            | \$189.0                    | \$520.0     | \$962.0         | \$1,512.0               | \$41.6                   | 4  | K              | 0                 | 5                  | 0            | \$40  |                 |
| Grover Cleveland Middle School - Interior | 001      | Band Room                     | 1X2 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 30                       | 0          | 900                    | 22                                                                  | 2160            | 1944         | \$408.2                     | 0                                                     | 30                       | 0                      | 2160                                       | 2160                                    | 0                            | 0                         | None Proposed                  |                           | 0.9            | 1944            | 408.2               | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | 4                        | K  | 0              | 5                 | 0                  | \$150        |       |                 |
| Grover Cleveland Middle School - Interior | 001      | Orchestra Room                | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts   | 9                        | 0          | 1008                   | 96                                                                  | 2160            | 2177.28      | \$457.2                     | Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs | 9                        | 612                    | 2160                                       | 2160                                    | 121.92                       | 121.92                    | None Proposed                  |                           | 0.396          | 855.36          | 179.6               | \$24.0                                   | \$200.0               | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$224.0            | \$289.0                    | \$2,016.0   | \$2,601.0       | \$93.6                  | 4                        | K  | 0              | 5                 | 0                  | \$45         |       |                 |
| Grover Cleveland Middle School - Interior | 001      | Band Room                     | 90W Halogen Fixture                                 | 5                        | 0          | 450                    | 96                                                                  | 2160            | 972          | \$204.1                     | Replace 90W Fixture with 44W LED Fixture              | 5                        | 220                    | 2160                                       | 2160                                    | 475.2                        | 475.2                     | None Proposed                  |                           | 0.23           | 496.8           | 104.3               | \$0.0                                    | \$390.0               | \$137.0                | \$0.0                             | \$137.0                                 | \$390.0        | \$527.0            | \$685.0                    | \$1,950.0   | \$2,635.0       | \$91.7                  | 4                        | E  | 0              | 30                | 0                  | \$150        |       |                 |
| Grover Cleveland Middle School - Interior | 001      | Band Room                     | 1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts   | 1                        | 0          | 32                     | 14                                                                  | 2160            | 66.12        | \$14.5                      | Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs | 1                        | 17                     | 2160                                       | 2160                                    | 36.72                        | 36.72                     | None Proposed                  |                           | 0.015          | 32.4            | 6.8                 | \$24.0                                   | \$50.0                | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$74.0             | \$139.0                    | \$65.0      | \$74.0          | \$139.0                 | \$2.6                    | 4  | K              | 0                 | 5                  | 0            | \$5   |                 |
| Grover Cleveland Middle School - Interior | 001      | Boiler Room                   | 60W Incandescent Fixture                            | 17                       | 0          | 1020                   | 5                                                                   | 900             | 910          | \$107.1                     | Replace 60W Incandescent Fixture with 13W CFL         | 17                       | 221                    | 900                                        | 900                                     | 110.5                        | 110.5                     | None Proposed                  |                           | 0.799          | 399.5           | 83.9                | \$0.0                                    | \$6.3                 | \$4.0                  | \$0.0                             | \$0.0                                   | \$4.0          | \$6.3              | \$10.3                     | \$68.0      | \$106.3         | \$174.3                 | \$362.6                  | 4  | N              | 0                 | 0                  | 0            | \$0   |                 |
| Grover Cleveland Middle School - Interior | 001      | Boiler Room                   | 4" T5 Fixture w/3 T5FC28 Lamps                      | 2                        | 0          | 180                    | 10                                                                  | 900             | 90           | \$18.9                      | None Proposed                                         | 2                        | 180                    | 900                                        | 900                                     | 90                           | 90                        | None Proposed                  |                           | 0              | 0               | 0.0                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | 4                        | O  | 0              | 0                 | 0                  | \$0          |       |                 |
| Washington Elementary School - Interior   | 001      | 102                           | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts   | 12                       | 0          | 1344                   | 38                                                                  | 2160            | 2903.04      | \$645.5                     | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 12                       | 600                    | 2160                                       | 2160                                    | 1296                         | 1296                      | None Proposed                  |                           | 0.744          | 1607.04         | 257.1               | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$780.0     | \$3,120.0       | \$3,900.0               | \$239.6                  | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | Main Hall                     | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 4                        | 0          | 202.8                  | 34                                                                  | 2160            | 438.048      | \$70.1                      | Replace T8 Fixture with 36W Linear Panel LED Fixture  | 4                        | 144                    | 2160                                       | 2160                                    | 311.04                       | 311.04                    | None Proposed                  |                           | 0.0588         | 127.008         | 20.3                | \$230.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$230.0            | \$295.0                    | \$260.0     | \$920.0         | \$1,180.0               | \$47.0                   | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | 101                           | 2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts   | 14                       | 0          | 1568                   | 46                                                                  | 2160            | 3386.88      | \$541.9                     | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 14                       | 700                    | 2160                                       | 2160                                    | 1512                         | 1512                      | None Proposed                  |                           | 0.868          | 1874.88         | 300.0               | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$910.0     | \$3,640.0       | \$4,550.0               | \$279.6                  | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | Back Atrium                   | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 1                        | 0          | 88                     | 44                                                                  | 2160            | 190.08       | \$30.4                      | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 1                        | 50                     | 2160                                       | 2160                                    | 108                          | 108                       | None Proposed                  |                           | 0.038          | 82.08           | 13.1                | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$65.0      | \$260.0         | \$325.0                 | \$15.9                   | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | 101 Bathroom                  | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 1                        | 0          | 50.7                   | 40                                                                  | 900             | 25.35        | \$4.1                       | Replace T8 Fixture with 36W Linear Panel LED Fixture  | 1                        | 36                     | 900                                        | 900                                     | 18                           | 18                        | None Proposed                  |                           | 0.0147         | 7.35            | 1.2                 | \$230.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$230.0            | \$295.0                    | \$65.0      | \$230.0         | \$295.0                 | \$11.7                   | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | 105                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 17                       | 0          | 1496                   | 40                                                                  | 2160            | 3231.36      | \$517.0                     | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 17                       | 850                    | 2160                                       | 2160                                    | 1836                         | 1836                      | None Proposed                  |                           | 0.646          | 1395.36         | 223.3               | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$1,105.0   | \$4,420.0       | \$5,525.0               | \$269.6                  | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | 105 Storage                   | 1X2 Fixtures with 2-T8 Lamps w/ Electronic Ballasts | 2                        | 0          | 60                     | 20                                                                  | 900             | 30           | \$4.8                       | 0                                                     | 2                        | 0                      | 900                                        | 900                                     | 0                            | 0                         | None Proposed                  |                           | 0.06           | 30              | 4.8                 | \$0.0                                    | \$0.0                 | \$0.0                  | \$0.0                             | \$0.0                                   | \$0.0          | \$0.0              | \$0.0                      | \$0.0       | \$0.0           | \$0.0                   | 16                       | K  | 0              | 5                 | 0                  | \$10         |       |                 |
| Washington Elementary School - Interior   | 001      | 105 Stairs                    | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 4                        | 0          | 202.8                  | 20                                                                  | 2160            | 438.048      | \$70.1                      | Replace T8 Fixture with 36W Linear Panel LED Fixture  | 4                        | 144                    | 2160                                       | 2160                                    | 311.04                       | 311.04                    | None Proposed                  |                           | 0.0588         | 127.008         | 20.3                | \$230.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$230.0            | \$295.0                    | \$260.0     | \$920.0         | \$1,180.0               | \$47.0                   | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 001      | 208                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 12                       | 0          | 1056                   | 25                                                                  | 2160            | 2280.96      | \$365.0                     | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 12                       | 600                    | 2160                                       | 2160                                    | 1296                         | 1296                      | None Proposed                  |                           | 0.456          | 984.96          | 157.6               | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$780.0     | \$3,120.0       | \$3,900.0               | \$190.3                  | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 002      | Girls Bathroom                | 2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts   | 2                        | 0          | 101.4                  | 13                                                                  | 900             | 50.7         | \$8.1                       | Replace T8 Fixture with 36W Linear Panel LED Fixture  | 2                        | 72                     | 900                                        | 900                                     | 36                           | 36                        | None Proposed                  |                           | 0.0294         | 14.7            | 2.4                 | \$230.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$230.0            | \$295.0                    | \$130.0     | \$460.0         | \$590.0                 | \$23.5                   | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 002      | 201                           | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 12                       | 0          | 1056                   | 41                                                                  | 2160            | 2280.96      | \$365.0                     | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 12                       | 600                    | 2160                                       | 2160                                    | 1296                         | 1296                      | None Proposed                  |                           | 0.456          | 984.96          | 157.6               | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$780.0     | \$3,120.0       | \$3,900.0               | \$190.3                  | 16 | O              | 0                 | 0                  | 0            | \$0   |                 |
| Washington Elementary School - Interior   | 002      | BSI Workroom                  | 2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts   | 5                        | 0          | 440                    | 36                                                                  | 2160            | 950.4        | \$152.1                     | Replace T8 Fixture with 50W Linear Panel LED Fixture  | 5                        | 250                    | 2160                                       | 2160                                    | 540                          | 540                       | None Proposed                  |                           | 0.19           | 410.4           | 65.7                | \$260.0                                  | \$0.0                 | \$65.0                 | \$0.0                             | \$0.0                                   | \$65.0         | \$260.0            | \$325.0                    | \$325.0     | \$1,300.0       | \$1,625.0               | \$79.3                   | 16 | O              | 0                 | 0                  |              |       |                 |

**Incentives**

|                                           | K               | D                  | E                  | F                       |                        |
|-------------------------------------------|-----------------|--------------------|--------------------|-------------------------|------------------------|
| <b>Location</b>                           | <b>LED Tube</b> | <b>Daylighting</b> | <b>LED Fixture</b> | <b>LED Pole Mounted</b> | <b>Total Incentive</b> |
| James Caldwell High School - Interior     | 3201            | 0                  | 8                  | 0                       | \$16,245.0             |
| James Caldwell High School - Exterior     | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| James Caldwell High School - Total        | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Grover Cleveland Middle School - Interior | 3272            | 0                  | 0                  | 0                       | \$16,360.0             |
| Grover Cleveland Middle School - Exterior | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Grover Cleveland Middle School - Total    | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Harrison School Building - Interior       | 600             | 0                  | 0                  | 0                       | \$3,000.0              |
| Harrison School Building - Exterior       | 0               | 0                  | 4                  | 0                       | \$120.0                |
| Harrison School Building - Total          | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Jefferson Elementary School - Interior    | 1176            | 0                  | 0                  | 0                       | \$5,880.0              |
| Jefferson Elementary School - Exterior    | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Jefferson Elementary School - Total       | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Lincoln Elementary School - Interior      | 813             | 0                  | 0                  | 0                       | \$4,065.0              |
| Lincoln Elementary School - Exterior      | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Lincoln Elementary School - Total         | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Washington Elementary School - Interior   | 253             | 0                  | 0                  | 0                       | \$1,265.0              |
| Washington Elementary School - Exterior   | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Washington Elementary School - Total      | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Wilson Elementary School - Interior       | 994             | 0                  | 0                  | 0                       | \$4,970.0              |
| Wilson Elementary School - Exterior       | 0               | 0                  | 0                  | 0                       | \$0.0                  |
| Wilson Elementary School - Total          | 0               | 0                  | 0                  | 0                       | \$0.0                  |

Energy Audit Lighting Summary

| Location                                  | ID | Cost        | Cost+Markup | Incentives | Cost (Post Incentive) | Energy Savings | Energy Savings+MCS | Simple Payback | KW Save | KWH Save | Base KW | Base KWH | MCS     | ARO    | IRR    | NPV       | Lifetime Savings |
|-------------------------------------------|----|-------------|-------------|------------|-----------------------|----------------|--------------------|----------------|---------|----------|---------|----------|---------|--------|--------|-----------|------------------|
| James Caldwell High School - Interior     | 1  | \$297,731.5 | \$427,989   | \$16,245   | \$411,744             | \$10,833       | \$20,361           | 20.2           | 43      | 90,277   | 110     | 232,840  | \$9,527 | (1.7%) | (1.0%) | (115,231) | \$378,684        |
| Grover Cleveland Middle School - Interior | 4  | \$267,832.0 | \$385,009   | \$16,360   | \$368,649             | \$19,570       | \$28,447           | 13.0           | 46      | 93,189   | 108     | 221,089  | \$8,877 | 1.0%   | 4.5%   | 45,630    | \$529,085        |
| Harrison School Building - Interior       | 7  | \$56,185.8  | \$80,767    | \$3,000    | \$77,767              | \$2,181        | \$3,857            | 20.2           | 8       | 14,543   | 20      | 35,391   | \$1,676 | (1.7%) | (0.9%) | (21,597)  | \$71,736         |
| Jefferson Elementary School - Interior    | 10 | \$89,355.3  | \$128,448   | \$5,880    | \$122,568             | \$4,577        | \$7,717            | 15.9           | 14      | 28,608   | 40      | 73,576   | \$3,140 | (0.4%) | 1.9%   | (10,182)  | \$143,531        |
| Lincoln Elementary School - Interior      | 13 | \$67,344.3  | \$96,807    | \$4,065    | \$92,742              | \$3,326        | \$5,432            | 17.1           | 10      | 20,786   | 24      | 49,923   | \$2,107 | (0.8%) | 1.0%   | (13,631)  | \$101,035        |
| Washington Elementary School - Interior   | 16 | \$80,270.0  | \$115,388   | \$1,265    | \$114,123             | \$3,710        | \$7,893            | 14.5           | 11      | 23,191   | 23      | 48,253   | \$4,182 | 0.2%   | 3.1%   | 821       | \$146,798        |
| Wilson Elementary School - Interior       | 19 | \$82,260.8  | \$118,250   | \$4,970    | \$113,280             | \$3,449        | \$6,067            | 18.7           | 13      | 26,529   | 31      | 64,183   | \$2,619 | (1.3%) | (0.0%) | (24,921)  | \$112,846        |

| ECM                                  | James Caldwell High School - Interior | Grover Cleveland Middle School - Interior | Harrison School Building - Interior | Jefferson Elementary School - Interior | Lincoln Elementary School - Interior | Washington Elementary School - Interior | Wilson Elementary School - Interior |
|--------------------------------------|---------------------------------------|-------------------------------------------|-------------------------------------|----------------------------------------|--------------------------------------|-----------------------------------------|-------------------------------------|
| Assumed Inflation (Gas)              | 2%                                    | 2%                                        | 2%                                  | 2%                                     | 2%                                   | 2%                                      | 2%                                  |
| Initial Yearly Savings (Gas)         |                                       |                                           |                                     |                                        |                                      |                                         |                                     |
| Assumed Inflation (Electricity)      | 3%                                    | 3%                                        | 3%                                  | 3%                                     | 3%                                   | 3%                                      | 3%                                  |
| Initial Yearly Savings (Electricity) | \$20,360.53                           | \$28,447.10                               | \$3,857.02                          | \$7,717.18                             | \$5,432.29                           | \$7,892.82                              | \$6,067.32                          |
| Assumed Average Useful Life (Years)  | 15                                    | 15                                        | 15                                  | 15                                     | 15                                   | 15                                      | 15                                  |
| <b>Lifetime Savings</b>              | <b>\$378,683.82</b>                   | <b>\$529,085.19</b>                       | <b>\$71,736.42</b>                  | <b>\$143,531.20</b>                    | <b>\$101,034.73</b>                  | <b>\$146,797.91</b>                     | <b>\$112,845.65</b>                 |
| <u>Year</u>                          | <u>Annual Savings</u>                 | <u>Annual Savings</u>                     | <u>Annual Savings</u>               | <u>Annual Savings</u>                  | <u>Annual Savings</u>                | <u>Annual Savings</u>                   | <u>Annual Savings</u>               |
| 1                                    | \$20,360.53                           | \$28,447.10                               | \$3,857.02                          | \$7,717.18                             | \$5,432.29                           | \$7,892.82                              | \$6,067.32                          |
| 2                                    | \$20,971.35                           | \$29,300.51                               | \$3,972.73                          | \$7,948.70                             | \$5,595.26                           | \$8,129.61                              | \$6,249.34                          |
| 3                                    | \$21,600.49                           | \$30,179.53                               | \$4,091.91                          | \$8,187.16                             | \$5,763.12                           | \$8,373.49                              | \$6,436.83                          |
| 4                                    | \$22,248.51                           | \$31,084.92                               | \$4,214.67                          | \$8,432.77                             | \$5,936.01                           | \$8,624.70                              | \$6,629.93                          |
| 5                                    | \$22,915.96                           | \$32,017.46                               | \$4,341.11                          | \$8,685.76                             | \$6,114.09                           | \$8,883.44                              | \$6,828.83                          |
| 6                                    | \$23,603.44                           | \$32,977.99                               | \$4,471.35                          | \$8,946.33                             | \$6,297.52                           | \$9,149.94                              | \$7,033.69                          |
| 7                                    | \$24,311.54                           | \$33,967.33                               | \$4,605.49                          | \$9,214.72                             | \$6,486.44                           | \$9,424.44                              | \$7,244.70                          |
| 8                                    | \$25,040.89                           | \$34,986.35                               | \$4,743.65                          | \$9,491.16                             | \$6,681.03                           | \$9,707.17                              | \$7,462.04                          |
| 9                                    | \$25,792.12                           | \$36,035.94                               | \$4,885.96                          | \$9,775.89                             | \$6,881.46                           | \$9,998.39                              | \$7,685.91                          |
| 10                                   | \$26,565.88                           | \$37,117.02                               | \$5,032.54                          | \$10,069.17                            | \$7,087.91                           | \$10,298.34                             | \$7,916.48                          |
| 11                                   | \$27,362.86                           | \$38,230.53                               | \$5,183.52                          | \$10,371.25                            | \$7,300.55                           | \$10,607.29                             | \$8,153.98                          |
| 12                                   | \$28,183.74                           | \$39,377.44                               | \$5,339.02                          | \$10,682.38                            | \$7,519.56                           | \$10,925.51                             | \$8,398.60                          |
| 13                                   | \$29,029.25                           | \$40,558.76                               | \$5,499.19                          | \$11,002.86                            | \$7,745.15                           | \$11,253.28                             | \$8,650.55                          |
| 14                                   | \$29,900.13                           | \$41,775.53                               | \$5,664.17                          | \$11,332.94                            | \$7,977.50                           | \$11,590.87                             | \$8,910.07                          |
| 15                                   | \$30,797.13                           | \$43,028.79                               | \$5,834.09                          | \$11,672.93                            | \$8,216.83                           | \$11,938.60                             | \$9,177.37                          |

**IRR, NPV, AROI**

Inflation Rate: 3%

| Lighting Upgrades<br>James Caldwell High School - Interior |               | Lighting Upgrades<br>Grover Cleveland Middle School - Interior |               | Lighting Upgrades<br>Harrison School Building - Interior |              |
|------------------------------------------------------------|---------------|----------------------------------------------------------------|---------------|----------------------------------------------------------|--------------|
| Life of ECRM (Yrs):                                        | 15            | Life of ECRM (Yrs):                                            | 15            | Life of ECRM (Yrs):                                      | 15           |
| Year                                                       | Cash Flow     | Year                                                           | Cash Flow     | Year                                                     | Cash Flow    |
| 0                                                          | (\$411,744.0) | 0                                                              | (\$368,648.5) | 0                                                        | (\$77,767.0) |
| 1                                                          | \$20,360.5    | 1                                                              | \$28,447.1    | 1                                                        | \$3,857.0    |
| 2                                                          | \$20,971.4    | 2                                                              | \$29,300.5    | 2                                                        | \$3,972.7    |
| 3                                                          | \$21,600.5    | 3                                                              | \$30,179.5    | 3                                                        | \$4,091.9    |
| 4                                                          | \$22,248.5    | 4                                                              | \$31,084.9    | 4                                                        | \$4,214.7    |
| 5                                                          | \$22,916.0    | 5                                                              | \$32,017.5    | 5                                                        | \$4,341.1    |
| 6                                                          | \$23,603.4    | 6                                                              | \$32,978.0    | 6                                                        | \$4,471.3    |
| 7                                                          | \$24,311.5    | 7                                                              | \$33,967.3    | 7                                                        | \$4,605.5    |
| 8                                                          | \$25,040.9    | 8                                                              | \$34,986.3    | 8                                                        | \$4,743.7    |
| 9                                                          | \$25,792.1    | 9                                                              | \$36,035.9    | 9                                                        | \$4,886.0    |
| 10                                                         | \$26,565.9    | 10                                                             | \$37,117.0    | 10                                                       | \$5,032.5    |
| 11                                                         | \$27,362.9    | 11                                                             | \$38,230.5    | 11                                                       | \$5,183.5    |
| 12                                                         | \$28,183.7    | 12                                                             | \$39,377.4    | 12                                                       | \$5,339.0    |
| 13                                                         | \$29,029.3    | 13                                                             | \$40,558.8    | 13                                                       | \$5,499.2    |
| 14                                                         | \$29,900.1    | 14                                                             | \$41,775.5    | 14                                                       | \$5,664.2    |
| 15                                                         | \$30,797.1    | 15                                                             | \$43,028.8    | 15                                                       | \$5,834.1    |
| IRR                                                        | (1.0%)        | IRR                                                            | 4.5%          | IRR                                                      | (0.9%)       |
| NPV                                                        | (\$115,231.4) | NPV                                                            | \$45,629.7    | NPV                                                      | (\$21,596.8) |
| ARO I                                                      | (1.7%)        | ARO I                                                          | 1.0%          | ARO I                                                    | (1.7%)       |

**IRR, NPV, AROI**

Inflation Rate: 3%

| Lighting Upgrades<br>Jefferson Elementary School - Interior |               | Lighting Upgrades<br>Lincoln Elementary School - Interior |              | Lighting Upgrades<br>Washington Elementary School - Interior |               |
|-------------------------------------------------------------|---------------|-----------------------------------------------------------|--------------|--------------------------------------------------------------|---------------|
| Life of ECRM (Yrs): 15                                      |               | Life of ECRM (Yrs): 15                                    |              | Life of ECRM (Yrs): 15                                       |               |
| Year                                                        | Cash Flow     | Year                                                      | Cash Flow    | Year                                                         | Cash Flow     |
| 0                                                           | (\$122,568.2) | 0                                                         | (\$92,742.4) | 0                                                            | (\$114,123.1) |
| 1                                                           | \$7,717.2     | 1                                                         | \$5,432.3    | 1                                                            | \$7,892.8     |
| 2                                                           | \$7,948.7     | 2                                                         | \$5,595.3    | 2                                                            | \$8,129.6     |
| 3                                                           | \$8,187.2     | 3                                                         | \$5,763.1    | 3                                                            | \$8,373.5     |
| 4                                                           | \$8,432.8     | 4                                                         | \$5,936.0    | 4                                                            | \$8,624.7     |
| 5                                                           | \$8,685.8     | 5                                                         | \$6,114.1    | 5                                                            | \$8,883.4     |
| 6                                                           | \$8,946.3     | 6                                                         | \$6,297.5    | 6                                                            | \$9,149.9     |
| 7                                                           | \$9,214.7     | 7                                                         | \$6,486.4    | 7                                                            | \$9,424.4     |
| 8                                                           | \$9,491.2     | 8                                                         | \$6,681.0    | 8                                                            | \$9,707.2     |
| 9                                                           | \$9,775.9     | 9                                                         | \$6,881.5    | 9                                                            | \$9,998.4     |
| 10                                                          | \$10,069.2    | 10                                                        | \$7,087.9    | 10                                                           | \$10,298.3    |
| 11                                                          | \$10,371.2    | 11                                                        | \$7,300.5    | 11                                                           | \$10,607.3    |
| 12                                                          | \$10,682.4    | 12                                                        | \$7,519.6    | 12                                                           | \$10,925.5    |
| 13                                                          | \$11,002.9    | 13                                                        | \$7,745.1    | 13                                                           | \$11,253.3    |
| 14                                                          | \$11,332.9    | 14                                                        | \$7,977.5    | 14                                                           | \$11,590.9    |
| 15                                                          | \$11,672.9    | 15                                                        | \$8,216.8    | 15                                                           | \$11,938.6    |
| IRR                                                         | 1.9%          | IRR                                                       | 1.0%         | IRR                                                          | 3.1%          |
| NPV                                                         | (\$10,182.0)  | NPV                                                       | (\$13,631.3) | NPV                                                          | \$820.9       |
| AROI                                                        | (0.4%)        | AROI                                                      | (0.8%)       | AROI                                                         | 0.2%          |

**IRR, NPV, AROI**

**Inflation Rate:**                      **3%**

| <b>Lighting Upgrades</b>                   |                      |
|--------------------------------------------|----------------------|
| <b>Wilson Elementary School - Interior</b> |                      |
| Life of ECRM (Yrs):                        | <b>15</b>            |
| Year                                       | Cash Flow            |
| 0                                          | <b>(\$113,279.8)</b> |
| 1                                          | <b>\$6,067.3</b>     |
| 2                                          | \$6,249.3            |
| 3                                          | \$6,436.8            |
| 4                                          | \$6,629.9            |
| 5                                          | \$6,828.8            |
| 6                                          | \$7,033.7            |
| 7                                          | \$7,244.7            |
| 8                                          | \$7,462.0            |
| 9                                          | \$7,685.9            |
| 10                                         | \$7,916.5            |
| 11                                         | \$8,154.0            |
| 12                                         | \$8,398.6            |
| 13                                         | \$8,650.6            |
| 14                                         | \$8,910.1            |
| 15                                         | \$9,177.4            |
| IRR                                        | <b>(0.0%)</b>        |
| NPV                                        | <b>(\$24,920.7)</b>  |
| AROI                                       | <b>(1.3%)</b>        |

# CDMSmith

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## ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: West Caldwell  
Estimate by: RG  
Checked by: ZP

| ITEM | DESCRIPTION                               | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL         |
|------|-------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|---------------|
| 1    | <b>James Caldwell High School - Total</b> |     |      |                       |                      |     |      |               |                   |               |
|      | Lighting Upgrades                         | 1   | ea.  | \$ 207,724.50         | \$ 207,724.50        | 1   | ea.  | \$ 90,007.00  | \$ 90,007.00      | \$ 297,731.50 |
|      | Subtotal                                  |     |      |                       | \$ 207,724.50        |     |      |               | \$ 90,007.00      |               |

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 297,731.50 |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 44,659.73  |
| SUB-TOTAL w/ OH & P =  | \$ | 342,391.23 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 85,597.81  |
| BUDGET COST ESTIMATE = | \$ | 427,989.03 |

- Notes:
- CDMSmith has no control over the cost of labor, materials, equipment, services furnished or market conditions.
  - CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
  - Bonds not included in estimate.
  - Escalation not included in estimate.
- o "This is an Opinion of Probable Construction Cost only. CDMSmith has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids. There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.

| ITEM | DESCRIPTION                                   | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL         |
|------|-----------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|---------------|
| 1    | <b>Grover Cleveland Middle School - Total</b> |     |      |                       |                      |     |      |               |                   |               |
|      | Lighting Upgrades                             | 1   | ea.  | \$ 190,034.00         | \$ 190,034.00        | 1   | ea.  | \$ 77,798.00  | \$ 77,798.00      | \$ 267,832.00 |
|      | Subtotal                                      |     |      |                       | \$ 190,034.00        |     |      |               | \$ 77,798.00      |               |

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 267,832.00 |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 40,174.80  |
| SUB-TOTAL w/ OH & P =  | \$ | 308,006.80 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 77,001.70  |
| BUDGET COST ESTIMATE = | \$ | 385,008.50 |

- Notes:
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  - Bonds not included in estimate.
  - Escalation not included in estimate.
- o "This is an Opinion of Probable Construction Cost only. CDMSmith has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids. There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.

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## ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: West Caldwell  
Estimate by: RG  
Checked by: ZP

| ITEM | DESCRIPTION                             | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL        |
|------|-----------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|--------------|
| 1    | <b>Harrison School Building - Total</b> |     |      |                       |                      |     |      |               |                   |              |
|      | Lighting Upgrades                       | 1   | ea.  | \$ 36,860.75          | \$ 36,860.75         | 1   | ea.  | \$ 19,325.00  | \$ 19,325.00      | \$ 56,185.75 |
|      | Subtotal                                |     |      |                       | \$ 36,860.75         |     |      |               | \$ 19,325.00      |              |

Notes:

1. CDMSmith has no control over the cost of labor, materials, equipment, services furnished or market conditions.
2. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
3. Bonds not included in estimate.
4. Escalation not included in estimate.

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|                        |    |           |
|------------------------|----|-----------|
| SUBTOTAL =             | \$ | 56,185.75 |
| MARKUP % =             | \$ | 0.15      |
| MARKUP =               | \$ | 8,427.86  |
| SUB-TOTAL w/ OH & P =  | \$ | 64,613.61 |
| CONTINGENCY % =        |    | 0.25      |
| CONTINGENCY =          | \$ | 16,153.40 |
| BUDGET COST ESTIMATE = | \$ | 80,767.02 |

| ITEM | DESCRIPTION                                | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL        |
|------|--------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|--------------|
| 1    | <b>Jefferson Elementary School - Total</b> |     |      |                       |                      |     |      |               |                   |              |
|      | Lighting Upgrades                          | 1   | ea.  | \$ 66,585.25          | \$ 66,585.25         | 1   | ea.  | \$ 22,770.00  | \$ 22,770.00      | \$ 89,355.25 |
|      | Subtotal                                   |     |      |                       | \$ 66,585.25         |     |      |               | \$ 22,770.00      |              |

Notes:

1. CDMSmith has no control over the cost of labor, materials, equipment, services furnished or market conditions.
2. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
3. Bonds not included in estimate.
4. Escalation not included in estimate.

o "This is an Opinion of Probable Construction Cost only. CDMSmith has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids. There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 89,355.25  |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 13,403.29  |
| SUB-TOTAL w/ OH & P =  | \$ | 102,758.54 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 25,689.63  |
| BUDGET COST ESTIMATE = | \$ | 128,448.17 |

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## ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: West Caldwell  
Estimate by: RG  
Checked by: ZP

| ITEM | DESCRIPTION                              | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL        |
|------|------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|--------------|
| 1    | <b>Lincoln Elementary School - Total</b> |     |      |                       |                      |     |      |               |                   |              |
|      | Lighting Upgrades                        | 1   | ea.  | \$ 47,450.25          | \$ 47,450.25         | 1   | ea.  | \$ 19,894.00  | \$ 19,894.00      | \$ 67,344.25 |
|      | Subtotal                                 |     |      |                       | \$ 47,450.25         |     |      |               | \$ 19,894.00      |              |

Notes:

1. CDMSmith has no control over the cost of labor, materials, equipment, services furnished or market conditions.
2. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
3. Bonds not included in estimate.
4. Escalation not included in estimate.

o "This is an Opinion of Probable Construction Cost only. CDMSmith has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids. There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.

|                        |    |           |
|------------------------|----|-----------|
| SUBTOTAL =             | \$ | 67,344.25 |
| MARKUP % =             | \$ | 0.15      |
| MARKUP =               | \$ | 10,101.64 |
| SUB-TOTAL w/ OH & P =  | \$ | 77,445.89 |
| CONTINGENCY % =        |    | 0.25      |
| CONTINGENCY =          | \$ | 19,361.47 |
| BUDGET COST ESTIMATE = | \$ | 96,807.36 |

| ITEM | DESCRIPTION                                 | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL        |
|------|---------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|--------------|
| 1    | <b>Washington Elementary School - Total</b> |     |      |                       |                      |     |      |               |                   |              |
|      | Lighting Upgrades                           | 1   | ea.  | \$ 63,890.00          | \$ 63,890.00         | 1   | ea.  | \$ 16,380.00  | \$ 16,380.00      | \$ 80,270.00 |
|      | Subtotal                                    |     |      |                       | \$ 63,890.00         |     |      |               | \$ 16,380.00      |              |

Notes:

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2. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
3. Bonds not included in estimate.
4. Escalation not included in estimate.

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|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 80,270.00  |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 12,040.50  |
| SUB-TOTAL w/ OH & P =  | \$ | 92,310.50  |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 23,077.63  |
| BUDGET COST ESTIMATE = | \$ | 115,388.13 |

# CDMSmith

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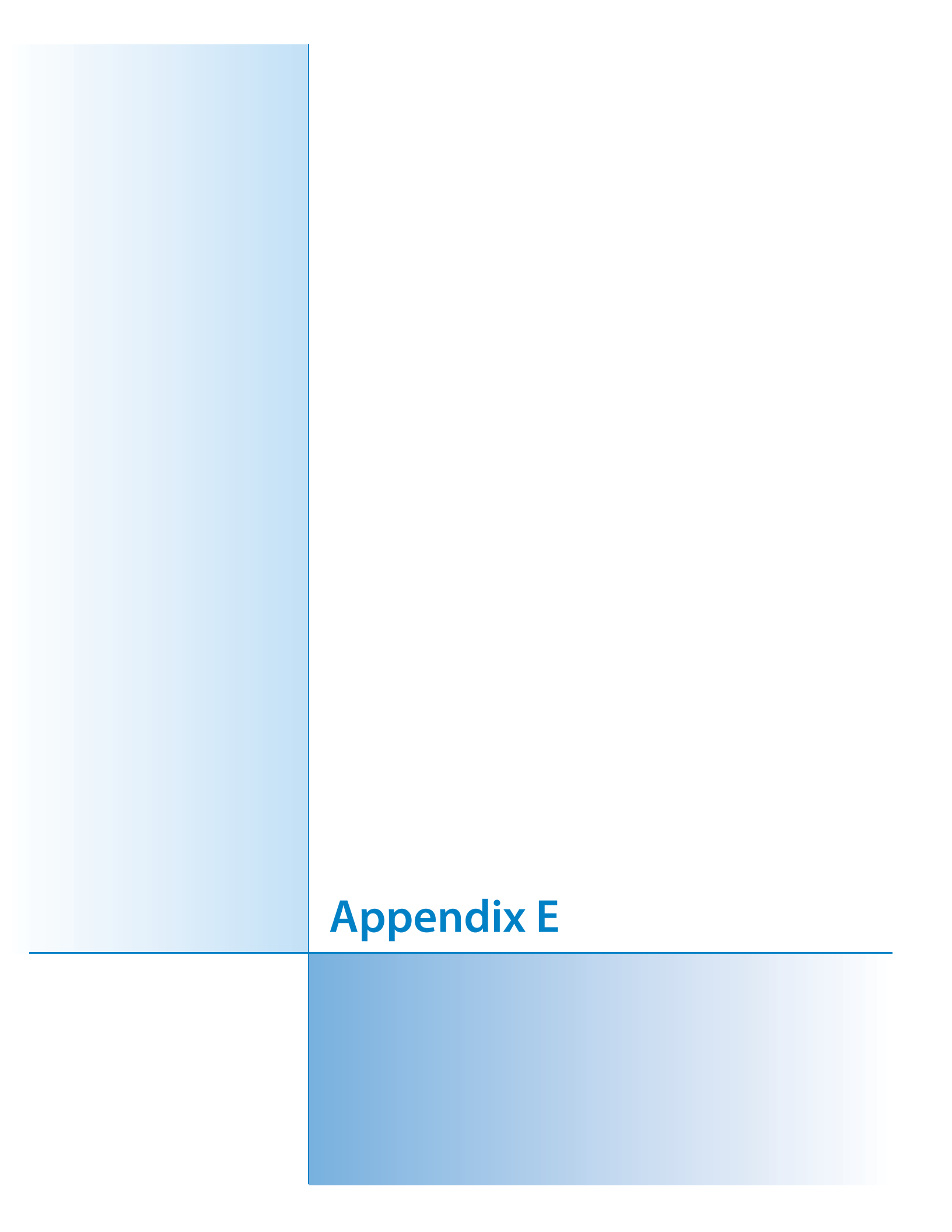
## ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: West Caldwell  
Estimate by: RG  
Checked by: ZP

| ITEM | DESCRIPTION                      | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL        |
|------|----------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|--------------|
| 1    | Wilson Elementary School - Total |     |      |                       |                      |     |      |               |                   |              |
|      | Lighting Upgrades                | 1   | ea.  | \$ 58,052.75          | \$ 58,052.75         | 1   | ea.  | \$ 24,208.00  | \$ 24,208.00      | \$ 82,260.75 |
|      | Subtotal                         |     |      |                       | \$ 58,052.75         |     |      |               | \$ 24,208.00      |              |

- Notes:
- CDMSmith has no control over the cost of labor, materials, equipment, services furnished or market conditions.
  - CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
  - Bonds not included in estimate.
  - Escalation not included in estimate.
- o "This is an Opinion of Probable Construction Cost only. CDMSmith has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDMSmith does not guarantee that this opinion will not vary from actual cost, or contractor's bids. There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 82,260.75  |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 12,339.11  |
| SUB-TOTAL w/ OH & P =  | \$ | 94,599.86  |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 23,649.97  |
| BUDGET COST ESTIMATE = | \$ | 118,249.83 |

The graphic consists of a large light blue rectangle on the left side of the page. A horizontal line extends from the right edge of this rectangle across the page. A vertical line extends from the bottom of the light blue rectangle down to the bottom of the page. These two lines intersect at the bottom right corner of the light blue rectangle, forming an L-shape. The text "Appendix E" is positioned at this intersection point, with the "A" and "E" partially overlapping the light blue area and the "ppendix" part on the white background.

## Appendix E

| SUMMARY DATA |  |  |
|--------------|--|--|
|--------------|--|--|

|                               |               |
|-------------------------------|---------------|
| Solar kWh:                    | 764,527.0     |
| Utility Savings:              | \$123,132.8   |
| SRECS:                        | \$139,564.4   |
| Maintenance Costs:            | -\$15,290.5   |
| Total Cost (For All Systems): | \$6,572,500.0 |

| ID | Building Name                  | AROI   | IRR    | NPV            | Lifetime Savings | Simple Payback | Energy Savings (\$) | SRECS      |
|----|--------------------------------|--------|--------|----------------|------------------|----------------|---------------------|------------|
| 1  | James Caldwell High School     | 0.65%  | 0.92%  | (\$414,305.10) | \$1,625,627.4    | 21.5           | \$44,588            | \$54,263.0 |
| 2  | Grover Cleveland Middle School | 0.46%  | 0.57%  | (\$298,583.06) | \$975,376.5      | 22.4           | \$26,753            | \$32,557.8 |
| 3  | Jefferson Elementary School    | -1.04% | -2.29% | (\$131,829.05) | \$156,060.2      | 33.8           | \$4,280             | \$4,341.0  |
| 4  | Lincoln Elementary School      | -1.18% | -2.48% | (\$121,761.72) | \$138,720.2      | 35.5           | \$3,805             | \$3,472.8  |
| 5  | Washington Elementary School   | -0.43% | -0.91% | (\$135,926.48) | \$249,696.4      | 28.0           | \$6,849             | \$6,945.7  |
| 6  | Wilson Elementary School       | -0.93% | -2.22% | (\$147,132.45) | \$173,400.3      | 32.6           | \$4,756             | \$5,426.3  |
| 7  | Harrison School Building       | 0.89%  | 1.64%  | (\$176,217.90) | \$1,170,451.8    | 20.5           | \$32,103            | \$32,557.8 |

**James Caldwell High School**

Design Goal: Provide

28% of average annual electricity

**Existing Conditions**

Average Annual Electrical Usage (kWh) 1,067,471  
 Current Utility Price (\$/kWh) 0.15  
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

**Calculations**

Solar Rating - Zip Code: 7040 4.50 kWh/sq-m/day  
 Solar Capacity Required (kW) 250  
 Roof Space Needed (sq-ft) 25,000.00  
 Annual Solar kWh (PV Watts) 297,250  
 Net System installation Cost (\$/kWh) \$1,500,000  
 Electrical Service Modification Cost \$100,000  
 Total System Installation Cost **\$1,600,000**  
     Materials \$1,120,000  
     Labor \$480,000  
 Engineers Opinion of Probable Cost \$2,000,000

**Assumptions**

Annual System Degredation 0.50%  
 Annual Utility Inflation 3.00%  
 Annual Maintenance Costs 2%

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS    | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|----------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |          |                   |                  |                       |                       |                     |
| 1       | 0.1500        | 297,250.0 | \$44,587.5      | \$54,263 | (\$5,945)         | \$92,905.5       | \$92,905.5            | \$0.183               |                     |
| 2       | 0.1545        | 295,763.8 | \$45,695.5      | \$53,992 | (\$5,915)         | \$93,771.9       | \$186,677.4           | \$0.183               |                     |
| 3       | 0.1591        | 294,284.9 | \$46,831.0      | \$53,722 | (\$5,886)         | \$94,667.0       | \$281,344.4           | \$0.183               |                     |
| 4       | 0.1639        | 292,813.5 | \$47,994.8      | \$53,453 | (\$5,856)         | \$95,591.6       | \$376,936.1           | \$0.183               |                     |
| 5       | 0.1688        | 291,349.4 | \$49,187.5      | \$53,186 | (\$5,827)         | \$96,546.3       | \$473,482.4           | \$0.183               |                     |
| 6       | 0.1739        | 289,892.7 | \$50,409.8      | \$52,920 | (\$5,798)         | \$97,531.8       | \$571,014.2           | \$0.183               |                     |
| 7       | 0.1791        | 288,443.2 | \$51,662.4      | \$52,655 | (\$5,769)         | \$98,548.9       | \$669,563.1           | \$0.183               |                     |
| 8       | 0.1845        | 287,001.0 | \$52,946.3      | \$52,392 | (\$5,740)         | \$99,598.3       | \$769,161.3           | \$0.183               |                     |
| 9       | 0.1900        | 285,566.0 | \$54,262.0      | \$52,130 | (\$5,711)         | \$100,680.7      | \$869,842.1           | \$0.183               |                     |
| 10      | 0.1957        | 284,138.2 | \$55,610.4      | \$51,869 | (\$5,683)         | \$101,797.0      | \$971,639.1           | \$0.183               |                     |
| 11      | 0.2016        | 282,717.5 | \$56,992.3      | \$51,610 | (\$5,654)         | \$102,948.0      | \$1,074,587.1         | \$0.183               |                     |
| 12      | 0.2076        | 281,303.9 | \$58,408.6      | \$51,352 | (\$5,626)         | \$104,134.5      | \$1,178,721.6         | \$0.183               |                     |
| 13      | 0.2139        | 279,897.4 | \$59,860.0      | \$51,095 | (\$5,598)         | \$105,357.3      | \$1,284,079.0         | \$0.183               |                     |
| 14      | 0.2203        | 278,497.9 | \$61,347.5      | \$50,840 | (\$5,570)         | \$106,617.4      | \$1,390,696.3         | \$0.183               |                     |
| 15      | 0.2269        | 277,105.4 | \$62,872.0      | \$50,586 | (\$5,542)         | \$107,915.5      | \$1,498,611.8         | \$0.183               |                     |
| 16      | 0.2337        | 275,719.9 | \$64,434.4      | \$6,893  | (\$5,514)         | \$65,813.0       | \$1,564,424.8         |                       | \$0.025             |
| 17      | 0.2407        | 274,341.3 | \$66,035.6      | \$6,859  | (\$5,487)         | \$67,407.3       | \$1,631,832.1         |                       | \$0.025             |
| 18      | 0.2479        | 272,969.6 | \$67,676.6      | \$6,824  | (\$5,459)         | \$69,041.4       | \$1,700,873.5         |                       | \$0.025             |
| 19      | 0.2554        | 271,604.7 | \$69,358.3      | \$6,790  | (\$5,432)         | \$70,716.4       | \$1,771,589.9         |                       | \$0.025             |
| 20      | 0.2630        | 270,246.7 | \$71,081.9      | \$6,756  | (\$5,405)         | \$72,433.1       | \$1,844,023.0         |                       | \$0.025             |
| 21      | 0.2709        | 268,895.5 | \$72,848.3      | \$6,722  | (\$5,378)         | \$74,192.7       | \$1,918,215.7         |                       | \$0.025             |
| 22      | 0.2790        | 267,551.0 | \$74,658.5      | \$6,689  | (\$5,351)         | \$75,996.3       | \$1,994,212.0         |                       | \$0.025             |
| 23      | 0.2874        | 266,213.2 | \$76,513.8      | \$6,655  | (\$5,324)         | \$77,844.9       | \$2,072,056.9         |                       | \$0.025             |
| 24      | 0.2960        | 264,882.2 | \$78,415.2      | \$6,622  | (\$5,298)         | \$79,739.6       | \$2,151,796.5         |                       | \$0.025             |
| 25      | 0.3049        | 263,557.8 | \$80,363.8      | \$6,589  | (\$5,271)         | \$81,681.6       | \$2,233,478.1         |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

**Grover Cleveland Middle School**  
Design Goal: Provide  
22% of average annual electricity

**Existing Conditions**

Average Annual Electrical Usage (kWh) 794,780  
Current Utility Price (\$/kWh) 0.15  
Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

**Calculations**

Solar Rating - Zip Code: 7040 4.50 kWh/sq-m/day  
Solar Capacity Required (kW) 150  
Roof Space Needed (sq-ft) 15,000.00  
Annual Solar kWh (PV Watts) 178,350  
Net System installation Cost (\$6/kWh) \$900,000  
Electrical Service Modification Cost \$100,000  
Total System Installation Cost **\$1,000,000**  
Materials \$700,000  
Labor \$300,000  
Engineers Opinion of Probable Cost \$1,250,000

**Assumptions**

Annual System Degredation 0.50%  
Annual Utility Inflation 3.00%  
Annual Maintenance Costs 2%

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS    | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|----------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |          |                   |                  |                       |                       |                     |
| 1       | 0.1500        | 178,350.0 | \$26,752.5      | \$32,558 | (\$3,567)         | \$55,743.3       | \$55,743.3            | \$0.183               |                     |
| 2       | 0.1545        | 177,458.3 | \$27,417.3      | \$32,395 | (\$3,549)         | \$56,263.1       | \$112,006.4           | \$0.183               |                     |
| 3       | 0.1591        | 176,571.0 | \$28,098.6      | \$32,233 | (\$3,531)         | \$56,800.2       | \$168,806.7           | \$0.183               |                     |
| 4       | 0.1639        | 175,688.1 | \$28,796.9      | \$32,072 | (\$3,514)         | \$57,355.0       | \$226,161.6           | \$0.183               |                     |
| 5       | 0.1688        | 174,809.7 | \$29,512.5      | \$31,912 | (\$3,496)         | \$57,927.8       | \$284,089.4           | \$0.183               |                     |
| 6       | 0.1739        | 173,935.6 | \$30,245.9      | \$31,752 | (\$3,479)         | \$58,519.1       | \$342,608.5           | \$0.183               |                     |
| 7       | 0.1791        | 173,065.9 | \$30,997.5      | \$31,593 | (\$3,461)         | \$59,129.3       | \$401,737.8           | \$0.183               |                     |
| 8       | 0.1845        | 172,200.6 | \$31,767.8      | \$31,435 | (\$3,444)         | \$59,759.0       | \$461,496.8           | \$0.183               |                     |
| 9       | 0.1900        | 171,339.6 | \$32,557.2      | \$31,278 | (\$3,427)         | \$60,408.4       | \$521,905.2           | \$0.183               |                     |
| 10      | 0.1957        | 170,482.9 | \$33,366.2      | \$31,122 | (\$3,410)         | \$61,078.2       | \$582,983.5           | \$0.183               |                     |
| 11      | 0.2016        | 169,630.5 | \$34,195.4      | \$30,966 | (\$3,393)         | \$61,768.8       | \$644,752.3           | \$0.183               |                     |
| 12      | 0.2076        | 168,782.3 | \$35,045.1      | \$30,811 | (\$3,376)         | \$62,480.7       | \$707,233.0           | \$0.183               |                     |
| 13      | 0.2139        | 167,938.4 | \$35,916.0      | \$30,657 | (\$3,359)         | \$63,214.4       | \$770,447.4           | \$0.183               |                     |
| 14      | 0.2203        | 167,098.7 | \$36,808.5      | \$30,504 | (\$3,342)         | \$63,970.4       | \$834,417.8           | \$0.183               |                     |
| 15      | 0.2269        | 166,263.2 | \$37,723.2      | \$30,351 | (\$3,325)         | \$64,749.3       | \$899,167.1           | \$0.183               |                     |
| 16      | 0.2337        | 165,431.9 | \$38,660.6      | \$4,136  | (\$3,309)         | \$39,487.8       | \$938,654.9           |                       | \$0.025             |
| 17      | 0.2407        | 164,604.8 | \$39,621.3      | \$4,115  | (\$3,292)         | \$40,444.4       | \$979,099.3           |                       | \$0.025             |
| 18      | 0.2479        | 163,781.7 | \$40,605.9      | \$4,095  | (\$3,276)         | \$41,424.8       | \$1,020,524.1         |                       | \$0.025             |
| 19      | 0.2554        | 162,962.8 | \$41,615.0      | \$4,074  | (\$3,259)         | \$42,429.8       | \$1,062,953.9         |                       | \$0.025             |
| 20      | 0.2630        | 162,148.0 | \$42,649.1      | \$4,054  | (\$3,243)         | \$43,459.9       | \$1,106,413.8         |                       | \$0.025             |
| 21      | 0.2709        | 161,337.3 | \$43,709.0      | \$4,033  | (\$3,227)         | \$44,515.6       | \$1,150,929.4         |                       | \$0.025             |
| 22      | 0.2790        | 160,530.6 | \$44,795.1      | \$4,013  | (\$3,211)         | \$45,597.8       | \$1,196,527.2         |                       | \$0.025             |
| 23      | 0.2874        | 159,727.9 | \$45,908.3      | \$3,993  | (\$3,195)         | \$46,706.9       | \$1,243,234.2         |                       | \$0.025             |
| 24      | 0.2960        | 158,929.3 | \$47,049.1      | \$3,973  | (\$3,179)         | \$47,843.8       | \$1,291,077.9         |                       | \$0.025             |
| 25      | 0.3049        | 158,134.7 | \$48,218.3      | \$3,953  | (\$3,163)         | \$49,009.0       | \$1,340,086.9         |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

# Jefferson Elementary School

Design Goal: Provide

12% of average annual electricity

## Existing Conditions

|                                                  |                       |
|--------------------------------------------------|-----------------------|
| Average Annual Electrical Usage (kWh)            | 191,790               |
| Current Utility Price (\$/kWh)                   | 0.18                  |
| Actual SREC Market Values (January 2010-Present) | \$110/MWh - \$700/MWh |

## Calculations

|                                        |                   |
|----------------------------------------|-------------------|
| Solar Rating - Zip Code: 7040          | 4.50 kWh/sq-m/day |
| Solar Capacity Required (kW)           | 20                |
| Roof Space Needed (sq-ft)              | 2,000.00          |
| Annual Solar kWh (PV Watts)            | 23,780            |
| Net System installation Cost (\$6/kWh) | \$120,000         |
| Electrical Service Modification Cost   | \$100,000         |
| Total System Installation Cost         | <b>\$220,000</b>  |
| Materials                              | \$154,000         |
| Labor                                  | \$66,000          |
| Engineers Opinion of Probable Cost     | \$275,000         |

## Assumptions

|                           |       |
|---------------------------|-------|
| Annual System Degredation | 0.50% |
| Annual Utility Inflation  | 3.00% |
| Annual Maintenance Costs  | 2%    |

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS   | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|---------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |         |                   |                  |                       |                       |                     |
| 1       | 0.1800        | 23,780.0  | \$4,280.4       | \$4,341 | (\$476)           | \$8,145.8        | \$8,145.8             | \$0.183               |                     |
| 2       | 0.1854        | 23,661.1  | \$4,386.8       | \$4,319 | (\$473)           | \$8,232.9        | \$16,378.7            | \$0.183               |                     |
| 3       | 0.1910        | 23,542.8  | \$4,495.8       | \$4,298 | (\$471)           | \$8,322.7        | \$24,701.4            | \$0.183               |                     |
| 4       | 0.1967        | 23,425.1  | \$4,607.5       | \$4,276 | (\$469)           | \$8,415.2        | \$33,116.6            | \$0.183               |                     |
| 5       | 0.2026        | 23,308.0  | \$4,722.0       | \$4,255 | (\$466)           | \$8,510.7        | \$41,627.3            | \$0.183               |                     |
| 6       | 0.2087        | 23,191.4  | \$4,839.3       | \$4,234 | (\$464)           | \$8,609.1        | \$50,236.4            | \$0.183               |                     |
| 7       | 0.2149        | 23,075.5  | \$4,959.6       | \$4,212 | (\$462)           | \$8,710.5        | \$58,946.9            | \$0.183               |                     |
| 8       | 0.2214        | 22,960.1  | \$5,082.8       | \$4,191 | (\$459)           | \$8,815.0        | \$67,761.9            | \$0.183               |                     |
| 9       | 0.2280        | 22,845.3  | \$5,209.1       | \$4,170 | (\$457)           | \$8,922.6        | \$76,684.6            | \$0.183               |                     |
| 10      | 0.2349        | 22,731.1  | \$5,338.6       | \$4,150 | (\$455)           | \$9,033.5        | \$85,718.1            | \$0.183               |                     |
| 11      | 0.2419        | 22,617.4  | \$5,471.3       | \$4,129 | (\$452)           | \$9,147.7        | \$94,865.8            | \$0.183               |                     |
| 12      | 0.2492        | 22,504.3  | \$5,607.2       | \$4,108 | (\$450)           | \$9,265.3        | \$104,131.1           | \$0.183               |                     |
| 13      | 0.2566        | 22,391.8  | \$5,746.6       | \$4,088 | (\$448)           | \$9,386.3        | \$113,517.5           | \$0.183               |                     |
| 14      | 0.2643        | 22,279.8  | \$5,889.4       | \$4,067 | (\$446)           | \$9,510.9        | \$123,028.4           | \$0.183               |                     |
| 15      | 0.2723        | 22,168.4  | \$6,035.7       | \$4,047 | (\$443)           | \$9,639.2        | \$132,667.6           | \$0.183               |                     |
| 16      | 0.2804        | 22,057.6  | \$6,185.7       | \$551   | (\$441)           | \$6,296.0        | \$138,963.6           |                       | \$0.025             |
| 17      | 0.2888        | 21,947.3  | \$6,339.4       | \$549   | (\$439)           | \$6,449.2        | \$145,412.8           |                       | \$0.025             |
| 18      | 0.2975        | 21,837.6  | \$6,497.0       | \$546   | (\$437)           | \$6,606.1        | \$152,018.9           |                       | \$0.025             |
| 19      | 0.3064        | 21,728.4  | \$6,658.4       | \$543   | (\$435)           | \$6,767.0        | \$158,785.9           |                       | \$0.025             |
| 20      | 0.3156        | 21,619.7  | \$6,823.9       | \$540   | (\$432)           | \$6,932.0        | \$165,717.9           |                       | \$0.025             |
| 21      | 0.3251        | 21,511.6  | \$6,993.4       | \$538   | (\$430)           | \$7,101.0        | \$172,818.9           |                       | \$0.025             |
| 22      | 0.3349        | 21,404.1  | \$7,167.2       | \$535   | (\$428)           | \$7,274.2        | \$180,093.1           |                       | \$0.025             |
| 23      | 0.3449        | 21,297.1  | \$7,345.3       | \$532   | (\$426)           | \$7,451.8        | \$187,545.0           |                       | \$0.025             |
| 24      | 0.3552        | 21,190.6  | \$7,527.9       | \$530   | (\$424)           | \$7,633.8        | \$195,178.8           |                       | \$0.025             |
| 25      | 0.3659        | 21,084.6  | \$7,714.9       | \$527   | (\$422)           | \$7,820.3        | \$202,999.1           |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

**Lincoln Elementary School**

Design Goal: Provide

13% of average annual electricity

**Existing Conditions**

Average Annual Electrical Usage (kWh) 141,720  
 Current Utility Price (\$/kWh) 0.2  
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

**Calculations**

Solar Rating - Zip Code: 7040 4.50 kWh/sq-m/day  
 Solar Capacity Required (kW) 16  
 Roof Space Needed (sq-ft) 1,600.00  
 Annual Solar kWh (PV Watts) 19,024  
 Net System installation Cost (\$/kWh) \$96,000  
 Electrical Service Modification Cost \$100,000  
 Total System Installation Cost **\$196,000**  
     Materials \$137,200  
     Labor \$58,800  
 Engineers Opinion of Probable Cost \$245,000

**Assumptions**

Annual System Degredation 0.50%  
 Annual Utility Inflation 3.00%  
 Annual Maintenance Costs 2%

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS   | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|---------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |         |                   |                  |                       |                       |                     |
| 1       | 0.2000        | 19,024.0  | \$3,804.8       | \$3,473 | (\$380)           | \$6,897.2        | \$6,897.2             | \$0.183               |                     |
| 2       | 0.2060        | 18,928.9  | \$3,899.3       | \$3,455 | (\$379)           | \$6,976.2        | \$13,873.4            | \$0.183               |                     |
| 3       | 0.2122        | 18,834.2  | \$3,996.2       | \$3,438 | (\$377)           | \$7,057.8        | \$20,931.1            | \$0.183               |                     |
| 4       | 0.2185        | 18,740.1  | \$4,095.6       | \$3,421 | (\$375)           | \$7,141.8        | \$28,072.9            | \$0.183               |                     |
| 5       | 0.2251        | 18,646.4  | \$4,197.3       | \$3,404 | (\$373)           | \$7,228.3        | \$35,301.2            | \$0.183               |                     |
| 6       | 0.2319        | 18,553.1  | \$4,301.6       | \$3,387 | (\$371)           | \$7,317.4        | \$42,618.6            | \$0.183               |                     |
| 7       | 0.2388        | 18,460.4  | \$4,408.5       | \$3,370 | (\$369)           | \$7,409.3        | \$50,027.9            | \$0.183               |                     |
| 8       | 0.2460        | 18,368.1  | \$4,518.1       | \$3,353 | (\$367)           | \$7,503.8        | \$57,531.7            | \$0.183               |                     |
| 9       | 0.2534        | 18,276.2  | \$4,630.4       | \$3,336 | (\$366)           | \$7,601.2        | \$65,132.9            | \$0.183               |                     |
| 10      | 0.2610        | 18,184.8  | \$4,745.4       | \$3,320 | (\$364)           | \$7,701.4        | \$72,834.2            | \$0.183               |                     |
| 11      | 0.2688        | 18,093.9  | \$4,863.3       | \$3,303 | (\$362)           | \$7,804.5        | \$80,638.7            | \$0.183               |                     |
| 12      | 0.2768        | 18,003.4  | \$4,984.2       | \$3,287 | (\$360)           | \$7,910.7        | \$88,549.4            | \$0.183               |                     |
| 13      | 0.2852        | 17,913.4  | \$5,108.1       | \$3,270 | (\$358)           | \$8,019.9        | \$96,569.3            | \$0.183               |                     |
| 14      | 0.2937        | 17,823.9  | \$5,235.0       | \$3,254 | (\$356)           | \$8,132.3        | \$104,701.5           | \$0.183               |                     |
| 15      | 0.3025        | 17,734.7  | \$5,365.1       | \$3,237 | (\$355)           | \$8,247.9        | \$112,949.4           | \$0.183               |                     |
| 16      | 0.3116        | 17,646.1  | \$5,498.4       | \$441   | (\$353)           | \$5,586.6        | \$118,536.0           |                       | \$0.025             |
| 17      | 0.3209        | 17,557.8  | \$5,635.0       | \$439   | (\$351)           | \$5,722.8        | \$124,258.9           |                       | \$0.025             |
| 18      | 0.3306        | 17,470.1  | \$5,775.1       | \$437   | (\$349)           | \$5,862.4        | \$130,121.3           |                       | \$0.025             |
| 19      | 0.3405        | 17,382.7  | \$5,918.6       | \$435   | (\$348)           | \$6,005.5        | \$136,126.8           |                       | \$0.025             |
| 20      | 0.3507        | 17,295.8  | \$6,065.7       | \$432   | (\$346)           | \$6,152.1        | \$142,278.9           |                       | \$0.025             |
| 21      | 0.3612        | 17,209.3  | \$6,216.4       | \$430   | (\$344)           | \$6,302.4        | \$148,581.3           |                       | \$0.025             |
| 22      | 0.3721        | 17,123.3  | \$6,370.9       | \$428   | (\$342)           | \$6,456.5        | \$155,037.8           |                       | \$0.025             |
| 23      | 0.3832        | 17,037.6  | \$6,529.2       | \$426   | (\$341)           | \$6,614.4        | \$161,652.2           |                       | \$0.025             |
| 24      | 0.3947        | 16,952.5  | \$6,691.4       | \$424   | (\$339)           | \$6,776.2        | \$168,428.4           |                       | \$0.025             |
| 25      | 0.4066        | 16,867.7  | \$6,857.7       | \$422   | (\$337)           | \$6,942.0        | \$175,370.4           |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

**Washington Elementary School**

Design Goal: Provide

23% of average annual electricity

**Existing Conditions**

Average Annual Electrical Usage (kWh) 165,545  
 Current Utility Price (\$/kWh) 0.18  
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

**Calculations**

Solar Rating - Zip Code: 7040 4.50 kWh/sq-m/day  
 Solar Capacity Required (kW) 32  
 Roof Space Needed (sq-ft) 3,200.00  
 Annual Solar kWh (PV Watts) 38,048  
 Net System installation Cost (\$6/kWh) \$192,000  
 Electrical Service Modification Cost \$100,000  
 Total System Installation Cost **\$292,000**  
     Materials \$204,400  
     Labor \$87,600  
 Engineers Opinion of Probable Cost \$365,000

**Assumptions**

Annual System Degredation 0.50%  
 Annual Utility Inflation 3.00%  
 Annual Maintenance Costs 2%

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS   | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|---------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |         |                   |                  |                       |                       |                     |
| 1       | 0.1800        | 38,048.0  | \$6,848.6       | \$6,946 | (\$761)           | \$13,033.3       | \$13,033.3            | \$0.183               |                     |
| 2       | 0.1854        | 37,857.8  | \$7,018.8       | \$6,911 | (\$757)           | \$13,172.6       | \$26,205.9            | \$0.183               |                     |
| 3       | 0.1910        | 37,668.5  | \$7,193.2       | \$6,876 | (\$753)           | \$13,316.3       | \$39,522.2            | \$0.183               |                     |
| 4       | 0.1967        | 37,480.1  | \$7,372.0       | \$6,842 | (\$750)           | \$13,464.4       | \$52,986.6            | \$0.183               |                     |
| 5       | 0.2026        | 37,292.7  | \$7,555.2       | \$6,808 | (\$746)           | \$13,617.1       | \$66,603.7            | \$0.183               |                     |
| 6       | 0.2087        | 37,106.3  | \$7,742.9       | \$6,774 | (\$742)           | \$13,774.6       | \$80,378.3            | \$0.183               |                     |
| 7       | 0.2149        | 36,920.7  | \$7,935.4       | \$6,740 | (\$738)           | \$13,936.8       | \$94,315.1            | \$0.183               |                     |
| 8       | 0.2214        | 36,736.1  | \$8,132.5       | \$6,706 | (\$735)           | \$14,104.0       | \$108,419.1           | \$0.183               |                     |
| 9       | 0.2280        | 36,552.4  | \$8,334.6       | \$6,673 | (\$731)           | \$14,276.2       | \$122,695.3           | \$0.183               |                     |
| 10      | 0.2349        | 36,369.7  | \$8,541.8       | \$6,639 | (\$727)           | \$14,453.6       | \$137,149.0           | \$0.183               |                     |
| 11      | 0.2419        | 36,187.8  | \$8,754.0       | \$6,606 | (\$724)           | \$14,636.4       | \$151,785.3           | \$0.183               |                     |
| 12      | 0.2492        | 36,006.9  | \$8,971.6       | \$6,573 | (\$720)           | \$14,824.5       | \$166,609.8           | \$0.183               |                     |
| 13      | 0.2566        | 35,826.9  | \$9,194.5       | \$6,540 | (\$717)           | \$15,018.2       | \$181,628.0           | \$0.183               |                     |
| 14      | 0.2643        | 35,647.7  | \$9,423.0       | \$6,507 | (\$713)           | \$15,217.5       | \$196,845.5           | \$0.183               |                     |
| 15      | 0.2723        | 35,469.5  | \$9,657.1       | \$6,475 | (\$709)           | \$15,422.7       | \$212,268.2           | \$0.183               |                     |
| 16      | 0.2804        | 35,292.1  | \$9,897.1       | \$882   | (\$706)           | \$10,073.6       | \$222,341.8           |                       | \$0.025             |
| 17      | 0.2888        | 35,115.7  | \$10,143.1      | \$878   | (\$702)           | \$10,318.6       | \$232,660.4           |                       | \$0.025             |
| 18      | 0.2975        | 34,940.1  | \$10,395.1      | \$874   | (\$699)           | \$10,569.8       | \$243,230.3           |                       | \$0.025             |
| 19      | 0.3064        | 34,765.4  | \$10,653.4      | \$869   | (\$695)           | \$10,827.3       | \$254,057.5           |                       | \$0.025             |
| 20      | 0.3156        | 34,591.6  | \$10,918.2      | \$865   | (\$692)           | \$11,091.1       | \$265,148.7           |                       | \$0.025             |
| 21      | 0.3251        | 34,418.6  | \$11,189.5      | \$860   | (\$688)           | \$11,361.6       | \$276,510.2           |                       | \$0.025             |
| 22      | 0.3349        | 34,246.5  | \$11,467.6      | \$856   | (\$685)           | \$11,638.8       | \$288,149.0           |                       | \$0.025             |
| 23      | 0.3449        | 34,075.3  | \$11,752.5      | \$852   | (\$682)           | \$11,922.9       | \$300,071.9           |                       | \$0.025             |
| 24      | 0.3552        | 33,904.9  | \$12,044.6      | \$848   | (\$678)           | \$12,214.1       | \$312,286.0           |                       | \$0.025             |
| 25      | 0.3659        | 33,735.4  | \$12,343.9      | \$843   | (\$675)           | \$12,512.6       | \$324,798.6           |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

**Wilson Elementary School**

Design Goal: Provide

20% of average annual electricity

**Existing Conditions**

Average Annual Electrical Usage (kWh) 151,760

Current Utility Price (\$/kWh) 0.16

Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

**Calculations**

Solar Rating - Zip Code: 7040 4.50 kWh/sq-m/day

Solar Capacity Required (kW) 25

Roof Space Needed (sq-ft) 2,500.00

Annual Solar kWh (PV Watts) 29,725

Net System installation Cost (\$6/kWh) \$150,000

Electrical Service Modification Cost \$100,000

Total System Installation Cost **\$250,000**

Materials \$175,000

Labor \$75,000

Engineers Opinion of Probable Cost \$312,500

**Assumptions**

Annual System Degredation 0.50%

Annual Utility Inflation 3.00%

Annual Maintenance Costs 2%

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS   | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|---------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |         |                   |                  |                       |                       |                     |
| 1       | 0.1600        | 29,725.0  | \$4,756.0       | \$5,426 | (\$595)           | \$9,587.8        | \$9,587.8             | \$0.183               |                     |
| 2       | 0.1648        | 29,576.4  | \$4,874.2       | \$5,399 | (\$592)           | \$9,681.8        | \$19,269.6            | \$0.183               |                     |
| 3       | 0.1697        | 29,428.5  | \$4,995.3       | \$5,372 | (\$589)           | \$9,778.9        | \$29,048.5            | \$0.183               |                     |
| 4       | 0.1748        | 29,281.4  | \$5,119.4       | \$5,345 | (\$586)           | \$9,879.1        | \$38,927.7            | \$0.183               |                     |
| 5       | 0.1801        | 29,134.9  | \$5,246.7       | \$5,319 | (\$583)           | \$9,982.5        | \$48,910.2            | \$0.183               |                     |
| 6       | 0.1855        | 28,989.3  | \$5,377.0       | \$5,292 | (\$580)           | \$10,089.2       | \$58,999.5            | \$0.183               |                     |
| 7       | 0.1910        | 28,844.3  | \$5,510.7       | \$5,266 | (\$577)           | \$10,199.3       | \$69,198.8            | \$0.183               |                     |
| 8       | 0.1968        | 28,700.1  | \$5,647.6       | \$5,239 | (\$574)           | \$10,312.8       | \$79,511.6            | \$0.183               |                     |
| 9       | 0.2027        | 28,556.6  | \$5,787.9       | \$5,213 | (\$571)           | \$10,429.8       | \$89,941.4            | \$0.183               |                     |
| 10      | 0.2088        | 28,413.8  | \$5,931.8       | \$5,187 | (\$568)           | \$10,550.4       | \$100,491.8           | \$0.183               |                     |
| 11      | 0.2150        | 28,271.7  | \$6,079.2       | \$5,161 | (\$565)           | \$10,674.8       | \$111,166.6           | \$0.183               |                     |
| 12      | 0.2215        | 28,130.4  | \$6,230.2       | \$5,135 | (\$563)           | \$10,802.8       | \$121,969.4           | \$0.183               |                     |
| 13      | 0.2281        | 27,989.7  | \$6,385.1       | \$5,110 | (\$560)           | \$10,934.8       | \$132,904.2           | \$0.183               |                     |
| 14      | 0.2350        | 27,849.8  | \$6,543.7       | \$5,084 | (\$557)           | \$11,070.7       | \$143,974.9           | \$0.183               |                     |
| 15      | 0.2420        | 27,710.5  | \$6,706.3       | \$5,059 | (\$554)           | \$11,210.7       | \$155,185.6           | \$0.183               |                     |
| 16      | 0.2493        | 27,572.0  | \$6,873.0       | \$689   | (\$551)           | \$7,010.9        | \$162,196.5           |                       | \$0.025             |
| 17      | 0.2568        | 27,434.1  | \$7,043.8       | \$686   | (\$549)           | \$7,181.0        | \$169,377.5           |                       | \$0.025             |
| 18      | 0.2645        | 27,297.0  | \$7,218.8       | \$682   | (\$546)           | \$7,355.3        | \$176,732.8           |                       | \$0.025             |
| 19      | 0.2724        | 27,160.5  | \$7,398.2       | \$679   | (\$543)           | \$7,534.0        | \$184,266.8           |                       | \$0.025             |
| 20      | 0.2806        | 27,024.7  | \$7,582.1       | \$676   | (\$540)           | \$7,717.2        | \$191,984.0           |                       | \$0.025             |
| 21      | 0.2890        | 26,889.5  | \$7,770.5       | \$672   | (\$538)           | \$7,904.9        | \$199,888.9           |                       | \$0.025             |
| 22      | 0.2976        | 26,755.1  | \$7,963.6       | \$669   | (\$535)           | \$8,097.4        | \$207,986.3           |                       | \$0.025             |
| 23      | 0.3066        | 26,621.3  | \$8,161.5       | \$666   | (\$532)           | \$8,294.6        | \$216,280.9           |                       | \$0.025             |
| 24      | 0.3158        | 26,488.2  | \$8,364.3       | \$662   | (\$530)           | \$8,496.7        | \$224,777.6           |                       | \$0.025             |
| 25      | 0.3252        | 26,355.8  | \$8,572.1       | \$659   | (\$527)           | \$8,703.9        | \$233,481.5           |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

**Harrison School Building**

Design Goal: Provide

131% of average annual electricity

**Existing Conditions**

Average Annual Electrical Usage (kWh) 136,650  
 Current Utility Price (\$/kWh) 0.18  
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

**Calculations**

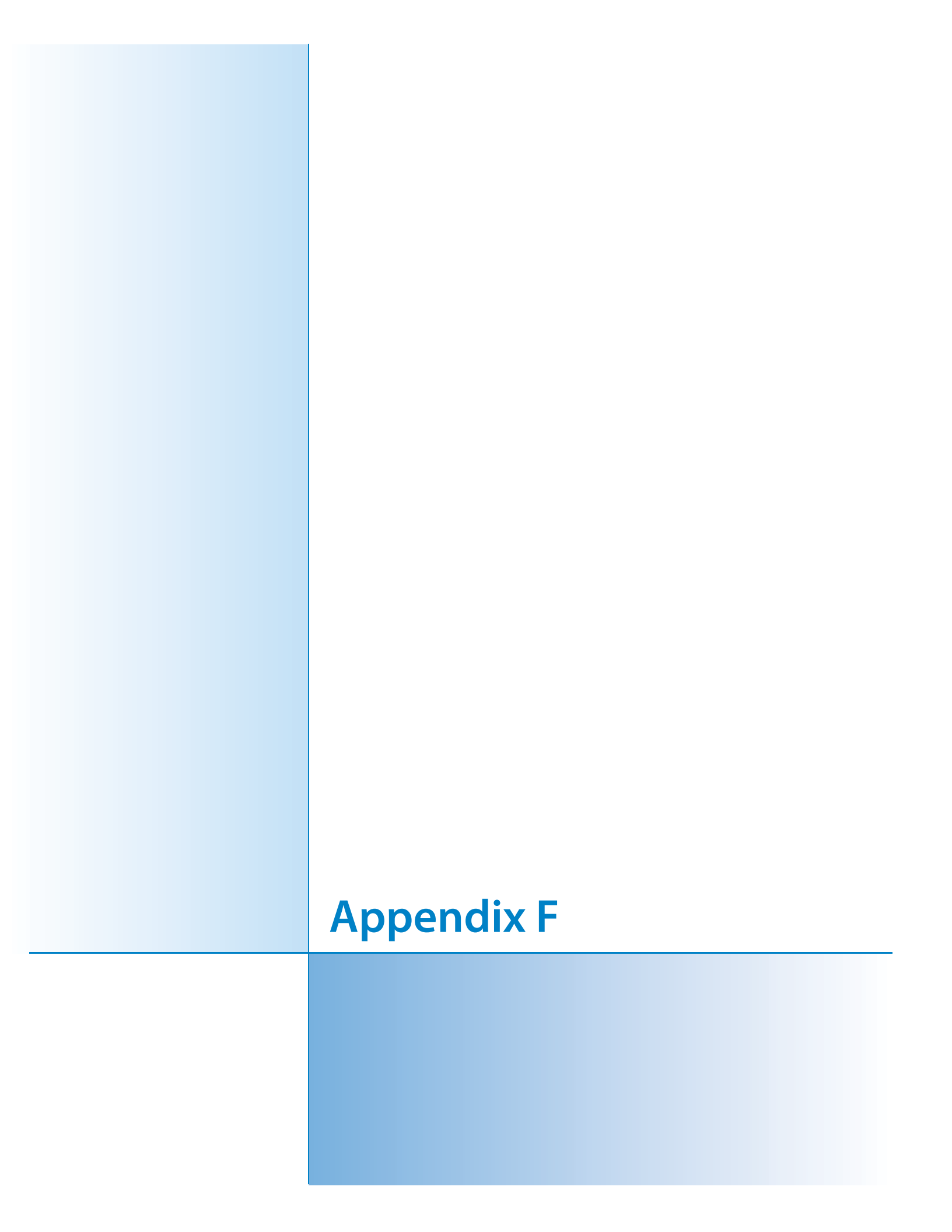
Solar Rating - Zip Code: 7040 4.50 kWh/sq-m/day  
 Solar Capacity Required (kW) 150  
 Roof Space Needed (sq-ft) 15,000.00  
 Annual Solar kWh (PV Watts) 178,350  
 Net System installation Cost (\$6/kWh) \$900,000  
 Electrical Service Modification Cost \$100,000  
 Total System Installation Cost **\$1,000,000**  
     Materials \$700,000  
     Labor \$300,000  
 Engineers Opinion of Probable Cost \$1,250,000

**Assumptions**

Annual System Degredation 0.50%  
 Annual Utility Inflation 3.00%  
 Annual Maintenance Costs 2%

| Year    | Utility Price | Solar kWh | Utility Savings | SRECS    | Maintenance Costs | Annual Cash Flow | Cummulative Cash Flow | SREC Factor (\$/kWh)* | REC Factor (\$/kWh) |
|---------|---------------|-----------|-----------------|----------|-------------------|------------------|-----------------------|-----------------------|---------------------|
| Install |               |           |                 |          |                   |                  |                       |                       |                     |
| 1       | 0.1800        | 178,350.0 | \$32,103.0      | \$32,558 | (\$3,567)         | \$61,093.8       | \$61,093.8            | \$0.183               |                     |
| 2       | 0.1854        | 177,458.3 | \$32,900.8      | \$32,395 | (\$3,549)         | \$61,746.6       | \$122,840.4           | \$0.183               |                     |
| 3       | 0.1910        | 176,571.0 | \$33,718.3      | \$32,233 | (\$3,531)         | \$62,420.0       | \$185,260.3           | \$0.183               |                     |
| 4       | 0.1967        | 175,688.1 | \$34,556.2      | \$32,072 | (\$3,514)         | \$63,114.3       | \$248,374.7           | \$0.183               |                     |
| 5       | 0.2026        | 174,809.7 | \$35,415.0      | \$31,912 | (\$3,496)         | \$63,830.3       | \$312,205.0           | \$0.183               |                     |
| 6       | 0.2087        | 173,935.6 | \$36,295.0      | \$31,752 | (\$3,479)         | \$64,568.3       | \$376,773.2           | \$0.183               |                     |
| 7       | 0.2149        | 173,065.9 | \$37,197.0      | \$31,593 | (\$3,461)         | \$65,328.8       | \$442,102.1           | \$0.183               |                     |
| 8       | 0.2214        | 172,200.6 | \$38,121.3      | \$31,435 | (\$3,444)         | \$66,112.5       | \$508,214.6           | \$0.183               |                     |
| 9       | 0.2280        | 171,339.6 | \$39,068.6      | \$31,278 | (\$3,427)         | \$66,919.9       | \$575,134.4           | \$0.183               |                     |
| 10      | 0.2349        | 170,482.9 | \$40,039.5      | \$31,122 | (\$3,410)         | \$67,751.5       | \$642,885.9           | \$0.183               |                     |
| 11      | 0.2419        | 169,630.5 | \$41,034.5      | \$30,966 | (\$3,393)         | \$68,607.9       | \$711,493.8           | \$0.183               |                     |
| 12      | 0.2492        | 168,782.3 | \$42,054.2      | \$30,811 | (\$3,376)         | \$69,489.7       | \$780,983.5           | \$0.183               |                     |
| 13      | 0.2566        | 167,938.4 | \$43,099.2      | \$30,657 | (\$3,359)         | \$70,397.6       | \$851,381.1           | \$0.183               |                     |
| 14      | 0.2643        | 167,098.7 | \$44,170.2      | \$30,504 | (\$3,342)         | \$71,332.1       | \$922,713.3           | \$0.183               |                     |
| 15      | 0.2723        | 166,263.2 | \$45,267.9      | \$30,351 | (\$3,325)         | \$72,293.9       | \$995,007.2           | \$0.183               |                     |
| 16      | 0.2804        | 165,431.9 | \$46,392.8      | \$4,136  | (\$3,309)         | \$47,219.9       | \$1,042,227.1         |                       | \$0.025             |
| 17      | 0.2888        | 164,604.8 | \$47,545.6      | \$4,115  | (\$3,292)         | \$48,368.6       | \$1,090,595.8         |                       | \$0.025             |
| 18      | 0.2975        | 163,781.7 | \$48,727.1      | \$4,095  | (\$3,276)         | \$49,546.0       | \$1,140,141.8         |                       | \$0.025             |
| 19      | 0.3064        | 162,962.8 | \$49,938.0      | \$4,074  | (\$3,259)         | \$50,752.8       | \$1,190,894.6         |                       | \$0.025             |
| 20      | 0.3156        | 162,148.0 | \$51,179.0      | \$4,054  | (\$3,243)         | \$51,989.7       | \$1,242,884.3         |                       | \$0.025             |
| 21      | 0.3251        | 161,337.3 | \$52,450.8      | \$4,033  | (\$3,227)         | \$53,257.4       | \$1,296,141.7         |                       | \$0.025             |
| 22      | 0.3349        | 160,530.6 | \$53,754.2      | \$4,013  | (\$3,211)         | \$54,556.8       | \$1,350,698.6         |                       | \$0.025             |
| 23      | 0.3449        | 159,727.9 | \$55,089.9      | \$3,993  | (\$3,195)         | \$55,888.6       | \$1,406,587.1         |                       | \$0.025             |
| 24      | 0.3552        | 158,929.3 | \$56,458.9      | \$3,973  | (\$3,179)         | \$57,253.6       | \$1,463,840.7         |                       | \$0.025             |
| 25      | 0.3659        | 158,134.7 | \$57,861.9      | \$3,953  | (\$3,163)         | \$58,652.6       | \$1,522,493.3         |                       | \$0.025             |

\* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

The graphic consists of a large light blue rectangle on the left side of the page. A horizontal line extends from the right edge of this rectangle across the page. A vertical line extends from the bottom of the light blue rectangle down to the bottom of the page. These two lines intersect at the bottom right corner of the light blue rectangle, forming an L-shape. The text "Appendix F" is positioned at this intersection point, with the "F" partially overlapping the vertical line.

## Appendix F



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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM                                                     | DESCRIPTION                            | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL      |
|----------------------------------------------------------|----------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|------------|
| <b>Grover Cleveland Middle School: Condensing Boiler</b> |                                        |     |      |                       |                      |     |      |               |                   |            |
| 1                                                        | Boiler Removal                         | 3   | Ea   | \$ -                  | \$ -                 | 7   | Ea   | \$ 2,950.00   | \$ 20,650.00      | 20,650.00  |
| 2                                                        | Condensing Boiler (2000 MBH, 92% AFUE) | 3   | Ea   | \$ 37,000.00          | \$ 111,000.00        | 3   | Ea   | \$ 9,050.00   | \$ 27,150.00      | 138,150.00 |
| 3                                                        | 8" Stainless Steel Chimney (40')       | 40  | L.F. | \$ 47.50              | \$ 1,900.00          | 40  | L.F. | \$ 20.00      | \$ 800.00         | 2,700.00   |
| 4                                                        | Steel Hot Water Piping                 | 60  | L.F. | \$ 64.00              | \$ 3,840.00          | 60  | L.F. | \$ 26.00      | \$ 1,560.00       | 5,400.00   |
| Subtotal                                                 |                                        |     |      |                       | 116,740.00           |     |      |               | 50,160.00         |            |

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 166,900.00 |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 25,035.00  |
| SUB-TOTAL w/ OH & P =  | \$ | 191,935.00 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 47,983.75  |
| BUDGET COST ESTIMATE = | \$ | 239,918.75 |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
- CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
- CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
- Estimates do not include site conditions that may be required as part of the project. These may include abatement, remediation, or structural work.
- Estimate assumes associated systems are available and in good working order. This includes existing chimney and venting, combustion air, floor drains, electrical and local controls.

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                           | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL     |
|------|-------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|-----------|
|      | <b>Jefferson Elementary School: Condensing Boiler</b> |     |      |                       |                      |     |      |               |                   |           |
| 1    | Boiler Removal (1000 MBH)                             | 3   | Ea   | 0.00                  | \$ -                 | 3   | Ea   | \$ 2,950.00   | \$ 8,850.00       | 8,850.00  |
| 2    | Condensing Boiler (1500 MBH)                          | 2   | Ea   | \$32,200.00           | \$ 64,400.00         | 2   | Ea   | \$ 7,425.00   | \$ 14,850.00      | 79,250.00 |
| 3    | 8" Stainless Steel Chimney (40')                      | 40  | L.F. | \$12.55               | \$ 502.00            | 40  | L.F. | \$ 19.85      | \$ 794.00         | 1,296.00  |
| 4    | Steel Hot Water Piping                                | 60  | Ea   | \$64.00               | \$ 3,840.00          | 60  | Ea   | \$ 26.00      | \$ 1,560.00       | 5,400.00  |
|      | <b>Subtotal</b>                                       |     |      |                       | <b>68,742.00</b>     |     |      |               | <b>26,054.00</b>  |           |

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 94,796.00  |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 14,219.40  |
| SUB-TOTAL w/ OH & P =  | \$ | 109,015.40 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 27,253.85  |
| BUDGET COST ESTIMATE = | \$ | 136,269.25 |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
- CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
- CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
- Estimates do not include site conditions that may be required as part of the project. These may include abatement, remediation, or structural work.
- Estimate assumes associated systems are available and in good working order. This includes existing chimney and venting, combustion air, floor drains, electrical and local controls.

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                         | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL     |
|------|-----------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|-----------|
|      | <b>Lincoln Elementary School: Condensing Boiler</b> |     |      |                       |                      |     |      |               |                   |           |
| 1    | Boiler Removal (1000 MBH)                           | 3   | Ea   | 0.00                  | \$ -                 | 3   | Ea   | \$ 2,950.00   | \$ 8,850.00       | 8,850.00  |
| 2    | Condensing Boiler (1500 MBH)                        | 2   | Ea   | \$32,200.00           | \$ 64,400.00         | 2   | Ea   | \$ 7,425.00   | \$ 14,850.00      | 79,250.00 |
| 3    | 8" Stainless Steel Chimney (40')                    | 40  | L.F. | \$12.55               | \$ 502.00            | 40  | L.F. | \$ 19.85      | \$ 794.00         | 1,296.00  |
| 4    | Steel Hot Water Piping                              | 60  | Ea   | \$64.00               | \$ 3,840.00          | 60  | Ea   | \$ 26.00      | \$ 1,560.00       | 5,400.00  |
|      | Subtotal                                            |     |      |                       | 68,742.00            |     |      |               | 26,054.00         |           |

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 94,796.00  |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 14,219.40  |
| SUB-TOTAL w/ OH & P =  | \$ | 109,015.40 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 27,253.85  |
| BUDGET COST ESTIMATE = | \$ | 136,269.25 |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
- CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                        | QTY   | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY   | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL      |
|------|----------------------------------------------------|-------|------|-----------------------|----------------------|-------|------|---------------|-------------------|------------|
| 1    | <b>James Caldwell High School: Windows Upgrade</b> |       |      |                       |                      |       |      |               |                   |            |
| 2    | Removal of Windows                                 | 8,570 | S.F. |                       | \$ -                 | 8,570 | S.F. | \$ 3.00       | \$ 25,710.00      | 25,710.00  |
|      | New Windows                                        | 8,570 | S.F. | 76.00                 | \$ 651,320.00        | 8,570 | S.F. | \$ 11.00      | \$ 94,270.00      | 745,590.00 |
|      | Subtotal                                           |       |      |                       | 0.00                 |       |      |               | 25,710.00         |            |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |              |
|------------------------|----|--------------|
| SUBTOTAL =             | \$ | 771,300.00   |
| MARKUP % =             | \$ | 0.15         |
| MARKUP =               | \$ | 115,695.00   |
| SUB-TOTAL w/ OH & P =  | \$ | 886,995.00   |
| CONTINGENCY % =        |    | 0.25         |
| CONTINGENCY =          | \$ | 221,748.75   |
| BUDGET COST ESTIMATE = | \$ | 1,108,743.75 |

## Notes:

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

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Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                          | QTY   | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY   | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL      |
|------|------------------------------------------------------|-------|------|-----------------------|----------------------|-------|------|---------------|-------------------|------------|
| 1    | <b>Washington Elementary School: Windows Upgrade</b> |       |      |                       |                      |       |      |               |                   |            |
| 2    | Removal of Windows                                   | 2,175 | S.F. |                       | \$ -                 | 2,175 | S.F. | \$ 3.00       | \$ 6,525.00       | 6,525.00   |
|      | New Windows                                          | 2,175 | S.F. | 76.00                 | \$ 165,300.00        | 2,175 | S.F. | \$ 11.00      | \$ 23,925.00      | 189,225.00 |
|      | Subtotal                                             |       |      |                       | 0.00                 |       |      |               | 6,525.00          |            |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 195,750.00 |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 29,362.50  |
| SUB-TOTAL w/ OH & P =  | \$ | 225,112.50 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 56,278.13  |
| BUDGET COST ESTIMATE = | \$ | 281,390.63 |

## Notes:

- Bonds not included in estimate.
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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
 Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                      | QTY   | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY   | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL      |
|------|--------------------------------------------------|-------|------|-----------------------|----------------------|-------|------|---------------|-------------------|------------|
|      | <b>Harrison School Building: Windows Upgrade</b> |       |      |                       |                      |       |      |               |                   |            |
| 1    | Removal of Windows                               | 2,505 | S.F. |                       | \$ -                 | 2,505 | S.F. | \$ 3.00       | \$ 7,515.00       | 7,515.00   |
| 2    | New Windows                                      | 2,505 | S.F. | 76.00                 | \$ 190,380.00        | 1     | S.F. | \$ 11.00      | \$ 11.00          | 190,391.00 |
|      | <b>Subtotal</b>                                  |       |      |                       | 0.00                 |       |      |               | 7,515.00          |            |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |            |
|------------------------|----|------------|
| SUBTOTAL =             | \$ | 197,906.00 |
| MARKUP % =             | \$ | 0.15       |
| MARKUP =               | \$ | 29,685.90  |
| SUB-TOTAL w/ OH & P =  | \$ | 227,591.90 |
| CONTINGENCY % =        |    | 0.25       |
| CONTINGENCY =          | \$ | 56,897.98  |
| BUDGET COST ESTIMATE = | \$ | 284,489.88 |

## Notes:

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
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| ITEM | DESCRIPTION                                                                | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL      |
|------|----------------------------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|------------|
| 1    | <b>Grover Cleveland Middle School: DDC Controls</b>                        |     |      |                       |                      |     |      |               |                   |            |
|      | DDC Controls Per Classroom (thermostat, damper, control valve, controller) | 47  | Ea   | \$3,250.00            | \$152,750.00         |     | Ea   | \$ -          | \$ -              | 152,750.00 |
|      | Subtotal                                                                   |     |      |                       | 152,750.00           |     |      |               | 0.00              |            |

Cost data obtained from RSMeans CostWorks 2015

SUBTOTAL = \$ 152,750.00  
 MARKUP % = \$ 0.15  
 MARKUP = \$ 22,912.50  
 SUB-TOTAL w/ OH & P = \$ 175,662.50  
 CONTINGENCY % = 0.25  
 CONTINGENCY = \$ 43,915.63  
 BUDGET COST ESTIMATE = \$ 219,578.13

## Notes:

1. Bonds not included in estimate.
2. Escalation not included in estimate.
3. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
4. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                                                                                                  | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL     |
|------|------------------------------------------------------------------------------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|-----------|
| 1    | <b>Lincoln Elementary School: DDC Controls</b><br>DDC Controls Per Classroom (thermostat, damper, control valve, controller) | 16  | Ea   | \$3,250.00            | \$ 52,000.00         |     | Ea   |               | \$ -              | 52,000.00 |
|      | Subtotal                                                                                                                     |     |      |                       | 52,000.00            |     |      |               | 0.00              |           |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |                  |
|------------------------|----|------------------|
| SUBTOTAL =             | \$ | 52,000.00        |
| MARKUP % =             | \$ | 0.15             |
| MARKUP =               | \$ | 7,800.00         |
| SUB-TOTAL w/ OH & P =  | \$ | 59,800.00        |
| CONTINGENCY % =        |    | 0.25             |
| CONTINGENCY =          | \$ | 14,950.00        |
| BUDGET COST ESTIMATE = | \$ | <u>74,750.00</u> |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                                                                                                     | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL     |
|------|---------------------------------------------------------------------------------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|-----------|
| 1    | <b>Washington Elementary School: DDC Controls</b><br>DDC Controls Per Classroom (thermostat, damper, control valve, controller) | 13  | Ea   | \$3,250.00            | \$ 42,250.00         |     | Ea   | \$ -          |                   | 42,250.00 |
|      | Subtotal                                                                                                                        |     |      |                       | 42,250.00            |     |      |               | 0.00              |           |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |                  |
|------------------------|----|------------------|
| SUBTOTAL =             | \$ | 42,250.00        |
| MARKUP % =             | \$ | 0.15             |
| MARKUP =               | \$ | 6,337.50         |
| SUB-TOTAL w/ OH & P =  | \$ | 48,587.50        |
| CONTINGENCY % =        |    | 0.25             |
| CONTINGENCY =          | \$ | 12,146.88        |
| BUDGET COST ESTIMATE = | \$ | <u>60,734.38</u> |

## Notes:

1. Bonds not included in estimate.
2. Escalation not included in estimate.
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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                                                                                                 | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL     |
|------|-----------------------------------------------------------------------------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|-----------|
| 1    | <b>Harrison School Building: DDC Controls</b><br>DDC Controls Per Classroom (thermostat, damper, control valve, controller) | 12  | Ea   | \$3,250.00            | \$ 39,000.00         |     | Ea   | \$ -          |                   | 39,000.00 |
|      | Subtotal                                                                                                                    |     |      |                       | 39,000.00            |     |      |               | 0.00              |           |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |           |
|------------------------|----|-----------|
| SUBTOTAL =             | \$ | 39,000.00 |
| MARKUP % =             | \$ | 0.15      |
| MARKUP =               | \$ | 5,850.00  |
| SUB-TOTAL w/ OH & P =  | \$ | 44,850.00 |
| CONTINGENCY % =        |    | 0.25      |
| CONTINGENCY =          | \$ | 11,212.50 |
| BUDGET COST ESTIMATE = | \$ | 56,062.50 |

Notes:

1. Bonds not included in estimate.
2. Escalation not included in estimate.
3. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
4. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                                  | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL    |
|------|--------------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|----------|
|      | <b>Grover Cleveland Middle School: Condensing DHW</b>        |     |      |                       |                      |     |      |               |                   |          |
| 1    | Removal of Existing Domestic Water Heater                    |     |      |                       |                      | 1   | Ea   | \$ 500.00     | \$ 500.00         | 500.00   |
| 2    | Domestic Water Heater Condensing Unit (100 gal, 199,000 BTU) | 1   | Ea   | \$6,200.00            | \$ 6,200.00          | 1   | Ea   | \$ 1,025.00   | \$ 1,025.00       | 7,225.00 |
|      | <i>Subtotal</i>                                              |     |      |                       | 6,200.00             |     |      |               | 1,525.00          |          |

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

|                        |    |           |
|------------------------|----|-----------|
| SUBTOTAL =             | \$ | 7,725.00  |
| MARKUP % =             | \$ | 0.15      |
| MARKUP =               | \$ | 1,158.75  |
| SUB-TOTAL w/ OH & P =  | \$ | 8,883.75  |
| CONTINGENCY % =        |    | 0.25      |
| CONTINGENCY =          | \$ | 2,220.94  |
| BUDGET COST ESTIMATE = | \$ | 11,104.69 |

## Notes:

1. Bonds not included in estimate.
2. Escalation not included in estimate.
3. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
4. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.
  - o "This is an Opinion of Probable Construction Cost only. CDM has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids. There are not any costs provided for: Change Orders, Design Engineering, Construction Oversight, Client Costs, Finance or Funding Costs, Legal Fees, Land Acquisition or temporary/permanent Easements, Operations, or any other costs associated with this project that are not specifically part of the bidding contractor's proposed scope.



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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                            | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL    |
|------|--------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|----------|
|      | <b>Washington Elementary School: Condensing DHW</b>    |     |      |                       |                      |     |      |               |                   |          |
| 1    | Removal of Existing Domestic Water Heater              | 1   | Ea   |                       | \$ -                 | 1   | Ea   | \$ 500.00     | \$ 500.00         | 500.00   |
| 2    | Domestic Water Heater Condensing Unit (50 gal, 75 MBH) | 1   | Ea   | \$2,220.00            | \$ 2,220.00          | 1   | Ea   | \$ 325.00     | \$ 325.00         | 2,545.00 |
|      | <b>Subtotal</b>                                        |     |      |                       | <b>2,220.00</b>      |     |      |               | <b>825.00</b>     |          |

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

|                        |    |          |
|------------------------|----|----------|
| SUBTOTAL =             | \$ | 3,045.00 |
| MARKUP % =             | \$ | 0.15     |
| MARKUP =               | \$ | 456.75   |
| SUB-TOTAL w/ OH & P =  | \$ | 3,501.75 |
| CONTINGENCY % =        |    | 0.25     |
| CONTINGENCY =          | \$ | 875.44   |
| BUDGET COST ESTIMATE = | \$ | 4,377.19 |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                            | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL    |
|------|--------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|----------|
| 1    | <b>Wilson Elementary School: Condensing DHW</b>        |     |      |                       |                      |     |      |               |                   |          |
| 2    | Removal of Existing Domestic Water Heater              | 1   | Ea   |                       | \$ -                 | 1   | Ea   | \$ 500.00     | \$ 500.00         | 500.00   |
|      | Domestic Water Heater Condensing Unit (50 gal, 75 MBH) | 1   | Ea   | \$2,200.00            | \$ 2,200.00          | 1   | Ea   | \$ 340.00     | \$ 340.00         | 2,540.00 |
|      | Subtotal                                               |     |      |                       | 2,200.00             |     |      |               | 840.00            |          |

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

|                        |    |          |
|------------------------|----|----------|
| SUBTOTAL =             | \$ | 3,040.00 |
| MARKUP % =             | \$ | 0.15     |
| MARKUP =               | \$ | 456.00   |
| SUB-TOTAL w/ OH & P =  | \$ | 3,496.00 |
| CONTINGENCY % =        |    | 0.25     |
| CONTINGENCY =          | \$ | 874.00   |
| BUDGET COST ESTIMATE = | \$ | 4,370.00 |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
- CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
- CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.

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# ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**  
Reviewed By **B. McLean**

| ITEM | DESCRIPTION                                            | QTY | UNIT | MATERIAL<br>UNIT COST | MATERIAL<br>SUBTOTAL | QTY | UNIT | LABOR<br>COST | LABOR<br>SUBTOTAL | TOTAL    |
|------|--------------------------------------------------------|-----|------|-----------------------|----------------------|-----|------|---------------|-------------------|----------|
| 1    | <b>Harrison School Building: Condensing DHW</b>        |     |      |                       |                      |     |      |               |                   |          |
| 2    | Removal of Existing Domestic Water Heater              | 1   | Ea   |                       | \$ -                 | 1   | Ea   | \$ 500.00     | \$ 500.00         | 500.00   |
|      | Domestic Water Heater Condensing Unit (50 gal, 75 MBH) | 1   | Ea   | \$2,200.00            | \$ 2,200.00          | 1   | Ea   | \$ 340.00     | \$ 340.00         | 2,540.00 |
|      | Subtotal                                               |     |      |                       | 2,200.00             |     |      |               | 840.00            |          |

Cost data obtained from RSMeans CostWorks 2015

|                        |    |          |
|------------------------|----|----------|
| SUBTOTAL =             | \$ | 3,040.00 |
| MARKUP % =             | \$ | 0.15     |
| MARKUP =               | \$ | 456.00   |
| SUB-TOTAL w/ OH & P =  | \$ | 3,496.00 |
| CONTINGENCY % =        |    | 0.25     |
| CONTINGENCY =          | \$ | 874.00   |
| BUDGET COST ESTIMATE = | \$ | 4,370.00 |

## Notes:

- Bonds not included in estimate.
- Escalation not included in estimate.
- CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
- CDM does not guarantee that this opinion will not vary from actual cost, or contractor's bids.

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**CostWorks 2015 - West Caldwell**

| HP  | Description                                                                                           | Daily Labor |              | Unit   | Bare Mat. | Bare      |          | Total     | Total Incl. O&P |
|-----|-------------------------------------------------------------------------------------------------------|-------------|--------------|--------|-----------|-----------|----------|-----------|-----------------|
|     |                                                                                                       | Crew        | Output Hours |        |           | Labor     | Labor    |           |                 |
| 1   | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 1 HP   | 1 Elec      | 4.5          | 1.778  | Ea.       | \$ 520    | \$ 136   | \$ 656    | \$ 775          |
| 5   | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 5 HP   | 1 Elec      | 4.5          | 1.778  | Ea.       | \$ 785    | \$ 136   | \$ 921    | \$ 1,075        |
| 8   | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 7.5 HP | 1 Elec      | 4.2          | 1.905  | Ea.       | \$ 1,025  | \$ 146   | \$ 1,171  | \$ 1,350        |
| 10  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 10 HP  | 1 Elec      | 4            | 2      | Ea.       | \$ 1,175  | \$ 153   | \$ 1,328  | \$ 1,525        |
| 15  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 15 HP  | 1 Elec      | 3.2          | 2.5    | Ea.       | \$ 1,750  | \$ 192   | \$ 1,942  | \$ 2,200        |
| 25  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 25 HP  | 2 Elec      | 5            | 3.2    | Ea.       | \$ 2,775  | \$ 245   | \$ 3,020  | \$ 3,400        |
| 30  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 30 HP  | 2 Elec      | 4.8          | 3.333  | Ea.       | \$ 2,925  | \$ 255   | \$ 3,180  | \$ 3,575        |
| 40  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 40 HP  | 2 Elec      | 4            | 4      | Ea.       | \$ 3,575  | \$ 305   | \$ 3,880  | \$ 3,950        |
| 50  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 50 HP  | 2 Elec      | 3.2          | 5      | Ea.       | \$ 3,825  | \$ 385   | \$ 4,210  | \$ 4,825        |
| 60  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 60 HP  | 2 Elec      | 2.8          | 5.714  | Ea.       | \$ 5,650  | \$ 440   | \$ 6,090  | \$ 6,875        |
| 75  | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 75 HP  | 2 Elec      | 2.4          | 6.667  | Ea.       | \$ 6,900  | \$ 510   | \$ 7,410  | \$ 8,375        |
| 100 | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 100 HP | 3 Elec      | 2.7          | 8.889  | Ea.       | \$ 8,800  | \$ 680   | \$ 9,480  | \$ 10,700       |
| 150 | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 150 HP | 3 Elec      | 1.8          | 13.333 | Ea.       | \$ 12,300 | \$ 875   | \$ 13,175 | \$ 16,400       |
| 200 | Motors, totally enclosed, premium efficiency, 1.15 service factor, 1800 RPM, 230/460 V, 60 Hz, 200 HP | 3 Elec      | 1.5          | 16     | Ea.       | \$ 17,100 | \$ 1,225 | \$ 18,325 | \$ 20,600       |

**CostWorks 2015 - West Caldwell - Variable Speed Drives**

| Qty | CSI Number     | Description                                                              | Crew   | Daily Output | Labor Hours | Unit | Bare Mat.   | Bare Labor  | Total        | Total Incl. O&P |
|-----|----------------|--------------------------------------------------------------------------|--------|--------------|-------------|------|-------------|-------------|--------------|-----------------|
| 1   | 26292 310 0100 | Variable frequency drives, enclosed, 460 volt, 3 HP motor size, NEMA 1   | 1 Elec | 0.8          | 10          | Ea.  | \$ 1,850.00 | \$ 765.00   | \$ 2,615.00  | \$ 3,200.00     |
| 1   | 26292 310 0110 | Variable frequency drives, enclosed, 460 volt, 5 HP motor size, NEMA 1   | 1 Elec | 0.8          | 10          | Ea.  | \$ 2,100.00 | \$ 765.00   | \$ 2,865.00  | \$ 3,475.00     |
| 1   | 26292 310 0120 | Variable frequency drives, enclosed, 460 volt, 7.5 HP motor size, NEMA 1 | 1 Elec | 0.67         | 11.94       | Ea.  | \$ 2,200.00 | \$ 920.00   | \$ 3,120.00  | \$ 3,825.00     |
| 1   | 26292 310 0130 | Variable frequency drives, enclosed, 460 volt, 10 HP motor size, NEMA 1  | 1 Elec | 0.67         | 11.94       | Ea.  | \$ 2,425.00 | \$ 920.00   | \$ 3,345.00  | \$ 4,050.00     |
| 1   | 26292 310 0140 | Variable frequency drives, enclosed, 460 volt, 15 HP motor size, NEMA 1  | 2 Elec | 0.89         | 17.978      | Ea.  | \$ 3,125.00 | \$ 1,375.00 | \$ 4,500.00  | \$ 5,500.00     |
| 1   | 26292 310 0150 | Variable frequency drives, enclosed, 460 volt, 20 HP motor size, NEMA 1  | 2 Elec | 0.89         | 17.978      | Ea.  | \$ 4,250.00 | \$ 1,375.00 | \$ 5,625.00  | \$ 6,725.00     |
| 1   | 26292 310 0160 | Variable frequency drives, enclosed, 460 volt, 25 HP motor size, NEMA 1  | 2 Elec | 0.67         | 23.881      | Ea.  | \$ 5,250.00 | \$ 1,850.00 | \$ 7,100.00  | \$ 8,500.00     |
| 1   | 26292 310 0170 | Variable frequency drives, enclosed, 460 volt, 30 HP motor size, NEMA 1  | 2 Elec | 0.67         | 23.881      | Ea.  | \$ 5,675.00 | \$ 1,850.00 | \$ 7,525.00  | \$ 9,025.00     |
| 1   | 26292 310 0180 | Variable frequency drives, enclosed, 460 volt, 40 HP motor size, NEMA 1  | 2 Elec | 0.67         | 23.881      | Ea.  | \$ 6,575.00 | \$ 1,850.00 | \$ 8,425.00  | \$ 9,975.00     |
| 1   | 26292 310 0190 | Variable frequency drives, enclosed, 460 volt, 50 HP motor size, NEMA 1  | 2 Elec | 0.53         | 30.189      | Ea.  | \$ 9,675.00 | \$ 2,325.00 | \$ 12,000.00 | \$ 14,200.00    |

The graphic consists of a large, light blue rectangle in the top-left corner and a smaller, medium blue rectangle in the bottom-right corner. A thin blue line runs vertically from the top of the page to the bottom of the medium blue rectangle, and a thin blue line runs horizontally from the left edge of the page to the right edge of the medium blue rectangle. The text "Appendix G" is positioned in the center of the intersection of these two lines.

## Appendix G

| ECM                                  | Grover Cleveland Middle School<br>Condensing Boiler | Lincoln Elementary School<br>Condensing Boiler |
|--------------------------------------|-----------------------------------------------------|------------------------------------------------|
| Assumed Inflation (Gas, Oil)         | 2%                                                  | 2%                                             |
| Initial Yearly Savings (Gas, Oil)    | \$386.50                                            | \$3,613.73                                     |
| Assumed Inflation (Electricity)      | 3%                                                  | 3%                                             |
| Initial Yearly Savings (Electricity) | \$0.00                                              | \$0.00                                         |
| Annual Maintenance Cost Savings      | \$9,000.00                                          | \$6,000.00                                     |
| Assumed Average Useful Life (Years)  | 24                                                  | 24                                             |
| <b>Lifetime Savings</b>              | <b>\$227,758.04</b>                                 | <b>\$109,936.41</b>                            |
| <u>Year</u>                          | <u>Annual Savings</u>                               | <u>Annual Savings</u>                          |
| 1                                    | \$9,386.50                                          | \$3,613.73                                     |
| 2                                    | \$9,394.23                                          | \$3,686.01                                     |
| 3                                    | \$9,402.11                                          | \$3,759.73                                     |
| 4                                    | \$9,410.16                                          | \$3,834.92                                     |
| 5                                    | \$9,418.36                                          | \$3,911.62                                     |
| 6                                    | \$9,426.73                                          | \$3,989.85                                     |
| 7                                    | \$9,435.26                                          | \$4,069.65                                     |
| 8                                    | \$9,443.97                                          | \$4,151.04                                     |
| 9                                    | \$9,452.85                                          | \$4,234.06                                     |
| 10                                   | \$9,461.90                                          | \$4,318.74                                     |
| 11                                   | \$9,471.14                                          | \$4,405.12                                     |
| 12                                   | \$9,480.56                                          | \$4,493.22                                     |
| 13                                   | \$9,490.18                                          | \$4,583.08                                     |
| 14                                   | \$9,499.98                                          | \$4,674.75                                     |
| 15                                   | \$9,509.98                                          | \$4,768.24                                     |
| 16                                   | \$9,520.18                                          | \$4,863.61                                     |
| 17                                   | \$9,530.58                                          | \$4,960.88                                     |
| 18                                   | \$9,541.19                                          | \$5,060.10                                     |
| 19                                   | \$9,552.02                                          | \$5,161.30                                     |
| 20                                   | \$9,563.06                                          | \$5,264.52                                     |
| 21                                   | \$9,574.32                                          | \$5,369.81                                     |
| 22                                   | \$9,585.80                                          | \$5,477.21                                     |
| 23                                   | \$9,597.52                                          | \$5,586.75                                     |
| 24                                   | \$9,609.47                                          | \$5,698.49                                     |

**IRR, NPV, AROI - HVAC ECRMS**

| Grover Cleveland Middle School<br>Condensing Boiler |                | Lincoln Elementary School<br>Condensing Boiler |                |
|-----------------------------------------------------|----------------|------------------------------------------------|----------------|
| Year                                                | Cash Flow      | Year                                           | Cash Flow      |
| 0                                                   | (\$235,918.75) | 0                                              | (\$132,269.25) |
| 1                                                   | \$9,386.50     | 1                                              | \$3,613.73     |
| 2                                                   | \$9,394.23     | 2                                              | \$3,686.01     |
| 3                                                   | \$9,402.11     | 3                                              | \$3,759.73     |
| 4                                                   | \$9,410.16     | 4                                              | \$3,834.92     |
| 5                                                   | \$9,418.36     | 5                                              | \$3,911.62     |
| 6                                                   | \$9,426.73     | 6                                              | \$3,989.85     |
| 7                                                   | \$9,435.26     | 7                                              | \$4,069.65     |
| 8                                                   | \$9,443.97     | 8                                              | \$4,151.04     |
| 9                                                   | \$9,452.85     | 9                                              | \$4,234.06     |
| 10                                                  | \$9,461.90     | 10                                             | \$4,318.74     |
| 11                                                  | \$9,471.14     | 11                                             | \$4,405.12     |
| 12                                                  | \$9,480.56     | 12                                             | \$4,493.22     |
| 13                                                  | \$9,490.18     | 13                                             | \$4,583.08     |
| 14                                                  | \$9,499.98     | 14                                             | \$4,674.75     |
| 15                                                  | \$9,509.98     | 15                                             | \$4,768.24     |
| 16                                                  | \$9,520.18     | 16                                             | \$4,863.61     |
| 17                                                  | \$9,530.58     | 17                                             | \$4,960.88     |
| 18                                                  | \$9,541.19     | 18                                             | \$5,060.10     |
| 19                                                  | \$9,552.02     | 19                                             | \$5,161.30     |
| 20                                                  | \$9,563.06     | 20                                             | \$5,264.52     |
| 21                                                  | \$9,574.32     | 21                                             | \$5,369.81     |
| 22                                                  | \$9,585.80     | 22                                             | \$5,477.21     |
| 23                                                  | \$9,597.52     | 23                                             | \$5,586.75     |
| 24                                                  | \$9,609.47     | 24                                             | \$5,698.49     |
| IRR                                                 | -0.28%         | IRR                                            | -7.90%         |
| NPV                                                 | (\$75,430.48)  | NPV                                            | (\$83,072.53)  |
| AROI                                                | -0.19%         | AROI                                           | -3.93%         |

| ECM                                  | James Caldwell High<br>School<br>Window Upgrade | Washington Elementary<br>School<br>Window Upgrade | Harrison School Building<br>Window Upgrade |
|--------------------------------------|-------------------------------------------------|---------------------------------------------------|--------------------------------------------|
| Assumed Inflation (Gas, Oil)         | 2%                                              | 2%                                                | 2%                                         |
| Initial Yearly Savings (Gas, Oil)    | \$9,954.23                                      | \$2,825.66                                        | \$2,220.58                                 |
| Assumed Inflation (Electricity)      | 3%                                              | 3%                                                | 3%                                         |
| Initial Yearly Savings (Electricity) | \$23.67                                         | -\$17.64                                          | \$55.96                                    |
| Assumed Average Useful Life (Years)  | 20                                              | 20                                                | 20                                         |
| <b>Lifetime Savings</b>              | <b>\$242,497.56</b>                             | <b>\$48,537.13</b>                                | <b>\$55,458.06</b>                         |
| <u>Year</u>                          | <u>Annual Savings</u>                           | <u>Annual Savings</u>                             | <u>Annual Savings</u>                      |
| 1                                    | \$9,977.90                                      | \$2,808.01                                        | \$2,276.55                                 |
| 2                                    | \$10,177.69                                     | \$2,864.00                                        | \$2,322.64                                 |
| 3                                    | \$10,381.49                                     | \$2,921.10                                        | \$2,369.67                                 |
| 4                                    | \$10,589.37                                     | \$2,979.33                                        | \$2,417.65                                 |
| 5                                    | \$10,801.42                                     | \$3,038.73                                        | \$2,466.62                                 |
| 6                                    | \$11,017.71                                     | \$3,099.30                                        | \$2,516.58                                 |
| 7                                    | \$11,238.34                                     | \$3,161.08                                        | \$2,567.56                                 |
| 8                                    | \$11,463.39                                     | \$3,224.09                                        | \$2,619.58                                 |
| 9                                    | \$11,692.95                                     | \$3,288.36                                        | \$2,672.66                                 |
| 10                                   | \$11,927.11                                     | \$3,353.90                                        | \$2,726.82                                 |
| 11                                   | \$12,165.96                                     | \$3,420.75                                        | \$2,782.09                                 |
| 12                                   | \$12,409.60                                     | \$3,488.93                                        | \$2,838.48                                 |
| 13                                   | \$12,658.11                                     | \$3,558.46                                        | \$2,896.03                                 |
| 14                                   | \$12,911.61                                     | \$3,629.38                                        | \$2,954.74                                 |
| 15                                   | \$13,170.19                                     | \$3,701.71                                        | \$3,014.66                                 |
| 16                                   | \$13,433.96                                     | \$3,775.48                                        | \$3,075.80                                 |
| 17                                   | \$13,703.00                                     | \$3,850.71                                        | \$3,138.19                                 |
| 18                                   | \$13,977.44                                     | \$3,927.44                                        | \$3,201.85                                 |
| 19                                   | \$14,257.38                                     | \$4,005.70                                        | \$3,266.81                                 |
| 20                                   | \$14,542.94                                     | \$4,085.51                                        | \$3,333.10                                 |
| 21                                   |                                                 |                                                   |                                            |
| 22                                   |                                                 |                                                   |                                            |
| 23                                   |                                                 |                                                   |                                            |
| 24                                   |                                                 |                                                   |                                            |

| James Caldwell High School<br>Window Upgrade |                  | Washington Elementary School<br>Window Upgrade |                  | Harrison School Building<br>Window Upgrade |                |
|----------------------------------------------|------------------|------------------------------------------------|------------------|--------------------------------------------|----------------|
| Year                                         | Cash Flow        | Year                                           | Cash Flow        | Year                                       | Cash Flow      |
| 0                                            | (\$1,108,743.75) | 0                                              | (\$1,108,743.75) | 0                                          | \$ (281,391)   |
| 1                                            | \$9,977.90       | 1                                              | \$2,276.55       | 1                                          | \$2,276.55     |
| 2                                            | \$10,177.69      | 2                                              | \$2,322.64       | 2                                          | \$2,322.64     |
| 3                                            | \$10,381.49      | 3                                              | \$2,369.67       | 3                                          | \$2,369.67     |
| 4                                            | \$10,589.37      | 4                                              | \$2,417.65       | 4                                          | \$2,417.65     |
| 5                                            | \$10,801.42      | 5                                              | \$2,466.62       | 5                                          | \$2,466.62     |
| 6                                            | \$11,017.71      | 6                                              | \$2,516.58       | 6                                          | \$2,516.58     |
| 7                                            | \$11,238.34      | 7                                              | \$2,567.56       | 7                                          | \$2,567.56     |
| 8                                            | \$11,463.39      | 8                                              | \$2,619.58       | 8                                          | \$2,619.58     |
| 9                                            | \$11,692.95      | 9                                              | \$2,672.66       | 9                                          | \$2,672.66     |
| 10                                           | \$11,927.11      | 10                                             | \$2,726.82       | 10                                         | \$2,726.82     |
| 11                                           | \$12,165.96      | 11                                             | \$2,782.09       | 11                                         | \$2,782.09     |
| 12                                           | \$12,409.60      | 12                                             | \$2,838.48       | 12                                         | \$2,838.48     |
| 13                                           | \$12,658.11      | 13                                             | \$2,896.03       | 13                                         | \$2,896.03     |
| 14                                           | \$12,911.61      | 14                                             | \$2,954.74       | 14                                         | \$2,954.74     |
| 15                                           | \$13,170.19      | 15                                             | \$3,014.66       | 15                                         | \$3,014.66     |
| 16                                           | \$13,433.96      | 16                                             | \$3,075.80       | 16                                         | \$3,075.80     |
| 17                                           | \$13,703.00      | 17                                             | \$3,138.19       | 17                                         | \$3,138.19     |
| 18                                           | \$13,977.44      | 18                                             | \$3,201.85       | 18                                         | \$3,201.85     |
| 19                                           | \$14,257.38      | 19                                             | \$3,266.81       | 19                                         | \$3,266.81     |
| 20                                           | \$14,542.94      | 20                                             | \$3,333.10       | 20                                         | \$3,333.10     |
| 21                                           |                  | 21                                             |                  |                                            |                |
| 22                                           |                  | 22                                             |                  |                                            |                |
| 23                                           |                  | 23                                             |                  |                                            |                |
| 24                                           |                  | 24                                             |                  |                                            |                |
| IRR                                          | -11.07%          | IRR                                            | -19.11%          | IRR                                        | -11.69%        |
| NPV                                          | (\$931,828.58)   | NPV                                            | (\$1,068,293.50) | NPV                                        | (\$240,940.38) |
| ARO                                          | -5.77%           | ARO                                            | -6.46%           | ARO                                        | -5.86%         |

| ECM                                  | Grover Cleveland Middle School<br>DDC upgrade | Lincoln Elementary School<br>DDC upgrade | Washington Elementary School<br>DDC upgrade | Harrison School Building<br>DDC upgrade |
|--------------------------------------|-----------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------------------|
| Assumed Inflation (Gas, Oil)         | 2%                                            | 2%                                       | 2%                                          | 2%                                      |
| Initial Yearly Savings (Gas, Oil)    | \$99.16                                       | \$337.59                                 | \$622.95                                    | \$309.36                                |
| Assumed Inflation (Electricity)      | 3%                                            | 3%                                       | 3%                                          | 3%                                      |
| Initial Yearly Savings (Electricity) | \$2,747.55                                    | \$576.08                                 | \$608.48                                    | \$485.54                                |
| Assumed Average Useful Life (Years)  | 20                                            | 20                                       | 20                                          | 20                                      |
| <b>Lifetime Savings</b>              | <b>\$52,816.25</b>                            | <b>\$23,681.92</b>                       | <b>\$31,486.03</b>                          | <b>\$20,563.26</b>                      |
| <u>Year</u>                          | <u>Annual Savings</u>                         | <u>Annual Savings</u>                    | <u>Annual Savings</u>                       | <u>Annual Savings</u>                   |
| 1                                    | \$2,846.71                                    | \$913.67                                 | \$1,231.43                                  | \$794.90                                |
| 2                                    | \$2,931.12                                    | \$937.70                                 | \$1,262.14                                  | \$815.65                                |
| 3                                    | \$3,018.04                                    | \$962.39                                 | \$1,293.65                                  | \$836.97                                |
| 4                                    | \$3,107.55                                    | \$987.75                                 | \$1,325.98                                  | \$858.86                                |
| 5                                    | \$3,199.73                                    | \$1,013.80                               | \$1,359.15                                  | \$881.34                                |
| 6                                    | \$3,294.64                                    | \$1,040.56                               | \$1,393.18                                  | \$904.43                                |
| 7                                    | \$3,392.39                                    | \$1,068.05                               | \$1,428.09                                  | \$928.15                                |
| 8                                    | \$3,493.04                                    | \$1,096.29                               | \$1,463.92                                  | \$952.51                                |
| 9                                    | \$3,596.70                                    | \$1,125.30                               | \$1,500.68                                  | \$977.53                                |
| 10                                   | \$3,703.43                                    | \$1,155.10                               | \$1,538.41                                  | \$1,003.23                              |
| 11                                   | \$3,813.35                                    | \$1,185.72                               | \$1,577.11                                  | \$1,029.63                              |
| 12                                   | \$3,926.54                                    | \$1,217.17                               | \$1,616.83                                  | \$1,056.75                              |
| 13                                   | \$4,043.11                                    | \$1,249.49                               | \$1,657.59                                  | \$1,084.61                              |
| 14                                   | \$4,163.14                                    | \$1,282.70                               | \$1,699.42                                  | \$1,113.22                              |
| 15                                   | \$4,286.75                                    | \$1,316.81                               | \$1,742.34                                  | \$1,142.62                              |
| 16                                   | \$4,414.05                                    | \$1,351.86                               | \$1,786.39                                  | \$1,172.81                              |
| 17                                   | \$4,545.14                                    | \$1,387.87                               | \$1,831.60                                  | \$1,203.83                              |
| 18                                   | \$4,680.13                                    | \$1,424.87                               | \$1,878.00                                  | \$1,235.70                              |
| 19                                   | \$4,819.14                                    | \$1,462.89                               | \$1,925.62                                  | \$1,268.44                              |
| 20                                   | \$4,962.30                                    | \$1,501.96                               | \$1,974.49                                  | \$1,302.08                              |
| 21                                   |                                               |                                          |                                             |                                         |
| 22                                   |                                               |                                          |                                             |                                         |
| 23                                   |                                               |                                          |                                             |                                         |
| 24                                   |                                               |                                          |                                             |                                         |

| Grover Cleveland Middle School<br>DDC upgrade |                | Lincoln Elementary School<br>DDC upgrade |               | Washington Elementary School<br>DDC upgrade |               | Harrison School Building<br>DDC upgrade |               |
|-----------------------------------------------|----------------|------------------------------------------|---------------|---------------------------------------------|---------------|-----------------------------------------|---------------|
| Year                                          | Cash Flow      | Year                                     | Cash Flow     | Year                                        | Cash Flow     | Year                                    | Cash Flow     |
| 0                                             | (\$219,578.00) | 0                                        | \$ (74,750)   | 0                                           | \$ (60,734)   | 0                                       | \$ (56,063)   |
| 1                                             | \$2,846.71     | 1                                        | \$913.67      | 1                                           | \$1,231.43    | 1                                       | \$794.90      |
| 2                                             | \$2,931.12     | 2                                        | \$937.70      | 2                                           | \$1,262.14    | 2                                       | \$815.65      |
| 3                                             | \$3,018.04     | 3                                        | \$962.39      | 3                                           | \$1,293.65    | 3                                       | \$836.97      |
| 4                                             | \$3,107.55     | 4                                        | \$987.75      | 4                                           | \$1,325.98    | 4                                       | \$858.86      |
| 5                                             | \$3,199.73     | 5                                        | \$1,013.80    | 5                                           | \$1,359.15    | 5                                       | \$881.34      |
| 6                                             | \$3,294.64     | 6                                        | \$1,040.56    | 6                                           | \$1,393.18    | 6                                       | \$904.43      |
| 7                                             | \$3,392.39     | 7                                        | \$1,068.05    | 7                                           | \$1,428.09    | 7                                       | \$928.15      |
| 8                                             | \$3,493.04     | 8                                        | \$1,096.29    | 8                                           | \$1,463.92    | 8                                       | \$952.51      |
| 9                                             | \$3,596.70     | 9                                        | \$1,125.30    | 9                                           | \$1,500.68    | 9                                       | \$977.53      |
| 10                                            | \$3,703.43     | 10                                       | \$1,155.10    | 10                                          | \$1,538.41    | 10                                      | \$1,003.23    |
| 11                                            | \$3,813.35     | 11                                       | \$1,185.72    | 11                                          | \$1,577.11    | 11                                      | \$1,029.63    |
| 12                                            | \$3,926.54     | 12                                       | \$1,217.17    | 12                                          | \$1,616.83    | 12                                      | \$1,056.75    |
| 13                                            | \$4,043.11     | 13                                       | \$1,249.49    | 13                                          | \$1,657.59    | 13                                      | \$1,084.61    |
| 14                                            | \$4,163.14     | 14                                       | \$1,282.70    | 14                                          | \$1,699.42    | 14                                      | \$1,113.22    |
| 15                                            | \$4,286.75     | 15                                       | \$1,316.81    | 15                                          | \$1,742.34    | 15                                      | \$1,142.62    |
| 16                                            | \$4,414.05     | 16                                       | \$1,351.86    | 16                                          | \$1,786.39    | 16                                      | \$1,172.81    |
| 17                                            | \$4,545.14     | 17                                       | \$1,387.87    | 17                                          | \$1,831.60    | 17                                      | \$1,203.83    |
| 18                                            | \$4,680.13     | 18                                       | \$1,424.87    | 18                                          | \$1,878.00    | 18                                      | \$1,235.70    |
| 19                                            | \$4,819.14     | 19                                       | \$1,462.89    | 19                                          | \$1,925.62    | 19                                      | \$1,268.44    |
| 20                                            | \$4,962.30     | 20                                       | \$1,501.96    | 20                                          | \$1,974.49    | 20                                      | \$1,302.08    |
| 21                                            |                |                                          |               |                                             |               |                                         |               |
| 22                                            |                |                                          |               |                                             |               |                                         |               |
| 23                                            |                |                                          |               |                                             |               |                                         |               |
| 24                                            |                |                                          |               |                                             |               |                                         |               |
| IRR                                           | -7.96%         | IRR                                      | -8.61%        | IRR                                         | -5.25%        | IRR                                     | -7.65%        |
| NPV                                           | (\$164,469.75) | NPV                                      | (\$57,579.71) | NPV                                         | (\$37,876.09) | NPV                                     | (\$41,151.12) |
| ARO                                           | -5.37%         | ARO                                      | -5.44%        | ARO                                         | -4.64%        | ARO                                     | -5.25%        |

| ECM                                  | Grover Cleveland Middle School<br>Condensing DHW | Lincoln Elementary School<br>Condensing DHW | Washington Elementary School<br>Condensing DHW | Wilson Elementary School<br>Condensing DHW | Harrison School Building<br>Condensing DHW |
|--------------------------------------|--------------------------------------------------|---------------------------------------------|------------------------------------------------|--------------------------------------------|--------------------------------------------|
| Assumed Inflation (Gas, Oil)         | 2%                                               | 2%                                          | 2%                                             | 2%                                         | 2%                                         |
| Initial Yearly Savings (Gas, Oil)    | \$291.85                                         | \$126.32                                    | \$615.62                                       | \$192.26                                   | \$76.13                                    |
| Assumed Inflation (Electricity)      | 3%                                               | 3%                                          | 3%                                             | 3%                                         | 3%                                         |
| Initial Yearly Savings (Electricity) | \$0.00                                           | \$0.00                                      | \$0.00                                         | \$0.00                                     | \$0.00                                     |
| Annual Maintenance Cost Savings      | \$0.00                                           | \$0.00                                      | \$0.00                                         | \$0.00                                     | \$0.00                                     |
| Assumed Average Useful Life (Years)  | 24                                               | 24                                          | 24                                             | 24                                         | 24                                         |
| <b>Lifetime Savings</b>              | <b>\$8,878.52</b>                                | <b>\$3,842.83</b>                           | <b>\$10,646.15</b>                             | <b>\$4,116.65</b>                          | <b>\$2,315.87</b>                          |
| <u>Year</u>                          | <u>Annual Savings</u>                            | <u>Annual Savings</u>                       | <u>Annual Savings</u>                          | <u>Annual Savings</u>                      | <u>Annual Savings</u>                      |
| 1                                    | \$291.85                                         | \$126.32                                    | \$615.62                                       | \$192.26                                   | \$76.13                                    |
| 2                                    | \$297.68                                         | \$128.84                                    | \$627.93                                       | \$196.10                                   | \$77.65                                    |
| 3                                    | \$303.64                                         | \$131.42                                    | \$640.49                                       | \$200.02                                   | \$79.20                                    |
| 4                                    | \$309.71                                         | \$134.05                                    | \$653.30                                       | \$204.02                                   | \$80.78                                    |
| 5                                    | \$315.90                                         | \$136.73                                    | \$666.37                                       | \$208.10                                   | \$82.40                                    |
| 6                                    | \$322.22                                         | \$139.47                                    | \$679.69                                       | \$212.27                                   | \$84.05                                    |
| 7                                    | \$328.67                                         | \$142.25                                    | \$693.29                                       | \$216.51                                   | \$85.73                                    |
| 8                                    | \$335.24                                         | \$145.10                                    | \$707.15                                       | \$220.84                                   | \$87.44                                    |
| 9                                    | \$341.95                                         | \$148.00                                    | \$721.30                                       | \$225.26                                   | \$89.19                                    |
| 10                                   | \$348.78                                         | \$150.96                                    | \$735.72                                       | \$229.76                                   | \$90.98                                    |
| 11                                   | \$355.76                                         | \$153.98                                    | \$750.44                                       | \$234.36                                   | \$92.80                                    |
| 12                                   | \$362.87                                         | \$157.06                                    | \$765.44                                       | \$239.05                                   | \$94.65                                    |
| 13                                   | \$370.13                                         | \$160.20                                    | \$780.75                                       | \$243.83                                   | \$96.54                                    |
| 14                                   | \$377.53                                         | \$163.41                                    | \$796.37                                       | \$248.70                                   | \$98.48                                    |
| 15                                   | \$385.09                                         | \$166.67                                    | \$812.30                                       | \$253.68                                   | \$100.45                                   |
| 16                                   | \$392.79                                         | \$170.01                                    | \$828.54                                       | \$258.75                                   | \$102.45                                   |
| 17                                   | \$400.64                                         | \$173.41                                    | \$845.11                                       | \$263.93                                   | \$104.50                                   |
| 18                                   | \$408.66                                         | \$176.88                                    | \$862.01                                       | \$269.21                                   | \$106.59                                   |
| 19                                   | \$416.83                                         | \$180.41                                    | \$879.26                                       | \$274.59                                   | \$108.73                                   |
| 20                                   | \$425.17                                         | \$184.02                                    | \$896.84                                       | \$280.08                                   | \$110.90                                   |
| 21                                   | \$433.67                                         | \$187.70                                    | \$914.78                                       | \$285.68                                   | \$113.12                                   |
| 22                                   | \$442.34                                         | \$191.46                                    | \$933.07                                       | \$291.40                                   | \$115.38                                   |
| 23                                   | \$451.19                                         | \$195.29                                    | \$951.73                                       | \$297.22                                   | \$117.69                                   |
| 24                                   | \$460.21                                         | \$199.19                                    | \$970.77                                       | \$303.17                                   | \$120.04                                   |

IRR, NPV, AROI - HVAC ECRMS

| Grover Cleveland Middle School<br>Condensing DHW |               | Lincoln Elementary School<br>Condensing DHW |               | Washington Elementary School<br>Condensing DHW |              | Wilson Elementary School<br>Condensing DHW |              | Harrison School Building<br>Condensing DHW |              |
|--------------------------------------------------|---------------|---------------------------------------------|---------------|------------------------------------------------|--------------|--------------------------------------------|--------------|--------------------------------------------|--------------|
| Year                                             | Cash Flow     | Year                                        | Cash Flow     | Year                                           | Cash Flow    | Year                                       | Cash Flow    | Year                                       | Cash Flow    |
| 0                                                | (\$10,706.69) | 0                                           | (\$17,628.56) | 0                                              | (\$4,327.19) | 0                                          | (\$4,320.00) | 0                                          | (\$4,320.00) |
| 1                                                | \$291.85      | 1                                           | \$126.32      | 1                                              | \$615.62     | 1                                          | \$192.26     | 1                                          | \$76.13      |
| 2                                                | \$297.68      | 2                                           | \$128.84      | 2                                              | \$627.93     | 2                                          | \$196.10     | 2                                          | \$77.65      |
| 3                                                | \$303.64      | 3                                           | \$131.42      | 3                                              | \$640.49     | 3                                          | \$200.02     | 3                                          | \$79.20      |
| 4                                                | \$309.71      | 4                                           | \$134.05      | 4                                              | \$653.30     | 4                                          | \$204.02     | 4                                          | \$80.78      |
| 5                                                | \$315.90      | 5                                           | \$136.73      | 5                                              | \$666.37     | 5                                          | \$208.10     | 5                                          | \$82.40      |
| 6                                                | \$322.22      | 6                                           | \$139.47      | 6                                              | \$679.69     | 6                                          | \$212.27     | 6                                          | \$84.05      |
| 7                                                | \$328.67      | 7                                           | \$142.25      | 7                                              | \$693.29     | 7                                          | \$216.51     | 7                                          | \$85.73      |
| 8                                                | \$335.24      | 8                                           | \$145.10      | 8                                              | \$707.15     | 8                                          | \$220.84     | 8                                          | \$87.44      |
| 9                                                | \$341.95      | 9                                           | \$148.00      | 9                                              | \$721.30     | 9                                          | \$225.26     | 9                                          | \$89.19      |
| 10                                               | \$348.78      | 10                                          | \$150.96      | 10                                             | \$735.72     | 10                                         | \$229.76     | 10                                         | \$90.98      |
| 11                                               | \$355.76      | 11                                          | \$153.98      | 11                                             | \$750.44     | 11                                         | \$234.36     | 11                                         | \$92.80      |
| 12                                               | \$362.87      | 12                                          | \$157.06      | 12                                             | \$765.44     | 12                                         | \$239.05     | 12                                         | \$94.65      |
| 13                                               | \$370.13      | 13                                          | \$160.20      | 13                                             | \$780.75     | 13                                         | \$243.83     | 13                                         | \$96.54      |
| 14                                               | \$377.53      | 14                                          | \$163.41      | 14                                             | \$796.37     | 14                                         | \$248.70     | 14                                         | \$98.48      |
| 15                                               | \$385.09      | 15                                          | \$166.67      | 15                                             | \$812.30     | 15                                         | \$253.68     | 15                                         | \$100.45     |
| 16                                               | \$392.79      | 16                                          | \$170.01      | 16                                             | \$828.54     | 16                                         | \$258.75     | 16                                         | \$102.45     |
| 17                                               | \$400.64      | 17                                          | \$173.41      | 17                                             | \$845.11     | 17                                         | \$263.93     | 17                                         | \$104.50     |
| 18                                               | \$408.66      | 18                                          | \$176.88      | 18                                             | \$862.01     | 18                                         | \$269.21     | 18                                         | \$106.59     |
| 19                                               | \$416.83      | 19                                          | \$180.41      | 19                                             | \$879.26     | 19                                         | \$274.59     | 19                                         | \$108.73     |
| 20                                               | \$425.17      | 20                                          | \$184.02      | 20                                             | \$896.84     | 20                                         | \$280.08     | 20                                         | \$110.90     |
| 21                                               | \$433.67      | 21                                          | \$187.70      | 21                                             | \$914.78     | 21                                         | \$285.68     | 21                                         | \$113.12     |
| 22                                               | \$442.34      | 22                                          | \$191.46      | 22                                             | \$933.07     | 22                                         | \$291.40     | 22                                         | \$115.38     |
| 23                                               | \$451.19      | 23                                          | \$195.29      | 23                                             | \$951.73     | 23                                         | \$297.22     | 23                                         | \$117.69     |
| 24                                               | \$460.21      | 24                                          | \$199.19      | 24                                             | \$970.77     | 24                                         | \$303.17     | 24                                         | \$120.04     |
| IRR                                              | -1.35%        | IRR                                         | -18.66%       | IRR                                            | 13.27%       | IRR                                        | 2.38%        | IRR                                        | -4.22%       |
| NPV                                              | (\$4,614.23)  | NPV                                         | (\$15,908.89) | NPV                                            | \$4,053.74   | NPV                                        | (\$306.55)   | NPV                                        | (\$2,730.85) |
| AROI                                             | -1.44%        | AROI                                        | -5.95%        | AROI                                           | 7.56%        | AROI                                       | 0.28%        | AROI                                       | -2.40%       |

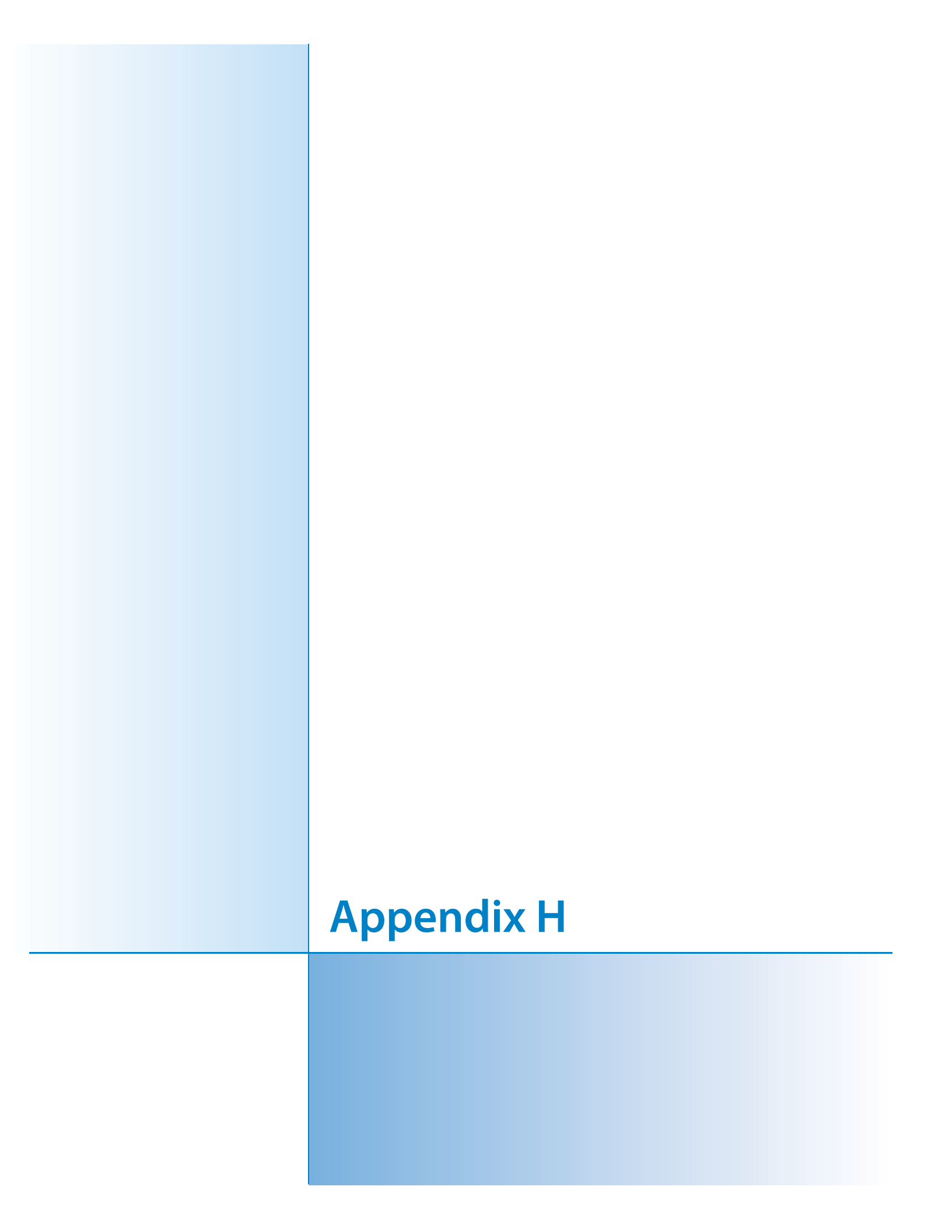
| ECM                                  | Grover Cleveland Middle School<br>Premium Motors | Lincoln Elementary School<br>Premium Motors | Washington Elementary School<br>Premium Motors | Wilson Elementary School<br>Premium Motors | Harrison School Building<br>Premium Motors |
|--------------------------------------|--------------------------------------------------|---------------------------------------------|------------------------------------------------|--------------------------------------------|--------------------------------------------|
| Assumed Inflation (Gas, Oil)         | 2%                                               | 2%                                          | 2%                                             | 2%                                         | 2%                                         |
| Initial Yearly Savings (Gas, Oil)    | \$322.18                                         | \$107.74                                    | \$31.79                                        | \$9.89                                     | \$63.60                                    |
| Assumed Inflation (Electricity)      | 3%                                               | 3%                                          | 3%                                             | 3%                                         | 3%                                         |
| Initial Yearly Savings (Electricity) | \$0.00                                           | \$0.00                                      | \$0.00                                         | \$0.00                                     | \$0.00                                     |
| Annual Maintenance Cost Savings      | \$0.00                                           | \$0.00                                      | \$0.00                                         | \$0.00                                     | \$0.00                                     |
| Assumed Average Useful Life (Years)  | 24                                               | 24                                          | 24                                             | 24                                         | 24                                         |
| <b>Lifetime Savings</b>              | <b>\$9,801.43</b>                                | <b>\$3,277.51</b>                           | <b>\$549.81</b>                                | <b>\$211.67</b>                            | <b>\$1,934.88</b>                          |
| <u>Year</u>                          | <u>Annual Savings</u>                            | <u>Annual Savings</u>                       | <u>Annual Savings</u>                          | <u>Annual Savings</u>                      | <u>Annual Savings</u>                      |
| 1                                    | \$322.18                                         | \$107.74                                    | \$31.79                                        | \$9.89                                     | \$63.60                                    |
| 2                                    | \$328.63                                         | \$109.89                                    | \$32.43                                        | \$10.08                                    | \$64.87                                    |
| 3                                    | \$335.20                                         | \$112.09                                    | \$33.08                                        | \$10.28                                    | \$66.17                                    |
| 4                                    | \$341.90                                         | \$114.33                                    | \$33.74                                        | \$10.49                                    | \$67.49                                    |
| 5                                    | \$348.74                                         | \$116.62                                    | \$34.41                                        | \$10.70                                    | \$68.84                                    |
| 6                                    | \$355.72                                         | \$118.95                                    | \$35.10                                        | \$10.91                                    | \$70.22                                    |
| 7                                    | \$362.83                                         | \$121.33                                    | \$35.80                                        | \$11.13                                    | \$71.63                                    |
| 8                                    | \$370.09                                         | \$123.75                                    | \$36.52                                        | \$11.36                                    | \$73.06                                    |
| 9                                    | \$377.49                                         | \$126.23                                    | \$37.25                                        | \$11.58                                    | \$74.52                                    |
| 10                                   | \$385.04                                         | \$128.75                                    | \$38.00                                        | \$11.81                                    | \$76.01                                    |
| 11                                   | \$392.74                                         | \$131.33                                    | \$38.76                                        | \$12.05                                    | \$77.53                                    |
| 12                                   | \$400.59                                         | \$133.96                                    | \$39.53                                        | \$12.29                                    | \$79.08                                    |
| 13                                   | \$408.61                                         | \$136.63                                    | \$40.32                                        | \$12.54                                    | \$80.66                                    |
| 14                                   | \$416.78                                         | \$139.37                                    | \$41.13                                        | \$12.79                                    | \$82.28                                    |
| 15                                   | \$425.11                                         | \$142.15                                    | \$41.95                                        | \$13.04                                    | \$83.92                                    |
| 16                                   | \$433.62                                         | \$145.00                                    | \$42.79                                        | \$13.30                                    | \$85.60                                    |
| 17                                   | \$442.29                                         | \$147.90                                    | \$43.65                                        | \$13.57                                    | \$87.31                                    |
| 18                                   | \$451.13                                         | \$150.86                                    | \$44.52                                        | \$13.84                                    | \$89.06                                    |
| 19                                   | \$460.16                                         | \$153.87                                    | \$45.41                                        | \$14.12                                    | \$90.84                                    |
| 20                                   | \$469.36                                         | \$156.95                                    | \$46.32                                        | \$14.40                                    | \$92.66                                    |
| 21                                   | \$478.75                                         | \$160.09                                    | \$47.24                                        | \$14.69                                    | \$94.51                                    |
| 22                                   | \$488.32                                         | \$163.29                                    | \$48.19                                        | \$14.98                                    | \$96.40                                    |
| 23                                   | \$498.09                                         | \$166.56                                    | \$49.15                                        | \$15.28                                    | \$98.33                                    |
| 24                                   | \$508.05                                         | \$169.89                                    | \$50.13                                        | \$15.59                                    | \$100.29                                   |

IRR, NPV, AROI - HVAC ECRMS

| Grover Cleveland Middle School<br>Premium Motors |              | Lincoln Elementary School<br>Premium Motors |            | Washington Elementary School<br>Premium Motors |              | Wilson Elementary School<br>Premium Motors |            | Harrison School Building<br>Premium Motors |              |
|--------------------------------------------------|--------------|---------------------------------------------|------------|------------------------------------------------|--------------|--------------------------------------------|------------|--------------------------------------------|--------------|
| Year                                             | Cash Flow    | Year                                        | Cash Flow  | Year                                           | Cash Flow    | Year                                       | Cash Flow  | Year                                       | Cash Flow    |
| 0                                                | (\$2,715.00) | 0                                           | (\$208.00) | 0                                              | (\$1,262.00) | 0                                          | (\$606.00) | 0                                          | (\$2,183.00) |
| 1                                                | \$322.18     | 1                                           | \$107.74   | 1                                              | \$31.79      | 1                                          | \$9.89     | 1                                          | \$63.60      |
| 2                                                | \$328.63     | 2                                           | \$109.89   | 2                                              | \$32.43      | 2                                          | \$10.08    | 2                                          | \$64.87      |
| 3                                                | \$335.20     | 3                                           | \$112.09   | 3                                              | \$33.08      | 3                                          | \$10.28    | 3                                          | \$66.17      |
| 4                                                | \$341.90     | 4                                           | \$114.33   | 4                                              | \$33.74      | 4                                          | \$10.49    | 4                                          | \$67.49      |
| 5                                                | \$348.74     | 5                                           | \$116.62   | 5                                              | \$34.41      | 5                                          | \$10.70    | 5                                          | \$68.84      |
| 6                                                | \$355.72     | 6                                           | \$118.95   | 6                                              | \$35.10      | 6                                          | \$10.91    | 6                                          | \$70.22      |
| 7                                                | \$362.83     | 7                                           | \$121.33   | 7                                              | \$35.80      | 7                                          | \$11.13    | 7                                          | \$71.63      |
| 8                                                | \$370.09     | 8                                           | \$123.75   | 8                                              | \$36.52      | 8                                          | \$11.36    | 8                                          | \$73.06      |
| 9                                                | \$377.49     | 9                                           | \$126.23   | 9                                              | \$37.25      | 9                                          | \$11.58    | 9                                          | \$74.52      |
| 10                                               | \$385.04     | 10                                          | \$128.75   | 10                                             | \$38.00      | 10                                         | \$11.81    | 10                                         | \$76.01      |
| 11                                               | \$392.74     | 11                                          | \$131.33   | 11                                             | \$38.76      | 11                                         | \$12.05    | 11                                         | \$77.53      |
| 12                                               | \$400.59     | 12                                          | \$133.96   | 12                                             | \$39.53      | 12                                         | \$12.29    | 12                                         | \$79.08      |
| 13                                               | \$408.61     | 13                                          | \$136.63   | 13                                             | \$40.32      | 13                                         | \$12.54    | 13                                         | \$80.66      |
| 14                                               | \$416.78     | 14                                          | \$139.37   | 14                                             | \$41.13      | 14                                         | \$12.79    | 14                                         | \$82.28      |
| 15                                               | \$425.11     | 15                                          | \$142.15   | 15                                             | \$41.95      | 15                                         | \$13.04    | 15                                         | \$83.92      |
| 16                                               | \$433.62     | 16                                          | \$145.00   | 16                                             | \$42.79      | 16                                         | \$13.30    | 16                                         | \$85.60      |
| 17                                               | \$442.29     | 17                                          | \$147.90   | 17                                             | \$43.65      | 17                                         | \$13.57    | 17                                         | \$87.31      |
| 18                                               | \$451.13     | 18                                          | \$150.86   | 18                                             | \$44.52      | 18                                         | \$13.84    | 18                                         | \$89.06      |
| 19                                               | \$460.16     | 19                                          | \$153.87   | 19                                             | \$45.41      | 19                                         | \$14.12    | 19                                         | \$90.84      |
| 20                                               | \$469.36     | 20                                          | \$156.95   | 20                                             | \$46.32      | 20                                         | \$14.40    | 20                                         | \$92.66      |
| 21                                               | \$478.75     | 21                                          | \$160.09   | 21                                             | \$47.24      | 21                                         | \$14.69    | 21                                         | \$94.51      |
| 22                                               | \$488.32     | 22                                          | \$163.29   | 22                                             | \$48.19      | 22                                         | \$14.98    | 22                                         | \$96.40      |
| 23                                               | \$498.09     | 23                                          | \$166.56   | 23                                             | \$49.15      | 23                                         | \$15.28    | 23                                         | \$98.33      |
| 24                                               | \$508.05     | 24                                          | \$169.89   | 24                                             | \$50.13      | 24                                         | \$15.59    | 24                                         | \$100.29     |
| IRR                                              | 12.81%       | IRR                                         | 53.69%     | IRR                                            | -8.65%       | IRR                                        | -4.70%     | IRR                                        | -0.88%       |
| NPV                                              | \$4,010.76   | NPV                                         | \$1,258.69 | NPV                                            | (\$829.17)   | NPV                                        | (\$399.64) | NPV                                        | (\$855.28)   |
| AROI                                             | 7.70%        | AROI                                        | 45.13%     | AROI                                           | -4.15%       | AROI                                       | -2.54%     | AROI                                       | -1.25%       |

| ECM                                  | James Caldwell High<br>School<br>Wind Turbine |
|--------------------------------------|-----------------------------------------------|
| Assumed Inflation (Gas, Oil)         | 2%                                            |
| Initial Yearly Savings (Gas, Oil)    | \$0.00                                        |
| Assumed Inflation (Electricity)      | 3%                                            |
| Initial Yearly Savings (Electricity) | \$8,300.10                                    |
| Assumed Average Useful Life (Years)  | 25                                            |
| <b>Lifetime Savings</b>              | <b>\$242,915.07</b>                           |
| <u>Year</u>                          | <u>Annual Savings</u>                         |
| 1                                    | \$7,193.42                                    |
| 2                                    | \$7,405.21                                    |
| 3                                    | \$7,622.10                                    |
| 4                                    | \$7,844.21                                    |
| 5                                    | \$8,071.68                                    |
| 6                                    | \$8,304.64                                    |
| 7                                    | \$8,543.23                                    |
| 8                                    | \$8,787.59                                    |
| 9                                    | \$9,037.85                                    |
| 10                                   | \$9,294.18                                    |
| 11                                   | \$9,556.72                                    |
| 12                                   | \$9,825.62                                    |
| 13                                   | \$10,101.05                                   |
| 14                                   | \$10,383.17                                   |
| 15                                   | \$10,672.14                                   |
| 16                                   | \$10,968.14                                   |
| 17                                   | \$11,271.34                                   |
| 18                                   | \$11,581.92                                   |
| 19                                   | \$11,900.06                                   |
| 20                                   | \$12,225.97                                   |
| 21                                   | \$12,559.81                                   |
| 22                                   | \$12,901.81                                   |
| 23                                   | \$13,252.15                                   |
| 24                                   | \$13,611.05                                   |
| 25                                   | \$13,978.73                                   |

| James Caldwell High School<br>Wind Turbine |                |
|--------------------------------------------|----------------|
| Year                                       | Cash Flow      |
| 0                                          | (\$151,000.00) |
| 1                                          | \$7,193.42     |
| 2                                          | \$7,405.21     |
| 3                                          | \$7,622.10     |
| 4                                          | \$7,844.21     |
| 5                                          | \$8,071.68     |
| 6                                          | \$8,304.64     |
| 7                                          | \$8,543.23     |
| 8                                          | \$8,787.59     |
| 9                                          | \$9,037.85     |
| 10                                         | \$9,294.18     |
| 11                                         | \$9,556.72     |
| 12                                         | \$9,825.62     |
| 13                                         | \$10,101.05    |
| 14                                         | \$10,383.17    |
| 15                                         | \$10,672.14    |
| 16                                         | \$10,968.14    |
| 17                                         | \$11,271.34    |
| 18                                         | \$11,581.92    |
| 19                                         | \$11,900.06    |
| 20                                         | \$12,225.97    |
| 21                                         | \$12,559.81    |
| 22                                         | \$12,901.81    |
| 23                                         | \$13,252.15    |
| 24                                         | \$13,611.05    |
| 25                                         | \$13,978.73    |
| IRR                                        | 2.12%          |
| NPV                                        | (\$13,046.08)  |
| ARO                                        | -1.90%         |

The graphic consists of a large light blue rectangle on the left side of the page. A thin blue vertical line separates this rectangle from the rest of the page. A thin blue horizontal line crosses the vertical line, extending to the right edge of the page. The text "Appendix H" is positioned to the right of the vertical line, just above the horizontal line. A medium blue rectangle is located at the bottom right of the page, below the horizontal line and to the right of the vertical line.

## Appendix H

Equipment Inventory  
High School

| Designation           | Building    | Location      | Manufacturer | Model             | Efficiency | Date | Capacity                 | ASHRAE Life Expectancy | Remarks           |
|-----------------------|-------------|---------------|--------------|-------------------|------------|------|--------------------------|------------------------|-------------------|
| EXUH1                 | Roof        | Auditorium    | AAON         | RN-070-3-0-BA04   |            | 2009 | 1080 MBH in, 864 MBH out | 15                     |                   |
| RTUHS2                | Roof        | Auditorium    | Lennox       | LGA120H4BH3G      |            | 2009 | 2,400 MBH, 10 tons       | 15                     |                   |
| RTUHS1                | Roof        | Auditorium    | Lennox       | LGC156HHHS2G      |            | 2009 | 260 MBH, 15 tons         | 15                     |                   |
| AC                    |             |               | Mitsubishi   | PUY-A36NHA2       |            |      | 3 tons                   | 15                     |                   |
| RTU                   |             |               |              | D2CG072NO992      |            |      | 125 MBH, 6 tons          | 15                     |                   |
| RTU                   | Roof        | 313           |              | D2CG072NO992      |            |      | 125 MBH, 6 tons          | 15                     |                   |
| RTU                   | Roof        |               |              | D2CG072NO992      |            |      | 125 MBH, 6 tons          | 15                     |                   |
| Condenser             |             |               |              | RCA-141-3E-01-AAA |            |      |                          | 15                     |                   |
| RTU                   |             | 310           | York         | D2EG060NO79       |            |      | 5 tons                   | 15                     |                   |
| RTU                   | Roof        | 315           |              |                   |            |      |                          | 15                     |                   |
| AC                    |             |               | EMI          | SCC24DF000AA0A    |            |      | 2 tons                   | 15                     |                   |
| RTU                   | Roof        | 509           | York         | D2CG072NO9925     |            | 1998 | 125 MBH, 6 tons          | 15                     |                   |
| RTU                   | Roof        |               | Lennox       | CHA16-513-5Y      |            |      |                          | 15                     |                   |
| RTU                   | Roof        | 208A          | McQuay       | RPS708BY          |            |      |                          | 15                     |                   |
| RTU                   | Roof        | Guidance      | AAON         | RK-25-2-E0-317    |            | 2000 | 270 MBH, 6 tons          | 15                     |                   |
| RTU                   | Roof        |               | AAON         | RK-05-2-E0-000    |            | 2000 | 5 tons                   | 15                     |                   |
| RTU                   | Roof        | Main Office   | AAON         | RK-15-2-E0-000    |            | 2000 | 15 tons                  | 15                     |                   |
| Boiler 1              | Boiler Room | Boiler Room   | Aerco        | Benchmark 3.0     | 95%        | 2009 | 3,000 MBH                | 25                     |                   |
| Boiler 2              | Boiler Room | Boiler Room   | Aerco        | Benchmark 3.0     | 95%        | 2009 | 3,000 MBH                | 25                     |                   |
| Boiler 3              | Boiler Room | Boiler Room   | Aerco        | Benchmark 3.0     | 95%        | 2009 | 3,000 MBH                | 25                     |                   |
| Boiler 4              | Boiler Room | Boiler Room   | Aerco        | Benchmark 3.0     | 95%        | 2009 | 3,000 MBH                | 25                     |                   |
| Boiler 5              | Boiler Room | Boiler Room   | Aerco        | Benchmark 3.0     | 95%        | 2009 | 3,000 MBH                | 25                     |                   |
| HWP 1                 | Boiler Room | Heat          | Taco         | ABB VFD           | 93%        | 2009 |                          | 20                     | 15 HP             |
| HWP 2                 | Boiler Room | Heat          | Taco         | ABB VFD           | 93%        | 2009 |                          | 20                     | 15 HP             |
| HWP 3                 | Boiler Room | Heat          | Taco         | ABB VFD           | 93%        | 2009 |                          | 20                     | 15 HP             |
| UV                    | Classroom   | Heat and Vent | Nesbit       |                   |            | 1967 |                          | 20                     | Pneumatic HV only |
| AC                    |             | 306           | Freidrich    |                   |            | 2006 |                          | 10                     |                   |
| EF                    |             | 303           |              |                   |            |      |                          | 20                     | 24x24             |
| AC                    |             | 300           |              |                   |            |      | 1 ton                    | 10                     |                   |
| AC                    |             | 206           |              |                   |            |      | 1 ton                    | 10                     |                   |
| AHU                   | Gym         | Gym           |              |                   |            |      |                          | 20                     | Heat and vent     |
| AHU                   |             | Aux Gym       | AAF          | HCS06AMF          |            |      |                          | 20                     | Heat and vent     |
| AC                    |             | 106           | Frigidaire   | FAS256R2A         | 9.4 EER    | 2008 | 25,000 BTUH              | 10                     |                   |
| AC                    |             | 105           | Frigidaire   |                   |            |      |                          | 10                     |                   |
| AC                    |             | 104A          | Frigidaire   |                   |            |      |                          | 10                     |                   |
| AC                    |             | 103           | Frigidaire   |                   |            |      |                          | 10                     |                   |
| AC                    |             | 102           | Frigidaire   |                   |            |      |                          | 10                     |                   |
| AC                    |             | 401           | Frigidaire   |                   |            | 1986 |                          | 10                     |                   |
| Domestic Water Heater | Boiler Room | Boiler Room   | Aerco        | KC 1000           | 95%        | 2009 | 23 gal, 1000 MBH         | 15                     |                   |

Equipment Inventory  
Middle School

| Designation           | Building           | Location           | Manufacturer  | Model           | Efficiency | Date | Capacity                  | ASHRAE Life Expectancy | Remarks                                                             |
|-----------------------|--------------------|--------------------|---------------|-----------------|------------|------|---------------------------|------------------------|---------------------------------------------------------------------|
| AC                    | Main Office        | Main Office        | Frigidaire    |                 |            | 2010 | 18,000 MBH                | 10                     |                                                                     |
| AC                    | Principal's Office | Principal's Office | Frigidaire    |                 |            | 2008 | 25,000 MBH                | 10                     |                                                                     |
| AC                    | VP's Office        | VP's Office        | Frigidaire    |                 |            | 2008 | 18,000 MBH                | 10                     |                                                                     |
| UV                    | 304                | 304                | Daikin        |                 |            | 2010 |                           | 20                     |                                                                     |
| UV                    | 306                | 306                | Daikin        |                 |            |      |                           | 20                     |                                                                     |
| UV                    | 303                | 303                | Nesbit        |                 |            | 2012 |                           | 20                     |                                                                     |
| UV                    | 308                | 308                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 301                | 301                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 302                | 302                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 309                | 309                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 310                | 310                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 311                | 311                | AAF           |                 |            | 1990 |                           | 20                     |                                                                     |
| UV                    | 312                | 312                | Nesbit        |                 |            | 2012 |                           | 20                     |                                                                     |
| UV                    | 314                | 314                | Nesbit        |                 |            | 2012 |                           | 20                     |                                                                     |
| UV                    | 316                | 316                | AAF           | AV005C11        |            | 2002 |                           | 20                     |                                                                     |
| AC                    | 316                | 316                | Frigidaire    | FAS256R2A       | 9.4 EER    | 2007 | 25,000 MBH                | 10                     |                                                                     |
| UV                    | 317                | 317                | AAF           |                 |            |      |                           | 20                     |                                                                     |
| UV                    | 313                | 313                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 318                | 318                | AAF           |                 |            |      |                           | 20                     |                                                                     |
| UV                    | 315                | 315                | AAF           |                 |            |      |                           | 20                     |                                                                     |
| UV                    | Art Room           | Art Room           | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 101                | 101                | AAF           |                 |            | 2002 |                           | 20                     |                                                                     |
| UV                    | 102                | 102                |               |                 |            |      |                           | 20                     |                                                                     |
| UV                    | 104                | 104                |               |                 |            |      |                           | 20                     |                                                                     |
| UV                    | 103                | 103                |               |                 |            | 1990 |                           | 20                     |                                                                     |
| UV                    | 105                | 105                | AAF           |                 |            | 2002 |                           | 20                     |                                                                     |
| AC                    | Custodian          | Custodian          | Whirlpool     |                 |            | 1990 |                           | 10                     |                                                                     |
| UV                    | 106                | 106                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| UV                    | 108                | 108                | Nesbit        | Old             |            |      |                           | 20                     |                                                                     |
| Boiler 1              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     | 1700 RPM constant speed<br>1740 RPM constant speed<br><br>Pneumatic |
| Boiler 2              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     |                                                                     |
| Boiler 3              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     |                                                                     |
| Boiler 4              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     |                                                                     |
| Boiler 5              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     |                                                                     |
| Boiler 6              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     |                                                                     |
| Boiler 7              | Boiler Room        | Boiler Room        | Laars         | HH1000MN20CCABD | 85%        | 1997 | 1,000 MBH in, 850 MBH out | 22                     |                                                                     |
| HWP 1                 | Boiler Room        | Boiler Room        | Marathon Taco |                 | 91%        |      |                           | 20                     | 15 HP                                                               |
| HWP 2                 | Boiler Room        | Boiler Room        | Marathon Taco |                 | 91%        |      |                           | 20                     | 15 HP                                                               |
| HWP                   | Mech Room          | Addition           | B+G           |                 | 84%        |      |                           | 20                     | 7.5 HP                                                              |
| HWP                   | Mech Room          | Addition           | B+G           |                 | 84%        |      |                           | 20                     | 7.5 HP                                                              |
| AHU                   | Gym                |                    |               |                 |            |      |                           | 20                     |                                                                     |
| Domestic Water Heater | Boiler Room        |                    | AO Smith      | BTR400A-118     | 80%        | 2009 | 95 gal                    | 15                     |                                                                     |
| Compressor            | Boiler Room        |                    | Quincy        | QT5QCB          | 84%        | Old  | 30 gal                    | 20                     | 2 HP                                                                |
| Compressor            | Boiler Room        |                    | Curtic        |                 | 87%        | New  | 30 gal                    | 20                     | 2 HP                                                                |

Equipment Inventory  
Harrison

| Designation           | Building         | Location | Manufacturer | Model         | Efficiency | Date | Capacity       | ASHRAE Life Expectancy | Remarks   |
|-----------------------|------------------|----------|--------------|---------------|------------|------|----------------|------------------------|-----------|
| AC                    | Main Office      |          | Frigidaire   | FAS256R2A     | 9.4EER     | 2007 | 25,000 BTU     | 10                     |           |
| UV                    | Main Office      |          | Nesbit       | HW10A         |            |      |                | 20                     | Pneumatic |
| Boiler 1              | Boiler Room      |          | Aerco        | Benchmark 3.0 |            | 2009 | 3,000,000 BTUH | 25                     |           |
| Boiler 2              | Boiler Room      |          |              |               |            |      | 3,000,000 BTUH | 25                     |           |
| UH                    |                  |          | Airtherm     | HA024         |            |      | 17,400 BTUH    | 20                     |           |
| UH                    |                  |          | Airtherm     | HA024         |            |      | 17,400 BTUH    | 20                     |           |
| HWP 1                 | Boiler Room      |          | B+G          |               | 87.50%     | 2003 |                | 20                     | 5 HP      |
| HWP 2                 | Boiler Room      |          | B+G          |               | 87.50%     |      |                | 20                     | 5 HP      |
| AC                    | Main Office      |          | Frigidaire   |               |            |      |                | 10                     | 1 ton     |
| UV                    | Main Office      |          |              |               |            |      |                | 20                     |           |
| UV                    | Copy Room        |          |              |               |            |      |                | 20                     |           |
| EUH                   | Main Office Bath |          | Electrolux   | WJA-12        |            |      |                | 13                     | 1,000 W   |
| AC                    | Print Room       |          | Haier        |               | 9.0 EER    | 2010 | 8,000 BTU      | 10                     |           |
| EUH                   | Print Room Bath  |          | Electrolux   | WJA-12        |            |      |                | 13                     | 1,000 W   |
| UV                    | Nurse            |          | Nesbit       |               |            |      |                | 20                     |           |
| EUH                   | Nurse Bath       |          | Electromode  | WJA-12        |            |      |                | 13                     | 1,000 W   |
| EF                    |                  |          |              |               |            |      | 24,000 BTU/H   | 20                     |           |
| MAU                   |                  |          |              |               |            |      |                | 20                     |           |
| AC                    | 14               |          | Frigidaire   |               | 9.0 EER    | 1992 | 18,000 BTU     | 10                     |           |
| UV                    | 14               |          | Nesbit       |               |            |      |                | 20                     |           |
| UV                    | 13               |          |              |               |            |      |                | 20                     |           |
| AC                    | 13               |          |              |               |            |      | 18,000 BTU     | 10                     |           |
| UV                    | 12               |          |              |               |            |      |                | 20                     |           |
| AC                    | 10               |          | GE           |               | 9.7 EER    |      | 18,000 BTU     | 10                     |           |
| AC                    | 9                |          | GE           |               |            |      | 18,000 BTU     | 10                     |           |
| AC                    | 9                |          | GE           |               |            |      | 18,000 BTU     | 10                     |           |
| Radiator              | Storage Room     |          |              |               |            |      |                | 20                     |           |
| UV                    | K                |          | McQuay       |               |            |      |                | 20                     |           |
| AC 1                  |                  |          | GE           |               |            | 1990 | 18,000 BTU     | 10                     |           |
| AC 2                  |                  |          | GE           |               |            | 1990 | 18,000 BTU     | 10                     |           |
| UV w/ AC              |                  |          | GE           |               |            | 1990 | 18,000 BTU     | 15                     |           |
| AC                    | 7                |          |              |               |            |      | 18,000 BTU     | 10                     |           |
| UV w/ AC              | 6                |          |              |               |            |      | 18,000 BTU     | 15                     |           |
| UV w/ AC              | 6                |          | Carrier      |               | 10 EER     | 1986 | 18,000 BTU     | 15                     |           |
| UV w/ AC              | 5                |          | Amana        |               |            |      | 18,000 BTU     | 15                     |           |
| UV w/ AC              | 5                |          | Amana        |               |            |      | 18,000 BTU     | 15                     |           |
| UV w/ AC              | 4                |          | MSL          |               |            |      | 18,000 BTU     | 15                     |           |
| UV w/ AC              | 4                |          | MSL          |               |            |      | 18,000 BTU     | 15                     |           |
| AC                    |                  |          | Frigidaire   |               | 9.7 EER    | 2007 | 25,000 BTU     | 10                     |           |
| Domestic Water Heater | Boiler Room      |          | Rheem        | G75-75N-2     | 80.00%     | 2011 | 72 gal, 75 MBH | 15                     |           |
| Compressor            | Boiler Room      |          | Devil Biss   | H4972         |            | 1967 | 30 gal         | 20                     | 3/4 HP    |
| Compressor            | Boiler Room      |          | Speedane     | 32409B        |            | 2002 | 10 gal         | 20                     | 1 HP      |

Equipment Inventory  
Washington

| Designation           | Location           | Serves    | Manufacturer | Model        | Efficiency | Date | Capacity       | ASHRAE Life Expectancy | Remarks |
|-----------------------|--------------------|-----------|--------------|--------------|------------|------|----------------|------------------------|---------|
| Boiler 1              |                    |           | HB Smith     | HB-14-201-2  | 82.00%     | 2009 | 4615 MBH       | 35                     | Steam   |
| Boiler 2              |                    |           | HB Smith     | HB-14-201-2  | 82.00%     | 2009 | 4615 MBH       | 35                     | Steam   |
| Unit Vent             |                    |           | Nesbit       |              |            | 1950 |                | 20                     |         |
| AC                    | Copy Room          | Copy Room | GE           |              |            | 2000 | 1 ton          | 10                     |         |
| AC                    | Teacher's Room     |           | Freidrich    |              |            | 2013 | 1 ton          | 10                     |         |
| AC                    | Main Office        |           | Freidrich    |              |            |      | 1 ton          | 10                     |         |
| AC                    | Nurse's Office     |           | Freidrich    |              |            |      | 1 ton          | 10                     |         |
| AC                    | Principal's Office |           | GE           |              |            |      |                | 10                     |         |
| AC                    | 205                |           | GE           |              |            |      |                | 10                     |         |
| AC                    | 205                |           | GE           |              |            | 1990 | 1.5 tons       | 10                     |         |
| AC                    | Library Office     |           | Carrier      |              |            | 2000 | 18,000 BTU     | 10                     |         |
| AC                    | Library            |           | Frigidaire   | FAS256R2A    |            | 2007 | 25,000 BTU     | 10                     |         |
| AC                    | Library            |           | Frigidaire   | FAS256R2A    |            | 2007 |                | 10                     |         |
| RTU                   | Skills             |           | York         | DDHBTO48AA   |            |      | 4 tons         | 15                     |         |
| RTU                   | Spec Ed            |           | Lennox       | KGA02454DSID |            |      | 60 MBH, 2 tons | 15                     |         |
| Fan                   |                    | Gym       |              |              |            |      |                | 20                     | 3 HP SF |
| Fan                   |                    | Gym       | Trane        | F5978        |            |      |                | 20                     | 2 HP RF |
| Domestic Water Heater | Boiler Room        |           | Rheem        | RHLNO5124    |            | 2014 | 40 gal, 38 MBH | 15                     |         |
| Compressor            | Boiler Room        |           | Landis       |              |            |      | 20 gal         | 20                     |         |

Equipment Inventory  
Wilson

| Designation           | Location           | Serves             | Manufacturer | Model         | Efficiency | Date | Quantity | ASHRAE Life Expectancy | Remarks        |
|-----------------------|--------------------|--------------------|--------------|---------------|------------|------|----------|------------------------|----------------|
| Boiler 1              | Boiler Room        | Heat               | Aerco        | Benchmark 2.0 | 95.00%     | 2009 | 1        | 25                     | 2,000 MBH      |
| Boiler 2              | Boiler Room        | Heat               | Aerco        | Benchmark 2.0 | 95.00%     | 2009 | 1        | 25                     | 2,000 MBH      |
| Pump 1                | Boiler Room        | Heat               | Taco         | -             | 90.20%     | 2009 | 1        | 20                     | 5 HP           |
| Pump 2                | Boiler Room        | Heat               | Taco         | -             | 90.20%     | 2009 | 1        | 20                     | 5 HP           |
| Pump 3                | Boiler Room        | Heat               | Taco         | -             | 90.20%     | 2009 | 1        | 20                     | 5 HP           |
| Pump 4                | Boiler Room        | Heat               | Taco         | -             | 90.20%     | 2009 | 1        | 20                     | 5 HP           |
| Pump 5                | Boiler Room        | Heat               | Taco         | -             | 90.20%     | 2009 | 1        | 20                     | 5 HP           |
| Pump 6                | Boiler Room        | Heat               | Taco         | -             | 90.20%     | 2009 | 1        | 20                     | 5 HP           |
| AHU                   | Faculty            | Faculty            | Trane        | TWE030C140A1  | 10 EER     | 1995 | 1        | 15                     | 2.5 ton        |
| AHU                   | Resource           | Resource           | Trane        | TWE060A100BB  | 10 EER     | 1995 | 1        | 15                     | 5 ton          |
| UV                    | Classrooms         | Classrooms         | Nesbitt      | Original      | -          | 1970 | 1        | 20                     |                |
| AC                    | 9                  | 9                  | Frigidaire   | FAS256R2A     | 10 EER     | 2007 | 1        | 10                     | 25 MBH         |
| HV                    | Gym                | Gym                | Nesbitt      | Old           | 10 EER     | 1970 | 1        | 20                     |                |
| AC                    | -                  | -                  | Comfort      | -             | 8.5 EER    | 1980 | 1        | 10                     | 28 MBH         |
| AC                    | Main Office        | Main Office        | GE           | -             | 10 EER     | 2000 | 1        | 10                     | 1 ton          |
| AC                    | Principal's Office | Principal's Office | -            | -             | 10 EER     | 2000 | 1        | 10                     |                |
| AC                    | Nurse's Office     | Nurse's Office     | Carrier      | -             | 10 EER     | 1980 | 1        | 10                     |                |
| AC                    | Library            | Library            | GE           | AEM14DQL2     | 10 EER     | 2013 | 1        | 10                     | 14 MBH         |
| AC                    | Computer Lab       | Computer Lab       | GE           | AEM14DQL2     | 10 EER     | 2013 | 1        | 10                     | 14 MBH         |
| AC                    | 105                | 105                | GE           | -             | 10 EER     | 2000 | 1        | 10                     | 1 ton          |
| AC                    | 103                | 103                | GE           | ASV24DAD2     | 8.50%      | 2001 | 1        | 10                     | 24 MBH         |
| AC                    | 101                | 101                | Frigidaire   | FAS256R2A     | 9.40%      | 2007 | 1        | 10                     | 25 MBH         |
| Domestic Water Heater | Boiler Room        | Hot Water          | AO Smith     | GCVL40100     | 80.00%     | 2005 | 1        | 15                     | 40 gal, 40 MBH |
| Compressor            | Boiler Room        | Controls           | ACP          | -             | -          | 1980 | 1        | 20                     | 20 gal, 3/4 HP |
| Compressor            | Boiler Room        | Controls           | Powers       | 7CH3          | -          | 1980 | 1        | 20                     | 20 gal, 3/4 HP |

Equipment Inventory  
Lincoln

| Designation           | Location           | Serves             | Manufacturer | Model           | Efficiency | Date | Quantity | ASHRAE Life Expectancy | Remarks          |
|-----------------------|--------------------|--------------------|--------------|-----------------|------------|------|----------|------------------------|------------------|
| Boiler 1              | Boiler Room        | Heat               | Laars        | HH1000MN20      | 85%        | 1997 | 1        | 22                     | 1000 MBH         |
| Boiler 2              | Boiler Room        | Heat               | Laars        | HH1000MN20      | 85%        | 1997 | 1        | 22                     | 1000 MBH         |
| Boiler 3              | Boiler Room        | Heat               | Laars        | HH1000MN20      | 85%        | 1997 | 1        | 22                     | 1000 MBH         |
| HWP 1                 | Boiler Room        | Heat               | Taco         | -               | 83%        | 1997 | 1        | 20                     | 3 HP, 1725 RPM   |
| HWP 2                 | Boiler Room        | Heat               | Taco         | -               | 83%        | 1997 | 1        | 20                     | 3 HP, 1725 RPM   |
| HWP 3                 | Boiler Room        | Heat               | B+G          | -               | 82%        | 1997 | 1        | 20                     | 3 HP, 1730 RPM   |
| HWP 4                 | Boiler Room        | Heat               | B+G          | -               | 83%        | 1997 | 1        | 20                     | 3 HP, 1725 RPM   |
| AC                    | R1                 | R1                 | Frigidaire   | -               | 9.4 EER    | 2010 | 1        | 10                     | 1 ton            |
| UV                    | Gym                | Gym                | -            | -               | -          | 1970 | 1        | 20                     | Heat vent        |
| UV                    | Gym                | Gym                | -            | -               | -          | 1970 | 1        | 20                     | Heat vent        |
| UV                    | Gym                | Gym                | -            | -               | -          | 1970 | 1        | 20                     | Heat vent        |
| UV                    | Gym                | Gym                | -            | -               | -          | 1970 | 1        | 20                     | Heat vent        |
| UV                    | 103                | Classrooms         | Nesbitt      | -               | -          | 1970 | 1        | 20                     | Pneumatic H+V    |
| AC                    | 201                | 201                | Frigidaire   | FAS256R2A       | 9.4 EER    | 2007 | 1        | 10                     | 25,000 BTU       |
| AC                    | 302                | 201                | GE           | AEM24DWL2       | 9.4 EER    | 2013 | 1        | 10                     | 2 ton            |
| AC                    | Main Office        | Main Office        | Frigidaire   | FAS155P1A2      | 10.7 EER   | 2000 | 1        | 10                     | 15,000 BTU       |
| AC                    | Principal's Office | Principal's Office | Freidrich    | -               | 9.4 EER    | 2000 | 1        | 10                     | 15,000 BTU       |
| AC                    | Nurse's Office     | Nurse's Office     | Hot Point    | -               | 9.4 EER    | 2000 | 1        | 10                     | 15,000 BTU       |
| AC                    | Faculty            | Faculty            | -            | HAMC-F042SA     | 9.4 EER    | 2000 | 1        | 10                     | 3.5 tons         |
| AC                    | Faculty            | Faculty            | -            | HAMC-F042SA     | 9.4 EER    | 2000 | 1        | 10                     | 3.5 tons         |
| RTU                   | Roof               | R2,R3              | Lennox       | KGA024S4FS1P808 | 9.4 EER    | 2000 | 1        | 15                     | 3.5 tons         |
| Domestic Water Heater | Boiler Room        | Main Bldg          | AO Smith     | PGXH40          | 80%        | 2010 | 1        | 20                     | 40 gal           |
| Domestic Water Heater | Store Room         | Addition           | Slate        | SB6120          | -          | 2000 | 1        | 20                     | 120 gal, 6kW x 3 |
| Compressor            | Boiler Room        | Controls           | ACP          | CLSA07534       | -          | 1980 | 1        | 20                     | 20 gal, 3/4 HP   |

Equipment Inventory  
Jefferson

| Designation           | Location           | Serves             | Manufacturer  | Model        | Efficiency | Date | Quantity | ASHRAE Life Expectancy | Remarks            |
|-----------------------|--------------------|--------------------|---------------|--------------|------------|------|----------|------------------------|--------------------|
| Boiler 1              | Boiler Room        | Heat               | Teledyne      | SHVB79330    | 80%        | 1997 | 1        | 22                     | 1,000 MBH          |
| Boiler 2              | Boiler Room        | Heat               | Teledyne      | HH1000       | 80%        | 1997 | 1        | 22                     | 1,000 MBH          |
| Boiler 3              | Boiler Room        | Heat               | Teledyne      | HH1000       | 80%        | 1997 | 1        | 22                     | 1,000 MBH          |
| Pumps                 | Boiler Room        | Heat               | Not installed |              |            |      |          |                        | Under Construction |
| AC                    | Lounge             | Lounge             | Amana         | -            | 10 EER     | 1980 | 1        | 10                     |                    |
| AHU                   | Group 2            | Group 2            | Lennox        | KGA024S4DS   | 10 EER     | 2002 | 1        | 20                     |                    |
| UV                    | Classrooms         | Classrooms         | Nesbitt       | Original     | -          | 1970 | 1/class  | 20                     |                    |
| RTU                   | Roof               | SG 1               | Lennox        | CHA16-261-3D | 10 EER     | 2002 | 1        | 15                     |                    |
| RTU                   | Roof               | SG 3               | Lennox        | KGA024S4DSIP | 10 EER     | 2002 | 1        | 15                     | 65 MBH, 2 tons     |
| AC                    | Nurse's Office     | Nurse's Office     | Hairer        | ESAX3186     | 10.7 EER   | 2002 | 1        | 10                     | 17,000 BTU         |
| AC                    | Main Office        | Main Office        | GE            | -            | 9.8 EER    | 2002 | 1        | 10                     | 5,200 BTU          |
| AC                    | Principal's Office | Principal's Office | GE            | -            | 9.8 EER    | 2002 | 1        | 10                     | 18,000 BTU         |
| AC                    | Library            | Library            | GE            | AEM24DQL2    | 9.8 EER    | 2013 | 1        | 10                     | 24,000 BTU         |
| AC                    | 15                 | 15                 | GE            | -            | 9.8 EER    | 1990 | 1        | 10                     | 2 tons             |
| Domestic Water Heater | Boiler Room        | Water Heating      | Rheem         | 22V4OF1      | 80%        | 2010 | 1        | 15                     | 40 gal, 38 MBH     |