



Final Energy Audit Report

Paterson BOE School District
December 18, 2015

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Executive Summary

As part of an initiative to reduce energy cost and consumption, Paterson Board of Education has secured the services of CDM Smith to perform an energy audit for seventeen (17) 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 July 28 - 30. 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 was measured through a simple payback analysis. The simple payback period was determined after establishing Engineer’s Opinion of Probable Construction Cost estimates, Operation and Maintenance (O&M) cost estimates, projected annual energy savings estimates, and the potential value of New Jersey Clean Energy rebates, or Renewable Energy Credits, if applicable. 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 can serve as a bench-marking tool. This data along with the building profiles that have been established through the EPA’s Portfolio Manager Program are used to quantify the reduction in electrical energy and natural gas usage following the implementation of the 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
School 01 & 26	718,772	222.9	198.7	52,684	\$110,085	\$ 41,374
School 02	311,110	123	96	73,705	\$49,396	\$ 63,546
School 03	321,653	78.8	80	38,790	\$49,869	\$ 30,628
School 04	760,851	164.8	136.9	90,578	\$113,388	\$ 72,232
School 05	838,775	158	189	72,879	\$125,406	\$ 60,988
School 08	368,700	107	111.6	60,034	\$55,947	\$ 49,353
School 09	1,406,124	315	463	12,189	\$212,386	\$ 10,866
School 10	363,585	99	85	51,770	\$61,729	\$ 43,944
School 11	194,600	98	62	21,130	\$27,858	\$ 19,665
School 14	75,620	32	40	13,750	\$12,915	\$ 12,730
School 15	556,871	96	49	89,609	\$85,738	\$ 95,594
School 19	218,426	73	57	26,833	\$32,807	\$ 31,068
School 20	529,250	192	93.6	62,260	\$78,168	\$ 54,940
School 21	464,566	166	116.7	64,468	\$95,898	\$ 51,507
School 24	1,283,846	417	417	49,485	\$192,518	\$ 39,662
School 25	375,738	104	110	49,111	\$61,096	\$ 40,645
School 27	793,393	120	114	40,073	\$117,954	\$ 30,451

Total utility cost shown does not include natural gas utility supply costs as this data was not available at the time of this audit.

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 other miscellaneous appliances were identified and evaluated, as discussed in Sections 2 and 4. However, these were not recommended due to longer payback periods. This table includes the Engineer's Opinion of Probable Construction Cost. Projected annual energy cost savings, projected annual energy usage savings, and total simple payback period for each recommended ECRM are also tabulated. 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 ²	Simple Payback (Years)	Greenhouse Gas Emission Reduction (Metric Tons)
1	School 21 Combine Heat and Power 65 kW	\$100,100	-36,374 Therms 280,800 kWh 594,000 kbtu	\$12,867	7.8	(42.93)
2	School 15 Lighting upgrade	\$243,693	0. Therms 77,665 kWh	\$18,047	13.5	2.77
3	School 19 Lighting upgrade	\$281,187	0. Therms 86,338 kWh	\$20,214	13.9	3.08
4	School 9 Lighting upgrade	\$251,274	0. Therms 81,856 kWh	\$18,006	14.0	2.92
5	School 10 Condensing Boilers	\$161,000	4,698. Therms	\$9,812	16.4	27.48
6	School 2 Condensing Boilers	\$352,978	13,203. Therms	\$22,276	15.8	77.24
7	School 11 Lighting upgrade	\$469,002	0. Therms 122,074 kWh	\$29,264	16.0	4.35
8	School 21 Lighting upgrade	\$215,234	0. Therms 41,664 kWh	\$12,818	16.8	1.49
9	School 8 Steam Boilers	\$136,012	5,715. Therms	\$ 8,115	16.8	33.43
10	School 14 Lighting upgrade	\$37,494	0. Therms 8,673 kWh	\$2,168	17.3	0.31
11	School 24 Lighting upgrade	\$430,640	0. Therms 86,609 kWh	\$23,530	18.3	3.09
12	School 10 Lighting upgrade	\$217,728	0. Therms 40,218 kWh	\$11,258	19.3	1.43
13	School 3 Lighting upgrade	\$360,686	0. Therms 69,776 kWh	\$18,355	19.7	2.49
14	School 4 Lighting upgrade	\$340,727	0. Therms 69,101 kWh	\$17,217	19.8	2.46
15	School 20 Lighting upgrade	\$215,405	0. Therms 44,945 kWh	\$10,712	20.1	1.60
16	School 8 Lighting upgrade	\$604,945	0. Therms 110,639 kWh	\$29,165	20.7	3.94

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17	School 2 Lighting upgrade	\$254,511	0. Therms 43,347 kWh	\$11,959	21.3	1.55
18	School 5 Lighting upgrade	\$264,218	0. Therms 41,538 kWh	\$11,948	22.1	1.48
19	School 25 Lighting upgrade	\$289,876	0. Therms 29,715 kWh	\$12,055	24.0	1.06
20	School 1 & 26 Lighting upgrade	\$361,414	0. Therms 53,082 kWh	\$15,068	24.0	1.89
21	School 9 DDC Controls	\$150,219	990. Therms 28,122 kWh	\$5,756.84	26.1	6.79
22	School 27 Lighting upgrade	\$543,365	0. Therms 56,367 kWh	\$20,728	26.2	2.01
23	School 24 DDC Controls	\$137,655	967. Therms 25,204 kWh	\$5,085.35	27.1	6.56
24	School 20 DDC Controls	\$113,434	1,245. Therms 10,585 kWh	\$3,406.25	33.3	7.66
25	School 3 DDC Controls	\$48,480	320. Therms 6,433 kWh	\$1,443.41	33.6	2.10
26	School 1 & 26 DDC Controls	\$116,676	769. Therms 14,375 kWh	\$3,432.01	34.0	5.01
27	School 5 DDC Controls	\$136,201	898. Therms 16,776 kWh	\$3,851.65	35.4	5.85
28	School 2 DDC Controls	\$117,289	1,474. Therms 6,222 kWh	\$3,293.12	35.6	8.85
29	School 8 DDC Controls	\$101,056	1,201. Therms 7,374 kWh	\$2,789.39	36.2	7.29
30	School 21 DDC Controls	\$141,364	1,289. Therms 9,291 kWh	\$3,723.06	38.0	7.87
31	School 25 DDC Controls	\$99,095	954. Therms 7,396 kWh	\$2,532.90	39.1	5.85
32	School 11 DDC Controls	\$48,406	423. Therms 3,892 kWh	\$1,203.73	40.2	2.61
33	School 4 DDC Controls	\$153,484	1,012. Therms 15,217 kWh	\$3,762.15	40.8	6.46
34	School 10 DDC Controls	\$79,989	527. Therms 7,272 kWh	\$1,957.16	40.9	3.34
35	School 19 DDC Controls	\$47,618	314. Therms 4,369 kWh	\$1,158.25	41.1	1.99

36	School 14 DDC Controls	\$22,454	148. Therms 1,512 kWh	\$495.06	45.4	0.92
37	School 15 DDC Controls	\$150,361	991. Therms 11,137 kWh	\$3,300.26	45.6	6.19
38	School 14 Steam Boilers	\$61,008	726. Therms	\$1,111.00	54.9	4.25
39	School 21 Steam Boilers	\$227,650	2,946. Therms	\$4,124.00	55.2	17.23
40	School 24 Steam Boilers	\$227,650	2,823. Therms	\$3,952.00	57.6	16.51
41	School 19 Windows	\$288,377	2,504. Therms -293 kWh	\$4,363.03	66.1	14.64
42	School 14 Windows	\$231,711	2,012. Therms -191 kWh	\$3,045.74	76.1	11.76
43	School 11 Windows	\$408,308	1,874. Therms 324 kWh	\$2,913.60	140.1	10.97
44	School 21 Windows	\$670,163	2,012. Therms -191 kWh	\$2,777.37	241.3	11.76

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.
5. Measures with paybacks greater than 25 years are not recommended.

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 17 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 is the variance of the prevailing energy market conditions and Solar Renewable Energy Credit (SREC) rates, with the largest impact to the payback model being the SREC credit pricing. For the payback model, conservative

estimates of the SREC's market value over a 25 year period were assumed, as 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)
School 01 & 26	\$ 1,894,000	\$ 69,538	380,926 kWh	\$ 57,139	19.9
School 02	\$ 838,000	\$ 28,606	156,702 kWh	\$ 25,072	20.7
School 03	\$ 814,000	\$ 27,675	151,606 kWh	\$ 24,257	20.8
School 04	\$ 1,240,000	\$ 44,188	242,060 kWh	\$ 36,309	20.5
School 05	\$ 1,816,000	\$ 66,514	364,364 kWh	\$ 54,655	19.9
School 08	\$ 1,468,000	\$ 53,025	290,472 kWh	\$ 43,571	20.2
School 09	\$ 2,260,000	\$ 83,724	458,640 kWh	\$ 68,796	19.7
School 10	\$ 1,060,000	\$ 37,211	203,840 kWh	\$ 34,652	19.5
School 11	\$ 604,000	\$ 19,535	107,016 kWh	\$ 14,982	23.3
School 14	\$ 172,000	\$ 2,790	15,288 kWh	\$ 2,599	42.3
School 15	\$ 2,074,000	\$ 76,515	419,146 kWh	\$ 62,871	19.8
School 19	\$ 430,000	\$ 12,791	70,070 kWh	\$ 10,511	24.5
School 20	\$ 1,618,000	\$ 58,840	322,322 kWh	\$ 48,348	20.1
School 21	\$ 562,000	\$ 17,907	98,098 kWh	\$ 20,601	19.2
School 24	\$ 730,000	\$ 24,419	133,770 kWh	\$ 20,066	21.8
School 25	\$ 700,000	\$ 23,257	127,400 kWh	\$ 20,384	21.3
School 27	\$ 1,000,000	\$ 34,885	191,100 kWh	\$ 28,665	20.9

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 as a renewable energy source 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 energy system installation. Other options, such as government bonds or a Power Purchase Agreement are potentially available and can 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 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)
\$5,239,984	23,616 Therms 980,589 kWh	\$293,315	17.9

Operation and Maintenance Measures

Operation and Maintenance

Building maintenance through the district appears to be current. The equipment appears to be regularly repaired and replaced. These repairs and replacements have been to maintain building function and not for the reason of energy efficiency. Lighting systems were generally in good operating condition.

Building operation is impaired by the school's inability to adjust the DDC control system. The staff have little ability to adjust the operation of the HVAC systems. Restoring the DDC control system headend and access to adjustment would be a large benefit to building operation.

Section 1

Introduction

1.1 General

As part of an initiative to reduce energy cost and consumption, Paterson Board of Education has secured the services of Camp Dresser McKee & Smith (CDM Smith) to perform an energy audit at seventeen (17) 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;

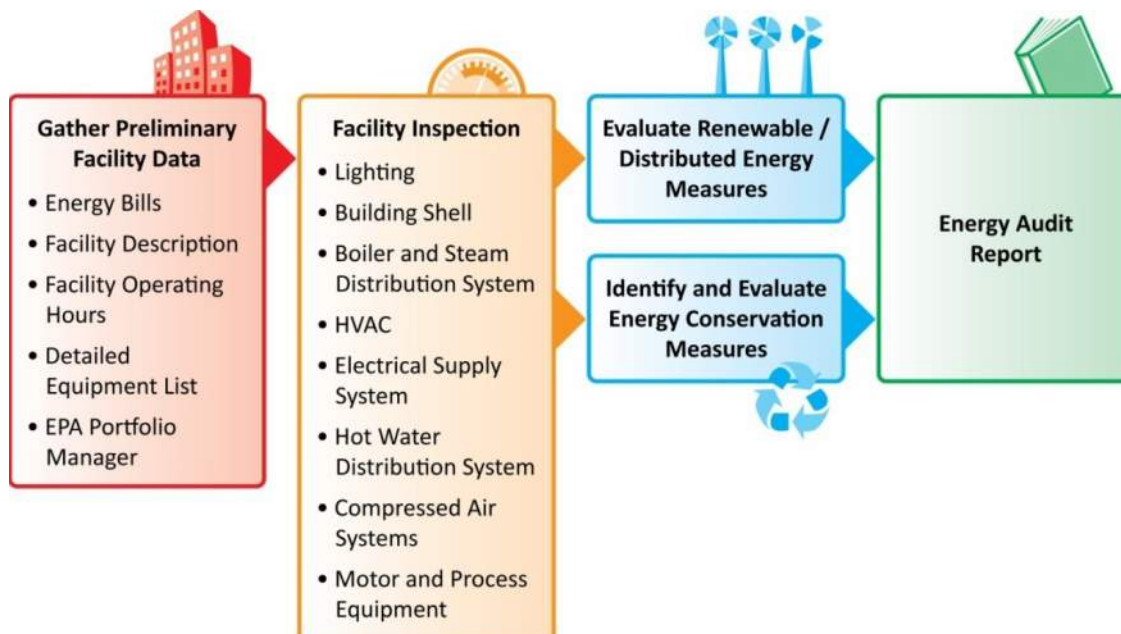
Facility inspection;

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 Background

The following is a brief summary of each of the facilities included in this energy audit.

School 1 and 26 were constructed around 1950 and is approximately 85,438 square feet. It is normally occupied 60 hours per week by 218 employees and approximately 577 students.

School 2 was constructed in 1922 and is approximately 85,887 square feet. It is normally occupied 60 hours per week by approximately 606 students.

School 3 was constructed about 100 years ago and is approximately 35,500 square feet. It is normally occupied 60 hours per week by approximately 466 students.

School 4, Dr. Frank Napier Jr, School of Science and Technology, was constructed in 1921 and is approximately 112,391 square feet. It is normally occupied 60 hours per week by approximately 569 students.

School 5 was constructed around 1930 and is approximately 99,735 square feet. It is normally occupied 60 hours per week by 1,424 students.

School 8 was constructed in 1885 and is approximately 74,000 square feet. It is normally occupied 60 hours per week by approximately 519 students.

School 9, Charles J. Riley School, was constructed in 1988 and is approximately 110,000 square feet. It is normally occupied 60 hours per week by approximately 1,295 students.

School 10 was constructed around 1950 and is approximately 58,573 square feet. It is normally occupied 60 hours per week by 52 employees and approximately 499 students.

School 11 was constructed around 1900 and is approximately 35,446 square feet. It is normally occupied 60 hours per week by 46 employees and approximately 217 students.

School 14 was constructed in 1885 and is approximately 16,442 square feet. It is normally occupied 60 hours per week by 13 employees and approximately 238 students.

School 15 was constructed about 100 years ago and is approximately 110,104 square feet. It is normally occupied 60 hours per week by 56 employees and approximately 715 students.

School 19 was constructed in 1896 and is approximately 34,869 square feet. It is normally occupied 60 hours per week by approximately 351 students.

School 20 was constructed in 1926 and is approximately 83,064 square feet. It is normally occupied 60 hours per week by approximately 479 students.

School 21 was constructed around 1950 and is approximately 103,516 square feet. It is normally occupied 60 hours per week by approximately 705 students.

School 24 was constructed around 1950 and is approximately 100,800 square feet. It is normally occupied 60 hours per week by approximately 813 students.

School 25 was constructed in 1930 and is approximately 72,564 square feet. It is normally occupied 60 hours per week by approximately 656 students.

School 27 was constructed in 1951 and is approximately 103,926 square feet. It is normally occupied 60 hours per week by approximately 863 students.

1.3 Purpose and Scope

An ASHRAE level II energy audit includes conducting a detailed 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, but also on the age and condition of the equipment and the capital available to implement major changes. Due to the rising cost of power and the desire to minimize dependence on foreign oil supplies, energy consumption is 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.

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Section 2

Facility 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 School 1 & 26

2.1.1 Description of Building Envelope

School 26 is assumed to be constructed around 1950 with an addition around 1980. The building is masonry construction with brick exterior. The interior finishes are painted block, brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. The roof is flat with bitumen rolled roofing.

School 1 is assumed to be constructed around 2000. The building appears to be steel framed with masonry walls. The interior has drywall finish. The building walls are assumed to be insulated and have a value of R-11. The roof is flat with EPDM rubber membrane.

The schools have double pane windows with aluminum frames. The windows are in good condition. The doors are metal half light configurations with single pane glass. Doors are in fair condition.

2.1.2 Description of Building HVAC

The heating in School 26 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by three gas-fired Weil-McLain boilers. These boilers have an input capacities of 5,485 MBH, 5,845, and 4,809 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to the steam coils of the unit ventilators in various locations throughout the building. Packaged air conditioning units with gas heat rooftop units provide heating and cooling for School 1.

An A.O. Smith gas-fired, domestic water heater with a 100 gallon storage tank located in the boiler room has an input capacity of 199 MBH. A Rheem electric domestic water heater with a 50 gallon storage tank located in the kitchen has an input capacity of 4,500 Watts. These water heaters provide domestic hot water throughout the building. The A.O. Smith and Rheem water heaters are in good condition.

Split-system air conditioners and window air conditioning units provide localized cooling for the building. The aforementioned packaged rooftop units provide centralized cooling for School 1.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head

end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.1.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. The gym has metal halide fixtures. Other spaces have compact fluorescent fixtures.

Building electrical service is 1600 amp, 3 phase, 208 volts. The electrical systems are in good condition.

2.1.4 Description of Trailers

The site has two trailers for additional classroom space. The spaces are heated and cooled by electric packaged terminal air conditioners. The trailers are nearing the end of their expected life.

2.2 School 2

2.2.1 Description of Building Envelope

School 2 is two buildings that have been connected. The older building was built before 1900. This building has peaked roof with slate and metal roofing. The walls are brick exterior with new interior finishes. The walls are assumed to have R-11 insulation. The roof is assumed to have R-19 insulation.

The main building is assumed to be constructed around 1922. The building is masonry construction with brick exterior. The interior finishes are painted block, brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. The roof is flat with bitumen rolled roofing. The roof is assumed to have an insulation value of R-8.

The schools have double pane windows with aluminum frames. The windows are in good condition. The doors are metal half light configurations with single pane glass. Doors are in fair condition.

2.2.2 Description of Building HVAC

The heating in School 2 is provided by steam or hot water generated from boilers. Low-pressure steam is generated in the original building boiler room by two gas-fired HB Smith boilers. These boilers each have an input capacity of 5,189 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 79%. Steam from the boilers is delivered to a steam to hot water heat exchanger. Hot water is generated in the annex boiler room by two gas-fired HB Smith boilers. These boilers each have an input capacity of 1,223 MBH. These boilers have an estimated operating efficiency of 75%. Hot water pumps deliver hot water to the hot water coils of the convectors, unit ventilators, and baseboard heaters in various locations throughout the building. A packaged air conditioning unit with hot water heat rooftop units provide heating for the annex.

A 2014 A.O. Smith gas-fired, domestic water heater with a 100 gallon storage tank located in the boiler room has an input capacity of 199 MBH. This water heater provides domestic hot water

throughout the annex. An American Water Heater gas-fired, domestic water heater with a 100 gallon storage tank located in the boiler room has an input capacity of 250 MBH. This domestic water heater provides domestic hot water throughout the original building.

Split-system air conditioners and window air conditioning units provide localized cooling for the building. Packaged air conditioning rooftop units and the aforementioned packaged rooftop unit provide centralized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.2.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed fixtures. Some spaces have T8 fixtures with electronic ballasts. Other fixtures include circline fluorescent, incandescent lamps or compact fluorescent.

The electrical service is old and not labelled. Building electrical systems are in good condition. The annex had upgraded electrical.

2.3 School 3

2.3.1 Description of Building Envelope

School 3 was constructed around 1920. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. The roof is flat with bitumen rolled roofing. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in fair condition. The doors are metal half light configurations with single pane glass. Doors are in fair condition.

2.3.2 Description of Building HVAC

The heating in School 3 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 5,124 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators in various locations throughout the building.

A 2001 A.O. Smith gas-fired, domestic water heater with an 81 gallon storage tank located in the boiler room has an input capacity of 154 MBH. This water heater provides domestic hot water throughout the building.

Window air conditioning units provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.3.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed fixtures. The gym has metal halide fixtures. Observed exit fixtures are LED or fluorescent lamped.

Building electrical service is 1600 amp, 3 phase, 208 volts. The electrical systems are in good condition.

2.4 School 4

2.4.1 Description of Building Envelope

School 4 was constructed in 1921. The exterior walls of School 4 are of brick and mortar façade with brick, or finished interior.

The building's lower roof is built-up with an EPDM membrane. The building's top roof incorporates asphalt over flat roof decks. The roofs are in good condition.

The building consists of a finished ceiling. The ceiling heights on the first floor are approximately 11'. The second and third floor ceiling heights are approximately 13', and 15' in the classrooms, and hallways respectively.

Most of the building windows were noted to be operable, double pane, with fair seals and in poor condition. Interior blinds were noted on classroom windows. The first floor windows had exterior security screens, and some of the other floor windows had exterior screens. While there are significant savings in window replacements, the anticipated payback would be well in excess of 20 years, as window replacements tend to be quite costly. As a result of the anticipated longer payback, this recommendation will not be evaluated further.

School 4 also has a number of window AC units. It is recommended that the air conditioning sleeves be checked for a tight seal and if the AC units are left in place through the winter that AC covers be purchased and installed. It was noted while on site that the window AC units for the office area are covered in the winter, but are still very drafty. An outdoor AC cover covers the top and sides of the unit to stop drafts. Window and through-wall AC covers are UV resistant, water repellent PVC vinyl with elasticized corners and straps for a tight fit. Outdoor or indoor AC covers can also be customized to meet the Board's needs. A standard outdoor AC cover can cost around \$15. The impact on the overall building heating load will be minimal. However, there will be a direct impact on the occupants comfort.

Most exterior doors are composite construction with double pane view windows, and no weatherstripping. The exterior doors are in good condition.

CDM Smith did not observe any significant gaps in exterior passageways or other obvious points of leakage in the building envelope that would warrant immediate corrective measures. While some repairs and upgrades may be recommended, modifications to the insulation system would not prove to be cost-effective, from an energy savings standpoint. However, caulking or installing weatherstripping at drafty spots, on windows, or doors along the building envelope is good practice. Caulking and weatherstripping can help to lower overall building infiltration rates, and therefore heating or cooling energy consumption.

Overall the building envelope is in good condition and is currently providing a sufficient level of insulation.



Example of an Outdoor AC Cover

2.4.2 Description of Building HVAC

The heating in School 4 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 5,494 MBH (1 MBH = 1,000 BTU/Hr) and are equipped with PowerFlame burners. These boilers have an estimated operating efficiency of 83%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators, and air handling units in various locations throughout the building.

A 2011 Lochinvar gas-fired, domestic water heater with a 119 gallon indirect storage tank located in the boiler room has an input capacity of 645 MBH. This water heater provides domestic hot water throughout the building.

Split-system air conditioners and window air conditioning units provide localized cooling for the building.

The building control system was converted to direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The

rooms are controlled by local thermostats for each unit ventilator. The staff reported that the DDC control system is working.

The boilers are in good condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.4.3 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. The gym and locker rooms have T5 lamp fixtures. Some incandescent and halogen lamps remain. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition. Each addition had different electrical layouts.

2.5 School 5

2.5.1 Description of Building Envelope

School 5 was constructed around 1930. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. The roof is flat with bitumen rolled roofing with stone ballast. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition.

2.5.2 Description of Building HVAC

The heating in School 5 is provided by hot water generated from boilers. Hot water is generated by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 5,052 MBH (1 MBH = 1,000 BTU/Hr. These boilers have an estimated operating efficiency of 75%. Hot water pumps deliver hot water to the hot water coils of the unit ventilators, and air handling units in various locations throughout the building. Rooftop heating and ventilating units with hot water coils provide heating for some of the building.

A 2011 Bradford White gas-fired, domestic water heater with an 80 gallon storage tank located in the boiler room has an input capacity of 250 MBH. This water heater provides domestic hot water throughout the building. A 2012 Eemax electric domestic water heater located in the janitor's room has an input capacity of 1400 Watts. This water heater provides domestic hot water for the janitor's room. The water heaters are in good condition.

Split-system air conditioners and window air conditioning units provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head

end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.5.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. Classrooms and offices have manual lighting controls. The gym is illuminated by metal halide fixtures. Other fixtures have retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition. Each addition had different electrical layouts.

2.6 School 8

2.6.1 Description of Building Envelope

School 8 was constructed in 1885. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. Portions of the building have steel structure. The roof is flat with bitumen rolled roofing with stone ballast. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition.

2.6.2 Description of Building HVAC

The heating in School 8 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired HB Smith boilers. These boilers each have an input capacity of 3,594 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators, and air handling units in various locations throughout the building.

An A.O. Smith gas-fired, domestic water heater with a 95 gallon storage tank located in the boiler room has an input capacity of 751 MBH. A Rheem electric domestic water heater with a 50 gallon storage tank located in the kitchen has an input capacity of 4,500 Watts. These water heaters provide domestic hot water throughout the building. The A.O. Smith water heater is in good condition.

Split-system air conditioners and window air conditioning units provide cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.6.3 Description of Building Lighting

The lighting system is primarily 1X4 and 2X2, 2X4 surface mounted T8 fixtures. All spaces had manual lighting controls. Other fixtures include incandescent and compact fluorescent. The gym lighting is metal halide. All observed exit fixtures are LED lamped.

Building electrical service is 800 amp, 3 phase, 208 volts. The electrical systems are in good condition.

2.7 School 9

2.7.1 Description of Building Envelope

School 9 was constructed in 1988. The building exterior walls are steel structure with block walls and brick facades. The interior finishes are painted block, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. Portions of the building have steel structure. The roof is flat with concrete on steel decking. The roof surface is bitumen rolled roofing. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition.

2.7.2 Description of Building HVAC

The heating in School 9 is provided by heat pump unit ventilators, electric air handling units, packaged air conditioning units with gas heat rooftop units, and gas fired roof top units.

A 1988 Lochinvar electric domestic water heater with a 500 gallon storage tank located in the boiler room has an input capacity of 645 MBH. This water heater provides domestic hot water throughout the building. The Lochinvar water heater is in poor condition.

Split-system air conditioners and the aforementioned heat pump unit ventilators, air handling units, and packaged rooftop unit provide localized cooling for the building.

The building control system was converted to a Johnson Controls direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit.

Most of the HVAC equipment appeared to vary from fair to good condition.

2.7.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. Other fixtures included incandescent and some have been retrofitted with CFL's. The gym and cafeteria have metal halide fixtures. All observed exit fixtures are LED lamped.

Building electrical connection is a 4000A, 480V, 3 phase. These systems are in good condition. Each addition had different electrical layouts.

2.8 School 10

2.8.1 Description of Building Envelope

The exterior walls of School 10 are of brick and mortar façade with finished interior.

The building roofs are built-up with an EPDM membrane with a white thermal barrier coating applied. The EPDM portion of the roof is in poor condition. Soft spots were noted on the roof. There is a roof leader that is not allowing water to drain properly. The water not draining properly from the roof leaders has caused staining of the brick façade. These noted areas of the roof can be the cause of leaks and other problems to the building. Portions of the roof have been in place for over 15 years. As such it is recommended that a qualified roofing contractor evaluate the system, including the structural capacity of the building frame and repair or replace the existing roofing system. A roof replacement is costly. Therefore; a system analysis including the structural integrity of the building may warrant the application of an elastomeric waterproof roof coating system. This coating will rectify any leaks and improve the level of insulation that the current roof is providing. It is also recommended that a white thermal barrier coating be considered. This coating works to reduce the surface temperature of the roof by reflecting the UV rays. The coating and provides insulation for the interior of the building reducing the heating and cooling loads. It is anticipated that the cost of the roof replacement will result in a payback period in excess of 20 years, and as such this recommendation will not be evaluated further.

The building consists of a finished ceiling. The ceiling heights are approximately 13', and 15' in the classrooms, and hallways respectively.

Most of the building windows were noted to be double pane, with good seals and in good condition. The windows have interior blinds. School 10 also has a number of window AC units. If these window units are left in through the winter, it is recommended that air conditioning sleeves be installed to minimize the infiltration of ambient air.

Most exterior doors consist of steel construction with weatherstripping on the single pane view window. The exterior doors are in poor condition. FRP doors are recommended on an energy efficiency level. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability. FRP doors will not expand or contract with changing weather.

CDM Smith did not observe any significant gaps in exterior passageways or other obvious points of leakage in the building envelope that would warrant immediate corrective measures. While some repairs and upgrades may be recommended, modifications to the insulation system would not prove to be cost-effective, from an energy savings standpoint. However, caulking or installing weatherstripping at drafty spots, on windows, or doors along the building envelope is good practice. Caulking and weatherstripping can help to lower overall building infiltration rates, and therefore heating or cooling energy consumption.

Overall the building envelope is in good condition and is currently providing a sufficient level of insulation.

2.8.2 Description of Building HVAC

The heating in School 10 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired HB Smith boilers. These boilers each have an input capacity of 5,189 MBH (1 MBH = 1,000 BTU/Hr) and are equipped with PowerFlame burners. These boilers have an estimated operating efficiency of 79%. Steam from the boilers is delivered to a steam to hot water heat exchanger. Hot water pumps deliver hot water to the hot water coils of the convectors, unit ventilators, and baseboard heaters in various locations throughout the building. There is also a gas fired make up air roof top unit providing heat for the auditorium/cafeteria.

A Bradford White gas-fired, domestic water heater with a 75 gallon storage tank located in the boiler room has an input capacity of 300 MBH. This water heater provides domestic hot water throughout the building.

Split-system air conditioners and window air conditioning units provide localized cooling for the building.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to poor condition.

2.8.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. Other fixtures included incandescent and some have been retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition. Each addition had different electrical layouts.

2.9 School 11

2.9.1 Description of Building Envelope

School 11 was constructed around 1900. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. Portions of the building have steel structure. The roof is flat with bitumen rolled roofing. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition.

2.9.2 Description of Building HVAC

The heating in School 11 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 2,485 MBH (1 MBH = 1,000 BTU/Hr). The 1998 boiler has an estimated operating efficiency of 75%, while the 2007 boiler has an estimated operating efficiency of 80%. Steam from the boilers is delivered to the steam coils of the unit ventilators, and air handling units in various locations throughout the building. There are a couple packaged terminal heat pumps providing heating for some rooms in the school.

Split-system air conditioners, window air conditioning units, and previously mentioned packaged terminal heat pumps provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

One boiler is in good condition, while the other in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.9.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. All observed exit fixtures are LED lamped.

Building electrical connection is a 600A, 120/208V, 3 phase. These systems are in good condition. Each addition had different electrical layouts.

2.10 School 14

2.10.1 Description of Building Envelope

School 14 was constructed in 1885. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. Portions of the building have steel structure. The roof is flat with bitumen rolled roofing. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition.

2.10.2 Description of Building HVAC

The heating in School 14 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 1,357 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to the steam coils of the unit ventilators, and convectors in various locations throughout the building.

Split-system air conditioners, and window air conditioning units provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.10.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. All observed exit fixtures are LED lamped.

The site electrical service is fed from a single electrical panel inside the building. The electrical equipment is in good condition.

2.11 School 15

2.11.1 Description of Building Envelope

School 15 was constructed around 1915. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. Portions of the building have steel structure. The roof is flat with bitumen rolled roofing with stone ballast. The roof is assumed to have an insulation value of R-8.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition.

2.11.2 Description of Building HVAC

The heating in School 15 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 5,124 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators, and heating and ventilating units in various locations throughout the building.

An A.O. Smith gas-fired, domestic water heater with a 100 gallon storage tank located in the boiler room has an input capacity of 199 MBH. This water heater provides domestic hot water throughout the building. The A.O. Smith water heater is in good condition.

Window air conditioning units provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.11.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. Other fixtures include circline fluorescent, have retrofitted with CFL's. The auditorium has incandescent fixtures. The gym has metal halide fixtures. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition.

2.12 School 19

2.12.1 Description of Building Envelope

School 19 was constructed in 1896. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. Portions of the building have steel structure. The roof is flat with bitumen rolled roofing with stone ballast. The roof is assumed to have an insulation value of R-8.

The schools have double pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in good condition.

2.12.2 Description of Building HVAC

The heating in School 19 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 3,753 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators in various locations throughout the building. A couple packaged terminal air conditioners with steam coils provide heating for the nurse and faculty rooms.

A Rheem gas-fired, domestic water heater with a 95 gallon storage tank located in the chief office has an input capacity of 76 MBH. This water heater provides domestic hot water throughout the building. The Rheem water heater is in good condition.

Split-system air conditioners, window air conditioning units, and packaged terminal air conditioners provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.12.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. Other fixtures include circline fluorescent. All observed exit fixtures are LED lamped.

Building electrical service is 350A, 120/208V, 3 phase. These systems are in good condition.

2.13 School 20

2.13.1 Description of Building Envelope

School 20 was constructed in 1926 and additions were added in 1969, and 2000. The exterior walls of School 20 are of brick and mortar façade, or masonry with concrete masonry unit (CMU) back up blocks, brick, or finished interior. The interior finish is cracking in the 1st to 2nd floor

stairwell of the original building. Overall this has a minimal effect on the thermal resistance of the building as the finish in this case offers more of an aesthetic value.

The building's 2000 addition roof is built-up with an EPDM membrane. The building's 1969 roof incorporates asphalt over flat roof decks. The original building roof consists of asphalt shingles over pitched roof decks. All the building roofs are in good condition.

The original building and 1969 addition consists of a finished ceiling. The ceiling heights are approximately 12', and 15' in the classrooms, and hallways respectively. The 2000 addition consists of an acoustic tile ceiling dropped ceiling with a height of 8-9'.

The original building and 1969 addition building windows were noted to be double pane, with seals, and in poor condition. The windows have interior blinds. One window is constructed of Plexiglas. Condensation in the panes was noted in many of the windows. The failure of the thermal insulating value of the double pane windows becomes apparent as any moisture condenses between the two panes, which is identifiable by any clouding of the windows. Frosting or cloudiness occurring in double pane windows are signs that the seal between the two panes of glass containing the layer of air or gas is broken. This allows for moist air to enter, thus diminishing the thermal insulation value. The 2000 addition windows are double pane, with good seals and in good condition. While there are significant savings in window replacements, the anticipated payback would be well in excess of 20 years, as window replacements tend to be quite costly. As a result of the anticipated longer payback, this recommendation will not be evaluated further. School 20 also has a number of window AC units. If these window units are left in through the winter, it is recommended that air conditioning sleeves be installed to minimize the infiltration of ambient air.

Most exterior doors consist of steel construction with no weatherstripping on the single pane view window. The exterior doors are in poor condition. FRP doors are recommended on an energy efficiency level. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability. FRP doors will not expand or contract with changing weather.

CDM Smith did not observe any significant gaps in exterior passageways or other obvious points of leakage in the building envelope that would warrant immediate corrective measures. While some repairs and upgrades may be recommended, modifications to the insulation system would not prove to be cost-effective, from an energy savings standpoint. However, caulking or installing weatherstripping at drafty spots, on windows, or doors along the building envelope is good practice. Caulking and weatherstripping can help to lower overall building infiltration rates, and therefore heating or cooling energy consumption.

Overall the building envelope is in good condition and is currently providing a sufficient level of insulation.

2.13.2 Description of Building HVAC

The heating in School 20 except for the 2000 addition is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired HB Smith boilers. A third boiler of the same make and size is decommissioned. These boilers each have an input

capacity of 4,180 MBH (1 MBH = 1,000 BTU/Hr) and are equipped with PowerFlame burners. These boilers have an estimated operating efficiency of 79%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators, and air handling units in various locations throughout the building. Packaged air conditioning units with gas heat rooftop units provide heating for the 2000 addition.

A Bradford White gas-fired, domestic water heater with an 80 gallon storage tank located in the boiler room has an input capacity of 200 MBH. This water heater provides domestic hot water throughout the building except for the 2000 addition. A State Select domestic water heater with a 50 gallon storage tank located in a storage closet has an input capacity of 40 MBH. This domestic water heater provides domestic hot water throughout the 2000 addition.

Split-system air conditioners and window air conditioning units provide localized cooling for the building. The aforementioned rooftop units provide cooling for the 2000 addition.

Staff said that all building controls are controlled manually.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.13.3 Description of Building Lighting

The lighting includes T8 lamps in fixture configurations including 1X4, 2X4 and 2X2 surface, suspended and recessed.

Other fixtures include circline, plug in fluorescent, and screw in fixture that have been retrofitted with compact fluorescent lamps. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition. Each addition had different electrical layouts.

2.14 School 21

2.14.1 Description of Building Envelope

The exterior walls of School 21 are of brick and mortar façade with concrete masonry unit (CMU) back up blocks, brick, or finished interior. An addition was added to the South side of the school.

The flat roof is built-up with an EPDM membrane and is in good condition. The other roof consists of asphalt shingles over pitched roof decks.

The building consists of an acoustic tile dropped or finished ceiling. The ceiling heights are approximately 11' in the classrooms.

The windows in the original building are single pane, operable, with interior blinds, with no weatherstripping, and in poor condition. The building addition windows are noted to be double pane, operable, with interior blinds in classrooms. These windows have no weatherstripping and are in good condition. School 21 also has a number of window AC units. If these window units are left in through the winter, it is recommended that air conditioning sleeves be installed to minimize the infiltration of ambient air.

Most exterior doors consist of steel construction with a single pane view window. The exterior doors are in poor condition. FRP doors are recommended on an energy efficiency level. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability. FRP doors will not expand or contract with changing weather.

CDM Smith did not observe any significant gaps in exterior passageways or other obvious points of leakage in the building envelope that would warrant immediate corrective measures. While some repairs and upgrades may be recommended, modifications to the insulation system would not prove to be cost-effective, from an energy savings standpoint. However, caulking or installing weatherstripping at drafty spots, on windows, or doors along the building envelope is good practice. Caulking and weatherstripping can help to lower overall building infiltration rates, and therefore heating or cooling energy consumption.

Overall the building envelope is in good condition and is currently providing a sufficient level of insulation.

2.14.2 Description of Building HVAC

The heating in School 21 except for the addition is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. One of these boilers has an input capacity of 4,763 MBH (1 MBH = 1,000 BTU/Hr), and the other 5,124 MBH and are equipped with PowerFlame burners. These boilers have an estimated operating efficiency of 83%. Steam from the boilers is delivered to the steam coils of the unit ventilators, and air handling units in various locations throughout the original building. Packaged air conditioning units with gas heat rooftop units provide heating for the addition. There are a couple packaged terminal heat pumps providing heating for rooms on the north side of the school.

A Bradford White electric, domestic water heater with a 119 gallon storage tank located in the boiler room has an input capacity of 4,500 Watts. This water heater provides domestic hot water throughout the building.

A split-system air conditioner, window air conditioning units, and previously mentioned packaged terminal heat pumps provide cooling for the building. The aforementioned rooftop units provide localized cooling for the addition.

There is no central DDC system used at the school.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.14.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X4 recessed T8 fixtures. Other fixtures include plug in fluorescent, and screw in fixture that have been retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building electrical systems are accessible and in good condition. Each addition had different electrical layouts.

2.15 School 24

2.15.1 Description of Building Envelope

School 24 was constructed in 1909 and additions were added in 2000, and 2008. The exterior walls of School 24 are brick and mortar or concrete masonry unit (CMU) block façade with concrete masonry unit (CMU) back up blocks, brick, or finished interior.

The original building's roof incorporates asphalt or built-up with an EPDM membrane over flat roof decks. The 2000 building addition roof is built-up with an EPDM membrane. The 2008 addition roof is built-up with an EPDM membrane with a white thermal barrier coating applied. A portion of the 2008 addition roof consists of glazed sky lighting. All the building roofs are in good condition. There was an area of pooling water on the Southeast corner of the original building due to the roof not sloping toward the roof drain. There are areas in the East part of the original building ceiling showing interior evidence of leakage. These noted areas of the roof can be the cause of leaks and other problems to the building.



Pooling on Roof

The building consists of an acoustic tile dropped ceiling. The second and third floor ceiling heights in the original building are approximately 9', and 7' in the classrooms, and hallways respectively.

The original building windows were noted to be double pane, with interior blinds, and in good condition. Some of the windows did not have weatherstripping. The building addition windows are double pane, with weatherstripping and in good condition. Some of the building addition windows have tinted glazing.

The exterior doors consist of steel construction. Some of the doors have weatherstripping on the view window glazing. FRP doors are recommended on an energy efficiency level. FRP doors are made out of a high strength, light weight material with energy saving insulation and good sealing ability. FRP doors will not expand or contract with changing weather.

CDM Smith did not observe any significant gaps in exterior passageways or other obvious points of leakage in the building envelope that would warrant immediate corrective measures. While some repairs and upgrades may be recommended, modifications to the insulation system would not prove to be cost-effective, from an energy savings standpoint. However, caulking or installing weatherstripping at drafty spots, on windows, or doors along the building envelope is good practice. Caulking and weatherstripping can help to lower overall building infiltration rates, and therefore heating or cooling energy consumption.

Overall the building envelope is in good condition and is currently providing a sufficient level of insulation.

2.15.2 Description of Building HVAC

The heating in School 24 is provided by steam or hot water generated from boilers. Low-pressure steam is generated in the basement mechanical room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 4,474 MBH (1 MBH = 1,000 BTU/Hr) and are

equipped with Gordon-Piatt Energy Group burners. These boilers have an estimated operating efficiency of 83%. Steam from the boilers is delivered to a steam to hot water heat exchanger. Hot water is generated in the 1st floor mechanical room by two gas-fired Thermal Solutions boilers. These boilers each have an input capacity of 1,000 MBH. These boilers have an estimated operating efficiency of 88%. Pumps deliver hot water to the heating coils of the unit ventilators, convectors, and baseboard heaters, and air handling units in various locations throughout the building. The 2000 and 2008 additions have roof mounted heat recovery units, packaged air conditioning units with gas or hot water heat, and a gas fired make-up air unit providing heat for the additions. There is an electric unit heater providing heat to the 1st floor mechanical room.

A Lochinvar gas-fired, domestic water heater with an indirect storage tank located in the basement mechanical room has an input capacity of 500 MBH. This domestic water heater provides domestic hot water throughout the building.

Two roof mounted McQuay 170 ton air cooled chillers provide chilled water for the chilled water coils in the unit ventilators, and air handlers. Split-system air conditioners units provide centralized cooling for the building. Packaged air conditioning units, some of which were previously mentioned, provide localized cooling for the addition.

The building control system was converted to direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The staff reported that the DDC control system does not work effectively due to broken equipment in the classroom unit ventilators.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.15.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. The gym has high bay T5 fixtures. Other fixtures include plug in fluorescent, and ones retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition. Each addition had different electrical layouts.

2.16 School 25

2.16.1 Description of Building Envelope

School 25 assumed to be constructed around 1930. The building is masonry construction with brick exterior. The interior finishes are painted block, brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. The roof is flat with bitumen rolled roofing. The roof is assumed to have an insulation value of R-8.

The schools have double pane windows with aluminum frames. The windows are in good condition. The original doors have been replaced. The doors are metal with single pane glass. Doors are in good condition.

2.16.2 Description of Building HVAC

The heating in School 25 is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 5,485 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to radiators, and the steam coils of the unit ventilators, and air handling units in various locations throughout the building.

A Bradford White gas-fired, domestic water heater with an 80 gallon storage tank located in the boiler room has an input capacity of 199 MBH. This water heater provides domestic hot water throughout the building. The Bradford White water heater is in good condition.

Split-system air conditioners and window air conditioning units provide localized cooling for the building.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.16.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. The gym has metal halide fixtures. Other fixtures include circline, plug in fluorescent, and ones retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building electrical service is 3000A, 120/208V, 3 phase. These systems are accessible and in good condition. Each addition had different electrical layouts.

2.17 School 27

2.17.1 Description of Building Envelope

School 27 was constructed around 1950. The building exterior walls are brick construction. The interior finishes are painted brick, plaster and tile. The walls are assumed to have an insulation value of R-4 and no insulation installed. The roof is flat with bitumen rolled roofing with stone ballast. The roof is assumed to have an insulation value of R-8.

The building has an addition that appears to be built in 2000. The building has steel structure with block walls and brick facade. The interior walls are drywall with some insulation. The walls are assumed to have an R-11. The roof is flat with EPDM roofing. The roof is assumed to have insulation under the membrane and have a value of R-19.

The schools have single pane windows with aluminum frames. The windows are in good condition. The doors are metal with side lights. Doors are in fair condition with daylight visible between the door and threshold. Door sweep weather-stripping or new doors should be installed to reduce drafts.

2.17.2 Description of Building HVAC

The heating in School 27 except for the addition is provided by steam generated from boilers. Low-pressure steam is generated in the boiler room by two gas-fired Weil-McLain boilers. These boilers each have an input capacity of 5,485 MBH (1 MBH = 1,000 BTU/Hr). These boilers have an estimated operating efficiency of 75%. Steam from the boilers is delivered to the steam coils of the unit ventilators, and convectors in various locations throughout the building. A couple packaged terminal heat pumps provide heating for some rooms in the school. Packaged air conditioning units with gas heat rooftop units provide heating for the addition. The trailers are heated by packaged air conditioning units with electric heat.

A Lochinvar gas-fired, domestic water heater has an input capacity of 400 MBH. A Slate electric, domestic water heater with a 119 gallon storage tank located in the kitchen has an input capacity of 15,000 Watts. These water heaters provide domestic hot water throughout the building. A Rheem electric, domestic water heater with a 10 gallon storage tank located in a trailer has an input capacity of 2,000 Watts. This water heater provides domestic hot water for the trailer. The Rheem and Slate water heaters are in good condition. The Lochinvar water heater is in fair condition.

Window air conditioning units, and previously mentioned packaged terminal heat pumps provide localized cooling for the building. The aforementioned rooftop units provide centralized cooling for the addition. The trailers are cooled by the previously mentioned packaged air conditioning units with electric heat.

The building control system was converted to a Staefa direct digital control, or DDC, system. This system uses local devices and sensors which report back to a central computer known as a head end. The rooms are controlled by local thermostats for each unit ventilator, or other HVAC unit. The head end is no longer connected to the system.

The boilers are in fair condition. Most of the other HVAC equipment appeared to vary from fair to good condition.

2.17.3 Description of Building Lighting

The lighting system is primarily 1X4 surface mounted and 2X2, 2X4 recessed T8 fixtures. The gym has metal halide fixtures. Other fixtures include circline and plug in fluorescent, incandescent and ones retrofitted with CFL's. All observed exit fixtures are LED lamped.

Building electrical systems are in good condition. Each addition had different electrical layouts.

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 were analyzed and unit costs of energy were obtained. The unit cost of energy, as determined from the information provided by the Board, these costs were 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 kWh monthly 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 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 School 1 and 26

Electric power for School 1 and 26 is fed from two Secondary three phase line from PSE&G. Figure 3.2-1 illustrates the monthly total energy consumption from May, 2014 through May, 2015.

From this graph, it can be determined that the average electrical consumption for School 1 and 26 is approximately 60,000 kWh/month.

Table 3.2-1 illustrates the seasonal peak demand loads for School 1 and 26 from May, 2014 through May, 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: School 1 and 26 Electricity Usage

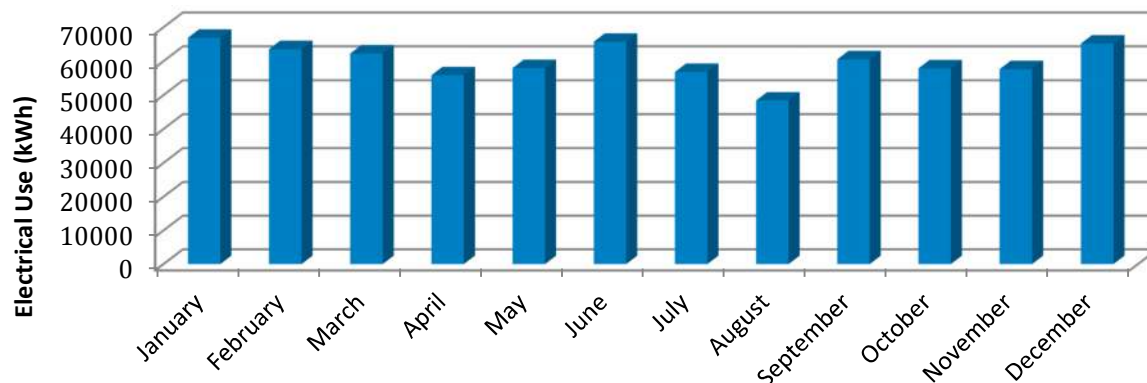


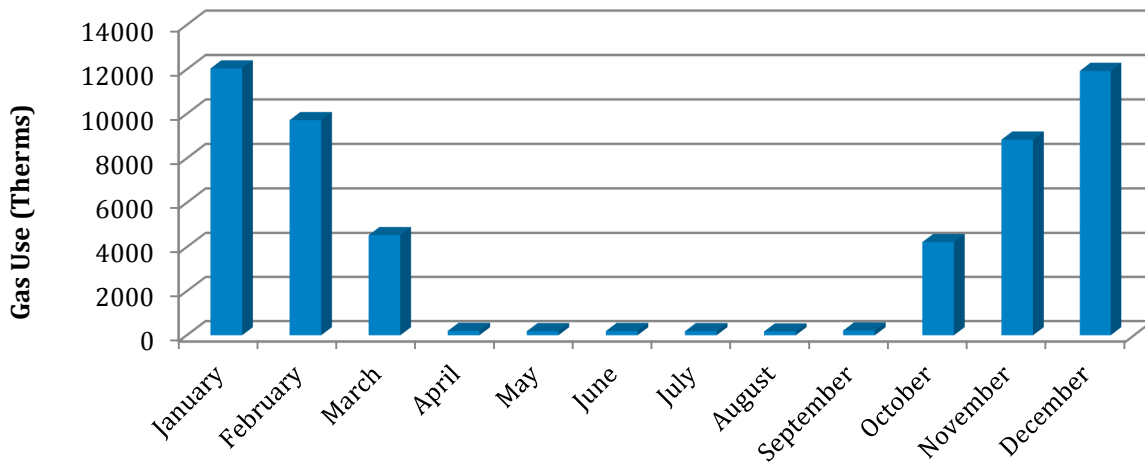
Table 3.2-1: School 1 and 26 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	222.9
Winter	198.7

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, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-2: School 1 and 26 Gas Usage



3.2.2 School 2

Electric power for School 2 is fed from one General Service Secondary three phase line PSE&G. Figure 3.2-3 illustrates the average monthly total energy consumption from May, 2014 through July, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 2 is approximately 26,000 kWh/month.

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

Figure 3.2-3: School 2 Electricity Usage

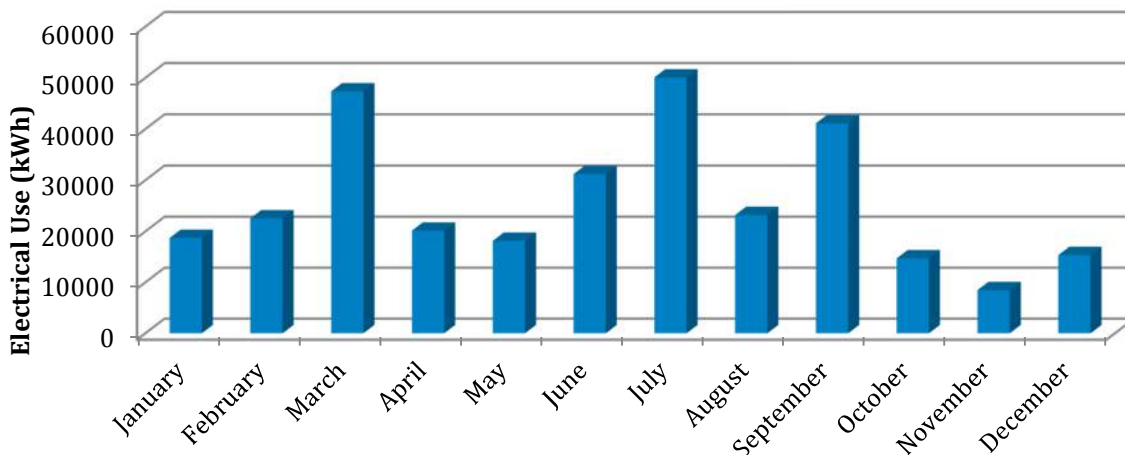


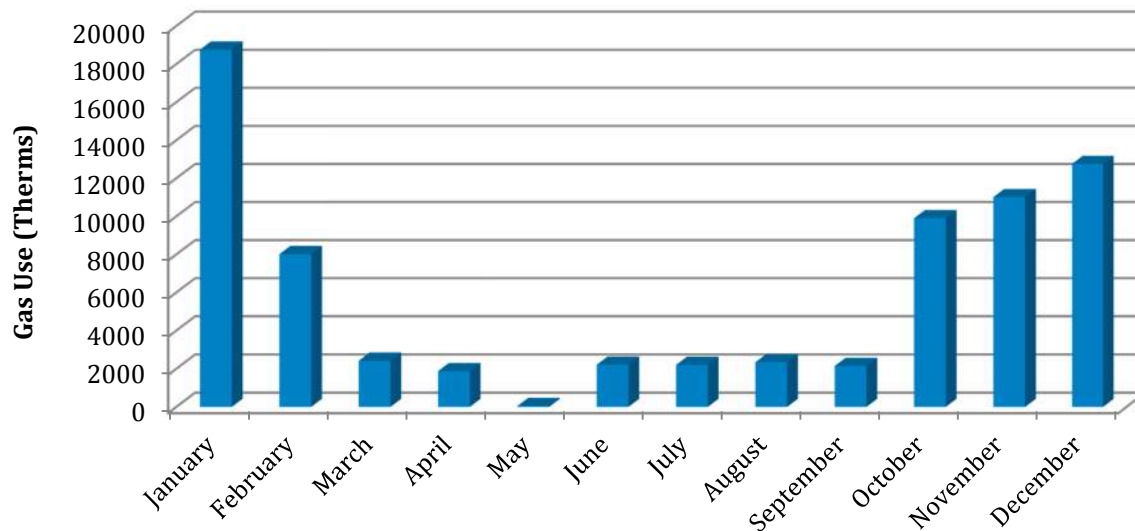
Table 3.2-2: School 2 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	123
Winter	96

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, derived from gas bills, at School 2 from May, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-4: School 2 Gas Usage



3.2.3 School 3

Electric power for School 3 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 May, 2014 through July, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 3 is approximately, 27,000 kWh/month.

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

Figure 3.2-5: School 3 Electricity Usage

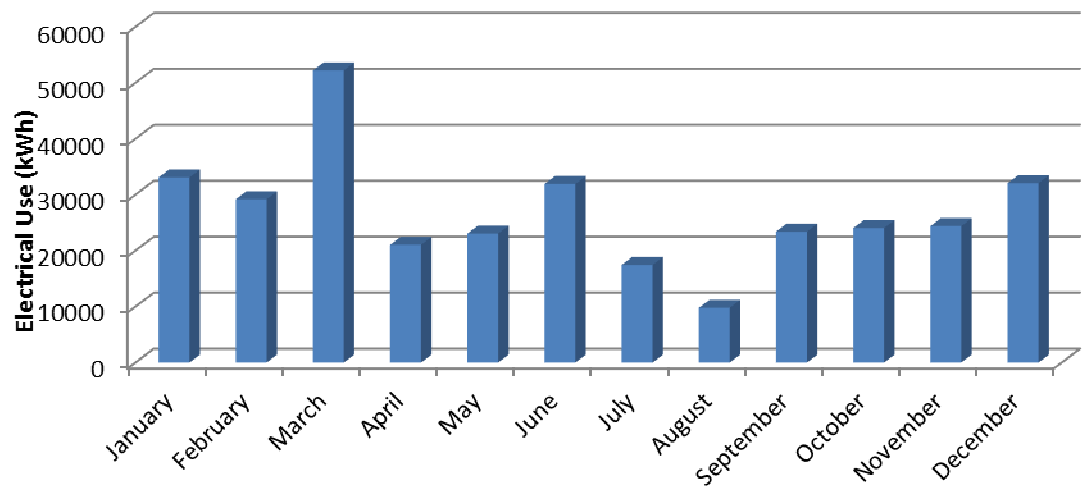


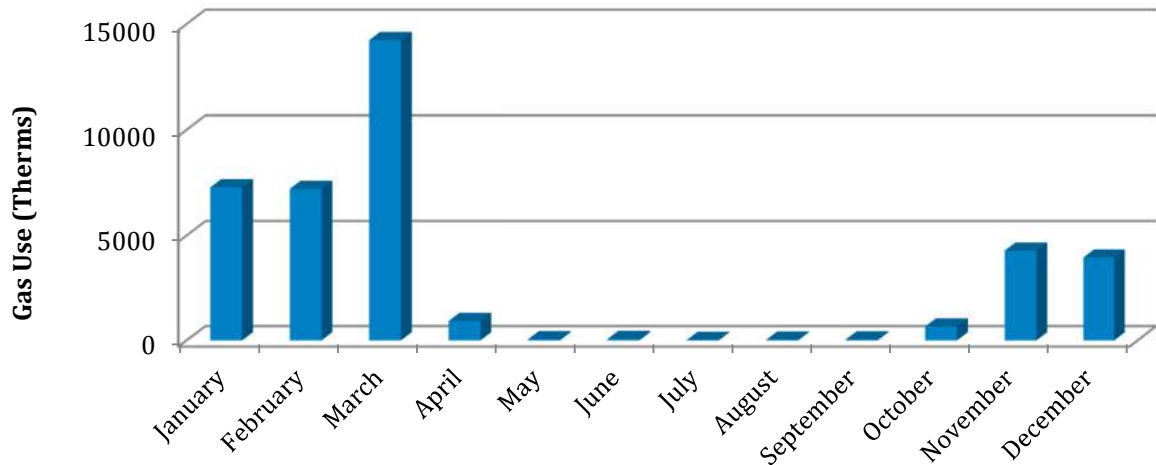
Table 3.2-3: School 3 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	78.8
Winter	80

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, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-6: School 3 Gas Usage



3.2.4 School 4

Electric power for School 4 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 May, 2014 through July, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 4 is approximately 64,000 kWh/month, excluding the apparent spike in consumption shown in May.

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

Figure 3.2-7: School 4 Electricity Usage

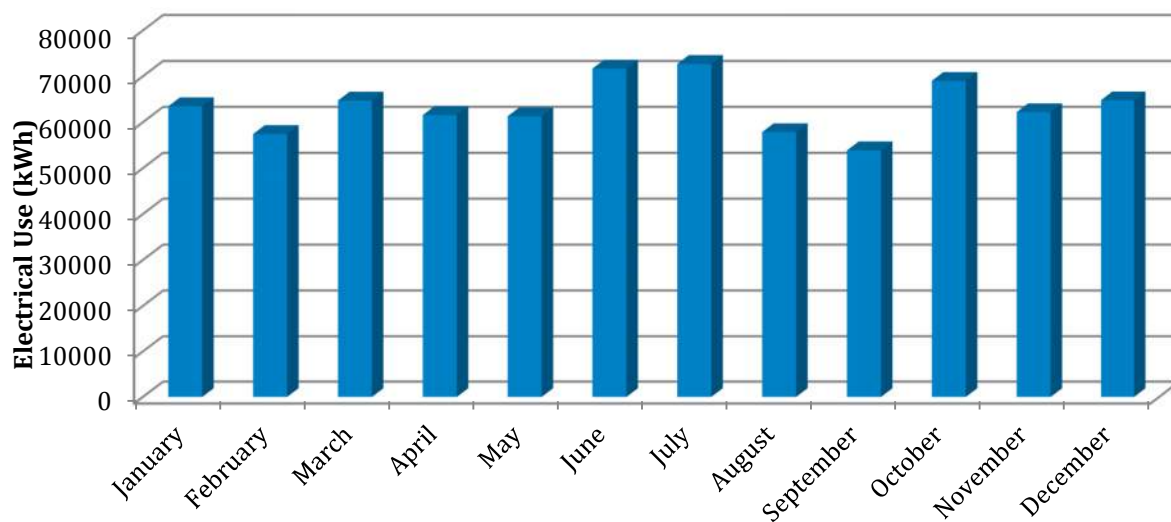


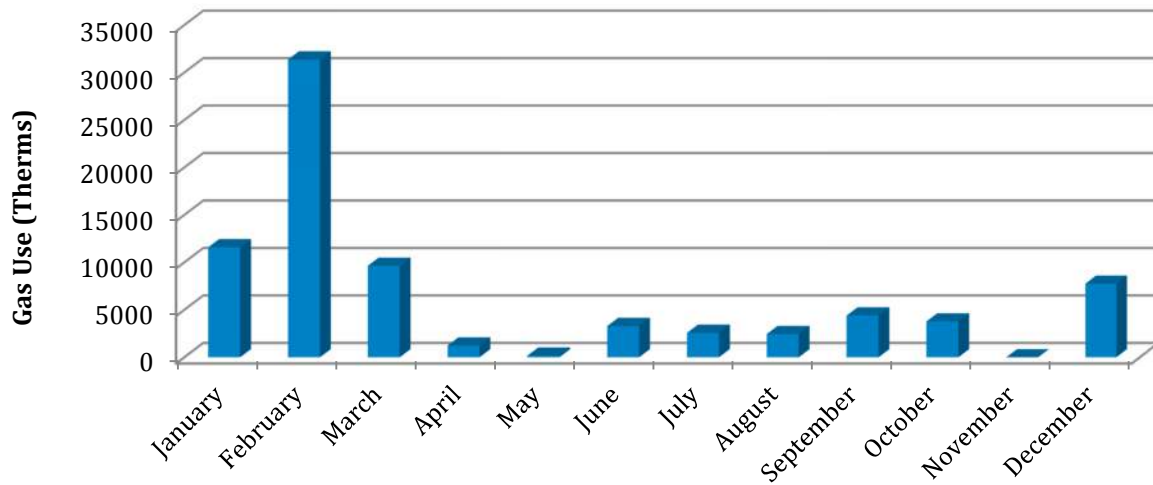
Table 3.2-4: School 4 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	164.8
Winter	136.9

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, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-8: School 4 Gas Usage



3.2.5 School 5

Electric power for School 5 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-9 illustrates the average monthly total energy consumption from May, 2014 through June, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 5 is approximately 70,000 kWh/month.

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

Figure 3.2-9: School 5 Electricity Usage

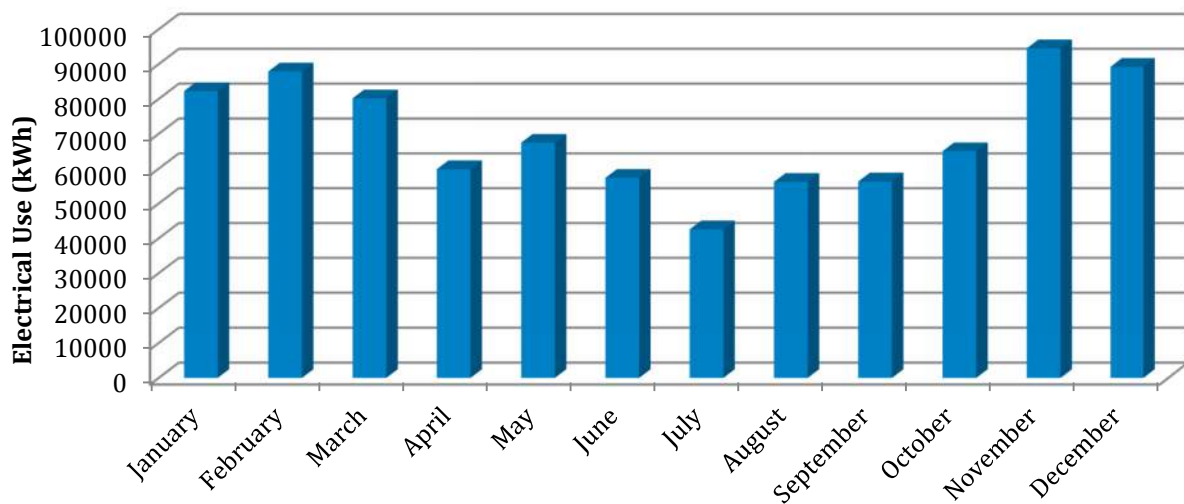
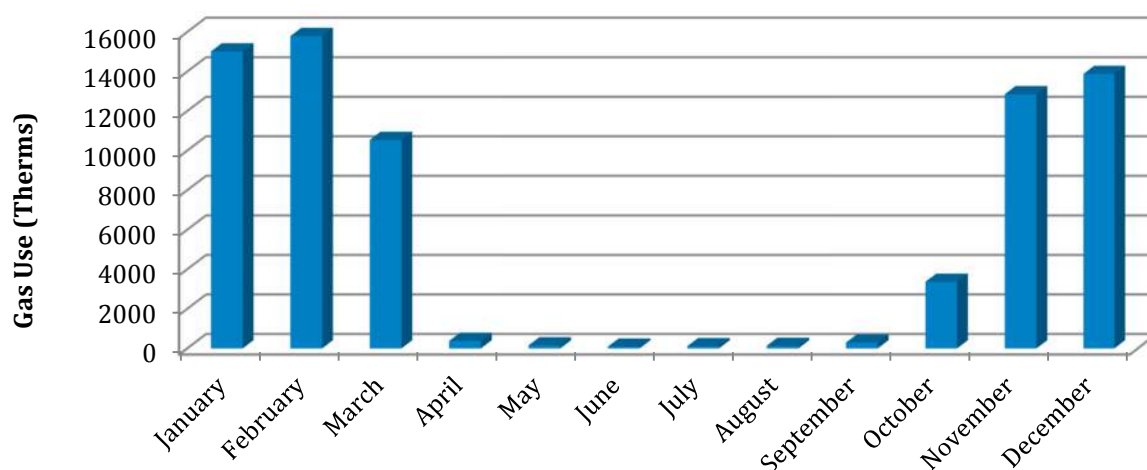


Table 3.2-5: School 5 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	158
Winter	189

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 -10 illustrates the monthly average natural gas consumption, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-10: School 5 Gas Usage

3.2.6 School 8

Electric power for School 8 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 May, 2014 through July, 2015 with duplicate months averaged together. Months September, October, and November were averaged together from one large bill.

From this graph, it can be determined that the average electrical consumption for School 8 is approximately 31,000 kWh/month.

Table 3.2-11 illustrates the seasonal peak electrical demand loads for School 8 from May, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-11: School 8 Electricity Usage

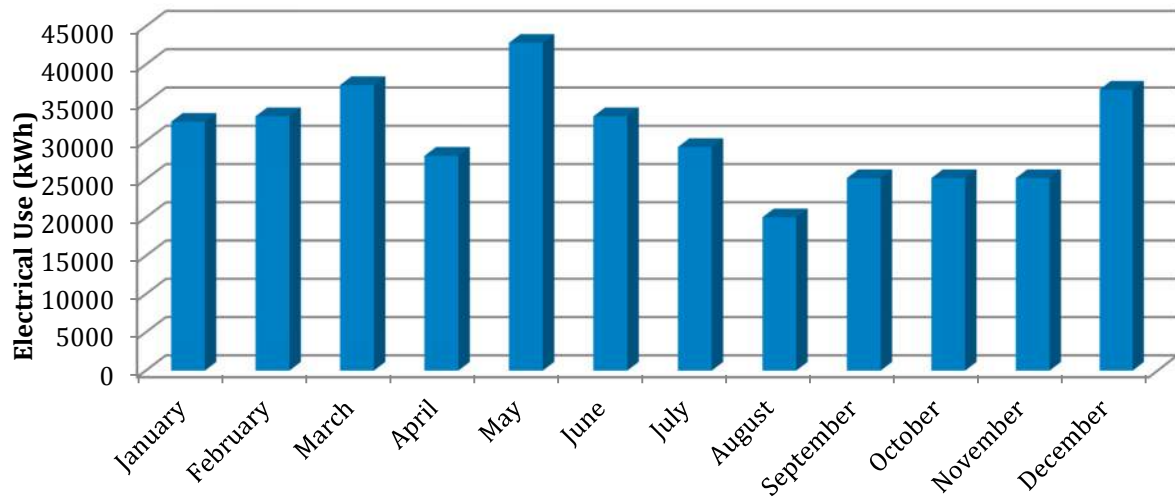


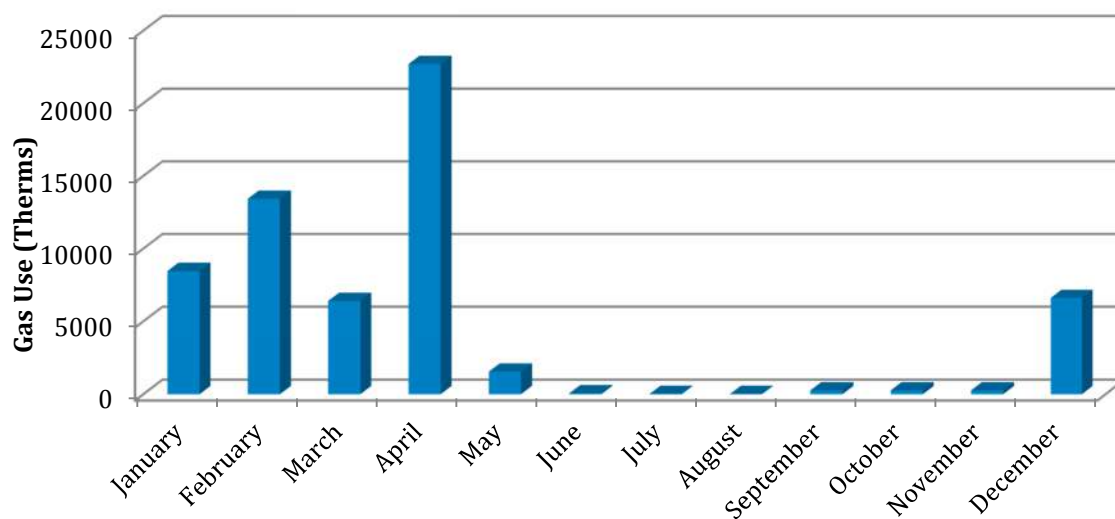
Table 3.2-6: School 8 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	107
Winter	111.6

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 -12 illustrates the monthly average natural gas consumption at School 8 from May, 2014 through July, 2015 with duplicate months averaged together. Months September, October, and November were averaged together from one large bill.

Figure 3.2-12: School 8 Gas Usage



3.2.7 School 9

Electric power for School 9 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-13 illustrates the average monthly total energy consumption from May, 2014 through July, 2015 with duplicate months averaged together. Months September and October were averaged together from one large bill.

From this graph, it can be determined that the average electrical consumption for School 9 is approximately 117,000 kWh/month during the time period considered in this analysis.

Table 3.2-7 illustrates the seasonal peak electrical demand loads for School 9 from May, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-13: School 9 Electricity Usage

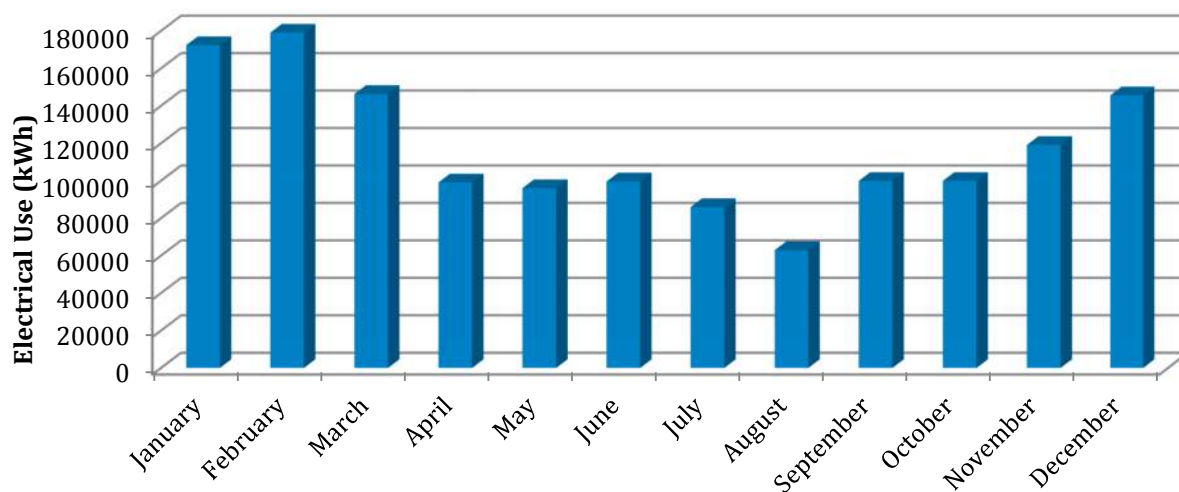
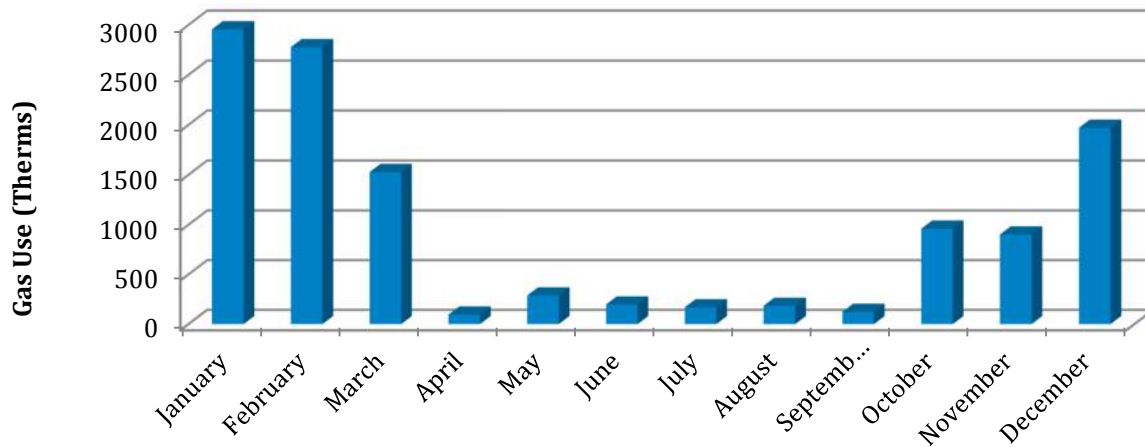


Table 3.2-7: School 9 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	315
Winter	463

Figure 3.2 -14 illustrates the monthly average natural gas consumption, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-14: School 9 Electricity Usage



3.2.8 School 10

Electric power for School 10 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-15 illustrates the average monthly total energy consumption from May, 2014 through July, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 10 is approximately 30,000 kWh/month.

Table 3.2-8 illustrates the seasonal peak electrical demand loads for School 10 from May, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-15: School 10 Electricity Usage

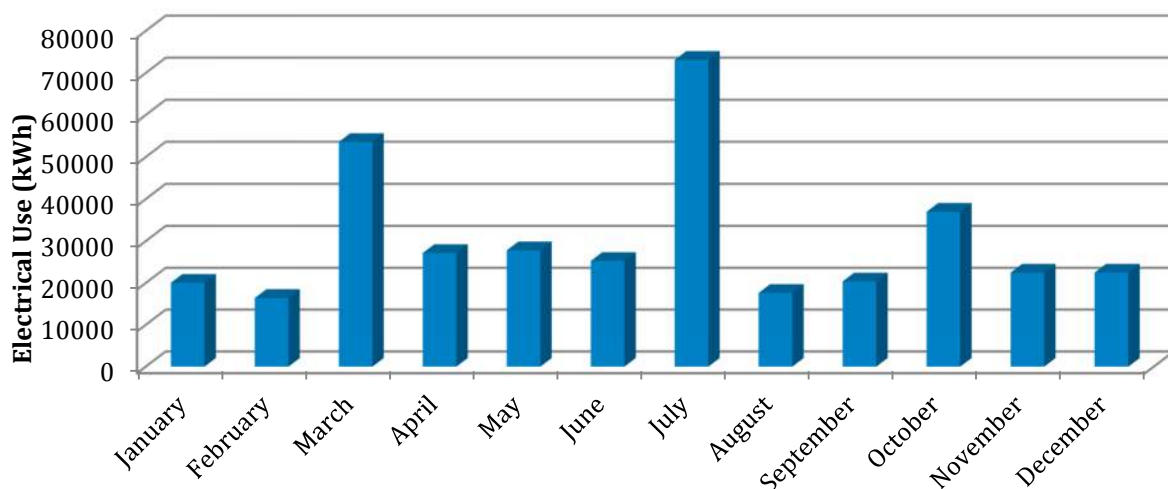


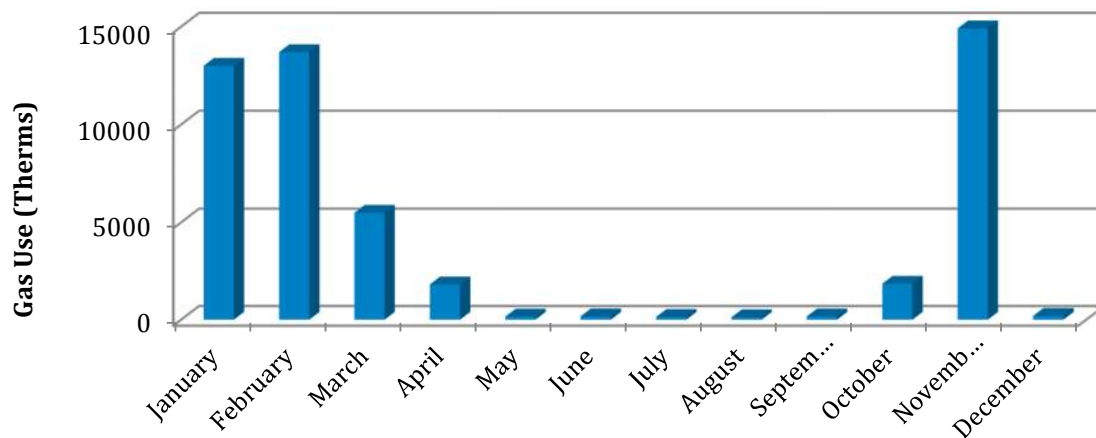
Table 3.2-8: School 10 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	99
Winter	85

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 -16 illustrates the monthly average natural gas consumption, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-16: School 10 Gas Usage



3.2.9 School 11

Electric power for School 11 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-17 illustrates the average monthly total energy consumption from April, 2014 through August, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 11 is approximately 16,000 kWh/month.

Table 3.2-9 illustrates the seasonal peak demand loads for School 11 from April, 2014 through August, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-17: School 11 Electricity Usage

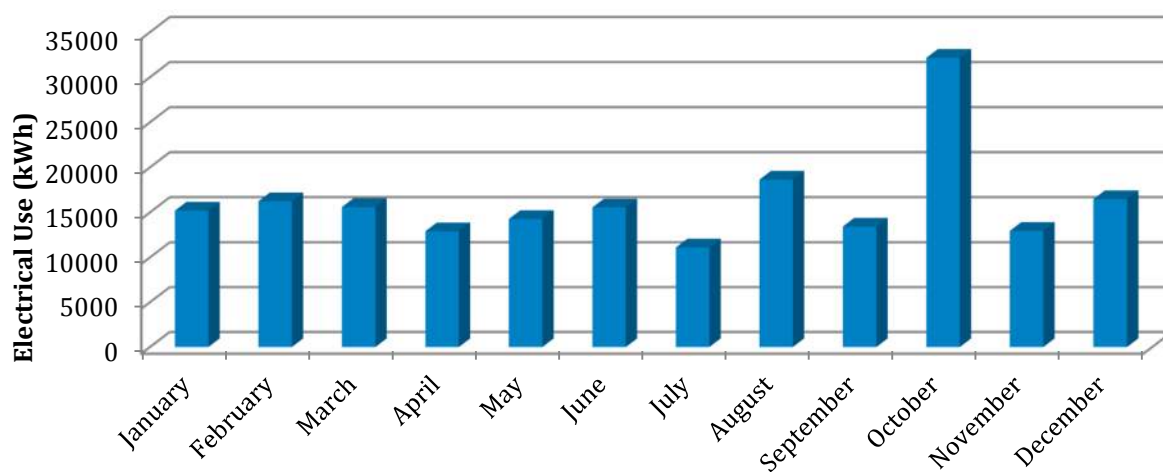
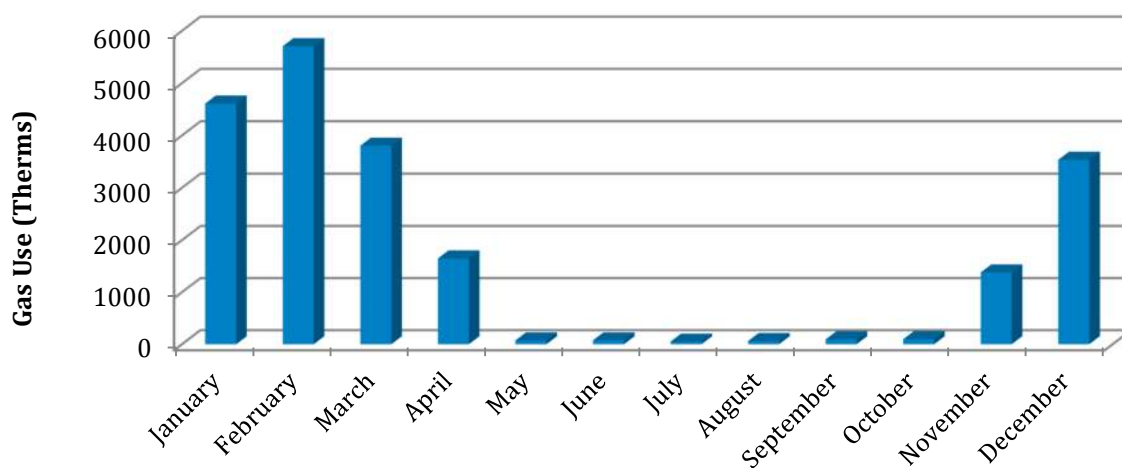


Table 3.2-9: School 11 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	98
Winter	62

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 -18 illustrates the monthly average natural gas consumption at School 11 from April, 2014 through August, 2015 with duplicate months averaged together.

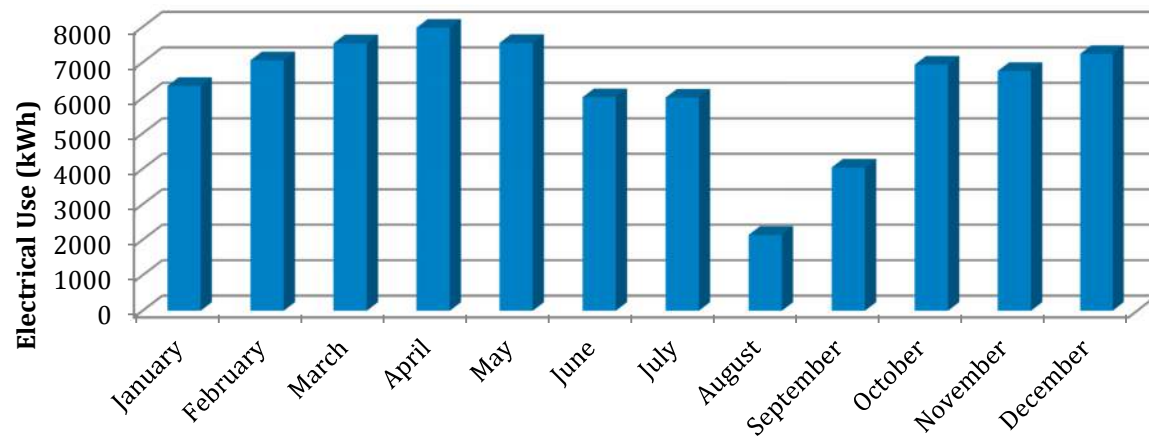
Figure 3.2-18: School 11 Gas Usage

3.2.10 School 14

Electric power for School 14 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-19 illustrates the average monthly total energy consumption from April, 2014 through July, 2015. Months April and May were averaged together from one large bill.

From this graph, it can be determined that the average electrical consumption for School 14 is approximately, 6,300 kWh/month.

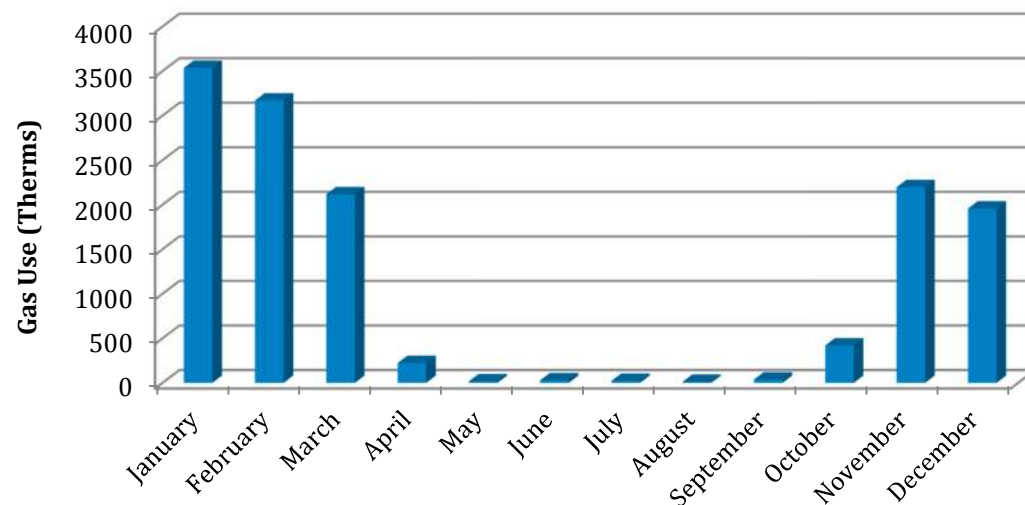
Table 3.2-10 illustrates the seasonal peak electrical demand loads for School 14 from April, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-19: School 14 Electricity Usage**Table 3.2-10: School 14 Seasonal Peak Demands**

Season	Peak Demand (kW)
Summer	32
Winter	40

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 -20 illustrates the monthly average natural gas consumption, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-20: School 14 Gas Usage

3.2.11 School 15

Electric power for School 15 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-21 illustrates the average monthly total energy consumption from May, 2014 through August, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 15 is approximately 46,000 kWh/month.

Table 3.2-11 illustrates the seasonal peak electrical demand loads for School 15 from May, 2014 through August, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-21: School 15 Electricity Usage

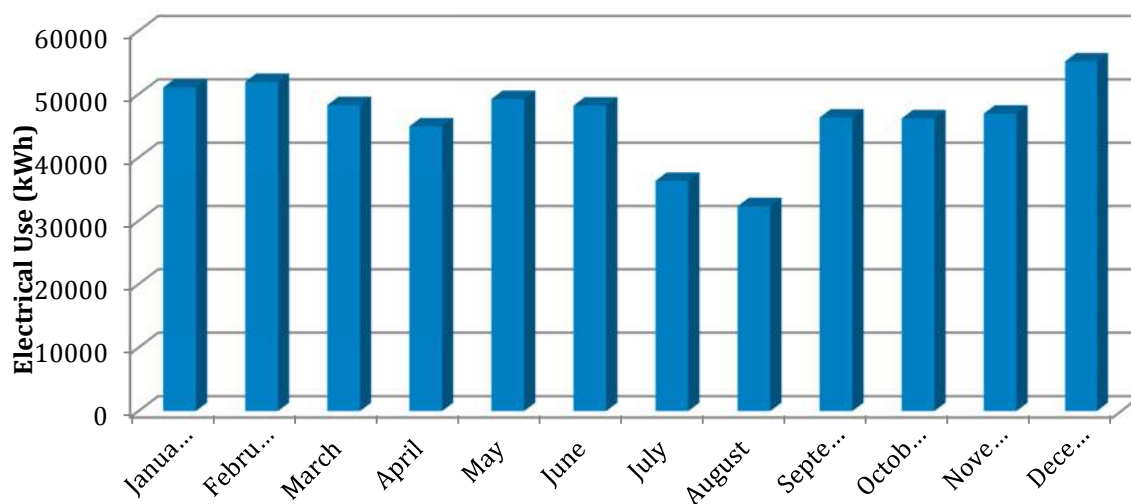


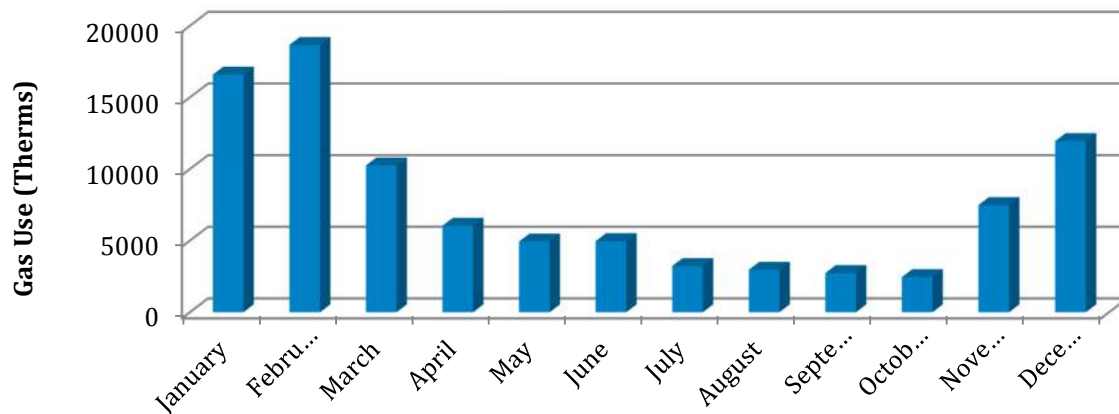
Table 3.2-11: School 15 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	96
Winter	49

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 -22 illustrates the monthly average natural gas consumption, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-22: School 15 Gas Usage



3.2.12 School 19

Electric power for School 19 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-23 illustrates the average monthly total energy consumption from May, 2014 through July, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 19 is approximately 18,000 kWh/month.

Table 3.2-12 illustrates the seasonal peak electrical demand loads for School 19 from May, 2014 through May, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-23: School 19 Electricity Usage

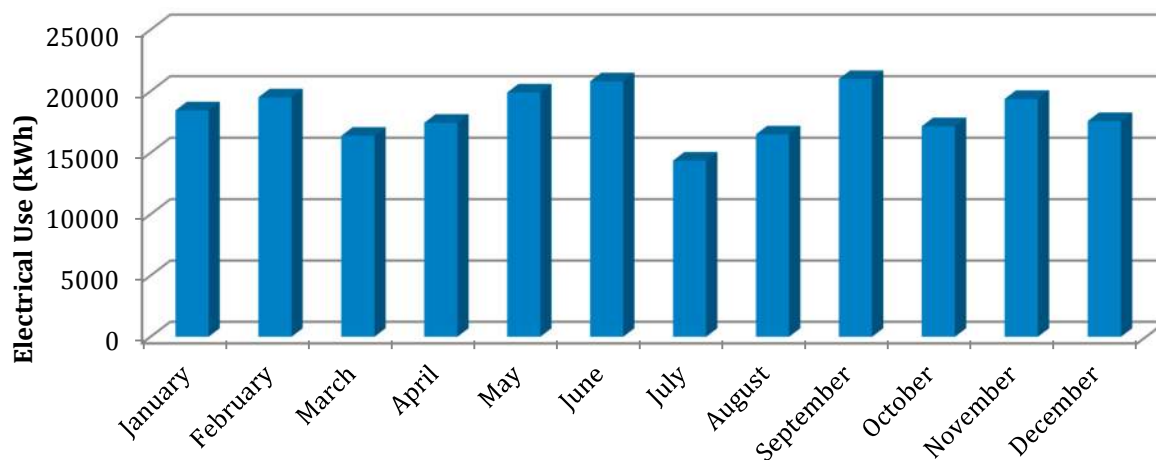


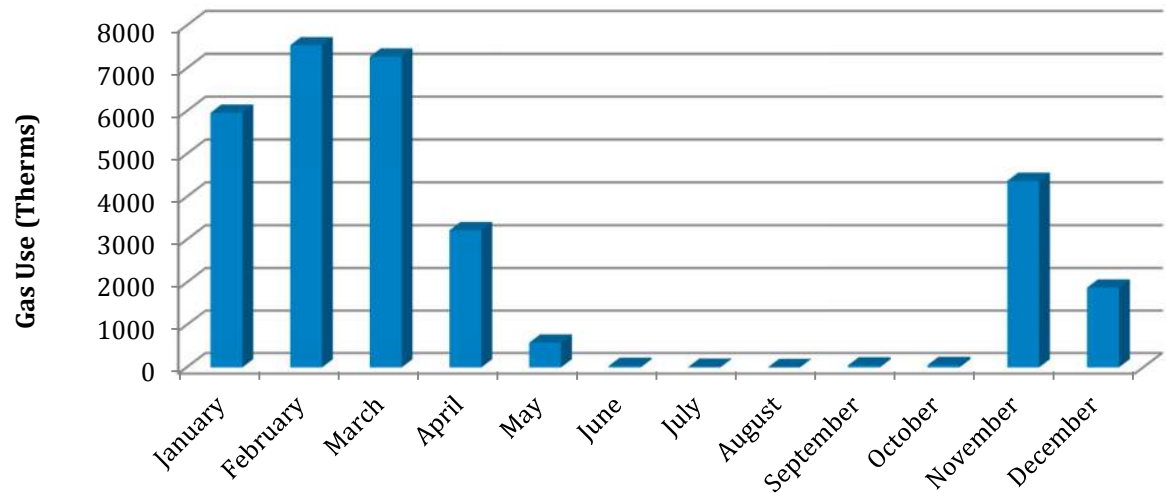
Table 3.2-12: School 19 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	73
Winter	57

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 -24 illustrates the monthly average natural gas consumption, derived from gas bills, at School 2 from June, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-24: School 19 Gas Usage

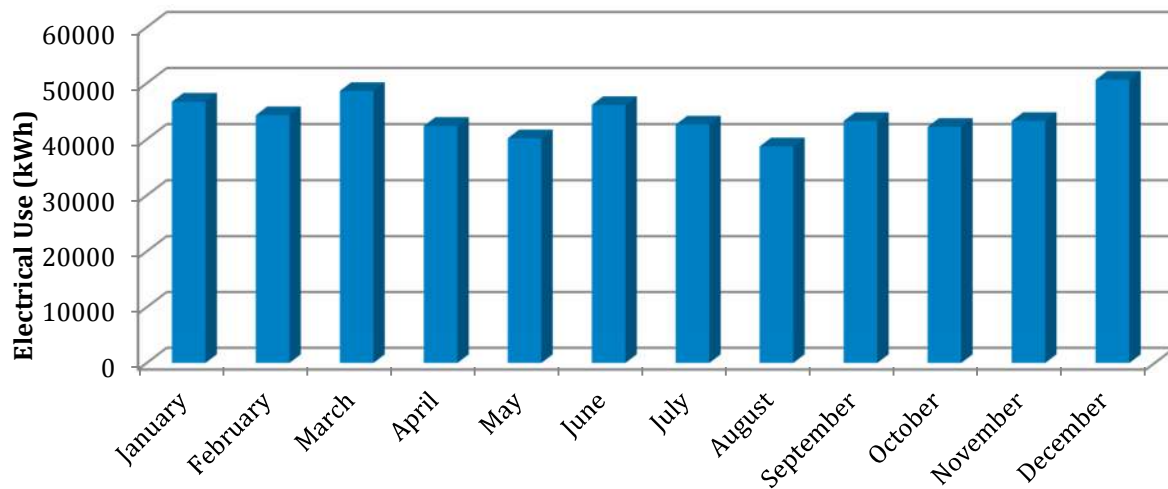


3.2.13 School 20

Electric power for the School 20 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-25 illustrates the average monthly total energy consumption from May, 2014 through August, 2015 with duplicate months averaged together. Months April, 2015 and May, 2015 were averaged together from one all-inclusive bill.

From this graph, it can be determined that the average electrical consumption for the School 20 is approximately, 44,000 kWh/month.

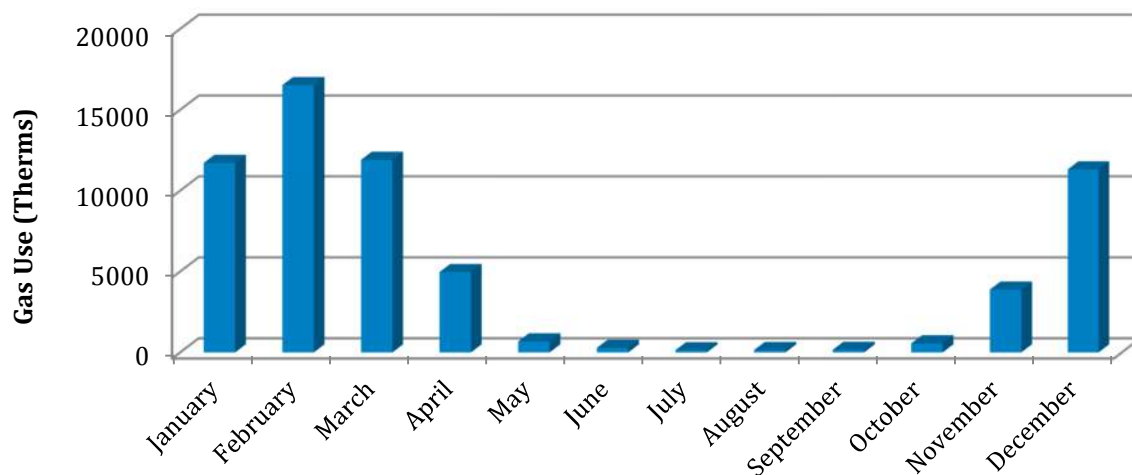
Table 3.2-13 illustrates the seasonal peak electrical demand loads for the School 20 from May, 2014 through August, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-25: School 20 Electricity Usage**Table 3.2-13: School 20 Seasonal Peak Demands**

Season	Peak Demand (kW)
Summer	192
Winter	93.6

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 -26 illustrates the monthly average natural gas consumption at the School 20 from May, 2014 through August, 2015 with duplicate months averaged together.

Figure 3.2-26: School 20 Gas Usage

3.2.14 School 21

Electric power for the School 21 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-27 illustrates the average monthly total energy consumption from May, 2014

through August, 2015. Months July, August and September, 2014 were averaged together from one all-inclusive bill.

From this graph, it can be determined that the average electrical consumption for School 21 is approximately 39,000 kWh/month.

Table 3.2-14 illustrates the seasonal peak electrical demand loads for the School 21 from May, 2014 through August, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-27: School 21 Electricity Usage

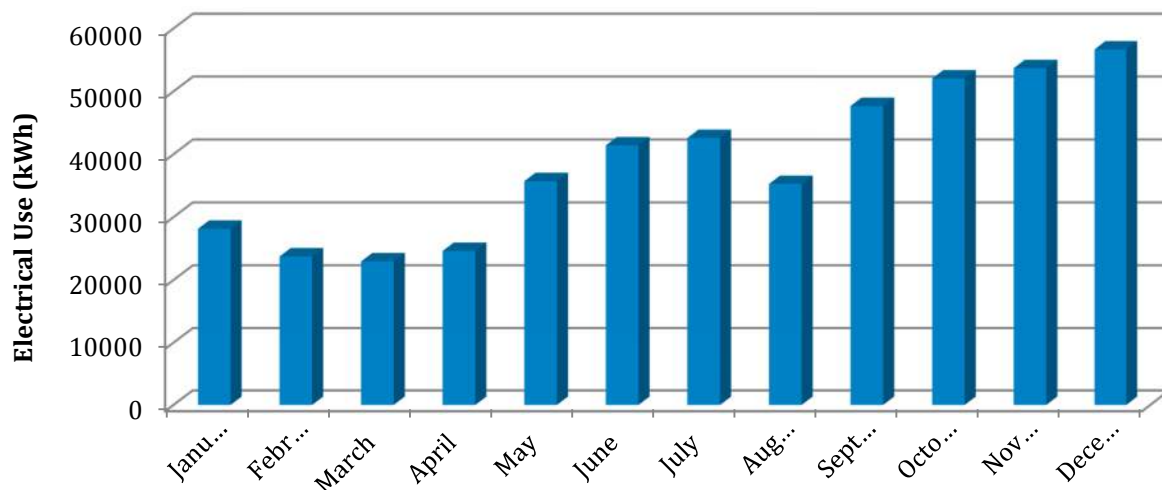


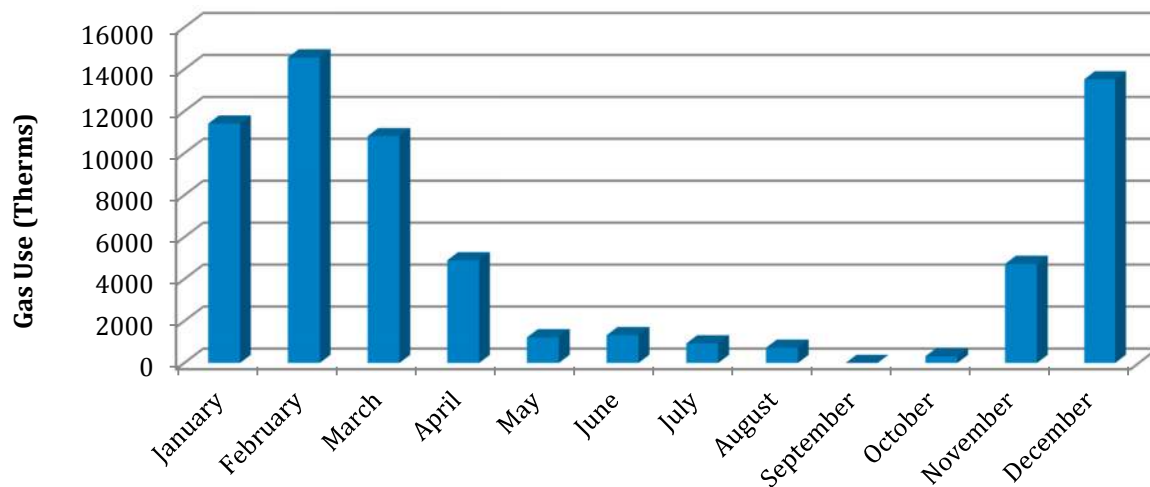
Table 3.2-14: School 21 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	166
Winter	116.7

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 -28 illustrates the monthly average natural gas consumption at the School 21 from May, 2014 through August, 2015 with duplicate months averaged together.

Figure 3.2-28: School 21 Gas Usage



3.2.15 School 24

Electric power for the School 24 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-29 illustrates the average monthly total energy consumption from May, 2014 through August, 2015. Months April and May, 2014 were averaged together from one all-inclusive bill.

From this graph, it can be determined that the average electrical consumption for School 24 is approximately 105,000 kWh/month.

Table 3.2-15 illustrates the seasonal peak electrical demand loads for the School 24 from April, 2014 through August, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-29: School 24 Electricity Usage

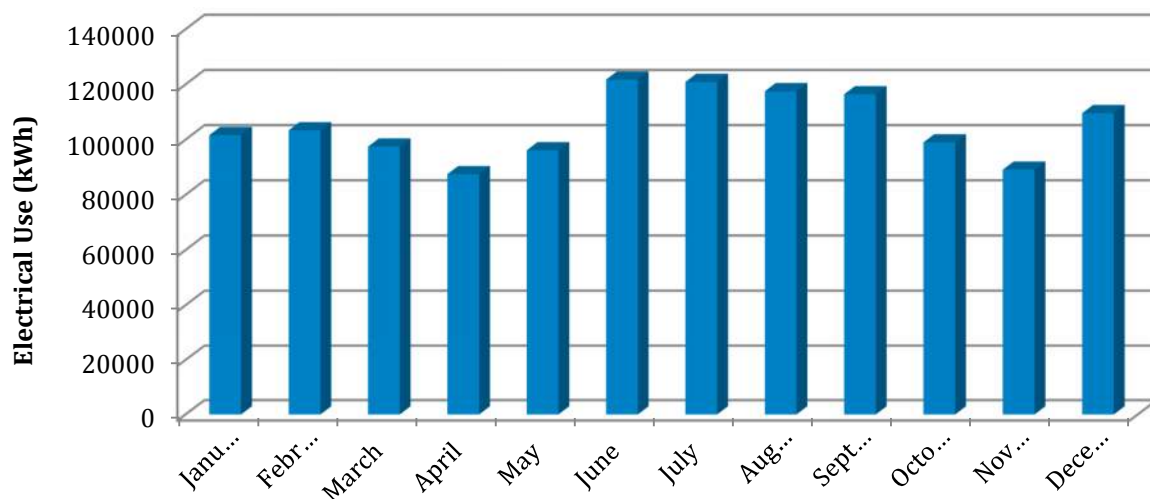
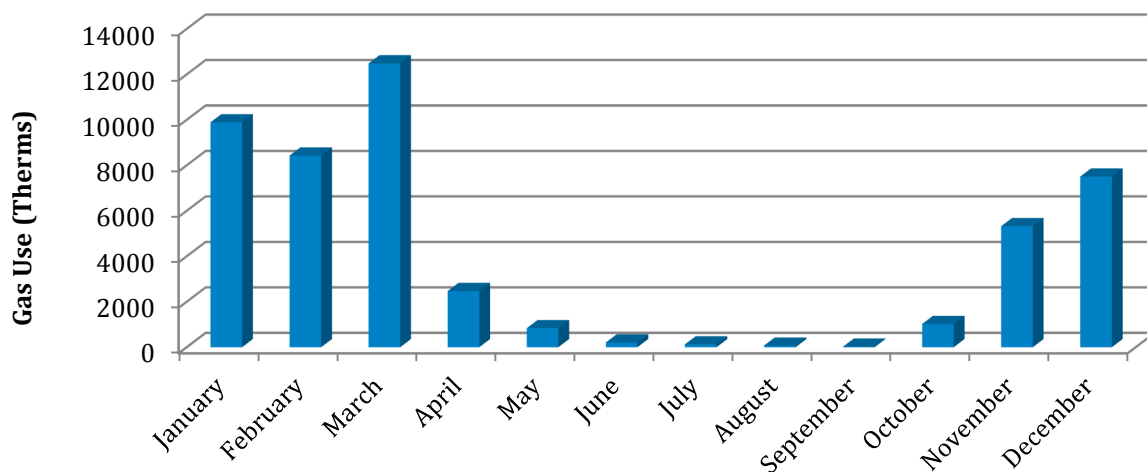


Table 3.2-15: School 24 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	417
Winter	417

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 -30 illustrates the monthly average natural gas consumption at the School 24 from April, 2014 through August, 2015 with duplicate months averaged together.

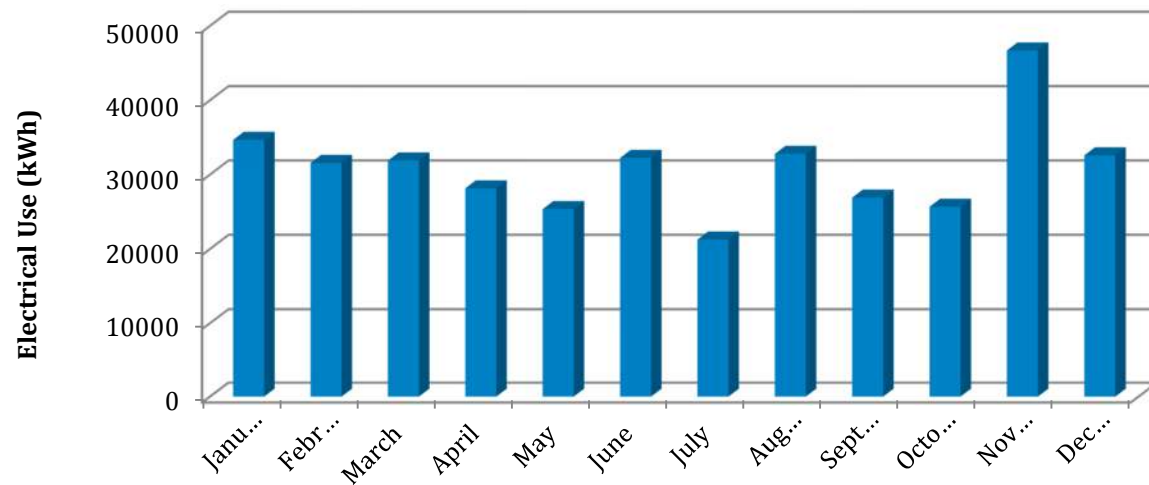
Figure 3.2-30: School 24 Gas Usage

3.2.16 School 25

Electric power for the School 25 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-31 illustrates the average monthly total energy consumption from May, 2014 through July, 2015 with duplicate months averaged together.

From this graph, it can be determined that the average electrical consumption for School 25 is approximately 31,000 kWh/month.

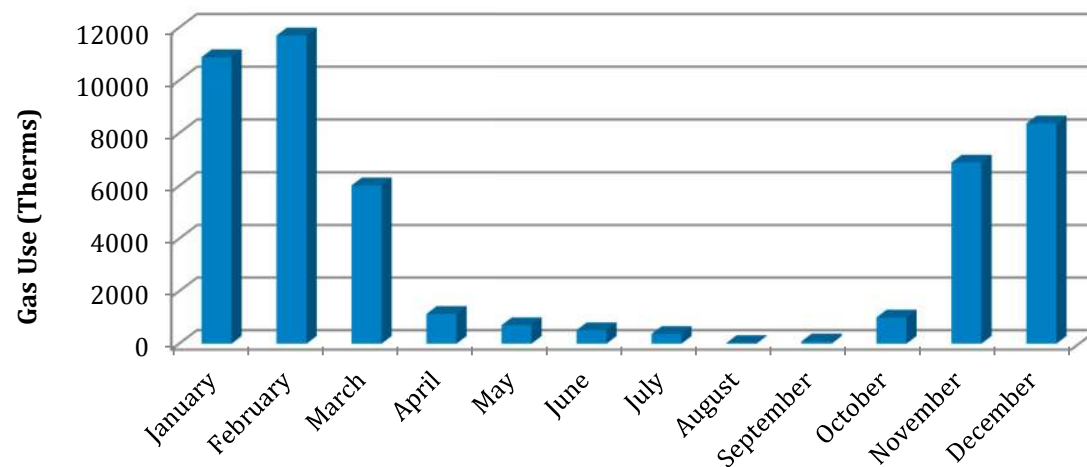
Table 3.2-16 illustrates the seasonal peak electrical demand loads for the School 25 from May, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-31: School 25 Electricity Usage**Table 3.2-16: School 25 Seasonal Peak Demands**

Season	Peak Demand (kW)
Summer	104
Winter	110

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 -32 illustrates the monthly average natural gas consumption at the School 25 from May, 2014 through July, 2015 with duplicate months averaged together.

Figure 3.2-32: School 25 Gas Usage

3.2.17 School 27

Electric power for the School 27 is fed from one General Service Secondary three phase line from PSE&G. Figure 3.2-33 illustrates the average monthly total energy consumption from August, 2014 through July, 2015.

From this graph, it can be determined that the average electrical consumption for School 27 is approximately 63,000 kWh/month.

Table 3.2-17 illustrates the seasonal peak electrical demand loads for the School 27 from August, 2014 through July, 2015. The information presented is only as recent as the most recent bill received.

Figure 3.2-33: School 27 Electricity Usage

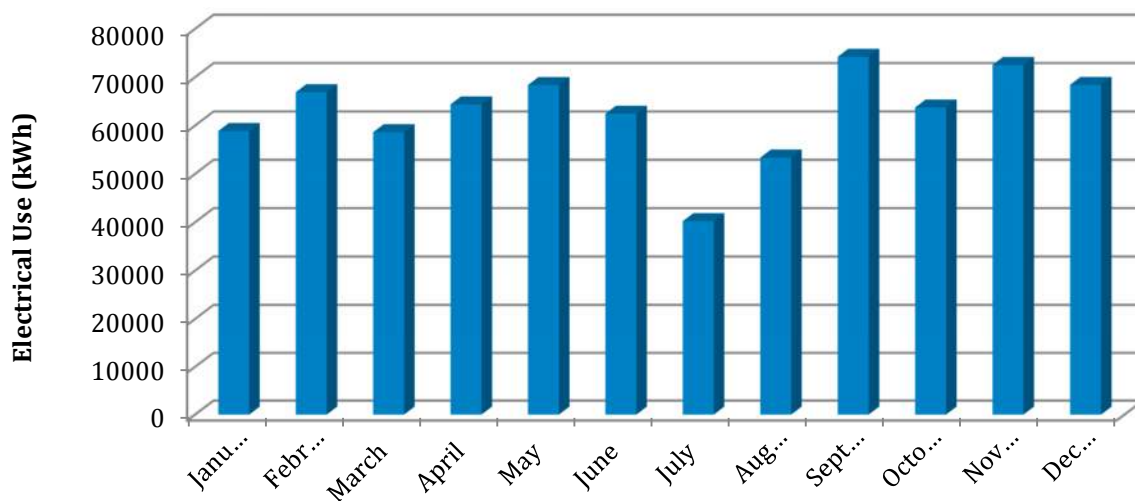


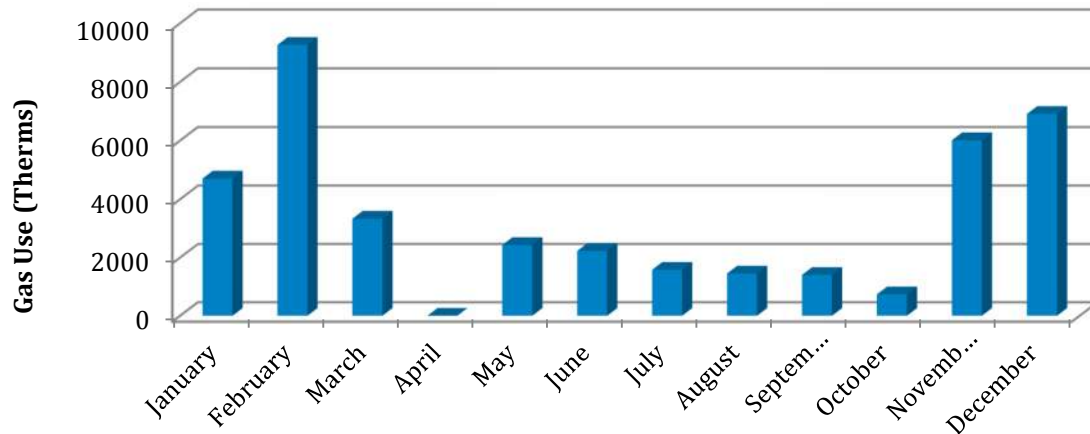
Table 3.2-17: School 27 Seasonal Peak Demands

Season	Peak Demand (kW)
Summer	120
Winter	114

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 -34 illustrates the monthly average natural gas consumption at the School 27 from May, 2014 through March, 2015. There is no data available for April.

Figure 3.2-34: School 27 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
School 1 and 26	\$0.15
School 2	\$0.16
School 3	\$0.16
School 4	\$0.15
School 5	\$0.15
School 8	\$0.15
School 9	\$0.15
School 10	\$0.17
School 11	\$0.14
School 14	\$0.17
School 15	\$0.15
School 19	\$0.15
School 20	\$0.15
School 21	\$0.21
School 24	\$0.15
School 25	\$0.16
School 27	\$0.15

Table 3.3-2: Natural Gas Aggregate Unit Costs

Service Location	Aggregate \$ / therm
School 1	\$1.39
School 2	\$1.46
School 3	\$1.39
School 4	\$1.40
School 5	\$1.44
School 8	\$1.42
School 9	\$1.49
School 10	\$1.45
School 11	\$1.53
School 14	\$1.53
School 15	\$1.67
School 19	\$1.76
School 20	\$1.48
School 21	\$1.40
School 24	\$1.40
School 25	\$1.43
School 27	\$1.36

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 account has been established for the Board, which includes a profile for the 17 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 for which utility data was available. Ratings were given for all except one of the 18 buildings. Results are a reflection of the information supplied, if more recent information is entered into the Portfolio Manager account, there is a possibility for better results.

School 1 and 26:	64
School 2:	81
School 3:	32
School 4:	58
School 5:	53
School 8:	76

School 9:	65
School 10:	65
School 11:	94
School 14:	91
School 15:	76
School 19:	77
School 20:	75
School 21:	90
School 24:	48
School 25:	83
School 27:	69

Portfolio manager information can be shared with other registered users or accounts. The following username has access the Portfolio Manager building profiles. The profiles can be shared with the Board:

████████████████████

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	Annual Savings	Simple Payback	MCS	ARO	IRR	NPV	Lifetime Savings
School 1 & 26 - Interior	\$ 366,399	\$ 4,985	\$ 361,414	\$ 7,962	24.0	\$ 7,106	2.5%	2.8%	\$ 141,973	\$ 280,253
School 2 - Interior	\$ 186,759	\$ 13,955	\$ 254,511	\$ 6,936	21.3	\$ 5,024	2.0%	1.5%	\$ 80,345	\$ 222,432
School 3 - Interior	\$ 261,722	\$ 15,540	\$ 360,686	\$ 10,900	19.7	\$ 7,455	1.6%	0.6%	\$ 93,382	\$ 341,380
School 4 - Interior	\$ 244,036	\$ 10,075	\$ 340,727	\$ 10,365	19.8	\$ 6,852	1.6%	0.7%	\$ 89,988	\$ 320,224
School 5 - Interior	\$ 187,004	\$ 4,600	\$ 264,218	\$ 6,231	22.1	\$ 5,727	2.1%	2.0%	\$ 90,221	\$ 222,216
School 8 - Interior	\$ 431,040	\$ 14,675	\$ 604,945	\$ 16,596	20.7	\$ 12,569	1.8%	1.3%	\$ 89,988	\$ 542,441

School 9 - Interior	\$ 179,971	\$ 7,435	\$ 251,274	\$ 12,278	14.0	\$ 5,727	0.5%	3.6%	\$ 10,945	\$ 334,886
School 10 - Interior	\$ 154,812	\$ 4,815	\$ 217,728	\$ 6,837	19.3	\$ 4,421	1.5%	0.5%	\$ 53,771	\$ 209,393
School 11 - Interior	\$ 334,784	\$ 12,250	\$ 469,002	\$ 19,115	16.0	\$ 10,149	0.4%	1.8%	\$ 42,827	\$ 544,279
School 14 - Interior	\$ 26,083	\$ 0	\$ 37,494	\$ 1,474	17.3	\$ 693	0.9%	0.9%	\$ 5,924	\$ 40,319
School 15 - Interior	\$ 173,897	\$ 6,285	\$ 243,693	\$ 11,650	13.5	\$ 6,397	0.7%	4.0%	\$ 19,121	\$ 335,646
School 19 - Interior	\$ 199,980	\$ 6,285	\$ 281,187	\$ 13,124	13.9	\$ 7,090	0.5%	3.6%	\$ 13,197	\$ 375,965
School 20 - Interior	\$ 151,447	\$ 2,300	\$ 215,405	\$ 6,742	20.1	\$ 3,970	1.7%	0.9%	\$ 59,404	\$ 199,233
School 21 - Interior	\$ 152,629	\$ 4,170	\$ 215,234	\$ 8,749	16.8	\$ 4,069	0.7%	1.2%	\$ 28,564	\$ 238,401
School 24 - Interior	\$ 304,076	\$ 6,470	\$ 430,640	\$ 15,491	18.3	\$ 8,039	1.2%	0.2%	\$ 87,969	\$ 437,634
School 25 - Interior	\$ 202,404	\$ 1,080	\$ 289,876	\$ 4,754	24.0	\$ 7,300	2.5%	2.9%	\$ 114,321	\$ 224,205
School 27 - Interior	\$ 382,327	\$ 6,230	\$ 543,365	\$ 8,752	26.2	\$ 11,975	2.9%	3.8%	\$ 241,507	\$ 385,511

*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.

Most of the buildings are modeled using software called eQuest, a Department of Energy-sponsored energy modeling program, to establish a baseline space heating and cooling energy usage. Climate data from Newark, NJ was used for analyses. Typical meteorological data used in the energy model analysis includes average local climate data for each hour of each day throughout a typical 8,760 hour year. From this, the model may be calibrated, using historical utility bills, to predict the impact of theoretical energy savings measures. As such, this energy model approach offers an alternative to comparing a facility's energy consumption to local heating and cooling degree day data.

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 Paterson Schools HVAC Improvements

4.2.1.1 Condensing Boiler Upgrade

Currently, the heating systems recommended for this measure utilize gas fired boilers. PS 02 and PS 10 have been retrofitted to hot water space heating. Each building has 2 steam boilers that serve a heat exchanger that generates the hot water for space heating.

Due to the tendency of equipment efficiency decreasing with age, CDM Smith estimates the boilers to be about 75% efficient. CDM Smith recommends removing the steam to hot water heat exchanger and installing high-efficiency, condensing boilers. The condensing boilers were sized according to the current capacities of heat exchangers. Condensing boilers are modeled with a full-load efficiency of ~93% and return water temperature of 100°F. There may be an opportunity to save more energy and cost by reducing the size of the installed boilers. Often, the buildings do not use their boilers' full heating capacities. These and other considerations are to be addressed when the new system is designed.

Fiscal savings from such an upgrade are then identified in Table 4.2-1 below. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Due to the improved automation and control within modern condensing boilers, their operation and maintenance costs tend to be less than those of typical cast iron, and firetube boilers. CDM Smith estimates a cast iron, or fire tube boiler system will typically cost around \$3,500 per year for regular preventative maintenance, whereas a condensing boiler system would cost around \$2,000 per year. Therefore, replacing the existing boilers with condensing boilers should result in an operation and maintenance cost savings of \$1,500 per year. CDM Smith has recommended that the two existing separate hot water systems at Schools 2 and 10 be heated with new condensing boilers, therefore the operation and maintenance cost savings is estimated to be \$3,000 per year.

4.2.1.2 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.

It is recommended that a direct digital control (DDC) building management system (BMS) be 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 staff and customer 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 trailers are not included in the cost or energy savings estimates because of the long conduit runs required to tie them into the building management system. The trailers are included in the eQuest model, so a percentage of the savings were removed from the energy savings based upon estimated or provided square footage of the trailers. This measure involves installing a DDC control system which will measure the space temperature of all the spaces, and control the heating and cooling equipment. The system will be able to vary the operation of the unit, outdoor air damper, space temperature set points, air conditioning systems (if applicable), boiler, and zone pumps (if applicable) based upon outdoor air temperature and building occupancy. This will include building start up staging, and outdoor temperature shut down.

A centralized building management system can incorporate real time energy monitoring for all HVAC systems, allowing the city to see exactly how much energy is being used to heat and/or cool the building at any time throughout the year. It can also incorporate staging air conditioning and heating units to reduce the building peak electrical and gas demand. The building management system can also be capable of relaying information a central control system for all buildings.

CDM Smith was not able to locate any available grants or incentives for consolidating systems and switching to DDC. Despite this, however, this change still offers an attractive payback and is therefore recommended by CDM Smith.

The estimated installed cost, projected energy and cost savings, and simple payback are included in Table 4.2-2. Savings are estimated to be 10% of the total ventilation, pump (if applicable), heating and cooling usage. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing a building management system.

4.2.1.3 Steam Boiler Replacement

Currently, the heating systems recommended for this measure utilize steam boilers. Some of these steam boilers serve steam to hot water heat exchangers, while other buildings have steam heating throughout the building. With exception of two boilers, boilers that have not yet exceeded their ASHRAE expected life are not recommended for replacement. An incremental payback analysis was used for all boilers that have exceeded their ASHRAE expected life.

The buildings with steam heat throughout will be recommended to have new steam boilers. There are four steam boilers at School 3 that are 52 years old, two steam boilers at School 4 that

are 55 years old, two steam boilers at School 9 that are 55 years old, two steam boilers at School 11 that are 54 years old, and two steam boilers at the Administration Building, one that is 53 years old, the other is 29 years old that are that are recommended for replacement. Due to the tendency of equipment efficiency to decrease with age CDM Smith estimates all the boilers to be about 70% efficient with exception to the 29 year old boiler that has an estimated efficiency of 75%. All, but one of these boilers have exceeded their ASHRAE expected life of 30 years.

Other buildings will have the part of the building served by the steam to hot water heat exchangers heated by new condensing hot water boilers, and new steam boilers for the portion of the building served by steam. This is recommended because converting all the steam piping and equipment (radiators, unit ventilators, coils, etc...) to hot water is a large capital cost, and the hot water piping and equipment are already installed and operational. There is one steam boiler at School 8 that is 26 years old with an ASHRAE expected life of 25 years. Due to the tendency of equipment efficiency to decrease with age CDM Smith estimates the 26 and 29 year old boilers to be about 75% efficient, and the 55 year old boiler to be about 70% efficient. These boilers listed above are recommended for replacement with condensing hot water and steam boilers.

CDM Smith recommends replacing these boilers with 83% efficient fire-tube steam boilers or high-efficiency, condensing hot water boilers. Condensing boilers are modeled with a full-load efficiency of ~92% and return water temperature of 100°F. There may be an opportunity to save more energy and cost by reducing the size of the installed boilers. Often, the buildings do not use their boilers' full heating capacities. These and other considerations are to be addressed when the new system is designed. The boilers were sized according to the building models, and the current capacities of boilers. The hot water pumps will give an estimate for the size of the hot water system. The capacity of the new condensing boilers installed at School 10 will be estimated based upon hot water pumps sizes because the percentage of hot water and steam heat is unknown. The capacity of the new condensing boilers installed at School 8 is assumed to be 1/4 of the capacity of the replaced boiler because the percentage of hot water and steam heat is unknown.

Fiscal savings from the replacement of existing steam boilers are identified in Table 4.2-3 below. It's important to note that these are estimates based on building models, and further investigation is warranted before pursuing boiler replacements.

Table 4.2-1												
Paterson Board of Education Condensing Boiler Upgrade												
	Engineer's Opinion of Probable Cost	Rebate	Total Cost	Predicted Annual Savings (Therms)	Annual Energy Savings	Annual Maintenance Cost Savings (AMCS)	Simple Payback	Annual Return on Investment (ARO I)	Lifetime Energy Savings* (24 years)	Internal Rate of Return (IRR)	Net Present Value (NPV)	Annual Estimated Greenhouse Gas Reductions (Tons CO2)
School 02	\$352,978	\$19,800	\$333,178	13,203 therms	\$ 19,276	\$3,000	15.0	-0.88%	\$ 586,423	0.01%	(\$70,753)	77.2
School 10	\$161,000	\$4,000	\$157,000	4,698 therms	\$ 7,517	\$3,000	16.0	1.70%	\$ 174,991	4.32%	\$20,880	27.5

*Assumes 2% yearly inflation on natural gas costs.

Table 4.2-2											
Paterson Board of Education Building Management System & Control ECRMs											
Building	Engineer's Opinion of Probable Cost	Rebate	Total Cost	Predicted Annual Savings (Therms/ kWh)	Annual Energy Savings	Annual Maintenance Cost Savings (AMCS)	Simple Payback	Internal Rate of Return (IRR)	Net Present Value (NPV)	Lifetime Energy Savings (15 years)*	Annual Estimated Greenhouse Gas Reductions (Tons CO2)
School 03 DDC Controls	\$48,480	\$0	\$48,480	776. Therms 6,433 kWh	\$ 2,063.99	\$0	23.5	0.8%	-\$10,186	\$52,745	4.77
School 24 DDC Controls	\$137,655	\$0	\$137,655	990. Therms 25,204 kWh	\$ 5,235.94	\$0	26.3	0.0%	-\$38,329	\$95,574	6.69
School 05 DDC Controls	\$136,201	\$0	\$136,201	1,458. Therms 16,776 kWh	\$ 4,613.21	\$0	29.5	-1.2%	-\$49,975	\$118,858	9.12
School 19 DDC Controls	\$47,618	\$0	\$47,618	537. Therms 4,369 kWh	\$ 1,600.66	\$0	29.7	-1.4%	-\$18,134	\$28,537	3.30
School 10 DDC Controls	\$79,989	\$0	\$79,989	1,035. Therms 7,272 kWh	\$ 2,552.92	\$0	31.3	-1.8%	-\$32,851	\$45,603	6.32
School 04 DDC Controls	\$153,484	\$0	\$153,484	1,812. Therms 15,217 kWh	\$ 4,850.21	\$0	31.6	-1.8%	-\$63,471	\$123,988	11.14
School 09 DDC Controls	\$150,219	\$0	\$150,219	244. Therms 28,122 kWh	\$ 4,741.99	\$0	31.7	-1.5%	-\$58,702	\$126,566	2.43
School 01 & 26 DDC Controls	\$116,676	\$0	\$116,676	1,054. Therms 14,375 kWh	\$ 3,666.32	\$0	31.8	-1.8%	-\$47,962	\$94,747	6.68
School 15 DDC Controls	\$150,361	\$0	\$150,361	1,792. Therms 11,137 kWh	\$ 4,707.70	\$0	31.9	-2.0%	-\$64,010	\$118,797	10.88
School 14 DDC Controls	\$22,454	\$0	\$22,454	275. Therms 1,512 kWh	\$ 679.05	\$0	33.1	-2.3%	-\$9,980	\$17,164	1.66
School 02 DDC Controls	\$117,289	\$0	\$117,289	1,474. Therms 6,222 kWh	\$ 3,528.97	\$0	33.2	-6.3%	-\$78,996	\$62,248	8.85
School 20 DDC Controls	\$113,434	\$0	\$113,434	1,245. Therms 10,585 kWh	\$ 3,406.26	\$0	33.3	-2.3%	-\$50,409	\$60,947	7.66
School 08 DDC Controls	\$101,056	\$0	\$101,056	1,201. Therms 7,374 kWh	\$ 2,789.39	\$0	36.2	-3.0%	-\$49,654	\$49,748	7.29
School 25 DDC Controls	\$99,095	\$0	\$99,095	982. Therms 7,396 kWh	\$ 2,626.49	\$0	37.7	-3.3%	-\$50,470	\$47,016	6.01
School 21 DDC Controls	\$141,364	\$0	\$141,364	1,289. Therms 9,291 kWh	\$ 3,723.06	\$0	38.0	-3.3%	-\$72,124	\$66,888	7.87
School 11 DDC Controls	\$48,406	\$0	\$48,406	423 Therms 3,892 kWh	\$ 1,203.74	\$0	40.2	-3.7%	-\$26,126	\$30,681	2.61
School 27 DDC Controls	\$141,924	\$0	\$141,924	801 Therms 15,042 kWh	\$ 3,449.07	\$0	41.1	-3.7%	-\$76,795	\$62,726	5.22

*Assumes 2% yearly inflation on natural gas costs, and 3% on electricity costs.

Table 4.2-3												
Paterson Board of Education Steam Boiler Replacement												
Building	Engineer's Opinion of Probable Cost	Rebate****	Total Cost	Predicted Annual Savings (Therms)	Annual Energy Savings	Annual Maintenance Cost Savings (AMCS)	Simple Payback	Annual Return on Investment (AROI)	Lifetime Energy Savings (24 or 25 years)*	Internal Rate of Return (IRR)	Net Present Value (NPV)	Annual Estimated Greenhouse Gas Reductions (Tons CO2)
School 08	\$143,212	\$7,200	\$136,012	5,715 therms	\$ 8,115	\$0	16.8	1.80%	\$ 246,883	4.97%	\$33,399	33.4
School 14	\$62,928	\$1,920	\$61,008	726 therms	\$ 1,111	\$0	54.9	-3.18%	\$ 33,792	-6.45%	(\$40,417)	4.2
School 21	\$236,650	\$9,000	\$227,650	2,946 therms	\$ 4,124	\$0	55.2	-3.19%	\$ 125,472	-6.49%	(\$154,538)	17.2
School 24	\$236,650	\$9,000	\$227,650	2,823 therms	\$ 3,952	\$0	57.6	-3.26%	\$ 120,233	-6.79%	(\$157,590)	16.5

Incremental payback analysis was used.
*Assumes 2% yearly inflation on natural gas costs.
**Savings was performed by difference between an 83% efficient Firtube boiler, and current boiler.
***Savings was performed by difference between the new 83% efficient Firtube, and 92% efficient condensing boilers, and the current boiler(s).
****Incentives for the new steam boilers, per New Jersey Clean Energy Program, are calculated through Custom Measure Path. Assumed to be \$1.00 per MBH.

Table 4.2-4							
Paterson Board of Education Window Replacement							
Building	Engineer's Opinion of Probable Cost	Predicted Annual Savings (kWh)	Predicted Annual Savings (Therms)	Annual Energy Savings	Annual Maintenance Cost Savings (AMCS)	Simple Payback	Lifetime Energy Savings (40 years)
School 11	\$408,308	324 kWh	1874 therms	\$ 2,914	\$0	140.1	\$175,987
School 14	\$231,711	-191 kWh	2,012 therms	\$ 3,046	\$0	76.1	\$183,969
School 19	\$288,377	-293 kWh	2,504 therms	\$ 4,363	\$0	66.1	\$263,536
School 21	\$670,163	-191 kWh	2,012 therms	\$ 2,777	\$0	241.3	\$167,759

4.2.1.4 Combined Heat and Power

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. Buildings with average demands of at least twice the unit rated capacity are presumed to have a majority of hours. The detailed calculations are included in Appendix C.

Table 4.2-4: Combined Heat and Power Screening

School	Electric			Gas		
	kWh	kW (avg)	\$	Therms	MBH (avg)	\$
*School 01 and 26	718,772	82	\$110,085	52,684	601	\$73,231
School 02	311,110	36	\$49,396	73,705	841	\$107,769
School 03	321,653	37	\$49,869	38,790	443	\$53,918
*School 04	760,851	87	\$113,388	90,578	1,034	\$126,809
*School 05	838,775	96	\$125,406	72,879	832	\$104,946
School 08	368,700	42	\$55,947	60,034	685	\$85,373
*School 09	1,406,124	161	\$212,386	12,189	139	\$18,162
School 10	363,585	42	\$61,729	51,770	591	\$75,067
School 11	194,600	22	\$27,858	21,130	241	\$32,343
School 14	75,620	9	\$12,915	13,750	157	\$21,038
*School 15	556,871	64	\$85,738	89,609	1,023	\$149,647
School 19	218,426	25	\$32,807	26,833	306	\$47,226
*School 20	529,250	60	\$78,168	62,260	711	\$92,296
School 21	464,566	53	\$95,898	64,468	736	\$90,188
*School 24	1,283,846	147	\$192,518	49,485	565	\$69,353
School 25	375,738	43	\$61,096	49,111	561	\$70,121
*School 27	793,393	91	\$118,216	40,073	457	\$54,495
			*Schools that appear to be CHP candidates			

Table 4.2-5: Combined Heat and Power Payback

Facility	Total Cost	Energy Savings	Incentive	Annual Fiscal Savings ²	Simple Payback (Years)
School 01 and 26	\$143,000	-36,374 therms	\$42,900	\$762	-56.71
		280,800 kWh			
		594,000 kbtu			
School 04	\$143,000	-36,374 therms	\$42,900	(\$761)	-30.44
		280,800 kWh			
		594,000 kbtu			
School 05	\$143,000	-36,374 therms	\$42,900	(\$2,080)	-21.72
		280,800 kWh			
		594,000 kbtu			
School 09	\$143,000	-36,374 therms	\$42,900	(\$3,469)	-16.69
		280,800 kWh			
		594,000 kbtu			
School 15	\$143,000	-36,374 therms	\$42,900	(\$9,196)	-8.54
		280,800 kWh			
		594,000 kbtu			
School 20	\$143,000	-36,374 therms	\$42,900	(\$4,134)	-15.03
		280,800 kWh			
		594,000 kbtu			
School 21	\$143,000	-36,374 therms	\$42,900	\$15,394	7.78
		280,800 kWh			
		594,000 kbtu			
School 24	\$143,000	-36,374 therms	\$42,900	(\$555)	-32.47
		280,800 kWh			
		594,000 kbtu			
School 27	\$143,000	-36,374 therms	\$42,900	\$690	-54.49
		280,800 kWh			
		594,000 kbtu			

These calculations are based upon the natural gas utility rates assumed. Rates should be verified before any further analysis is completed. These facilities require further analysis before pursuing further installation. Cost does not include any changes the electrical system, gas service, building or hot water system.

School 21 appears to be a good candidate and cost effective. The 65 kW unit appears to be oversized, so further analysis should be included to find an appropriate size, technology and operation methodology.

4.3 Alternative Energy Sources

4.3.1 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 17 systems with a total rating of approximately 2930 kW (dc) will be appropriate for the Board'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 17 Board 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 2014. 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 Board. 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)
School 01 & School 26	Flat	299
School 02	Flat	123
School 03	Flat	119
School 04	Flat	190
School 05	Flat	286
School 08	Flat	228
School 09	Flat	360
School 10	Flat	160
School 11	Flat	84
School 14	Sloped	12
School 15	Flat	329
School 19	Sloped	55
School 20	Sloped	253
School 21	Sloped	77
School 24	Flat	105
School 25	Sloped	100
School 27	Flat	150

4.3.1.1 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 are typically installed at a tilt of 20 degrees or lower in order to avoid any issues with wind and to 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.

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

Building	Simple Payback	Size	kWh	Energy Savings	SREC*	ARO I	IRR	NPV	Lifetime Savings
		(kW DC)	Production						(25 Years)
School 01 & 26	19.9	299	380,926	\$ 57,139	\$ 69,538.00	1.03%	1.60%	(\$335,431)	\$ 2,083,242
School 02	20.7	123	156,702	\$ 25,072	\$ 28,606.00	0.83%	1.35%	(\$175,727)	\$ 914,118
School 03	20.8	119	151,606	\$ 24,257	\$ 27,675.70	0.81%	1.31%	(\$174,078)	\$ 884,391
School 04	20.5	190	242,060	\$ 36,309	\$ 44,188.10	0.88%	1.34%	(\$258,718)	\$ 1,323,799
School 05	19.9	286	364,364	\$ 54,655	\$ 66,514.60	1.02%	1.58%	(\$326,282)	\$ 1,992,666
School 08	20.2	228	290,472	\$ 43,571	\$ 53,025.70	0.95%	1.46%	(\$285,462)	\$ 1,588,559
School 09	19.7	360	458,640	\$ 68,796	\$ 83,724.70	1.07%	1.68%	(\$378,362)	\$ 2,508,251
School 10	19.5	160	203,840	\$ 34,652	\$ 37,211.00	1.12%	1.95%	(\$144,369)	\$ 1,263,415
School 11	23.3	84	107,016	\$ 14,982	\$ 19,535.80	0.29%	0.14%	(\$208,592)	\$ 546,241
School 14	42.3	12	15,288	\$ 2,599	\$ 2,790.80	-1.64%	-3.93%	(\$126,452)	\$ 94,756

School 15	19.8	329	419,146	\$ 62,871	\$ 76,515.10	1.05%	16.5%	(\$356,544)	\$ 2,292,263
School 19	24.5	55	70,070	\$ 10,511	\$ 12,791.30	0.07%	-0.17%	(\$163,708)	\$ 383,205
School 20	20.1	253	322,322	\$ 48,348	\$ 58,839.90	0.98%	1.52%	(\$303,057)	\$ 1,762,743
School 21	19.2	77	98,098	\$ 20,601	\$ 17,907.80	1.20%	2.41%	(\$44,582)	\$ 751,082
School 24	21.8	105	133,770	\$ 20,066	\$ 24,419.70	0.58%	0.80%	(\$198,897)	\$ 731,573
School 25	21.3	100	127,400	\$ 20,384	\$ 23,256.90	0.70%	1.11%	(\$166,242)	\$ 743,185
School 27	20.9	150	191,100	\$ 28,665	\$ 34,885.30	0.78%	1.16%	(\$230,567)	\$ 1,045,104

Due to the high initial capital cost and relatively long calculated payback, CDM Smith does not recommend that the Board directly incur the cost of photovoltaic system installations at their facilities. As an alternative, the Board 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 7.1.10 of this report.

4.3.2 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 Paterson is 10 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 within 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 J for Wind Cad Modeling.

Table 4.3-5 includes a simple payback analysis for the installation of a wind turbine energy system on the most desirable site. Refer to Appendix K for a more detailed wind turbine financing spreadsheet, including utility cost avoidance and REC's.

Table 4.3-3
Simple Payback Analysis for Wind Turbine Energy System

Parameter	Wind Turbine
Probable Cost	\$151,000
Simple Payback	21.0 years
Annual Return On Investment (AROI)	0.60%
Lifetime Energy Savings (15 years)	\$256,894
Internal Rate of Return (IRR)	3.40%
Net Present Value (NPV)	\$7,323

*Refer to Appendix J for Wind Cad Modeling

Based on the simple payback model, summarized in Table 4.3-5, the wind power has minimal cost savings of the life of the equipment. If the New Jersey begins offering wind energy incentives, the Board 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 Board in lowering the payback period. Refer to 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 Board 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.

4.4 Water Systems

As a result of the National Energy Policy Act water use standards for commercial plumbing products were established. The standards required that toilets use no more than 1.6 gallons per flush, urinals were limited to 1 gallon per flush and faucets and shower heads were allowed a maximum flow of 1.5 gallons per minute (gpm) at 80 psi.

Prior to the National Energy Policy Act, originally passed in 1992, standard toilets used 3.5 – 5.5 gallons per flush, urinals required 2 to 3 gallons per flush and standard lavatory faucets has flow rates of 2.5 to 5 gpm.

The Paterson School District facilities have many of their urinals and toilets using 1 and 1.6 gallons per flush respectively. Water savings realizable from replacement of these fixtures would be minimal, and fixture replacement is therefore not expected to be cost effective. Appendix G presents a compiled inventory of the water fixtures per building.

In general, replacement of older water fixtures results in a 40 – 50% reduction in water consumption. Water is currently available to customers at low rates, specifically for Passaic Valley Water Commission, New Jersey water consumption is charged about \$2.90/ccf of water and \$1.74/ccf sewer or \$6.20/1,000 gallons of water used.

Although these water savings retrofits are a sustainable solution, benefiting society as a whole, the associated cost savings are typically insignificant when compared to the investment and it is anticipated that the resulting payback period will be well in excess of 20 years. As such, these measures have not been evaluated further.

Example: 3.5 gpf toilet replaced with 1.28 gpf toilet = 2.2 gallons of savings per flush

$1000 \text{ flushes per year} \times 2.2 \text{ gallons per flush} \times \$6.20/1000 \text{ gallons} = \$13.64/\text{year/toilet}$

Estimated installed cost: \$830

Payback: $\$830 / \$13.64 \text{ per year} = 61 \text{ years}$

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 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.
- Alpha Gas & Electric, LLC
- Ambit Northeast, LLC (Ambit Energy)
- American Powernet Management, LP
- Amerigreen Energy, Inc.
- AP Gas & Electric, LLC
- Astral Energy, LLC
- Barclays Capital Services, Inc.
- BBPC, LLC (Eastern Energy)
- Blue Pilot Energy, 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
- Constellation NewEnergy, Inc.
- Credit Suisse (USA) Inc.
- Direct Energy Business, LLC
- Discount Energy Group, LLC
- Dominion Retail, Inc.
- DTE Energy Supply, Inc.
- Energy.me Midwest, Inc.
- Energy Plus Holdings, LLC
- Ethical Electric Benefit Co. (Ethical Electric)
- Energy Service Providers (New Jersey Gas & Electric)
- FirstEnergy Solutions
- 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

- HOP Energy LLC
- Hudson Energy Services, LLC
- IDT Energy, Inc.
- Independence Energy Group, LLC
- Integrys Energy Services, Inc.
- Keil & Sons, Inc (Systrum Energy)
- Liberty Power Delaware, LLC
- Liberty Power Holdings, LLC
- Linde Energy Services
- Marathon Power LLC
- MP2 Energy NJ, LLC
- Natures Current, LLC
- MPower Energy NJ LLC
- NATGASCO, Inc (Supreme Energy, Inc)
- 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)
- PPL Energy Plus, LLC
- Public Power & Utility of New Jersey, LLC

- Reliant Energy
- ResCom Energy LLC
- Respond Power LLC
- Save on Energy, LLC
- SJ Energy Partners, Inc.
- South Jersey Energy Company
- Sperian Energy Corp.
- Spark Energy, LP
- Sprague Energy Corp.
- Starion Energy PA Inc.
- Stream Energy New Jersey, 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.

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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
- Solar Systems
- Wind Systems

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	Annual Savings	Simple Payback
School 01	\$ 74,963	\$ 1,585	\$ 106,174	\$ 3,964	16.6
School 02	\$ 186,759	\$ 13,955	\$ 254,511	\$ 6,936	21.3
School 03	\$ 261,722	\$ 15,540	\$ 360,686	\$ 10,900	19.7
School 04	\$ 244,036	\$ 10,075	\$ 340,727	\$ 10,365	19.8
School 05	\$ 187,004	\$ 4,600	\$ 264,218	\$ 6,231	22.1
School 08	\$ 431,040	\$ 14,675	\$ 604,945	\$ 16,596	20.7
School 09	\$ 179,971	\$ 7,435	\$ 251,274	\$ 12,278	14.0
School 10	\$ 154,812	\$ 4,815	\$ 217,728	\$ 6,837	19.3
School 11	\$ 334,784	\$ 12,250	\$ 469,002	\$ 19,115	16.0
School 14	\$ 26,083	\$ 0	\$ 37,494	\$ 1,474	17.3
School 15	\$ 173,897	\$ 6,285	\$ 243,693	\$ 11,650	13.5
School 19	\$ 199,980	\$ 6,285	\$ 281,187	\$ 13,124	13.9
School 20	\$ 151,447	\$ 2,300	\$ 215,405	\$ 6,742	20.1
School 21	\$ 152,629	\$ 4,170	\$ 215,234	\$ 8,749	16.8
School 24	\$ 304,076	\$ 6,470	\$ 430,640	\$ 15,491	18.3
School 25	\$ 202,404	\$ 1,080	\$ 289,489	\$ 4,754	24.0
School 26	\$ 179,923	\$ 5,150	\$ 253,489	\$ 3,998	29.2
School 27	\$ 382,327	\$ 6,230	\$ 543,365	\$ 8,752	26.2

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

Building Measure	Retrofit Cost	Incentives	Total Cost	Annual Fiscal Savings	Simple Payback (Years)
School 2 Condensing Boilers	\$ 333,178	\$ 19,800	\$ 352,978	\$ 22,276	15.0
School 8 Steam Boilers	\$ 143,212	\$ 7,200	\$ 143,212	\$ 8,115	16.8
School 10 Condensing Boilers	\$ 157,000	\$ 4,000	\$ 161,000	\$ 9,812	16.0

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 Paterson Board of Education.

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

Building	Retrofit Cost	Annual SREC Credit	Annual Fiscal Savings	Simple Payback (Years)
School 01 & School 26	\$ 1,894,000	\$ 69,538	\$ 57,139	19.9
School 02	\$ 838,000	\$ 28,606	\$ 25,072	20.7
School 03	\$ 814,000	\$ 27,675	\$ 24,257	20.8
School 04	\$ 1,240,000	\$ 44,188	\$ 36,309	20.5
School 05	\$ 1,816,000	\$ 66,514	\$ 54,655	19.9
School 08	\$ 1,468,000	\$ 53,025	\$ 43,571	20.2
School 09	\$ 2,260,000	\$ 83,724	\$ 68,796	19.7
School 10	\$ 1,060,000	\$ 37,211	\$ 34,652	19.5
School 11	\$ 604,000	\$ 19,535	\$ 14,982	23.3
School 14	\$ 172,000	\$ 2,790	\$ 2,599	42.3
School 15	\$ 2,074,000	\$ 76,515	\$ 62,871	19.8
School 19	\$ 430,000	\$ 12,791	\$ 10,511	24.5
School 20	\$ 1,618,000	\$ 58,840	\$ 48,348	20.1
School 21	\$ 562,000	\$ 17,907	\$ 20,601	19.2
School 24	\$ 730,000	\$ 24,419	\$ 20,066	21.8
School 25	\$ 700,000	\$ 23,257	\$ 20,384	21.3
School 27	\$ 1,000,000	\$ 34,885	\$ 28,665	20.9

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 Paterson Board of Education.

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

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

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.

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 (PPAs)

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. School 1 & 26, School 2, School 4, School 5, School 8, School 9, School 20, School, 21, School 24, School 25 and School 27. 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 \$104,563, 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/ft² 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: School 2, School 3, School 4, School 5, School 8, School, 10, School 11, School 14, School 15, School 19, School 20, School, 21, School 25 and School 27.

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.

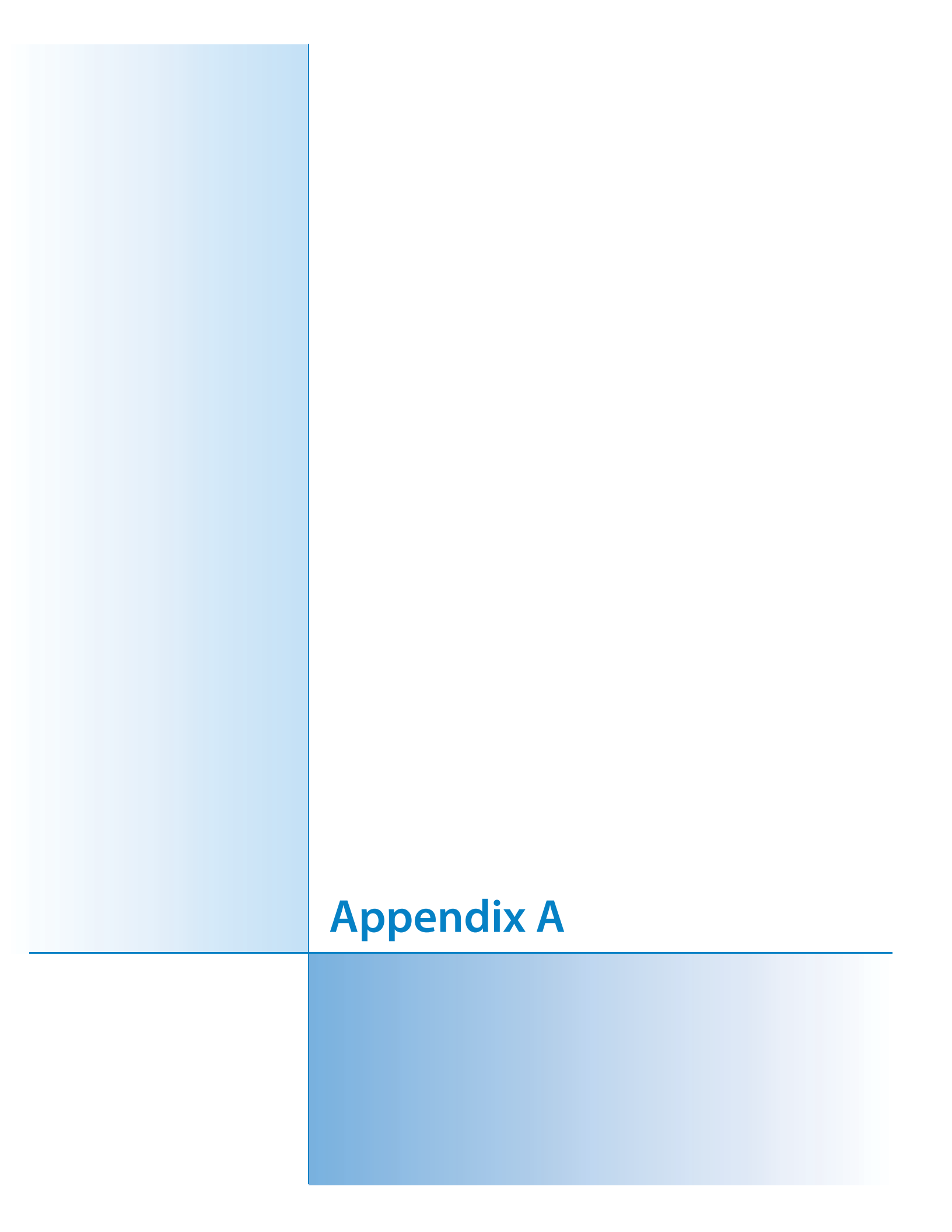
The Energy Assessment with the participating contractor will work to determine which conservation measures qualify and the resulting project cost. Following this assessment, a scope of work will be finalized and installation will be arranged. Following completion of the installation a 'project completion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

The contractor for Passaic County is:

Lime Energy
Tony McCoy
Phone: 732-791-5380
Email: 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

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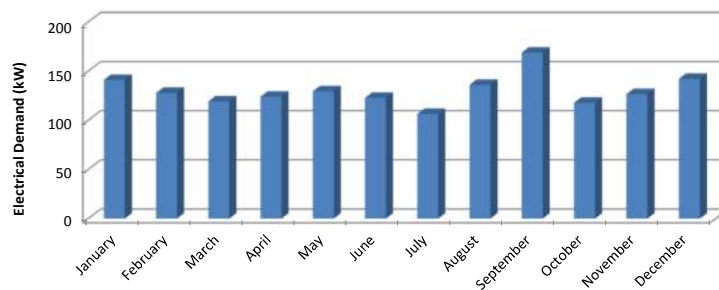
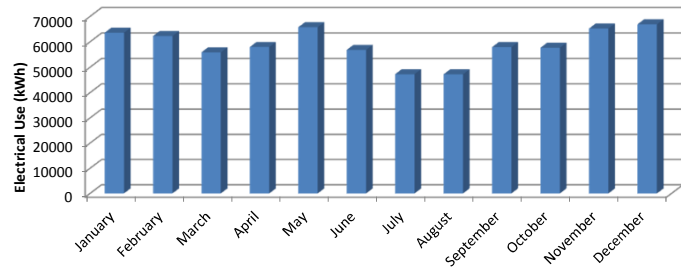
Appendix A

Energy Audit Building	Paterson School #1 & 26
Service Provider	PSE & G
Account Number	42 004 079 06
Meter Number	778015719, 9204953

2013											
Month	Day	Month	Day	Delivery Charge	Supply Charge	Total Charge	On Peak kWh	Off Peak	Total kWh	Peak kW	Off Peak kW
Jan	1	Feb	1			\$ -					
Feb	1	Mar	1			\$ -					
Mar	1	Apr	1			\$ -					
Apr	1	May	1			\$ -					
May	1	June	1			\$ -					
June	1	July	1			\$ -					
July	1	Aug	1			\$ -					
Aug	1	Sept	1			\$ -					
Sept	1	Oct	1			\$ -					
Oct	1	Nov	1			\$ -					
Nov	1	Dec	1			\$ -					
Dec	1	Jan	1			\$ -					

2014											
Month	Day	Month	Day	Delivery Charge	Supply Charge	Total Charge	On Peak kWh	Off Peak	Total kWh	Peak kW	Off Peak kW
Jan	1	Feb	1			\$ -					
Feb	1	Mar	1			\$ -					
Mar	19	Apr	17			\$ -			0		
Apr	21	May	20	\$ 2,694.80		\$ 2,694.80	33,200	23,200	56,400	196.0	116.0
May	20	June	19	\$ 4,840.57		\$ 4,840.57	42,000	24,400	66,400	220.0	132.0
June	19	July	21	\$ 4,390.60		\$ 4,390.60	33,200	27,600	60,800	196.0	136.0
July	21	Aug	19	\$ 3,584.77		\$ 3,584.77	24,800	23,600	48,400	156.0	116.0
Aug	19	Sept	11	\$ 3,619.37		\$ 3,619.37	27,200	20,000	47,200	220.0	136.0
Sept	11	Oct	18	\$ 2,642.36		\$ 2,642.36	34,207	23,684	57,891	197.7	168.9
Oct	18	Nov	17	\$ 2,527.83		\$ 2,527.83	32,175	25,479	57,654	170.6	117.8
Nov	18	Dec	19	\$ 2,777.90		\$ 2,777.90	38,180	27,022	65,202	184.0	126.7
Dec	19	Jan	21	\$ 2,832.45		\$ 2,832.45	35,458	31,436	66,894	185.8	142.2

2015											
Month	Day	Month	Day	Delivery Charge	Supply Charge	Total Charge	On Peak kWh	Off Peak	Total kWh	Peak kW	Off Peak kW
Jan	22	Feb	19	\$ 2,790.64		\$ 2,790.64	36049	27503	63,552	198.7	141.1
Feb	20	Mar	20	\$ 2,704.89		\$ 2,704.89	35410	26855	62,265	184	127.8
Mar	21	Apr	21	\$ 2,514.28		\$ 2,514.28	30300	25556	55,856	179	119.2
Apr	22	May	20	\$ 2,732.90		\$ 2,732.90	37013	22517	59,530	212	132.2
May	21	June	19	\$ 4,792.04		\$ 4,792.04	40864	24208	65,072	223	127.1
June	20	July	21	\$ 3,904.96		\$ 3,904.96	25668	27168	52,836	178	109.8
July	22	Aug	19	\$ 2,972.85		\$ 2,972.85	22697	23402	46,099	125	96.9
Aug	1	Sept	1			\$ -					
Sept	1	Oct	1			\$ -					
Oct	1	Nov	1			\$ -					
Nov	1	Dec	1			\$ -					
Dec	1	Jan	1			\$ -					

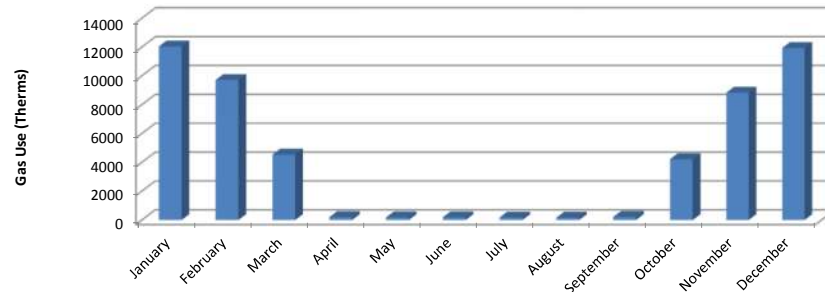


Energy Audit Building	Paterson School #1 & 26		
Service Provider	PSE & G		
Account Number	66 909 654 06		
Meter Number	1551212		

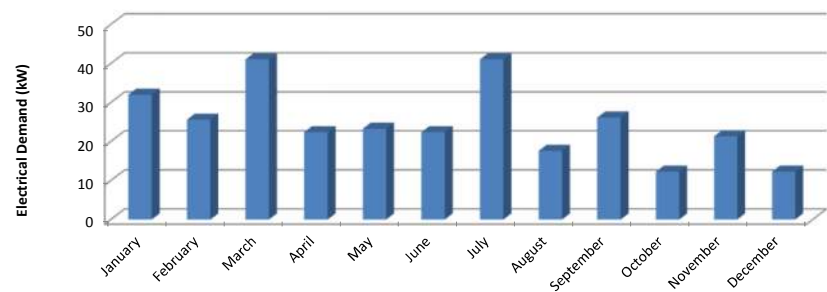
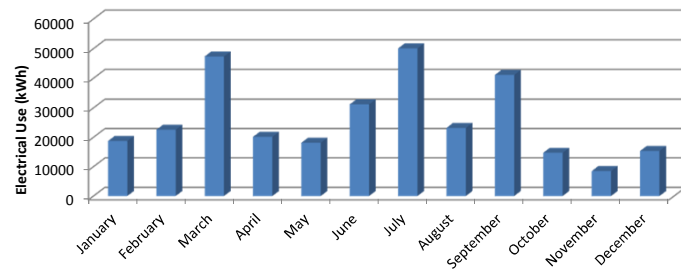
2013												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	1	Feb	1									
Feb	1	Mar	1									
Mar	1	Apr	1									
Apr	1	May	1									
May	1	June	1									
June	1	July	1									
July	1	Aug	1									
Aug	1	Sept	1									
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									

2014												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	1	Feb	1					\$ -				0
Feb	1	Mar	1					\$ -				0
Mar	18	Apr	17					\$ -				0.0
Apr	17	May	16					\$ -				0.0
May	1	June	1					\$ -				0.0
June	19	July	21			\$ 128.63	\$ 127.89	\$ 256.52	242.8			242.8
July	21	Aug	19			\$ 127.15	\$ 109.65	\$ 236.80	236.8			236.8
Aug	19	Sept	18			\$ 128.47	\$ 119.77	\$ 248.24	250.1			250.1
Sept	18	Oct	17			\$ 132.02	\$ 139.56	\$ 271.58	289.6			289.6
Oct	17	Nov	17			\$ 1,910.39	\$ 1,919.01	\$ 3,829.40	4,223.5			4,223.5
Nov	17	Dec	18			\$ 2,603.49	\$ 4,540.52	\$ 7,144.01	8,835.0			8,835.0
Dec	18	Jan	21			\$ 3,216.70	\$ 7,259.94	\$ 10,476.64	11927			11927

2015												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	21	Feb	19			\$ 3,479.82	\$ 6,540.70	\$ 10,020.52	12,039.5			12,039.5
Feb	19	Mar	20			\$ 3,130.25	\$ 5,001.80	\$ 8,132.05	9,713.7			9,713.7
Mar	20	Apr	21			\$ 514.00		\$ 514.00	4,540.9			4,540.9
Apr	21	May	20			\$ 122.92		\$ 122.92	199.1			199.1
May	20	June	19			\$ 121.62		\$ 121.62	185.7			185.7
June	19	July	21			\$ 117.43		\$ 117.43	143.3			143.3
July	21	Aug	19			\$ 115.90		\$ 115.90	127.8			127.8
Aug	19	Sept	18			\$ 114.82		\$ 114.82	96.5			96.5
Sept	18	Oct	19			\$ 120.06		\$ 120.06	143.75			144
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									



Energy Audit Building				Paterson School #2							
Service Provider				PSE & G							
Account Number				65 194 679 01							
Meter Number				728001394							
2013											
Month	Day	Month	Day	Delivery Charge	Supply Charge	Total Charge	On Peak kWh		Total kWh	Peak kW	
Jan	1	Feb	1			\$ -					
Feb	1	Mar	1			\$ -					
Mar	1	Apr	1			\$ -					
Apr	1	May	1			\$ -					
May	1	June	1			\$ -					
June	1	July	1			\$ -					
July	1	Aug	1			\$ -					
Aug	1	Sept	1			\$ -					
Sept	1	Oct	1			\$ -					
Oct	1	Nov	1			\$ -					
Nov	1	Dec	1			\$ -					
Dec	1	Jan	1			\$ -					
2014											
Month	Day	Month	Day	Delivery Charge	Supply Charge	Total Charge	Usage		Total kWh	Peak kW	
Jan	1	Feb	1		\$ -	\$ -					
Feb	1	Mar	1		\$ -	\$ -					
Mar	19	Apr	17		\$ -	\$ -			0		
Apr	18	May	16		\$ -	\$ -			0		
May	17	June	17		\$ -	\$ -			0		
Apr	29	May	29	\$ 1,179.87	\$ 1,811.55	\$ 2,991.42	18,150		18,150	69.8	
Apr	7	June	6	\$ 2,096.39	\$ 3,114.07	\$ 5,210.46	31,200		31,200	67.2	
June	6	Aug	5	\$ 3,390.72	\$ 4,998.48	\$ 8,389.20	50,080		50,080	123.2	
Aug	5	Sept	4	\$ 1,524.75	\$ 2,315.59	\$ 3,840.34	23,200		23,200	52.8	
Sept	4	Oct	6	\$ 1,605.41	\$ 4,104.19	\$ 5,709.60	41,120		41,120	78.4	
Oct	6	Dec	4	\$ 760.01	\$ 1,469.20	\$ 2,229.21	14,720		14,720	36.8	
Dec	4	Jan	6	\$ 538.93	\$ 846.39	\$ 1,385.32	8,480		8,480	64.0	
2015											
Month	Day	Month	Day	Delivery Charge	Supply Charge	Total Charge	Usage		Total kWh	Peak kW	
Jan	6	Feb	4	\$ 630.46	\$ 1,533.08	\$ 2,163.54	15360		15,360	36.8	
Feb	4	Mar	6	\$ 781.17	\$ 1,868.44	\$ 2,649.61	18720		18,720	96	
Mar	6	May	6	\$ 1,027.42	\$ 2,251.71	\$ 3,279.13	22560		22,560	77	
May	6	July	8	\$ 3,258.60	\$ 4,727.00	\$ 7,985.60	47360		47,360	123	
July	8	Aug	5	\$ 1,550.40	\$ 2,012.17	\$ 3,562.57	20160		20,160	67	
June	1	July	1		\$ -	\$ -			0		
July	1	Aug	1		\$ -	\$ -			0		
Aug	1	Sept	1		\$ -	\$ -					
Sept	1	Oct	1		\$ -	\$ -					
Oct	1	Nov	1		\$ -	\$ -					
Nov	1	Dec	1		\$ -	\$ -					
Dec	1	Jan	1		\$ -	\$ -					

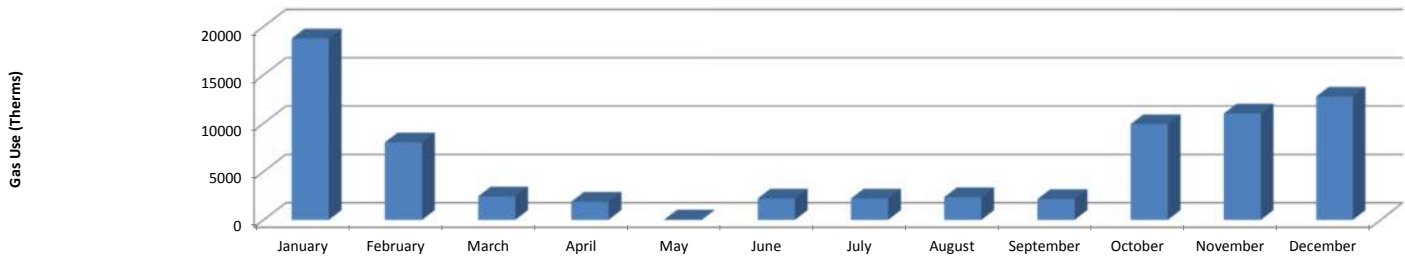


Energy Audit Building	Paterson School #2										
Service Provider	PSE & G										
Account Number	65 194 679 01										
Meter Number	3341968 & 2344544 (1) & 3499597 (2)										

2012												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	1	Feb	1									
Feb	1	Mar	1									
Mar	1	Apr	1									
Apr	1	May	1									
May	1	June	1									
June	1	July	1									
July	1	Aug	1									
Aug	1	Sept	1									
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									

2014												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	1	Feb	1					\$ -				0
Feb	1	Mar	1					\$ -				0
Mar	18	Apr	17					\$ -				0.0
Apr	17	May	16					\$ -				0.0
Apr	29	May	29					\$ -				0.0
May	6	June	5		\$ 107.90			\$ 107.90		49.6		49.6
Apr	4	June	5	\$ 78.57		\$ 452.71	\$ 1,521.53	\$ 2,052.81	181.5		2,032.9	2,214.4
June	5	Aug	5	\$ 46.24	\$ 220.07	\$ 418.28	\$ 1,462.50	\$ 2,147.09	78.6	136.2	1,989.2	2,204.1
Aug	5	Sept	4	\$ 28.58	\$ 171.81	\$ 258.85	\$ 1,404.82	\$ 1,864.06	56.7	680.7	1,604.4	2,341.8
Sept	4	Oct	6	\$ 27.96	\$ 166.10	\$ 245.57	\$ 1,322.66	\$ 1,762.29	54.8	626.8	1,465.9	2,147.5
Oct	6	Dec	4	\$ 68.36	\$ 1,527.20	\$ 3,615.45	\$ 6,066.11	\$ 11,277.12	142.0	2,116.0	7,643.0	9,901.0
Dec	4	Jan	6	\$ 49.78	\$ 1,285.71	\$ 2,171.94	\$ 7,235.56	\$ 10,742.99	115	4480	6417	11011

2015												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	6	Feb	4	\$ 55.32	\$ 1,194.78	\$ 2,533.94	\$ 7,158.02	\$ 10,942.06	128.9	3,862.7	8,762.5	12,754.1
Feb	4	Mar	6	\$ 52.55	\$ 1,367.67	\$ 3,234.77	\$ 9,879.96	\$ 14,534.95	121.6	5,015.9	13,626.3	18,763.9
Mar	6	June	6	\$ 125.39	\$ 692.21	\$ 643.81	\$ 3,720.46	\$ 5,181.87	301.6	4,156.9	3,556.9	8,015.4
June	5	July	8	\$ 38.45	\$ 224.43	\$ 208.81	\$ 1,157.13	\$ 1,628.82	89.5	1,254.6	1,078.5	2,422.5
July	8	Aug	5	\$ 29.12	\$ 192.73	\$ 193.28	\$ 889.22	\$ 1,304.35	58.9	907.4	913.1	1,879.4
June	1	July	1				\$ -	\$ -				0.0
July	8	Aug	5				\$ -	\$ -				0.0
Aug	1	Sept	1				\$ -	\$ -				0.0
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									

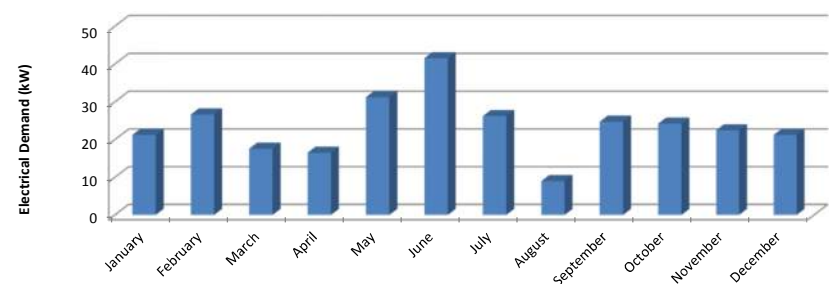
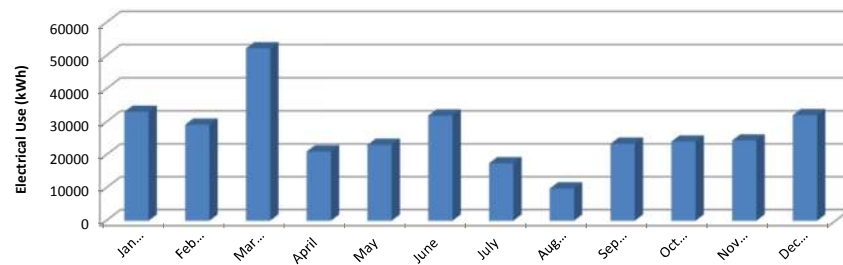


Energy Audit Building	Paterson School #3
Service Provider	PSE & G
Account Number	69 624 673 18
Meter Number	728001394

2013												
Month	Day	Month	Day	59585803 Delivery	9199607 Delivery	Supply Charge	Total Charge	On Peak kWh		Total kWh	Peak kW	
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	1	Apr	1			\$	-					
Apr	1	May	1			\$	-					
May	1	June	1			\$	-					
June	1	July	1			\$	-					
July	1	Aug	1			\$	-					
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

2014												
Month	Day	Month	Day	59585803 Delivery	9199607 Delivery	Supply Charge	Total Charge	59585803 Usage	9199607 Usage	Total kWh	59585803 Peak kW	9199607 Peak kW
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	19	Apr	17			\$	-			0		
Apr	18	May	16			\$	-			0		
May	17	June	17			\$	-			0		
Apr	29	May	29	\$	890.33	\$	2,226.76	18,150	4,160	22,310	69.8	35.2
May	29	June	30	\$	1,779.24	\$	4,962.71	23,400	4,240	27,640	74.3	21.6
June	30	July	29	\$	1,375.05	\$	3,675.68	10,575	6,880	17,455	78.8	24.0
July	29	Aug	27	\$	638.36	\$	1,902.92	8,025	1,760	9,785	27.0	17.6
Aug	27	Sept	26	\$	1,661.16	\$	4,485.64	19,725	3,680	23,405	74.3	28.0
Sept	26	Oct	27	\$	919.02	\$	3,617.42	19,725	4,320	24,045	72.8	37.6
Oct	27	Nov	25	\$	847.20	\$	3,610.27	18,150	6,240	24,390	67.5	31.2
Nov	25	Dec	29	\$	901.66	\$	4,608.17	20,475	11,600	32,075	63.8	34.4

2015												
Month	Day	Month	Day	59585803 Delivery	9199607 Delivery	Supply Charge	Total Charge	59585803 Usage	9199607 Usage	Total kWh	59585803 Peak kW	9199607 Peak kW
Dec	29	Feb	2	\$	918.80	\$	3,301.71	21000	12080	33,080	63.8	39.2
Feb	2	Mar	4	\$	836.56	\$	4,266.06	18075	11120	29,195	131	80.0
Mar	4	Apr	1	\$	2,790.24	\$	7,331.73	17250	34960	52,210	68	52.8
Apr	1	May	1	\$	755.24	\$	3,240.10	15600	5440	21,040	64	49.6
May	1	June	2	\$	944.33	\$	3,549.69	19800	4000	23,800	78	24.0
June	2	July	31	\$	2,790.24	\$	7,365.17	27075	9120	36,195	146	50.4
June	1	July	1			\$	-			0		
July	1	Aug	1			\$	-			0		
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

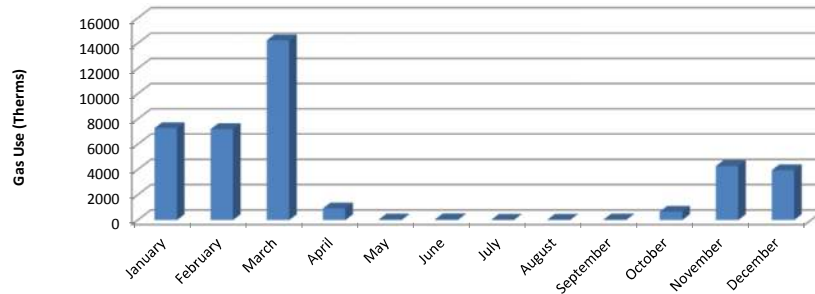


Energy Audit Building	Paterson School #3
Service Provider	PSE & G
Account Number	69 626 134 07
Meter Number	2415303

2013												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	1	Feb	1									
Feb	1	Mar	1									
Mar	1	Apr	1									
Apr	1	May	1									
May	1	June	1									
June	1	July	1									
July	1	Aug	1									
Aug	1	Sept	1									
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									

2014												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Jan	1	Feb	1					\$ -				0
Feb	1	Mar	1					\$ -				0
Mar	18	Apr	17					\$ -				0.0
Apr	17	May	16					\$ -				0.0
Apr	29	May	29					\$ -				0.0
May	6	June	5					\$ -				0.0
June	30	July	29			\$ 106.04	\$ 18.97	\$ 125.01	27.6			27.6
Jul	29	Aug	27			\$ 107.22	\$ 17.95	\$ 125.17	38.8			38.8
Aug	27	Sept	26			\$ 108.12	\$ 22.88	\$ 131.00	47.8			47.8
Sept	26	Oct	27			\$ 168.92	\$ 410.64	\$ 579.56	666.7			666.7
Oct	27	Nov	25			\$ 1,359.64	\$ 1,944.34	\$ 3,303.98	4,279.3			4,279.3
Dec	25	Jan	29			\$ 1,309.75	\$ 2,030.15	\$ 3,339.90	3950			3950

2015												
Month	Day	Month	Day	Delivery 1714595	Delivery 2643378	Delivery 2597857	Supply Charge	Total Charge	1714595 (therms)	2643378 (therms)	2597857 (therms)	Total Therms
Dec	29	Feb	2			\$ 1,810.14	\$ 4,152.61	\$ 5,962.75	7,280.0			7,280.0
Feb	2	Mar	4			\$ 1,799.36	\$ 3,805.41	\$ 5,604.77	7,205.5			7,205.5
Mar	4	Mar	30			\$ 3,241.13	\$ 7,227.79	\$ 10,468.92	14,240.5			14,240.5
Mar	4	May	1			\$ 194.42	\$ 443.51	\$ 637.93	928.5			928.5
May	1	June	2			\$ 108.94	\$ 26.96	\$ 135.90	57.0			57.0
June	2	July	31			\$ 213.29	\$ -	\$ 213.29	67.7			67.7
July	8	Aug	5				\$ -	\$ -				0.0
Aug	1	Sept	1					\$ -				0.0
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									



Energy Audit Building	Paterson School #4
Service Provider	PSE & G
Account Number	42 003 987 02
Meter Number	9204970

2013												
Month	Day	Month	Day	59585803 Delivery	9199607 Delivery	Supply Charge	Total Charge	On Peak kWh		Total kWh	Peak kW	
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	1	Apr	1			\$ -	\$ -					
Apr	1	May	1			\$ -	\$ -					
May	1	June	1			\$ -	\$ -					
June	1	July	1			\$ -	\$ -					
July	1	Aug	1			\$ -	\$ -					
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					
2014												
Month	Day	Month	Day	9204970 Delivery		Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	Total kWh	Peak kW	Off-Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	19	Apr	17			\$ -	\$ -			0		
Apr	18	May	16			\$ -	\$ -			0		
May	17	June	17			\$ -	\$ -			0		
Apr	29	May	29			\$ -	\$ -			0		
May	8	June	6	\$ 4,270.63		\$ 7,040.00	\$ 11,310.63	36,276	34,258	70,534	157.9	104.3
June	7	July	8	\$ 4,527.15		\$ 7,921.02	\$ 12,448.17	38,889	40,472	79,361	167.0	115.2
July	9	Aug	6	\$ 3,907.87		\$ 5,856.75	\$ 9,764.62	27,195	31,484	58,679	159.6	119.0
Aug	7	Sept	5	\$ 3,599.09		\$ 5,379.56	\$ 8,978.65	24,584	29,314	53,898	156.8	N/A
Sept	6	Oct	6	\$ 2,790.40		\$ 6,891.48	\$ 9,681.88	32,487	36,559	69,046	152.1	97.9
Oct	7	Nov	4	\$ 2,551.82		\$ 6,210.78	\$ 8,762.60	30,976	31,250	62,226	143.3	94.6
Nov	5	Dec	5	\$ 2,597.26		\$ 6,466.29	\$ 9,063.55	32,477	32,309	64,786	136.9	
2015												
Month	Day	Month	Day	9204970 Delivery		Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	Total kWh	Peak kW	Off-Peak kW
Dec	6	Jan	7	\$ 2,559.94		\$ 6,337.34	\$ 8,897.28	30098	33396	63,494	135.9	93.7
Jan	8	Feb	5	\$ 2,375.87		\$ 5,734.18	\$ 8,110.05	28880	28571	57,451	128.9	93.7
Feb	6	Mar	9	\$ 2,577.93		\$ 6,461.90	\$ 9,039.83	31419	33323	64,742	261	102.0
Mar	10	Apr	8	\$ 2,513.60		\$ 6,146.60	\$ 8,660.20	31022	30561	61,583	136	100.2
Apr	9	May	7	\$ 2,549.93		\$ 6,120.65	\$ 8,670.58	31250	30073	61,323	148	96.3
May	8	June	8	\$ 4,318.45		\$ 7,272.46	\$ 11,590.91	35971	36892	72,863	165	108.0
June	9	July	8	\$ 4,017.17		\$ 6,598.44	\$ 10,615.61	32547	33563	66,110	159	106.0
July	9	Aug	6	\$ 3,052.07		\$ 5,694.76	\$ 8,746.83	25366	31690	57,056	103	91.4
June	1	July	1			\$ -	\$ -			0		
July	1	Aug	1			\$ -	\$ -			0		
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					

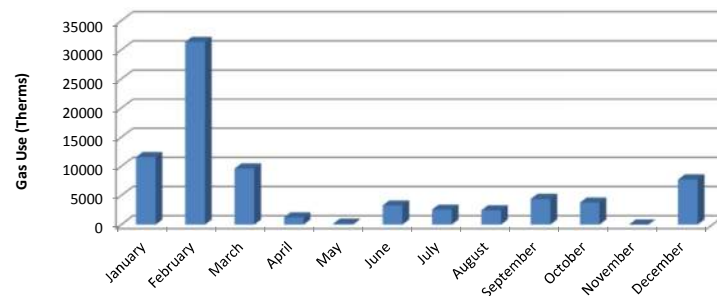


Energy Audit Building	Paterson School #4
Service Provider	PSE & G
Account Number	65 267 166 01
Meter Number	2643658, 2600293

2013												
Month	Day	Month	Day	Delivery 2600293	Supply 2600293	Delivery 2643658	Supply Charge	Total Charge	2643658 (therms)	2600293 (therms)	(therms)	Total Therms
Jan	1	Feb	1									
Feb	1	Mar	1									
Mar	1	Apr	1									
Apr	1	May	1									
May	1	June	1									
June	1	July	1									
July	1	Aug	1									
Aug	1	Sept	1									
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									

2014												
Month	Day	Month	Day	Delivery 2600293	Supply 2600293	Delivery 2643658	Supply Charge	Total Charge	2643658 (therms)	2600293 (therms)	(therms)	Total Therms
Jan	1	Feb	1					\$ -				0
Feb	1	Mar	1					\$ -				0
Mar	18	Apr	17					\$ -				0.0
Apr	17	May	16					\$ -				0.0
May	29	June	29					\$ -				0.0
June	6	July	5	\$ 704.84	\$ 3,015.83			\$ 3,720.67		6,513.6		6,513.6
July	10	Aug	8	\$ 577.76	\$ 2,450.94	\$ 104.09		\$ 3,132.79	7.7	5,117.0		5,124.7
Aug	8	Oct	8	\$ 535.08	\$ 2,258.72	\$ 224.10	\$ 3,225.83	\$ 6,243.73	174.3	4,687.2		4,861.5
Oct	8	Nov	6	\$ 1,689.20	\$ 1,885.53	\$ 1,623.91	\$ 1,987.02	\$ 7,185.66	4,373.2	4,149.9		8,523.1
Nov	6	Dec	9	\$ 1,393.62	\$ 974.07	\$ 1,247.85	\$ 96.95	\$ 3,712.49	1,881.5	1,895.3		3,776.8
Nov	6	Dec	9				\$ -	\$ -				0.0
Dec	9	Jan	9	\$ 636.20	\$ 1,787.63	\$ 1,862.07	\$ 3,847.25	\$ 8,133.15	5962.8	1784.7		7748

2015												
Month	Day	Month	Day	Delivery 2600293	Supply 2600293	Delivery 2643658	Supply Charge	Total Charge	2643658 (therms)	2600293 (therms)	(therms)	Total Therms
Jan	9	Feb	9	\$ 903.21	\$ 2,253.27	\$ 2,155.04	\$ 4,191.10	\$ 9,502.62	7,538.8	4,053.1		11,591.9
Feb	9	Mar	11	\$ 5,304.31	\$ 12,594.34	\$ 2,115.41	\$ 3,800.52	\$ 23,814.58	7,272.5	24,100.0		31,372.5
Mar	11	Apr	10	\$ 680.19		\$ 397.47	\$ 4,475.40	\$ 5,553.06	3,220.2	6,421.7		9,641.9
Apr	10	May	11	\$ 168.69		\$ 160.65	\$ 596.28	\$ 925.62	583.3	665.1		1,248.3
May	11	June	10	\$ 117.05		\$ 106.94	\$ 83.29	\$ 307.28	36.8	139.2		176.0
June	10	July	13	\$ 108.19		\$ 104.95	\$ -	\$ 213.14	16.7	49.5		66.1
July	13	Aug	10	\$ 105.53		\$ 104.19	\$ -	\$ 209.72	8.9	22.6		31.5
Aug	10	Sept	9	\$ 108.43		\$ 105.21	\$ 105.21	\$ 105.21	7.8	40.9		48.7
Sept	9	Oct	8	\$ 130.74		\$ 109.28		\$ 109.28	23.40	256.65		280
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									



Energy Audit Building	Public School #5
Service Provider	PSE & G
Account Number	42 001 554 00
Meter Number	9205097

2013																	
Month	Day	Month	Day	9205097 Delivery		Supply Charge	Total Charge	On Peak kWh			Total kWh	Peak kW					
Jan	1	Feb	1			\$	-										
Feb	1	Mar	1			\$	-										
Mar	1	Apr	1			\$	-										
Apr	1	May	1			\$	-										
May	1	June	1			\$	-										
June	1	July	1			\$	-										
July	1	Aug	1			\$	-										
Aug	1	Sept	1			\$	-										
Sept	1	Oct	1			\$	-										
Oct	1	Nov	1			\$	-										
Nov	1	Dec	1			\$	-										
Dec	1	Jan	1		From Other Bill	\$	-		From Other Bill								
2014																	
Month	Day	Month	Day	9205097 Delivery	778013099 Delivery	728003865 Delivery	Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	728003865 Usage	Total kWh	Peak kW	Off Peak kW			
Jan	1	Feb	1				\$ -	\$ -									
Feb	1	Mar	1				\$ -	\$ -									
Mar	19	Apr	17				\$ -	\$ -				0					
Apr	18	May	16				\$ -	\$ -				0					
May	12	June	11	\$	3,711.38	\$	1,032.26	\$	7,556.28	\$	12,299.92	28,200	23,200	24,307	75,707	158.0	130.0
June	11	July	11	\$	3,341.11	\$	686.57	\$	5,645.25	\$	9,672.93	23,600	21,200	11,760	56,560	146.0	107.6
July	11	Aug	11	\$	2,390.98	\$	399.27	\$	3,940.50	\$	6,730.75	16,600	19,200	3,680	39,480	86.0	62.0
Aug	12	Sept	10	\$	2,410.06	\$	553.74	\$	1,043.57	\$	5,609.32	19,113	17,487	19,600	56,200	145.1	98.6
Sept	11	Oct	9	\$	2,268.20	\$	314.21	\$	5,621.20	\$	8,203.61	26,608	21,631	8,080	56,319	164.4	137.9
Oct	10	Nov	7	\$	2,523.77	\$	332.10	\$	6,487.45	\$	9,343.32	29,583	26,775	8,640	64,998	179.1	139.9
Nov	8	Dec	10	\$	3,199.52	\$	519.61	\$	9,434.84	\$	13,153.97	40,540	40,308	13,680	94,528	184.9	169.8
2015																	
Month	Day	Month	Day	9205097 Delivery	778013099 Delivery	728003865 Delivery	Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	728003865 Usage	Total kWh	Peak kW	Off Peak kW			
Dec	11	Jan	12	\$	3,144.81	\$	449.48	\$	8,903.85	\$	12,498.14	37619	40229	11360	89,208	191.5	154.1
Jan	13	Feb	10	\$	2,921.82	\$	474.28	\$	8,208.87	\$	11,604.97	35829	34256	12160	82,245	186.5	146.9
Feb	11	Mar	12	\$	3,045.40	\$	519.13	\$	8,772.70	\$	12,337.23	38344	36030	13520	87,894	189	188.8
Mar	13	Apr	13	\$	2,869.31	\$	416.80	\$	8,001.97	\$	11,288.08	33095	36357	10720	80,172	176	157.5
Apr	14	May	12	\$	2,353.04	\$	331.90	\$	5,972.33	\$	8,657.27	27641	23476	8720	59,837	169	133.8
May	13	June	11	\$	3,465.14	\$	469.59	\$	5,906.16	\$	9,840.89	27988	23106	8080	59,174	143	108.4
June	12	July	13	\$	3,297.98	\$	664.92	\$	5,802.95	\$	9,765.85	22790	23910	11440	58,140	141	107.6
June	14	Aug	11	\$	2,493.65	\$	461.21	\$	4,560.02	\$	7,514.88	19181	20506	6000	45,687	94	77.0
June	1	July	1				\$ -	\$ -					0				
July	1	Aug	1				\$ -	\$ -					0				
Aug	1	Sept	1				\$ -	\$ -									
Sept	1	Oct	1				\$ -	\$ -									
Oct	1	Nov	1				\$ -	\$ -									
Nov	1	Dec	1				\$ -	\$ -									
Dec	1	Jan	1				\$ -	\$ -									

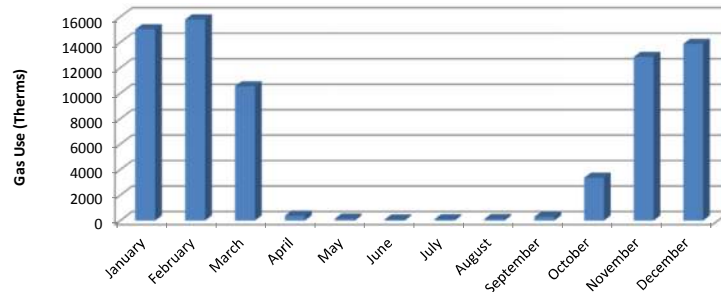


Energy Audit Building	Paterson School #5
Service Provider	PSE & G
Account Number	66 917 311 07
Meter Number	2209377

2013												
Month	Day	Month	Day	Delivery	Delivery	Delivery 2209377	Supply Charge	Total Charge	2209377 (therms)	(therms)	(therms)	Total Therms
Jan	1	Feb	1									
Feb	1	Mar	1									
Mar	1	Apr	1									
Apr	1	May	1									
May	1	June	1									
June	1	July	1									
July	1	Aug	1									
Aug	1	Sept	1									
Sept	1	Oct	1									
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									

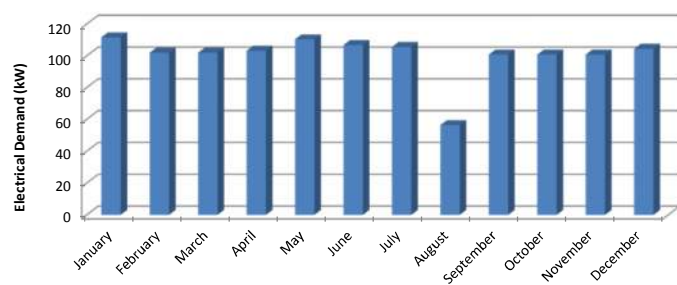
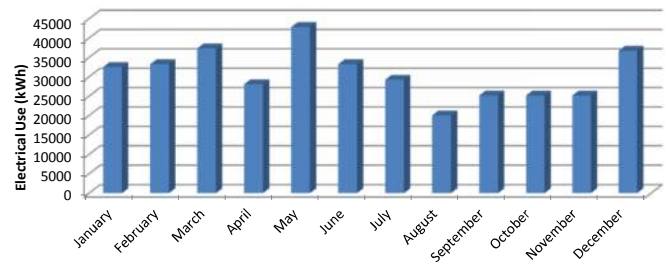
2014												
Month	Day	Month	Day	Delivery	Delivery	Delivery 2209377	Supply Charge	Total Charge	2209377 (therms)	(therms)	(therms)	Total Therms
Jan	1	Feb	1					\$ -				0
Feb	1	Mar	1					\$ -				0
Mar	18	Apr	17					\$ -				0.0
Apr	17	May	16					\$ -				0.0
May	29	June	29					\$ -				0.0
June	6	July	5					\$ -				0.0
July	12	Aug	11			\$ 120.67	\$ 118.51	\$ 239.18	172.5			172.5
Aug	11	Sept	10			\$ 123.95	\$ 136.11	\$ 260.06	205.1			205.1
Sept	10	Oct	9			\$ 146.28	\$ 207.38	\$ 353.66	430.3			430.3
Oct	9	Nov	7			\$ 2,703.91	\$ 1,528.83	\$ 4,232.74	3,364.8			3,364.8
Nov	7	Dec	10			\$ 4,128.20	\$ 6,605.79	\$ 10,733.99	12,853.6			12,853.6
Dec	10	Jan	12			\$ 4,282.28	\$ 8,841.13	\$ 13,123.41	13879			13879

2015												
Month	Day	Month	Day	Delivery	Delivery	Delivery 2209377	Supply Charge	Total Charge	2209377 (therms)	(therms)	(therms)	Total Therms
Jan	12	Feb	10			\$ 4,455.65	\$ 8,321.53	\$ 12,777.18	15,019.5			15,019.5
Feb	10	Mar	12			\$ 4,466.53	\$ 8,241.88	\$ 12,708.41	15,795.2			15,795.2
Mar	12	Apr	13			\$ 1,044.16	\$ 4,893.76	\$ 5,937.92	10,543.2			10,543.2
Apr	24	May	12			\$ 140.45	\$ 180.39	\$ 320.84	377.7			377.7
May	12	June	11			\$ 118.05	\$ 70.70	\$ 188.75	149.4			149.4
June	11	July	14			\$ 112.06	\$ -	\$ 112.06	88.9			88.9
July	14	Aug	11			\$ 107.90	\$ -	\$ 107.90	46.7			46.7
Aug	11	Sept	10			\$ 109.97		\$ 109.97	55.7			55.7
Sept	10	Oct	9			\$ 121.64		\$ 121.64	\$158.21			158
Oct	1	Nov	1									
Nov	1	Dec	1									
Dec	1	Jan	1									



Energy Audit Building	Paterson School #8
Service Provider	PSE & G
Account Number	65 388 175 05
Meter Number	728006958

2013										
Month	Day	Month	Day	728006958 Delivery	Supply Charge	Total Charge	On Peak kWh		Total kWh	Peak kW
Jan	1	Feb	1		\$	-				
Feb	1	Mar	1		\$	-				
Mar	1	Apr	1		\$	-				
Apr	1	May	1		\$	-				
May	1	June	1		\$	-				
June	1	July	1		\$	-				
July	1	Aug	1		\$	-				
Aug	1	Sept	1		\$	-				
Sept	1	Oct	1		\$	-				
Oct	1	Nov	1		\$	-				
Nov	1	Dec	1		\$	-				
Dec	1	Jan	1		\$	-				
2014										
Month	Day	Month	Day	728006958 Delivery	Supply Charge	Total Charge	728006958 Usage		Total kWh	Peak kW
Jan	1	Feb	1		\$	-				
Feb	1	Mar	1		\$	-				
Mar	19	Apr	17		\$	-			0	
Apr	18	May	16		\$	-			0	
May	17	June	17		\$	-			0	
May	6	June	5	\$	2,476.89	\$	3,173.96	\$	5,650.85	31,800
June	5	July	7	\$	2,230.04	\$	2,515.21	\$	4,745.25	25,200
July	7	Aug	5	\$	1,451.28	\$	2,000.19	\$	3,451.47	20,040
Aug	5	Sept	3	\$	1,453.88	\$	2,511.22	\$	3,965.10	25,160
Sept	3	Oct	3	\$	1,453.88	\$	2,511.22	\$	3,965.10	25,160
Oct	3	Nov	3	\$	1,453.88	\$	2,511.22	\$	3,965.10	25,160
Nov	3	Dec	4	\$	1,570.25	\$	3,665.02	\$	5,235.27	36,720
2015										
Month	Day	Month	Day	728006958 Delivery	Supply Charge	Total Charge	728006958 Usage		Total kWh	Peak kW
Dec	4	Jan	6	\$	1,474.48	\$	3,245.82	\$	4,720.30	32,520
Jan	6	Feb	4	\$	1,456.38	\$	3,317.68	\$	4,774.06	33,240
Feb	4	Mar	6	\$	1,580.48	\$	3,724.91	\$	5,305.39	37,320
Mar	6	Apr	7	\$	1,305.47	\$	2,802.66	\$	4,108.13	28,080
Apr	7	May	6	\$	1,785.71	\$	4,275.86	\$	6,061.57	42,840
May	6	June	5	\$	2,607.42	\$	3,461.41	\$	6,068.83	34,680
June	5	July	7	\$	2,423.32	\$	3,317.68	\$	5,741.00	33,240
July	7	Aug	5	\$	1,412.96	\$	2,000.19	\$	3,413.15	20,040
June	1	July	1		\$	-			0	
July	1	Aug	1		\$	-			0	
Aug	1	Sept	1		\$	-				
Sept	1	Oct	1		\$	-				
Oct	1	Nov	1		\$	-				
Nov	1	Dec	1		\$	-				
Dec	1	Jan	1		\$	-				

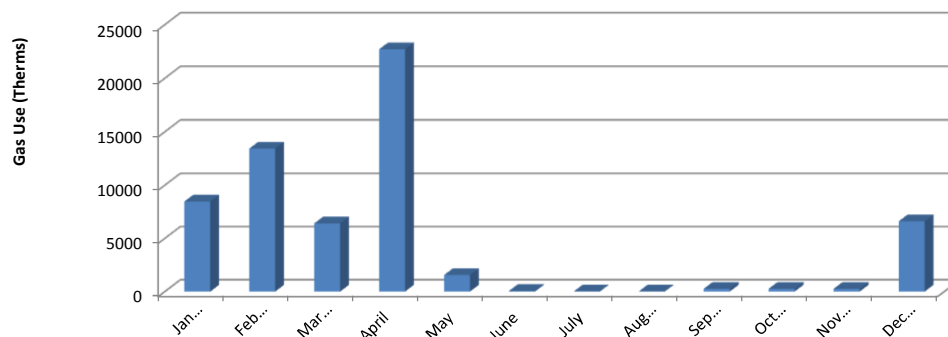


Energy Audit Building	Paterson School #8
Service Provider	PSE & G
Account Number	65 388 175 05
Meter Number	2415288

2013								
Month	Day	Month	Day	Delivery 2415288	Supply Charge	Total Charge	2415288 (therms)	Total Therms
Jan	1	Feb	1					
Feb	1	Mar	1					
Mar	1	Apr	1					
Apr	1	May	1					
May	1	June	1					
June	1	July	1					
July	1	Aug	1					
Aug	1	Sept	1					
Sept	1	Oct	1					
Oct	1	Nov	1					
Nov	1	Dec	1					
Dec	1	Jan	1					

2014								
Month	Day	Month	Day	Delivery 2415288	Supply Charge	Total Charge	2415288 (therms)	Total Therms
Jan	1	Feb	1			\$ -		0
Feb	1	Mar	1			\$ -		0
Jan	1	Feb	1			\$ -		0.0
Feb	1	Mar	1			\$ -		0.0
Mar	19	Apr	17			\$ -		0.0
Apr	18	May	16			\$ -		0.0
May	17	June	17		\$ -	\$ -		0.0
May	6	June	5	\$ 108.68	\$ 39.46	\$ 148.14	55.9	55.9
June	5	July	7	\$ 102.34	\$ 1.44	\$ 103.78	2.1	2.1
July	7	Aug	5	\$ 103.42	\$ 0.69	\$ 104.11	1.0	1.0
Aug	5	Sept	3	\$ 556.10	\$ 163.19	\$ 719.29	265.0	265.0
Sept	5	Oct	3	\$ 556.10	\$ 163.19	\$ 719.29	265.0	265.0
Oct	5	Nov	3	\$ 556.10	\$ 163.19	\$ 719.29	265.0	265.0
Nov	3	Dec	4	\$ 2,367.36	\$ 4,044.37	\$ 6,411.73	6601	6601

2015								
Month	Day	Month	Day	Delivery 2415288	Supply Charge	Total Charge	2415288 (therms)	Total Therms
Dec	4	Jan	6	\$ 2,646.77	\$ 5,562.34	\$ 8,209.11	8,462.4	8,462.4
Jan	6	Feb	4	\$ 3,879.50	\$ 7,536.50	\$ 11,416.00	13,428.5	13,428.5
Feb	4	Mar	6	\$ 2,823.44	\$ 3,369.99	\$ 6,193.43	6,400.2	6,400.2
Mar	6	Apr	7	\$ 2,117.70	\$ 11,521.24	\$ 13,638.94	22,699.6	22,699.6
Apr	7	May	6	\$ 250.33	\$ 720.31	\$ 970.64	1,551.8	1,551.8
May	6	June	5	\$ 109.68	\$ 29.44	\$ 139.12	64.5	64.5
June	5	July	7	\$ 107.14	\$ 18.60	\$ 125.74	38.9	38.9
July	7	Aug	5	\$ 106.11	\$ 13.43	\$ 119.54	28.4	28.4
June	1	July	1					
July	1	Aug	1					
Aug	1	Sept	1					
Sept	1	Oct	1					
Oct	1	Nov	1					
Nov	1	Dec	1					
Dec	1	Jan	1					

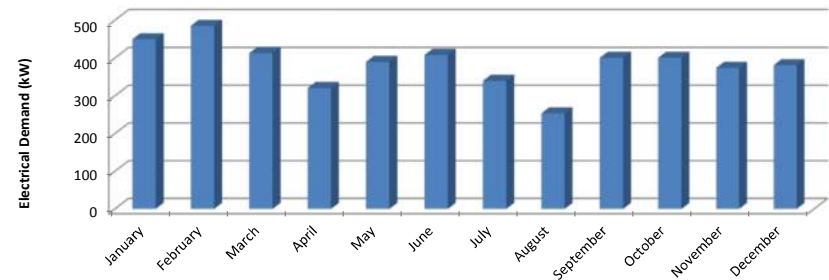
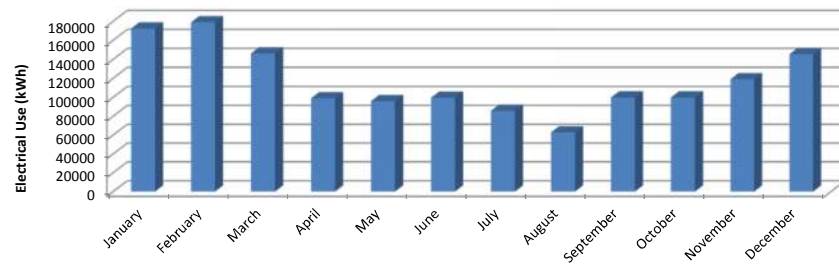


Energy Audit Building	Paterson School #9
Service Provider	PSE & G
Account Number	42 107 017 18
Meter Number	9204621

2013												
Month	Day	Month	Day	59585803 Delivery	9199607 Delivery	Supply Charge	Total Charge	On Peak kWh		Total kWh	Peak kW	
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	1	Apr	1			\$	-					
Apr	1	May	1			\$	-					
May	1	June	1			\$	-					
June	1	July	1			\$	-					
July	1	Aug	1			\$	-					
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

2014												
Month	Day	Month	Day	9204621 Delivery	778015045 Delivery	Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	Total kWh	Peak kW	Off-Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	19	Apr	17			\$ -	\$ -			0		
Apr	18	May	16			\$ -	\$ -			0		
May	1	May	31		\$ 4,225.60	\$ 9,162.76	\$ 13,388.36	59,650	32,152	91,802	340.0	242.6
June	1	June	30		\$ 7,790.74	\$ 10,065.24	\$ 17,855.98	64,431	36,413	100,844	393.1	315.2
July	1	July	31		\$ 6,392.54	\$ 8,460.49	\$ 14,853.03	48,786	35,980	84,766	305.6	264.0
Aug	1	Aug	30		\$ 5,170.74	\$ 6,282.54	\$ 11,453.28	32,792	30,153	62,945	253.9	201.0
Sept	1	Sept	31	\$ 4,561.58	\$ 2,862.50	\$ 9,974.51	\$ 17,398.59	62,470	37,466	99,935	400.7	334.5
Oct	1	Oct	31	\$ 4,561.58	\$ 2,862.50	\$ 9,974.51	\$ 17,398.59	62,470	37,466	99,935	400.7	334.5
Nov	1	Nov	30	\$ 4,904.45		\$ 11,891.36	\$ 16,795.81	60,624	58,516	119,140	374.1	339.8
Dec	1	Dec	31	\$ 5,637.98		\$ 14,532.64	\$ 20,170.62	75,947	69,656	145,603	381.3	340.2

2015												
Month	Day	Month	Day	9204621 Delivery	778015045 Delivery	Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	Total kWh	Peak kW	Off-Peak kW
Jan	1	Jan	31	\$ 6,611.31		\$ 17,206.84	\$ 23,818.15	85083	87313	172,396	449.7	427.4
Feb	1	Feb	28	\$ 6,918.28		\$ 17,872.78	\$ 24,791.06	87299	91769	179,068	485	463.4
Mar	1	Mar	31	\$ 5,782.71		\$ 14,606.00	\$ 20,388.71	76417	69921	146,338	413	387.8
Apr	1	Apr	30	\$ 4,184.03		\$ 9,889.97	\$ 14,074.00	57815	41273	99,088	321	269.0
May	1	May	31	\$ 4,472.39		\$ 10,015.83	\$ 14,488.22	63981	36368	100,349	390	303.5
June	1	June	30	\$ 7,889.90		\$ 9,820.31	\$ 17,710.21	63669	34721	98,390	408	333.0
July	1	July	31	\$ 6,767.28		\$ 8,703.43	\$ 15,470.71	52135	35065	87,200	340	297.8
Aug	1	Aug	30			\$ -	\$ -			0		
July	1	Aug	1			\$ -	\$ -			0		
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					

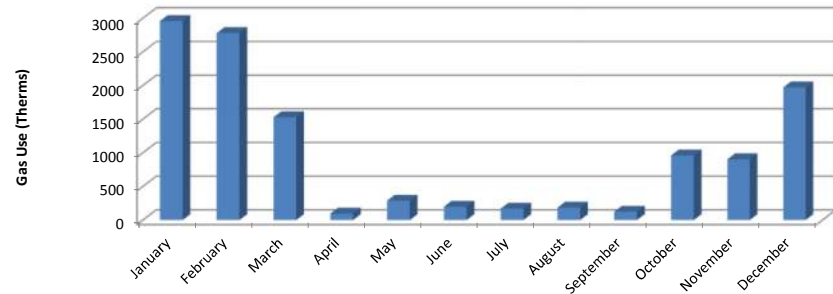


Energy Audit Building	Paterson School #9										
Service Provider	PSE & G										
Account Number	66 895 545 03										
Meter Number	2279828										

2013											
Month	Day	Month	Day	Delivery	Delivery	Delivery 2279828	Supply Charge	Total Charge	2279828 (therms)	(therms)	Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

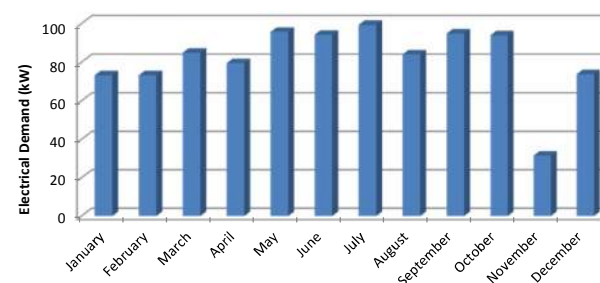
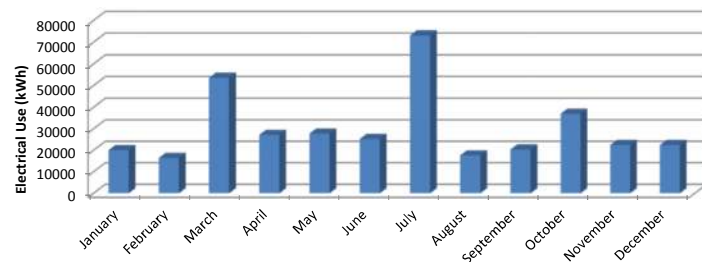
2014											
Month	Day	Month	Day	Delivery	Delivery	Delivery 2279828	Supply Charge	Total Charge	2279828 (therms)	(therms)	Total Therms
Jan	1	Feb	1					\$ -			0
Feb	1	Mar	1					\$ -			0
Mar	18	Apr	17					\$ -			0.0
Apr	17	May	16					\$ -			0.0
May	29	June	29					\$ -			0.0
June	6	July	5					\$ -			0.0
July	8	Aug	5			\$ 77.41	\$ 99.90	\$ 177.31	215.8		215.8
Aug	5	Sept	4			\$ 87.93	\$ 119.75	\$ 207.68	250.0		250.0
Sept	4	Oct	3			\$ 24.41	\$ 20.81	\$ 45.22	43.2		43.2
Oct	3	Nov	3			\$ 342.28	\$ 436.48	\$ 778.76	960.7		960.7
Nov	3	Dec	4			\$ 321.17	\$ 553.26	\$ 874.43	903.0		903.0
Dec	4	Jan	6			\$ 711.15	\$ 1,285.69	\$ 1,996.84	1971		1971

2015											
Month	Day	Month	Day	Delivery	Delivery	Delivery 2279828	Supply Charge	Total Charge	2279828 (therms)	(therms)	Total Therms
Jan	6	Feb	4			\$ 1,075.32	\$ 1,659.66	\$ 2,734.98	2,957.2		2,957.2
Feb	4	Mar	6			\$ 1,009.02	\$ 1,462.80	\$ 2,471.82	2,778.2		2,778.2
Mar	9	Apr	8			\$ 476.26	\$ 709.00	\$ 1,185.26	1,527.5		1,527.5
Apr	8	May	6			\$ 40.51	\$ 46.01	\$ 86.52	96.3		96.3
May	6	June	5			\$ 99.22	\$ 136.60	\$ 235.82	288.7		288.7
June	5	July	7			\$ 71.51	\$ -	\$ 71.51	197.9		197.9
July	7	Aug	5			\$ 49.01	\$ -	\$ 49.01	124.1		124.1
Aug	5	Sept	3			\$ 47.89		\$ 47.89	120.1		120.1
Sept	3	Oct	5			\$ 75.31		\$ 75.31	\$205.83		206
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								



Energy Audit Building	Paterson School #10
Service Provider	PSE & G
Account Number	69 626 583 03
Meter Number	678000610

2013											
Month	Day	Month	Day	678000610 Delivery	Supply Charge	Total Charge	678000610 Usage	Total kWh	Peak kW		
Jan	1	Feb	1		\$ -	\$ -					
Feb	1	Mar	1		\$ -	\$ -					
Mar	1	Apr	1		\$ -	\$ -					
Apr	1	May	1		\$ -	\$ -					
May	1	June	1		\$ -	\$ -					
June	1	July	1		\$ -	\$ -					
July	1	Aug	1		\$ -	\$ -					
Aug	1	Sept	1		\$ -	\$ -					
Sept	1	Oct	1		\$ -	\$ -					
Oct	1	Nov	1		\$ -	\$ -					
Nov	1	Dec	1		\$ -	\$ -					
Dec	1	Jan	1		\$ -	\$ -					
2014											
Month	Day	Month	Day	678000610 Delivery	Supply Charge	Total Charge	678000610 Usage	Total kWh	Peak kW		
Jan	1	Feb	1		\$ -	\$ -					
Feb	1	Mar	1		\$ -	\$ -					
Mar	19	Apr	17		\$ -	\$ -		0			
Apr	18	May	16		\$ -	\$ -		0			
May	1	May	31		\$ -	\$ -		0			
May	16	June	16	\$ 1,492.01	\$ 1,853.47	\$ 3,345.48	18,570	18,570	64.2		
June	16	July	15	\$ 6,087.96	\$ 13,031.19	\$ 19,119.15	130,560	130,560	99.3		
July	15	Aug	13	\$ 1,515.30	\$ 1,536.08	\$ 3,051.38	15,390	15,390	75.6		
Aug	13	Sept	12	\$ 1,940.21	\$ 2,036.12	\$ 3,976.33	20,400	20,400	94.8		
Sept	12	Oct	31	\$ 1,542.24	\$ 3,691.97	\$ 5,234.21	36,990	36,990	93.9		
Oct	13	Nov	11	\$ 823.01	\$ 2,245.73	\$ 3,068.74	22,500	22,500	31.5		
Dec	11	Dec	15	\$ 1,007.32	\$ 2,248.72	\$ 3,256.04	22,530	22,530	73.8		
2015											
Month	Day	Month	Day	678000610 Delivery	Supply Charge	Total Charge	678000610 Usage	Total kWh	Peak kW		
Dec	15	Jan	16	\$ 930.77	\$ 2,003.19	\$ 2,933.96	20070	20,070	73.2		
Jan	16	Feb	12	\$ 821.09	\$ 1,640.88	\$ 2,461.97	16440	16,440	73		
Feb	12	Mar	16	\$ 2,001.46	\$ 5,350.81	\$ 7,352.27	53610	53,610	170		
Mar	16	Apr	15	\$ 1,175.25	\$ 2,712.84	\$ 3,888.09	27180	27,180	80		
Apr	15	May	14	\$ 1,265.44	\$ 2,775.72	\$ 4,041.16	27810	27,810	96		
May	14	June	15	\$ 2,342.32	\$ 3,191.92	\$ 5,534.24	31980	31,980	94		
June	15	July	15	\$ 1,611.64	\$ 1,566.02	\$ 3,177.66	15690	15,690	84		
July	15	Aug	13	\$ 1,729.62	\$ 1,988.22	\$ 3,717.84	19920	19,920	84		
July	1	Aug	1		\$ -	\$ -		0			
Aug	1	Sept	1		\$ -	\$ -					
Sept	1	Oct	1		\$ -	\$ -					
Oct	1	Nov	1		\$ -	\$ -					
Nov	1	Dec	1		\$ -	\$ -					
Dec	1	Jan	1		\$ -	\$ -					

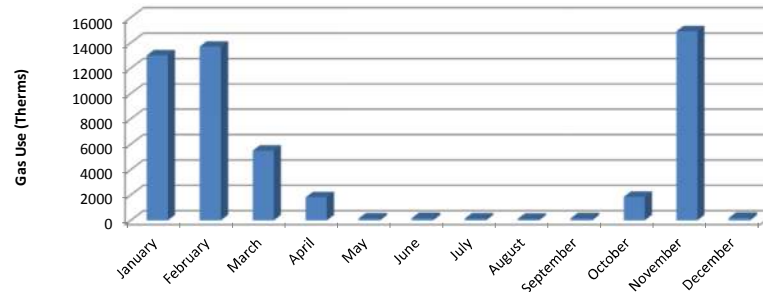


Energy Audit Building	Paterson School #10
Service Provider	PSE & G
Account Number	66 766 084 05
Meter Number	2265901, 2807036

2013											
Month	Day	Month	Day	Delivery	Delivery 2807036	Delivery 2265901	Supply Charge	Total Charge	2265901 (therms)	2807036 (therms)	(therms)
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

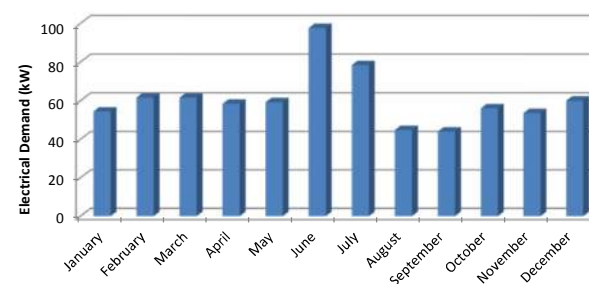
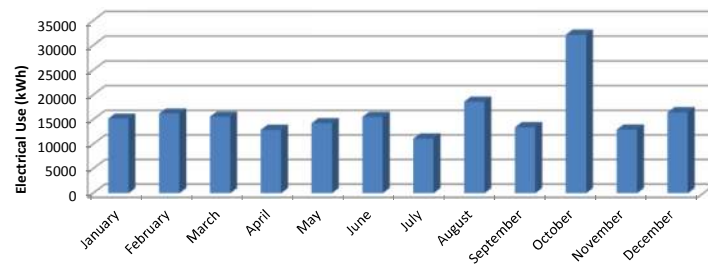
2014											
Month	Day	Month	Day	Delivery	Delivery 2807036	Delivery 2265901	Supply Charge	Total Charge	2265901 (therms)	2807036 (therms)	(therms)
Jan	1	Feb	1					\$ -			0
Feb	1	Mar	1					\$ -			0
Mar	18	Apr	17					\$ -			0.0
Apr	17	May	16					\$ -			0.0
May	29	June	29					\$ -			0.0
June	6	July	5					\$ -			0.0
July	15	Aug	13		\$ 103.31	\$ 29.83	\$ 41.74	\$ 174.88	60.8	0.0	60.8
Aug	13	Sept	12		\$ 103.31	\$ 80.58	\$ 150.00	\$ 333.89	226.1	0.0	226.1
Sept	12	Oct	13		\$ 104.49	\$ 36.63	\$ 103.86	\$ 244.98	161.3	11.8	173.1
Oct	13	Nov	11		\$ 2,082.13	\$ 19.51	\$ 1,140.47	\$ 3,242.11	27.4	1,824.3	1,851.7
Nov	11	Dec	12		\$ 3,959.76	\$ 98.10	\$ 9,135.73	\$ 13,193.59	285.5	14,625.7	14,911.2
Dec	15	Jan	16			\$ 71.91	\$ 125.63	\$ 197.54	199		199

2015											
Month	Day	Month	Day	Delivery	Delivery 2807036	Delivery 2265901	Supply Charge	Total Charge	2265901 (therms)	2807036 (therms)	(therms)
Jan	14	Feb	12		\$ 3,610.38	\$ 17.60	\$ 7,173.67	\$ 10,801.65	21.1	12,982.9	13,004.1
Feb	12	Mar	16		\$ 3,653.29	\$ 112.88	\$ 7,115.74	\$ 10,881.91	328.2	13,371.2	13,699.3
Mar	6	Apr	6		\$ 593.76	\$ 26.64	\$ 2,550.02	\$ 3,170.42	50.8	5,443.0	5,493.8
Apr	15	May	14		\$ 261.49	\$ 54.09	\$ 867.41	\$ 1,182.99	140.8	1,675.2	1,816.0
May	14	June	15		\$ 103.31	\$ 59.14	\$ 74.41	\$ 236.86	157.3	0.0	157.3
June	15	Aug	13		\$ 206.62	\$ 76.26	\$ -	\$ 282.88	176.8	0.0	176.8
Aug	13	Sept	5		\$ 104.98	\$ 79.09	\$ -	\$ 184.07	220.4	0.0	220.4
Sept	14	Oct	13		\$ 107.13	\$ 18.75		\$ 125.88	23.2	0.0	23.2
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								



Energy Audit Building	Paterson School #11
Service Provider	PSE & G
Account Number	67 178 247 00
Meter Number	728006764

2013										
Month	Day	Month	Day	678000610 Delivery	Supply Charge	Total Charge	678000610 Usage	Total kWh	Peak kW	
Jan	1	Feb	1		\$	-				
Feb	1	Mar	1		\$	-				
Mar	1	Apr	1		\$	-				
Apr	1	May	1		\$	-				
May	1	June	1		\$	-				
June	1	July	1		\$	-				
July	1	Aug	1		\$	-				
Aug	1	Sept	1		\$	-				
Sept	1	Oct	1		\$	-				
Oct	1	Nov	1		\$	-				
Nov	1	Dec	1		\$	-				
Dec	1	Jan	1		\$	-				
2014										
Month	Day	Month	Day	678000610 Delivery	Supply Charge	Total Charge	678000610 Usage	Total kWh	Peak kW	
Jan	1	Feb	1		\$	-				
Feb	1	Mar	1		\$	-				
Mar	19	Apr	17		\$	-		0		
March	24	Apr	23	\$ 615.29	\$ 1,261.60	\$ 1,876.89	12,640	12,640	47.2	
Apr	23	May	27	\$ 603.36	\$ 1,277.57	\$ 1,880.93	12,800	12,800	43.2	
May	27	June	23	\$ 965.75	\$ 982.13	\$ 1,947.88	9,840	9,840	97.6	
June	23	July	23	\$ 902.42	\$ 1,109.89	\$ 2,012.31	11,120	11,120	78.4	
July	23	Aug	21	\$ 906.16	\$ 1,165.78	\$ 2,071.94	11,680	11,680	37.6	
Aug	21	Sept	22	\$ 1,051.17	\$ 1,341.45	\$ 2,392.62	13,440	13,440	44.0	
Sept	22	Oct	21	\$ 1,225.97	\$ 3,209.89	\$ 4,435.86	32,160	32,160	56.0	
Oct	21	Nov	19	\$ 629.57	\$ 1,293.54	\$ 1,923.11	12,960	12,960	53.6	
Nov	19	Dec	22	\$ 764.06	\$ 1,644.87	\$ 2,408.93	16,480	16,480	60.0	
2015										
Month	Day	Month	Day	678000610 Delivery	Supply Charge	Total Charge	678000610 Usage	Total kWh	Peak kW	
Dec	22	Jan	23	\$ 701.66	\$ 1,517.11	\$ 2,218.77	15200	15,200	54.4	
Jan	23	Feb	23	\$ 764.72	\$ 1,620.91	\$ 2,385.63	16240	16,240	62	
Feb	23	Mar	24	\$ 745.61	\$ 1,557.04	\$ 2,302.65	15600	15,600	123	
Mar	24	Apr	23	\$ 658.85	\$ 1,317.49	\$ 1,976.34	13200	13,200	58	
Apr	23	May	22	\$ 740.77	\$ 1,573.01	\$ 2,313.78	15760	15,760	59	
May	22	June	23	\$ 1,590.97	\$ 2,123.96	\$ 3,714.93	21280	21,280	66	
June	23	July	24	\$ 891.39	\$ 1,109.89	\$ 2,001.28	11120	11,120	39	
July	24	Aug	21	\$ 1,409.79	\$ 2,555.14	\$ 3,964.93	25600	25,600	45	
July	1	Aug	1		\$	-		0		
Aug	1	Sept	1		\$	-				
Sept	1	Oct	1		\$	-				
Oct	1	Nov	1		\$	-				
Nov	1	Dec	1		\$	-				
Dec	1	Jan	1		\$	-				

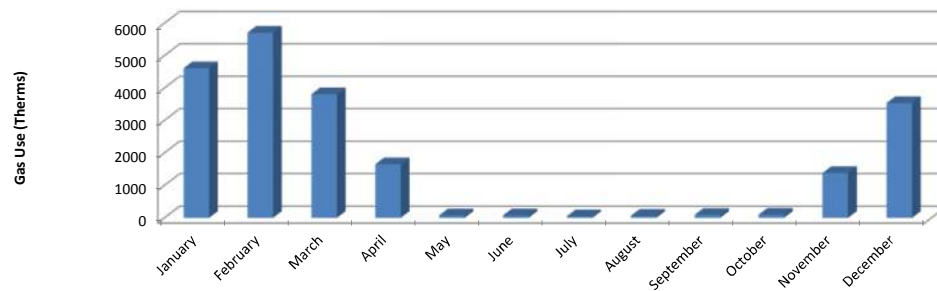


Energy Audit Building	Paterson School #11
Service Provider	PSE & G
Account Number	67 178 247 00
Meter Number	2643377

2012										
Month	Day	Month	Day	Delivery 2643377		Supply Charge	Total Charge	2643377 (therms)		Total Therms
Jan	1	Feb	1							
Feb	1	Mar	1							
Mar	1	Apr	1							
Apr	1	May	1							
May	1	June	1							
June	1	July	1							
July	1	Aug	1							
Aug	1	Sept	1							
Sept	1	Oct	1							
Oct	1	Nov	1							
Nov	1	Dec	1							
Dec	1	Jan	1							

2014										
Month	Day	Month	Day	Delivery 2643377		Supply Charge	Total Charge	2643377 (therms)		Total Therms
Dec	1	Jan	1				\$ -			0
Feb	1	Feb	1				\$ -			0
Mar	18	March	24				\$ -			0.0
March	24	Apr	23	\$ 302.27		\$ 1,343.37	\$ 1,645.64	1,817.2		1,817.2
Apr	23	May	27	\$ 113.37		\$ 63.47	\$ 176.84	92.9		92.9
May	27	June	23	\$ 112.74		\$ 65.27	\$ 178.01	92.4		92.4
June	23	July	23	\$ 112.58		\$ 63.33	\$ 175.91	92.2		92.2
July	23	Aug	21	\$ 112.60		\$ 61.22	\$ 173.82	92.3		92.3
Aug	21	Sept	22	\$ 112.63		\$ 55.56	\$ 168.19	92.6		92.6
Sept	22	Oct	21	\$ 112.69		\$ 58.45	\$ 171.14	94.9		94.9
Oct	21	Nov	19	\$ 804.66		\$ 849.34	\$ 1,654.00	1,379.0		1,379.0
Nov	19	Dec	22	\$ 1,127.86		\$ 2,165.48	\$ 3,293.34	3,534.5		3,534.5

2015										
Month	Day	Month	Day	Delivery 2643377		Supply Charge	Total Charge	2643377 (therms)		Total Therms
Dec	22	Jan	23	\$ 1,345.82		\$ 2,609.07	\$ 3,954.89	4609		4609
Jan	23	Feb	23	\$ 1,661.80		\$ 3,031.81	\$ 4,693.61	5,706.5		5,706.5
Feb	23	Mar	24	\$ 1,376.30		\$ 2,003.20	\$ 3,379.50	3,804.4		3,804.4
Mar	24	Apr	23	\$ 243.69		\$ 750.55	\$ 994.24	1,478.8		1,478.8
Apr	23	May	22	\$ 108.73		\$ 25.55	\$ 134.28	55.0		55.0
May	22	June	23	\$ 109.03		\$ 26.47	\$ 135.50	58.0		58.0
June	23	July	24	\$ 104.03		\$ 3.52	\$ 107.55	7.4		7.4
July	24	Aug	21	\$ 106.32		\$ 14.45	\$ 120.77	30.6		30.6
July	8	Aug	5			\$ -	\$ -			0.0
Aug	1	Sept	1			\$ -	\$ -			0.0
Sept	1	Oct	1							
Oct	1	Nov	1							
Nov	1	Dec	1							
Dec	1	Jan	1							

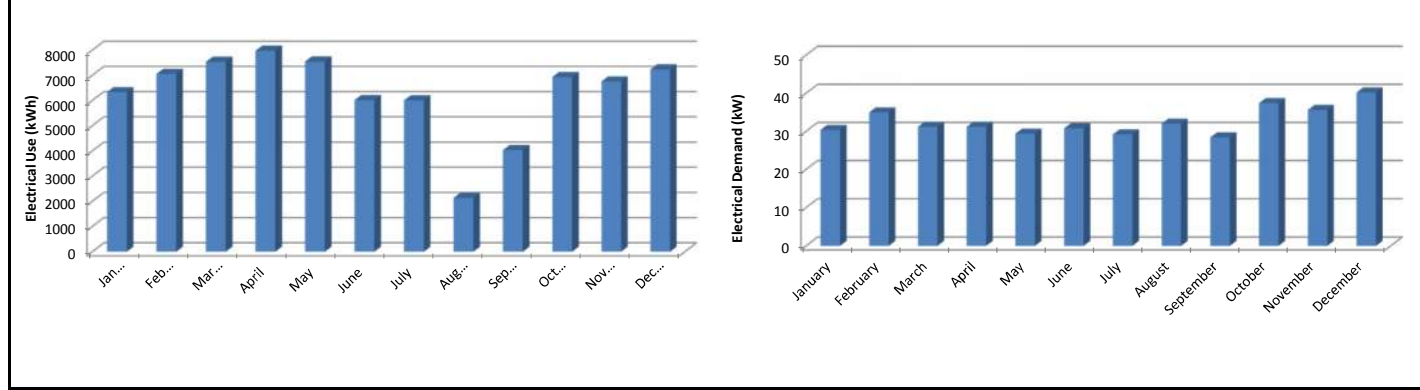


Energy Audit Building	Paterson School #14
Service Provider	PSE & G
Account Number	69 626 142 09
Meter Number	638000208

2013										
Month	Day	Month	Day	638000208 Delivery	Supply Charge	Total Charge	638000208 Usage	Total kWh	Peak kW	
Jan	1	Feb	1		\$	-				
Feb	1	Mar	1		\$	-				
Mar	1	Apr	1		\$	-				
Apr	1	May	1		\$	-				
May	1	June	1		\$	-				
June	1	July	1		\$	-				
July	1	Aug	1		\$	-				
Aug	1	Sept	1		\$	-				
Sept	1	Oct	1		\$	-				
Oct	1	Nov	1		\$	-				
Nov	1	Dec	1		\$	-				
Dec	1	Jan	1		\$	-				

2014										
Month	Day	Month	Day	638000208 Delivery	Supply Charge	Total Charge	638000208 Usage	Total kWh	Peak kW	
Jan	1	Feb	1		\$	-				
Feb	1	Mar	1		\$	-				
Mar	19	Apr	17		\$	-		0		
March	24	Apr	23		\$	-		0		
Apr	23	May	27		\$	-		0		
Apr	9	May	9	\$ 508.75	\$ 740.59	\$ 1,249.34	7,420	7,420	29.4	
May	9	June	10	\$ 508.75	\$ 740.59	\$ 1,249.34	7,420	7,420	29.4	
June	10	July	10	\$ 632.25	\$ 726.62	\$ 1,358.87	7,280	7,280	29.2	
July	10	Aug	8	\$ 449.79	\$ 131.75	\$ 581.54	1,320	1,320	32.0	
Aug	8	Sept	9	\$ 506.82	\$ 403.23	\$ 910.05	4,040	4,040	28.4	
Sept	9	Oct	8	\$ 379.00	\$ 692.68	\$ 1,071.68	6,940	6,940	37.4	
Oct	8	Nov	6	\$ 363.55	\$ 674.72	\$ 1,038.27	6,760	6,760	35.6	
Nov	6	Dec	9	\$ 398.06	\$ 722.62	\$ 1,120.68	7,240	7,240	40.2	

2015										
Month	Day	Month	Day	638000208 Delivery	Supply Charge	Total Charge	638000208 Usage	Total kWh	Peak kW	
Dec	9	Jan	9	\$ 328.39	\$ 632.80	\$ 961.19	6340	6,340	30.4	
Jan	9	Feb	9	\$ 370.49	\$ 704.66	\$ 1,075.15	7060	7,060	35	
Feb	9	Mar	11	\$ 368.68	\$ 752.57	\$ 1,121.25	7540	7,540	31	
Mar	11	Apr	11	\$ 382.16	\$ 796.48	\$ 1,178.64	7980	7,980	31	
Apr	11	May	11	\$ 365.39	\$ 766.54	\$ 1,131.93	7680	7,680	29	
May	12	June	11	\$ 555.67	\$ 461.12	\$ 1,016.79	4620	4,620	31	
June	11	July	13	\$ 502.52	\$ 473.10	\$ 975.62	4740	4,740	26	
July	13	Aug	11	\$ 250.41	\$ 295.44	\$ 545.85	2960	2,960	12	
July	1	Aug	1		\$	-		0		
Aug	1	Sept	1		\$	-				
Sept	1	Oct	1		\$	-				
Oct	1	Nov	1		\$	-				
Nov	1	Dec	1		\$	-				
Dec	1	Jan	1		\$	-				

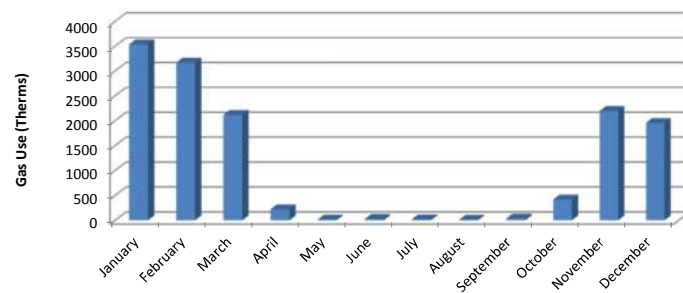


Energy Audit Building	Paterson School #14
Service Provider	PSE & G
Account Number	69 625 071 00
Meter Number	2049940

2012											
Month	Day	Month	Day	Delivery 20449940			Supply Charge	Total Charge	2643377 (therms)		Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
Apr	9	May	9								
May	9	June	10								
June	10	July	10								
July	10	Aug	8	\$ 18.29					\$ 23.22		
Aug	8	Sept	9								
Sept	9	Oct	8								
Oct	8	Nov	6								
Nov	6	Dec	9	\$ 813.86					\$ 2,197.30		

2014											
Month	Day	Month	Day	Delivery 20449940			Supply Charge	Total Charge	2643377 (therms)		Total Therms
Dec	9	Jan	9				\$ -	\$ -			0
Jan	9	Feb	9				\$ -	\$ -			0
Feb	9	Mar	11				\$ -	\$ -			0.0
Mar	11	Apr	11				\$ -	\$ -			0.0
Apr	9	May	9				\$ -	\$ -			0.0
May	9	June	10				\$ -	\$ -			0.0
June	10	July	10				\$ -	\$ -			0.0
July	10	Aug	8	\$ 18.29			\$ 15.41	\$ 33.70	23.2		23.2
Aug	8	Sept	9	\$ 12.20			\$ 2.00	\$ 14.20	3.3		3.3
Sept	9	Oct	8	\$ 26.08			\$ 30.13	\$ 56.21	48.9		48.9
Oct	8	Nov	6	\$ 163.11			\$ 259.13	\$ 422.24	420.7		420.7
Nov	6	Dec	9	\$ 813.86			\$ 1,346.24	\$ 2,160.10	2,197.3		2,197.3

2015											
Month	Day	Month	Day	Delivery 20449940			Supply Charge	Total Charge	2643377 (therms)		Total Therms
Dec	9	Jan	9	\$ 726.14			\$ 1,239.53	\$ 1,965.67	1958		1958
Jan	9	Feb	9	\$ 1,304.73			\$ 1,963.91	\$ 3,268.64	3,536.3		3,536.3
Feb	9	Mar	11	\$ 1,171.05			\$ 1,663.97	\$ 2,835.02	3,171.3		3,171.3
Mar	11	Apr	11	\$ 656.19			\$ 1,075.24	\$ 1,731.43	2,118.5		2,118.5
Apr	11	May	11	\$ 79.23			\$ 103.73	\$ 182.96	223.5		223.5
May	12	June	11	\$ 16.95			\$ 8.65	\$ 25.60	19.0		19.0
June	11	July	13	\$ 20.32			\$ 14.33	\$ 34.65	30.0		30.0
July	13	Aug	11	\$ 18.28			\$ 11.04	\$ 29.32	23.3		23.3
Aug	11	Sept	9	\$ 18.81			\$ 11.88	\$ 30.69	24.5		24.5
Sept	9	Oct	9	\$ 20.11			\$ 12.77	\$ 32.88	27.9		27.9
Oct	21	Nov	19								
Nov	19	Dec	22								
Nov	1	Dec	1								
Dec	1	Jan	1								

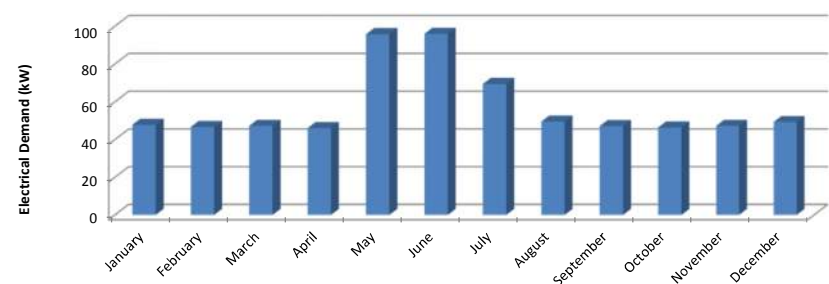


Energy Audit Building	Paterson School #15
Service Provider	PSE & G
Account Number	42 008 780 03
Meter Number	9204922

2013												
Month	Day	Month	Day	9204922 Delivery		Supply Charge	Total Charge	On Peak kWh		Total kWh	Peak kW	
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	1	Apr	1			\$	-					
Apr	1	May	1			\$	-					
May	1	June	1			\$	-					
June	1	July	1			\$	-					
July	1	Aug	1			\$	-					
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

2014												
Month	Day	Month	Day	9204922 Delivery	778018096 Delivery	Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	Total kWh	Peak kW	Off-Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	19	Apr	17			\$ -	\$ -			0		
Apr	18	May	16			\$ -	\$ -			0		
May	17	June	17			\$ -	\$ -			0		
Apr	24	May	23	\$ -	\$ 2,296.05	\$ 4,886.70	\$ 7,182.75	26,400	22,560	48,960	144.0	81.6
May	23	June	24	\$ -	\$ 3,536.93	\$ 5,238.03	\$ 8,774.96	26,880	25,600	52,480	144.0	81.6
June	24	July	24	\$ -	\$ 2,885.88	\$ 3,752.86	\$ 6,638.74	17,600	20,000	37,600	123.2	75.2
July	24	Aug	22	\$ -	\$ 2,091.36	\$ 3,098.10	\$ 5,189.46	13,600	17,440	31,040	72.0	54.4
Aug	22	Sept	23	\$ 3,184.54	\$ 348.34	\$ 4,622.50	\$ 8,155.38	23,500	22,813	46,313	141.7	77.2
Sept	24	Oct	22	\$ 2,113.61	\$ -	\$ 4,608.93	\$ 6,722.54	24,738	21,439	46,177	139.4	78.9
Oct	23	Nov	20	\$ 2,138.26	\$ -	\$ 4,684.58	\$ 6,822.84	25,296	21,639	46,935	142.0	84.1
Nov	21	Dec	23	\$ 2,380.94	\$ -	\$ 5,507.12	\$ 7,888.06	28,592	26,584	55,176	148.2	82.2

2015												
Month	Day	Month	Day	9204922 Delivery	778018096 Delivery	Supply Charge	Total Charge	On-Peak Usage	Off-Peak Usage	Total kWh	Peak kW	Off-Peak kW
Dec	24	Jan	24	\$ 2,257.37		\$ 5,096.90	\$ 7,354.27	25425	25641	51,066	143.7	83.7
Jan	25	Feb	24	\$ 2,269.44		\$ 5,185.03	\$ 7,454.47	26300	25649	51,949	140.3	79.5
Feb	25	Mar	25	\$ 2,177.82		\$ 4,818.93	\$ 6,996.75	25863	22418	48,281	142	81.1
Mar	26	Apr	24	\$ 2,075.05		\$ 4,482.87	\$ 6,557.92	23635	21279	44,914	139	79.9
Apr	25	May	26	\$ 2,218.26		\$ 4,943.49	\$ 7,161.75	26159	23370	49,529	143	72.6
May	27	June	24	\$ 3,268.32		\$ 4,382.76	\$ 7,651.08	23770	20141	43,911	144	73.2
June	25	July	24	\$ 2,317.70		\$ 3,496.74	\$ 5,814.44	16373	18661	35,034	85	64.4
July	25	Aug	24	\$ 2,079.16		\$ 3,350.12	\$ 5,429.28	14001	19564	33,565	77	58.6
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					

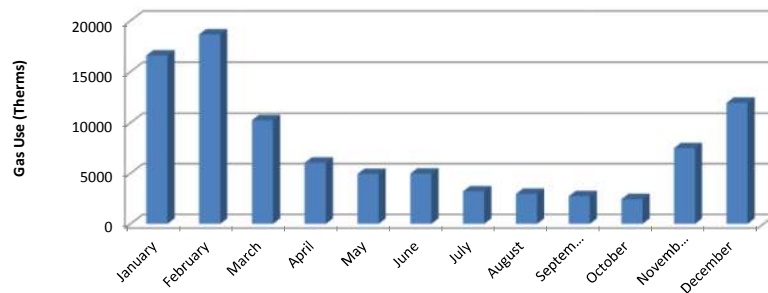


Energy Audit Building	Paterson School #15
Service Provider	PSE & G
Account Number	65 158 983 04
Meter Number	2806980

2012									
Month	Day	Month	Day	Delivery 2806980	Supply Charge	Total Charge	2806980 (therms)		Total Therms
Jan	1	Feb	1						
Feb	1	Mar	1						
Mar	1	Apr	1						
Apr	1	May	1						
May	1	June	1						
June	1	July	1						
July	1	Aug	1						
Aug	1	Sept	1						
Sept	1	Oct	1						
Oct	1	Nov	1						
Nov	1	Dec	1						
Dec	1	Jan	1						

2014									
Month	Day	Month	Day	Delivery 2806980	Supply Charge	Total Charge	2806980 (therms)		Total Therms
Jan	1	Feb	1			\$ -			0
Feb	1	Mar	1			\$ -			0
Mar	18	Apr	17			\$ -			0.0
Apr	17	May	16			\$ -			0.0
Apr	24	May	23			\$ -			0.0
May	23	June	24			\$ -			0.0
June	23	July	23	\$ 353.98	\$ 1,811.47	\$ 2,165.45	2,636.4		2,636.4
July	23	Aug	21	\$ 313.49	\$ 1,463.70	\$ 1,777.19	2,205.9		2,205.9
Aug	21	Sept	22	\$ 307.19	\$ 1,023.36	\$ 1,330.55	2,136.5		2,136.5
Sept	22	Oct	21	\$ 267.87	\$ 1,070.98	\$ 1,338.85	1,738.9		1,738.9
Oct	21	Nov	20	\$ 2,419.76	\$ 3,400.91	\$ 5,820.67	7,485.1		7,485.1
Nov	20	Dec	22	\$ 3,080.21	\$ 6,140.76	\$ 9,220.97	11,949		11,949

2015									
Month	Day	Month	Day	Delivery 2806980	Supply Charge	Total Charge	2806980 (therms)		Total Therms
Dec	24	Jan	24	\$ 3,772.67	\$ 9,873.34	\$ 13,646.01	16,590.6		16,590.6
Jan	24	Feb	23	\$ 4,099.75	\$ 10,066.42	\$ 14,166.17	18,662.4		18,662.4
Feb	23	Mar	24	\$ 1,502.24	\$ 5,244.88	\$ 6,747.12	10,251.0		10,251.0
Mar	24	Apr	23	\$ 646.87	\$ 3,067.82	\$ 3,714.69	6,044.3		6,044.3
Apr	23	May	22	\$ 551.51	\$ 2,293.09	\$ 2,844.60	4,940.3		4,940.3
May	22	June	25	\$ 554.24	\$ 2,267.34	\$ 2,821.58	4,968.8		4,968.8
June	25	July	24	\$ 452.11	\$ 1,824.65	\$ 2,276.76	3,820.0		3,820.0
July	24	Aug	24	\$ 443.60	\$ 1,762.03	\$ 2,205.63	3,724.1		3,724.1
Aug	1	Sept	1	\$413.85	\$ 1,619.69	\$2,033.54	\$3,337.54		3338
Sept	23	Oct	23	\$385.94	\$ 1,455.05	\$1,840.99	\$3,173.00		3173
Nov	1	Dec	1						
Dec	1	Jan	1						

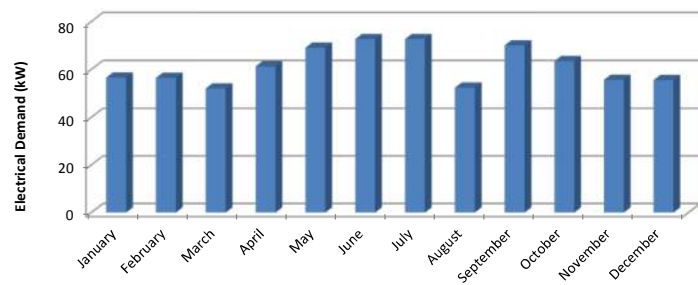


Energy Audit Building	Paterson School #19
Service Provider	PSE & G
Account Number	69 623 360 04
Meter Number	266015437

2013										
Month	Day	Month	Day	266015437 Delivery	Supply Charge	Total Charge	266015437 kWh	Total kWh	Peak kW	
Jan	1	Feb	1		\$	\$ -				
Feb	1	Mar	1		\$	\$ -				
Mar	1	Apr	1		\$	\$ -				
Apr	1	May	1		\$	\$ -				
May	1	June	1		\$	\$ -				
June	1	July	1		\$	\$ -				
July	1	Aug	1		\$	\$ -				
Aug	1	Sept	1		\$	\$ -				
Sept	1	Oct	1		\$	\$ -				
Oct	1	Nov	1		\$	\$ -				
Nov	1	Dec	1		\$	\$ -				
Dec	1	Jan	1		\$	\$ -				

2014										
Month	Day	Month	Day	266015437 Delivery	Supply Charge	Total Charge	266015437 kWh	Total kWh	Peak kW	
Jan	1	Feb	1		\$	\$ -				
Feb	1	Mar	1		\$	\$ -				
Mar	24	Apr	23		\$	\$ -		0		
Apr	18	May	16		\$	\$ -		0		
May	17	June	17		\$	\$ -		0		
Apr	23	May	22		\$	\$ -		0		
May	10	June	10	\$ 1,561.45	\$ 1,974.44	\$ 3,535.89	19,782	19,782	65.5	
June	10	July	10	\$ 1,579.18	\$ 2,042.71	\$ 3,621.89	20,466	20,466	66.5	
July	10	Aug	8	\$ 1,102.86	\$ 1,532.48	\$ 1,532.48	15,354	15,354	42.4	
Aug	8	Sept	11	\$ 1,269.39	\$ 1,646.57	\$ 2,915.96	16,497	16,497	52.4	
Sept	11	Oct	8	\$ 951.24	\$ 2,095.71	\$ 3,046.95	20,997	20,997	70.1	
Oct	8	Nov	6	\$ 799.66	\$ 1,712.14	\$ 2,511.80	17,154	17,154	63.5	
Nov	6	Dec	9	\$ 833.25	\$ 1,934.02	\$ 2,767.27	19,377	19,377	55.7	

2015										
Month	Day	Month	Day	266015437 Delivery	Supply Charge	Total Charge	266015437 kWh	Total kWh	Peak kW	
Dec	9	Jan	9	\$ 778.56	\$ 1,754.36	\$ 2,532.92	17577	17,577	55.6	
Jan	9	Feb	9	\$ 809.91	\$ 1,840.60	\$ 2,650.51	18441	18,441	56.6	
Feb	9	Mar	11	\$ 841.89	\$ 1,946.59	\$ 2,788.48	19503	19,503	57	
Mar	11	Apr	10	\$ 728.13	\$ 1,634.89	\$ 2,363.02	16380	16,380	52	
Apr	10	May	11	\$ 800.40	\$ 1,739.99	\$ 2,540.39	17433	17,433	61	
May	11	June	10	\$ 1,595.96	\$ 1,997.80	\$ 3,593.76	20016	20,016	69	
June	10	July	13	\$ 1,668.54	\$ 2,110.98	\$ 3,779.52	21150	21,150	73	
July	13	Aug	10	\$ 1,369.16	\$ 1,333.96	\$ 2,703.12	13365	13,365	73	
Aug	1	Sept	1		\$	\$ -				
Sept	1	Oct	1		\$	\$ -				
Oct	1	Nov	1		\$	\$ -				
Nov	1	Dec	1		\$	\$ -				
Dec	1	Jan	1		\$	\$ -				

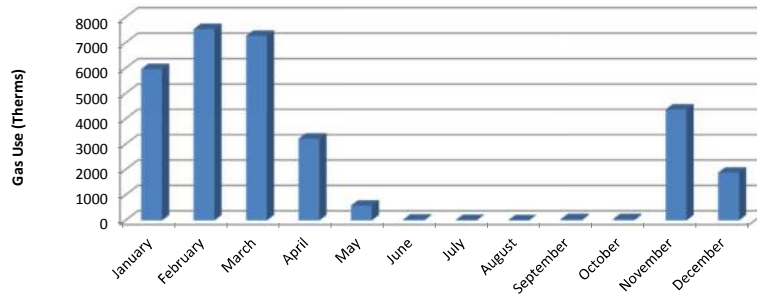


Energy Audit Building	Paterson School #19
Service Provider	PSE & G
Account Number	65 267 166 01
Meter Number	2643658

2012									
Month	Day	Month	Day	Delivery 2643658		Supply Charge	Total Charge	2643658 (therms)	Total Therms
Jan	1	Feb	1						
Feb	1	Mar	1						
Mar	1	Apr	1						
Apr	1	May	1						
May	1	June	1						
June	1	July	1						
July	1	Aug	1						
Aug	1	Sept	1						
Sept	1	Oct	1						
Oct	1	Nov	1						
Nov	1	Dec	1						
Dec	1	Jan	1						

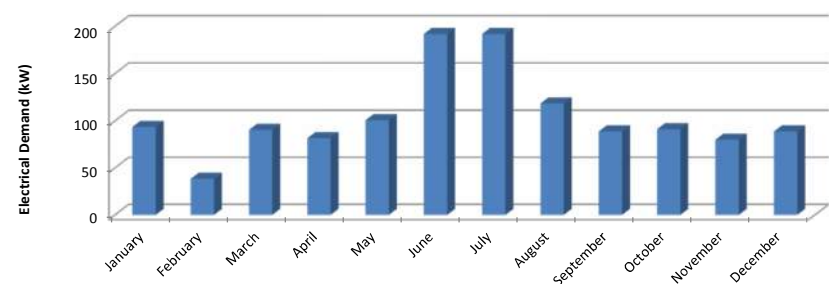
2014									
Month	Day	Month	Day	Delivery 2643658		Supply Charge	Total Charge	2643658 (therms)	Total Therms
Jan	1	Feb	1			\$ -	\$ -		0
Feb	1	Mar	1			\$ -	\$ -		0
Mar	18	Apr	17			\$ -	\$ -		0.0
Apr	17	May	16			\$ -	\$ -		0.0
Apr	29	May	29			\$ -	\$ -		0.0
May	10	June	10			\$ -	\$ -		0.0
June	10	July	10			\$ -	\$ -		0.0
July	10	Aug	8	\$ 104.09		\$ 3.58	\$ 107.67	7.7	7.7
Aug	8	Sept	11	\$ 112.05		\$ 41.86	\$ 153.91	87.2	87.2
Sept	11	Oct	8	\$ 112.05		\$ 41.86	\$ 153.91	87.2	87.2
Oct	8	Nov	6	\$ 1,623.91		\$ 1,987.02	\$ 3,610.93	4,373.2	4,373.2
Nov	6	Dec	9	\$ 1,247.85		\$ 966.95	\$ 2,214.80	1881	1881

2015									
Month	Day	Month	Day	Delivery 2643658		Supply Charge	Total Charge	2643658 (therms)	Total Therms
Dec	9	Jan	9	1862.07		\$ 3,847.25	\$ 5,709.32	5962.838	5,962.8
Jan	9	Feb	9	\$ 2,155.04		\$ 4,191.10	\$ 6,346.14	7,538.8	7,538.8
Feb	9	Mar	11	\$ 2,115.41		\$ 3,720.93	\$ 5,836.34	7,272.5	7,272.5
Mar	11	Apr	10	\$ 397.47		\$ 1,634.40	\$ 2,031.87	3,220.2	3,220.2
Apr	10	May	11	\$ 160.65		\$ 270.72	\$ 431.37	583.3	583.3
May	11	June	10	\$ 106.94		\$ 16.79	\$ 123.73	36.8	36.8
June	10	July	13	\$ 104.95		\$ 7.96	\$ 112.91	16.7	16.7
July	13	Aug	10	\$ 104.19		\$ 4.20	\$ 108.39	8.9	8.9
Aug	10	Sept	9	\$105.21		\$ 3.78	\$108.99	\$7.79	7.8
Sept	9	Oct	8	\$109.28		\$ 10.73	\$120.01	\$23.40	23.4
Nov	1	Dec	1						
Dec	1	Jan	1						



Energy Audit Building	Paterson School #20
Service Provider	PSE & G
Account Number	69 630 534 05
Meter Number	728005714 728006983

2013												
Month	Day	Month	Day	728005714 Delivery	728006983 Delivery	Supply Charge	Total Charge	728005714 kWh	728006983 kWh	Total kWh	728005714 Peak kW	728006983 Peak kW
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	1	Apr	1			\$	-					
Apr	1	May	1			\$	-					
May	1	June	1			\$	-					
June	1	July	1			\$	-					
July	1	Aug	1			\$	-					
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					
2014												
Month	Day	Month	Day	728005714 Delivery	728006983 Delivery	Supply Charge	Total Charge	728005714 kWh	728006983 kWh	Total kWh	728005714 Peak kW	728006983 Peak kW
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	24	Apr	23			\$	-			0		
Apr	18	May	16			\$	-			0		
May	17	June	17			\$	-			0		
Apr	25	May	23	\$	\$	\$						
May	23	June	23	\$	\$	\$						
June	23	July	23	\$	\$	\$						
July	23	Aug	21	\$	\$	\$						
Aug	21	Sept	22	\$	\$	\$						
Sept	22	Oct	21	\$	\$	\$						
Oct	21	Nov	19	\$	\$	\$						
Nov	19	Dec	22	\$	\$	\$						
2015												
Month	Day	Month	Day	728005714 Delivery	728006983 Delivery	Supply Charge	Total Charge	728005714 kWh	728006983 kWh	Total kWh	728005714 Peak kW	728006983 Peak kW
Dec	22	Jan	23	\$	\$	\$						
Jan	23	Feb	23	\$	\$	\$						
Feb	23	Mar	24	\$	\$	\$						
Mar	24	Apr	23	\$	\$	\$						
Apr	23	May	22	\$	\$	\$						
May	22	June	23	\$	\$	\$						
June	23	July	21	\$	\$	\$						
July	21	Aug	21	\$	\$	\$						
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

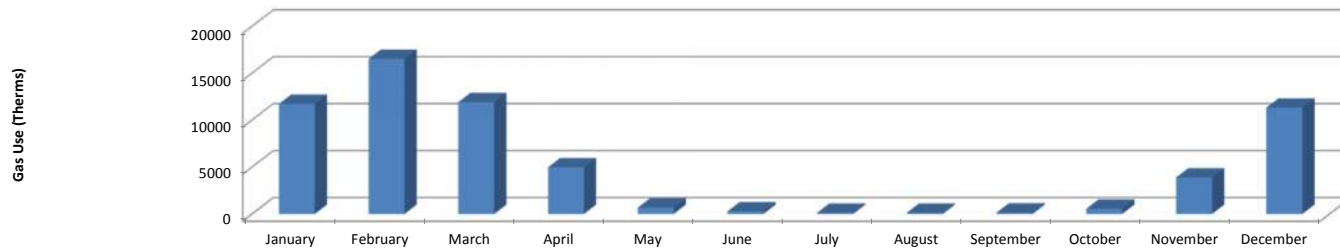


Energy Audit Building	Paterson School #20
Service Provider	PSE & G
Account Number	65 535 444 09
Meter Number	2917458

2012											
Month	Day	Month	Day	Delivery 2917458			Supply Charge	Total Charge	2917458 (therms)		Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

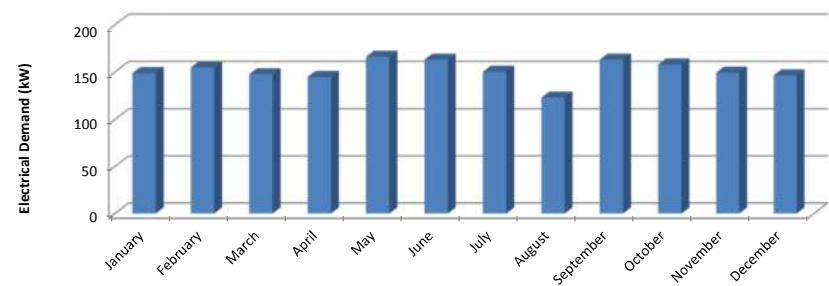
2014											
Month	Day	Month	Day	Delivery 2917458			Supply Charge	Total Charge	2917458 (therms)		Total Therms
Jan	1	Feb	1				\$ -				0
Feb	1	Mar	1				\$ -				0
Mar	24	Apr	23				\$ -				0.0
Apr	25	May	23	\$ 223.36			\$ 686.75	\$ 910.11	972.7		972.7
May	23	June	23	\$ 122.44			\$ 118.84	\$ 241.28	173.0		173.0
June	23	July	23	\$ 116.94			\$ 70.44	\$ 187.38	133.8		133.8
July	23	Aug	21	\$ 119.91			\$ 98.95	\$ 218.86	165.0		165.0
Aug	21	Sept	22	\$ 119.00			\$ 96.03	\$ 215.03	155.9		155.9
Sept	22	Oct	21	\$ 158.66			\$ 346.66	\$ 505.32	560.2		560.2
Oct	21	Nov	19	\$ 2,313.11			\$ 2,379.18	\$ 4,692.29	3,883.3		3,883.3
Nov	19	Dec	22	\$ 3,427.70			\$ 7,666.34	\$ 11,094.04	11314		11314

2015											
Month	Day	Month	Day	Delivery 2917458			Supply Charge	Total Charge	2917458 (therms)		Total Therms
Dec	22	Jan	23	\$ 3,488.33			\$ 6,998.72	\$ 10,487.05	11,715.3		11,715.3
Jan	23	Feb	23	\$ 4,604.84			\$ 8,926.60	\$ 13,531.44	16,522.9		16,522.9
Feb	23	Mar	24	\$ 3,910.86			\$ 6,089.32	\$ 10,000.18	11,901.5		11,901.5
Mar	24	Apr	23	\$ 551.74			\$ 2,305.56	\$ 2,857.30	4,967.1		4,967.1
Apr	23	May	23	\$ 141.65			\$ 177.54	\$ 319.19	389.1		389.1
May	23	June	23	\$ 141.65			\$ 185.85	\$ 327.49	389.1		389.1
June	23	July	24	\$ 116.86			\$ 65.06	\$ 181.92	137.5		137.5
July	24	Aug	21	\$ 115.08			\$ 57.98	\$ 173.06	119.5		119.5
July	8	Aug	5				\$ -	\$ -			0.0
Aug	1	Sept	1				\$ -	\$ -			0.0
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								



Energy Audit Building	Paterson School #21
Service Provider	PSE & G
Account Number	42 004 065 00
Meter Number	728005714 728006983

2013												
Month	Day	Month	Day	9204977 Delivery	778019048 Delivery	Supply Charge	Total Charge	On-Peak kWh	Off-Peak kWh	Total kWh	On Peak kW	Off Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	1	Apr	1			\$ -	\$ -					
Apr	1	May	1			\$ -	\$ -					
May	1	June	1			\$ -	\$ -					
June	1	July	1			\$ -	\$ -					
July	1	Aug	1			\$ -	\$ -					
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					
2014												
Month	Day	Month	Day	9204977 Delivery	778019048 Delivery	Supply Charge	Total Charge	On-Peak kWh	Off-Peak kWh	Total kWh	On Peak kW	Off Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	24	Apr	23			\$ -	\$ -			0		
Apr	21	May	20		\$ 2,296.06	\$ 4,886.70	\$ 7,182.76	26,880	22,080	48,960	144.0	89.6
May	20	June	19		\$ 3,945.91	\$ 5,844.87	\$ 9,790.78	32,640	25,920	58,560	163.2	102.4
June	19	July	21		\$ 3,735.74	\$ 5,685.18	\$ 9,420.92	27,840	29,120	56,960	150.4	102.4
July	21	Aug	19		\$ 2,921.54	\$ 4,503.43	\$ 7,424.97	21,760	23,360	45,120	108.8	86.4
Aug	19	Sept	14		\$ 3,652.76	\$ 4,758.94	\$ 8,411.70	24,320	23,360	47,680	163.2	115.2
Sept	19	Oct	17	\$ 2,342.32		\$ 5,194.71	\$ 7,537.03	28,479	23,567	52,046	158.1	94.8
Oct	18	Nov	17	\$ 2,345.92		\$ 5,358.90	\$ 7,704.82	27,412	26,279	53,691	149.5	117.5
Nov	18	Dec	18	\$ 2,415.00		\$ 5,655.73	\$ 8,070.73	31,014	25,651	56,665	146.6	104.8
2015												
Month	Day	Month	Day	9204977 Delivery	778019048 Delivery	Supply Charge	Total Charge	On-Peak kWh	Off-Peak kWh	Total kWh	On Peak kW	Off Peak kW
Dec	19	Jan	21	\$ 2,422.22		\$ 5,643.26	\$ 8,065.48	28395	28145	56,540	148.9	111.2
Jan	22	Feb	19	\$ 2,319.10		\$ 5,174.25	\$ 7,493.35	28095	23746	51,841	154.9	104.6
Feb	20	Mar	20	\$ 2,287.84		\$ 5,151.29	\$ 7,439.13	28651	22960	51,611	148	116.7
Mar	21	Apr	21	\$ 2,262.27		\$ 5,094.20	\$ 7,356.47	26,409	24,630	51,039	144.9	108.6
Apr	22	May	20	\$ 2,370.81		\$ 5,205.09	\$ 7,575.90	29678	22472	52,150	166	102.0
May	21	June	19	\$ 3,782.48		\$ 5,596.25	\$ 9,378.73	31791	24278	56,069	159	97.9
June	20	July	21	\$ 3,245.64		\$ 5,276.36	\$ 8,522.00	24639	28225	52,864	124	89.0
July	22	Aug	19	\$ 3,007.74		\$ 4,839.79	\$ 7,847.53	23059	25431	48,490	123	83.8
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					

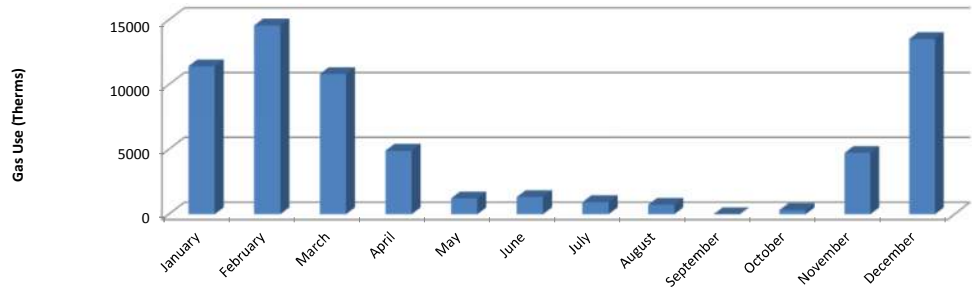


Energy Audit Building	Paterson School #20
Service Provider	PSE & G
Account Number	66 086 248 08
Meter Number	2917450

2012											
Month	Day	Month	Day	Delivery 2917450			Supply Charge	Total Charge	2917450 (therms)		Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

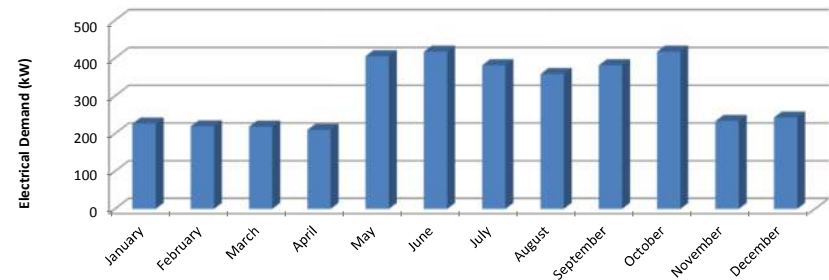
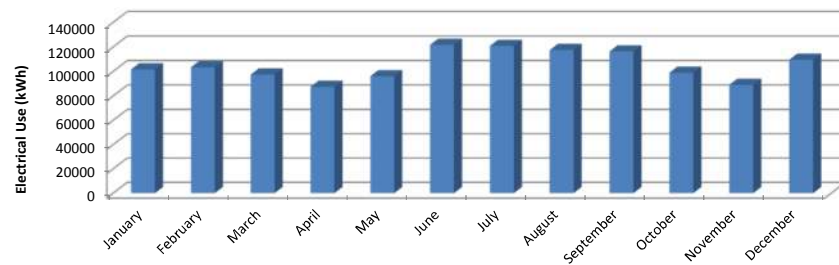
2014											
Month	Day	Month	Day	Delivery 2917450			Supply Charge	Total Charge	2917450 (therms)		Total Therms
Jan	1	Feb	1				\$ -	\$ -			0
Feb	1	Mar	1				\$ -	\$ -			0
Mar	24	Apr	23				\$ -	\$ -			0.0
Apr	23	May	22	\$ 312.61		\$ 1,318.30	\$ 1,630.91	1,929.2			1,929.2
May	22	June	23	\$ 102.14		\$ 2.28	\$ 104.42	3.2			3.2
June	23	July	23	\$ 103.51		\$ 1.56	\$ 105.07	3.2			3.2
July	23	Aug	23	\$ 103.51		\$ 1.56	\$ 105.07	3.2			3.2
Aug	23	Sept	23	\$ 103.51		\$ 1.56	\$ 105.07	3.2			3.2
Sept	23	Oct	21	\$ 134.79		\$ 153.67	\$ 288.46	318.9			318.9
Oct	21	Nov	19	\$ 2,357.05		\$ 2,147.79	\$ 4,504.84	4,727.1			4,727.1
Nov	19	Dec	22	\$ 3,696.08		\$ 6,947.92	\$ 10,644.00	13519			13519

2015											
Month	Day	Month	Day	Delivery 2917450			Supply Charge	Total Charge	2917450 (therms)		Total Therms
Dec	22	Jan	23	\$ 3,379.73		\$ 6,819.05	\$ 10,198.78	11,414.4			11,414.4
Jan	23	Feb	23	\$ 4,081.44		\$ 7,869.52	\$ 11,950.96	14,566.3			14,566.3
Feb	23	Mar	24	\$ 3,517.56		\$ 5,533.23	\$ 9,050.79	10,814.6			10,814.6
Mar	24	Apr	23	\$ 545.53		\$ 2,272.94	\$ 2,818.47	4,896.8			4,896.8
Apr	23	May	22	\$ 154.03		\$ 234.90	\$ 388.93	514.8			514.8
May	22	June	23	\$ 348.01		\$ 1,263.84	\$ 1,611.85	2,645.9			2,645.9
June	23	July	23	\$ 278.41		\$ 881.32	\$ 1,159.73	1,862.7			1,862.7
July	23	Aug	21	\$ 241.93		\$ 704.45	\$ 946.38	1,451.6			1,451.6
July	8	Aug	5			\$ -	\$ -				0.0
Aug	1	Sept	1				\$ -				0.0
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								



Energy Audit Building	Paterson School #24
Service Provider	PSE & G
Account Number	42 105 030 02
Meter Number	778019327 9211493

2013												
Month	Day	Month	Day	9211493 Delivery	778019327 Delivery	Supply Charge	Total Charge	On-Peak kWh	Off-Peak kWh	Total kWh	On Peak kW	Off Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	1	Apr	1			\$ -	\$ -					
Apr	1	May	1			\$ -	\$ -					
May	1	June	1			\$ -	\$ -					
June	1	July	1			\$ -	\$ -					
July	1	Aug	1			\$ -	\$ -					
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					
2014												
Month	Day	Month	Day	9211493 Delivery	778019327 Delivery	Supply Charge	Total Charge	On-Peak kWh	Off-Peak kWh	Total kWh	On Peak kW	Off Peak kW
Jan	1	Feb	1			\$ -	\$ -					
Feb	1	Mar	1			\$ -	\$ -					
Mar	24	Apr	23			\$ -	\$ -			0		
Apr	18	May	16			\$ -	\$ -			0		
May	20	June	19			\$ -	\$ -			0		
Apr	24	May	23		\$ 3,943.42	\$ 8,713.41	\$ 12,656.83	50,700	36,600	87,300	297.0	237.0
May	23	June	24		\$ 8,618.11	\$ 12,366.46	\$ 20,984.57	69,900	54,000	123,900	405.0	339.0
June	24	July	24		\$ 8,304.22	\$ 12,186.80	\$ 20,491.02	69,600	52,500	122,100	381.0	327.0
July	24	Aug	22		\$ 6,761.12	\$ 9,911.13	\$ 16,672.25	56,400	42,900	99,300	291.0	333.0
Aug	22	Sept	23		\$ 8,169.26	\$ 11,617.88	\$ 19,787.14	66,900	49,500	116,400	381.0	345.0
Sept	23	Oct	22		\$ 4,530.52	\$ 9,881.19	\$ 14,411.71	58,200	40,800	99,000	417.0	279.0
Oct	22	Nov	20	\$ 2,203.36	\$ 1,331.95	\$ 8,891.37	\$ 12,426.68	47,639	41,444	89,083	233.6	202.0
Nov	21	Dec	23	\$ 4,175.59	\$ 10,934.88	\$ 15,110.47	\$ 55,637	53,920	109,557	242.8	206.3	
2015												
Month	Day	Month	Day	9211493 Delivery	778019327 Delivery	Supply Charge	Total Charge	On-Peak kWh	Off-Peak kWh	Total kWh	On Peak kW	Off Peak kW
Dec	24	Jan	24	\$ 3,910.29		\$ 10,143.99	\$ 14,054.28	51252	50381	101,633	226.6	182.5
Jan	25	Feb	24	\$ 3,932.99		\$ 10,318.46	\$ 14,251.45	52275	51106	103,381	219.5	187.9
Feb	25	Mar	25	\$ 3,771.41		\$ 9,726.88	\$ 13,498.29	49935	47519	97,454	219	189.5
Mar	26	Apr	24	\$ 3,472.66		\$ 8,730.58	\$ 12,203.24	46,314	41,158	87,472	209.8	176.9
Apr	25	May	26	\$ 4,650.58		\$ 10,475.36	\$ 15,125.94	59457	45496	104,953	405	265.4
May	27	June	24	\$ 8,567.30		\$ 11,933.08	\$ 20,500.38	70657	48901	119,558	417	275.2
June	25	July	24	\$ 7,821.63		\$ 11,944.36	\$ 19,765.99	68838	50833	119,671	354	365.0
July	25	Aug	24	\$ 7,839.29		\$ 13,542.62	\$ 21,381.91	74464	61220	135,684	358	297.0
Aug	1	Sept	1			\$ -	\$ -					
Sept	1	Oct	1			\$ -	\$ -					
Oct	1	Nov	1			\$ -	\$ -					
Nov	1	Dec	1			\$ -	\$ -					
Dec	1	Jan	1			\$ -	\$ -					

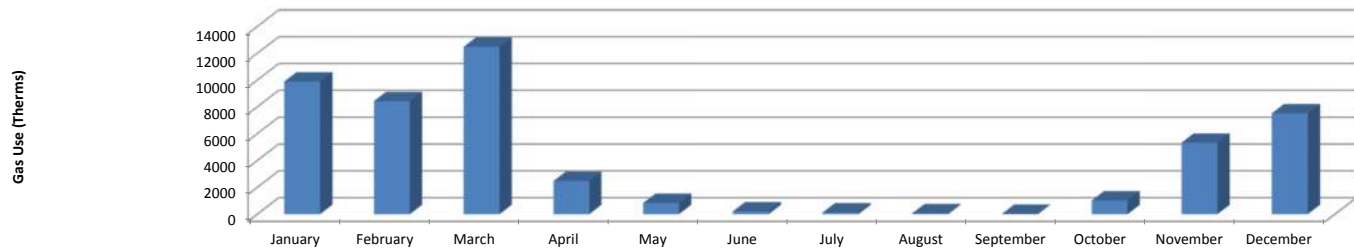


Energy Audit Building	Paterson School #24
Service Provider	PSE & G
Account Number	65 929 678 03
Meter Number	3342254

2012											
Month	Day	Month	Day	Delivery 3342254			Supply Charge	Total Charge	3342254 (therms)		Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

2014											
Month	Day	Month	Day	Delivery 3342254			Supply Charge	Total Charge	3342254 (therms)		Total Therms
Jan	1	Feb	1				\$ -	\$ -			0
Feb	1	Mar	1				\$ -	\$ -			0
Mar	24	Apr	23	\$ 242.99			\$ 803.21	\$ 1,046.20	1,175.4		1,175.4
Apr	23	May	30	\$ 242.99			\$ 803.21	\$ 1,046.20	1,175.4		1,175.4
May	30	June	26	\$ 113.64			\$ 71.17	\$ 184.81	100.8		100.8
June	26	July	28	\$ 115.37			\$ 62.82	\$ 178.19	119.3		119.3
July	28	Aug	26	\$ 105.43			\$ 9.68	\$ 115.11	21.0		21.0
Aug	26	Sept	26	\$ 105.54			\$ 10.64	\$ 116.18	22.2		22.2
Sept	26	Oct	24	\$ 203.50			\$ 491.32	\$ 694.82	1,019.6		1,019.6
Oct	24	Nov	24	\$ 1,803.15			\$ 2,417.81	\$ 4,220.96	5,321.3		5,321.3
Nov	24	Dec	26	\$ 2,131.27			\$ 3,857.22	\$ 5,988.49	7505		7505

2015											
Month	Day	Month	Day	Delivery 3342254			Supply Charge	Total Charge	3342254 (therms)		Total Therms
Dec	26	Jan	27	\$ 2,764.75			\$ 5,768.85	\$ 8,533.60	9,887.4		9,887.4
Jan	27	Feb	26	\$ 2,545.31			\$ 4,515.46	\$ 7,060.77	8,425.6		8,425.6
Feb	26	Mar	27	\$ 3,327.18			\$ 6,356.16	\$ 9,683.34	12,482.9		12,482.9
Mar	27	Apr	28	\$ 445.63			\$ 1,911.15	\$ 2,356.78	3,765.4		3,765.4
Apr	28	May	28	\$ 152.24			\$ 230.27	\$ 382.51	496.1		496.1
May	28	June	26	\$ 134.44			\$ 144.11	\$ 278.55	315.8		315.8
June	26	July	28	\$ 115.89			\$ 60.97	\$ 176.86	127.6		127.6
July	28	Aug	26	\$ 114.71			\$ 54.72	\$ 169.43	115.6		115.6
July	8	Aug	5				\$ -	\$ -			0.0
Aug	1	Sept	1				\$ -	\$ -			0.0
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

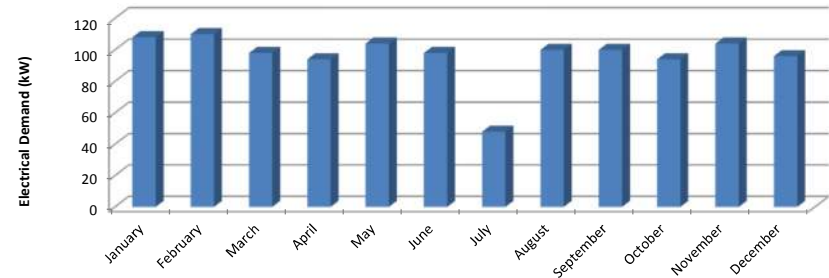


Energy Audit Building	Paterson School #25
Service Provider	PSE & G
Account Number	69 625 203 01
Meter Number	728009915 Unmetered

2013												
Month	Day	Month	Day	728009915 Delivery	Unmetered Delivery	Supply Charge	Total Charge	728009915 kWh	Unmetered kWh	Total kWh	On Peak kW	
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	1	Apr	1			\$	-					
Apr	1	May	1			\$	-					
May	1	June	1			\$	-					
June	1	July	1			\$	-					
July	1	Aug	1			\$	-					
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

2014												
Month	Day	Month	Day	728009915 Delivery	Unmetered Delivery	Supply Charge	Total Charge	728009915 kWh	Unmetered kWh	Total kWh	On Peak kW	
Jan	1	Feb	1			\$	-					
Feb	1	Mar	1			\$	-					
Mar	24	Apr	23			\$	-			0		
Apr	18	May	16			\$	-			0		
May	20	June	19			\$	-			0		
Apr	24	May	23			\$	-			0		
May	6	June	9	\$	\$	\$	\$	25,600	1,263	26,863	104.0	
June	9	July	7	\$	\$	\$	\$	23,600	1,150	24,750	98.0	
July	7	Aug	5	\$	\$	\$	\$	20,000	1,326	21,326	48.0	
Aug	5	Sept	4	\$	\$	\$	\$	31,400	1,380	32,780	100.0	
Sept	4	Oct	6	\$	\$	\$	\$	25,400	1,508	26,908	100.0	
Oct	6	Nov	3	\$	\$	\$	\$	24,000	1,675	25,675	94.0	
Nov	3	Dec	4	\$	\$	\$	\$	44,600	2,098	46,698	104.0	

2015												
Month	Day	Month	Day	728009915 Delivery	Unmetered Delivery	Supply Charge	Total Charge	728009915 kWh	Unmetered kWh	Total kWh	On Peak kW	
Dec	4	Jan	6	\$	\$	\$	\$	30400	2183	32,583	96.0	
Jan	6	Feb	6	\$	\$	\$	\$	32800	1872	34,672	108.0	
Feb	6	Mar	6	\$	\$	\$	\$	29800	1776	31,576	110	
Mar	6	Apr	7	\$	\$	\$	\$	30,200	1,693	31,893	98.0	
Apr	7	May	6	\$	\$	\$	\$	26800	1356	28,156	94	
May	6	June	5	\$	\$	\$	\$	22600	1263	23,863	104	
June	5	July	7	\$	\$	\$	\$	27000	12730	39,730	98	
July	7	Aug	5	\$	\$	\$	\$	20000	1204	21,204	48	
Aug	1	Sept	1			\$	-					
Sept	1	Oct	1			\$	-					
Oct	1	Nov	1			\$	-					
Nov	1	Dec	1			\$	-					
Dec	1	Jan	1			\$	-					

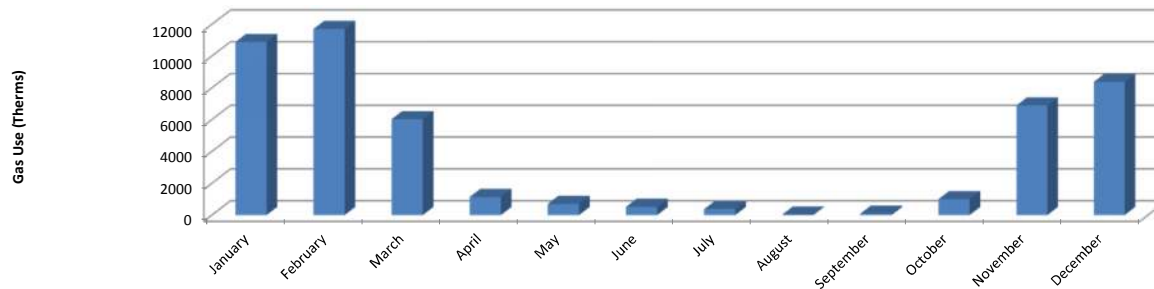


Energy Audit Building	Paterson School #25
Service Provider	PSE & G
Account Number	69 620 842 18
Meter Number	1808192

2012											
Month	Day	Month	Day	Delivery 1808192	Delivery 2643732	Supply Charge	Total Charge	1808192 (therms)	2643732 (therms)		Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

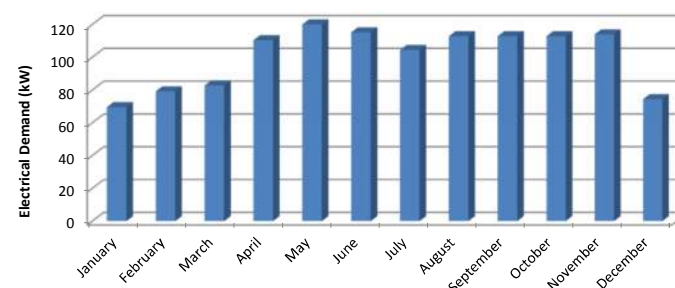
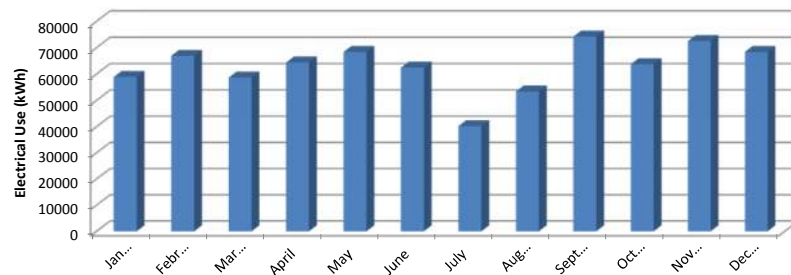
2014											
Month	Day	Month	Day	Delivery 1808192	Delivery 2643732	Supply Charge	Total Charge	1808192 (therms)	2643732 (therms)		Total Therms
Jan	1	Feb	1				\$ -				0
Feb	1	Mar	1				\$ -				0
Mar	24	Apr	23				\$ -				0.0
Mar	27	May	30			\$ -	\$ -				0.0
May	6	June	5	\$ 11.00	\$ 109.50	\$ 44.12	\$ 164.62	0.0	62.5		62.5
June	9	July	5	\$ 11.10	\$ 219.11	\$ 31.60	\$ 261.81	0.0	63.7		63.7
July	5	Aug	5	\$ 11.10	\$ 219.11	\$ 31.60	\$ 261.81	0.0	63.7		63.7
Aug	5	Sept	4	\$ 11.17	\$ 106.23	\$ 13.88	\$ 131.28	0.0	29.0		29.0
Sept	4	Oct	6	\$ 11.17	\$ 112.14	\$ 42.53	\$ 165.84	0.0	88.3		88.3
Oct	6	Nov	3	\$ 11.17	\$ 1,358.43	\$ 454.25	\$ 1,823.85	0.0	999.8		999.8
Nov	3	Dec	4	\$ 11.17	\$ 2,242.96	\$ 3,539.42	\$ 5,793.55	0	6887		6887

2015											
Month	Day	Month	Day	Delivery 1808192	Delivery 2643732	Supply Charge	Total Charge	1808192 (therms)	2643732 (therms)		Total Therms
Dec	4	Jan	6	\$ 11.17	\$ 2,394.31	\$ 5,501.49	\$ 7,906.97	0.0	8,369.7		8,369.7
Jan	6	Feb	6	\$ 11.17	\$ 2,705.47	\$ 6,085.95	\$ 8,802.59	0.0	10,881.3		10,881.3
Feb	6	Mar	6	\$ 11.17	\$ 3,318.17	\$ 6,157.69	\$ 9,487.03	0.0	11,702.1		11,702.1
Mar	6	Apr	7	\$ 59.84	\$ 630.63	\$ 3,055.61	\$ 3,746.08	159.8	5,860.4		6,020.3
Apr	7	May	6	\$ 11.17	\$ 213.70	\$ 528.08	\$ 752.95	0.0	1,137.7		1,137.7
May	6	June	5	\$ 11.17	\$ 232.82	\$ 614.79	\$ 858.78	0.0	1,347.3		1,347.3
June	5	July	7	\$ 11.17	\$ 198.56	\$ 461.73	\$ 671.46	0.0	966.7		966.7
July	7	Aug	5	\$ 11.17	\$ 170.52	\$ 322.74	\$ 504.43	0.0	682.1		682.1
July	8	Aug	5			\$ -	\$ -				0.0
Aug	1	Sept	1				\$ -				0.0
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								



Energy Audit Building	Paterson School #27
Service Provider	PSE & G
Account Number	69 625 203 01
Meter Number	728009915 Unmetered

2013											
Month	Day	Month	Day	1791457 Delivery	9193156 Delivery	Supply Charge	Total Charge	1791457 kWh	9193156 kWh	Total kWh	On Peak kW
Jan	1	Feb	1			\$ -	\$ -				
Feb	1	Mar	1			\$ -	\$ -				
Mar	1	Apr	1			\$ -	\$ -				
Apr	1	May	1			\$ -	\$ -				
May	1	June	1			\$ -	\$ -				
June	1	July	1			\$ -	\$ -				
July	15	Aug	12			\$ -	\$ -				
Aug	12	Sept	1			\$ -	\$ -				
Sept	1	Oct	1			\$ -	\$ -				
Oct	1	Nov	1			\$ -	\$ -				
Nov	1	Dec	1			\$ -	\$ -				
Dec	1	Jan	1			\$ -	\$ -				
2014											
Month	Day	Month	Day	1791457 Delivery	9193156 Delivery	Supply Charge	Total Charge	1791457 kWh	9193156 kWh	Total kWh	On Peak kW
Jan	1	Feb	1			\$ -	\$ -				
Feb	1	Mar	1			\$ -	\$ -				
Mar	24	Apr	23			\$ -	\$ -			0	
Apr	18	May	16			\$ -	\$ -			0	
May	20	June	19			\$ -	\$ -			0	
Apr	11	May	11			\$ -	\$ -			0	
May	6	June	9			\$ -	\$ -			0	
June	9	July	7			\$ -	\$ -			0	
July	15	Aug	12	\$ 1,495.42		\$ 4,120.16	\$ 5,615.58	N/A	41280	41280	104
Aug	12	Sept	10	\$ 1,418.53	\$ 1,639.00	\$ 5,326.86	\$ 8,384.39	21,330	32,040	53,370	112.8
Sept	10	Oct	13	\$ 1,759.70	\$ 2,443.15	\$ 7,407.90	\$ 11,610.75	26,460	47,760	74,220	112.8
Oct	13	Nov	10	\$ 1,565.18	\$ 2,056.42	\$ 6,361.39	\$ 9,982.99	23,535	40,200	63,735	112.8
Nov	10	Dec	12	\$ 1,751.59	\$ 2,363.35	\$ 7,240.02	\$ 11,354.95	26,338	46,200	72,538	114.0
2015											
Month	Day	Month	Day	1791457 Delivery	9193156 Delivery	Supply Charge	Total Charge	1791457 kWh	9193156 kWh	Total kWh	On Peak kW
Dec	12	Jan	13	\$ 1,756.71	\$ 2,148.50	\$ 6,828.50	\$ 10,733.71	26415	42000	68,415	74.4
Jan	13	Feb	10	\$ 1,529.26	\$ 1,835.43	\$ 5,876.31	\$ 9,241.01	22995	35880	58,875	69.6
Feb	10	Mar	6	\$ 1,759.70	\$ 2,068.70	\$ 6,677.29	\$ 10,505.69	26460	40440	66,900	79
Mar	6	Apr	7	\$ 1,568.17	\$ 1,792.46	\$ 5,850.86	\$ 9,211.49	23,580	35,040	58,620	82.8
Apr	11	May	11	\$ 1,735.76	\$ 1,958.20	\$ 6,425.77	\$ 10,119.73	26,100	38,280	64,380	110.4
May	6	June	5	\$ 1,954.23	\$ 1,995.04	\$ 6,825.51	\$ 10,774.77	29385	39000	68,385	120
June	11	July	11	\$ 1,415.54	\$ 2,105.53	\$ 6,232.64	\$ 9,753.71	21285	41160	62,445	115
July	10	Aug	10	\$ (269.34)	\$ 2,265.13	\$ 4,015.36	\$ 6,280.49	-4,050	44,280	40,230	104.4
Aug	1	Sept	1			\$ -	\$ -				
Sept	1	Oct	1			\$ -	\$ -				
Oct	1	Nov	1			\$ -	\$ -				
Nov	1	Dec	1			\$ -	\$ -				
Dec	1	Jan	1			\$ -	\$ -				

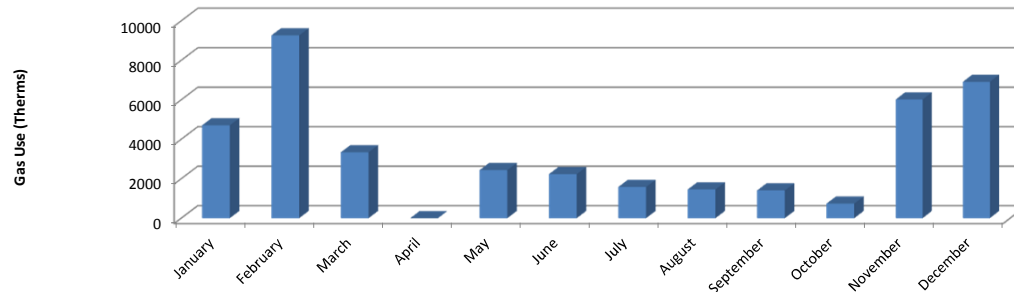


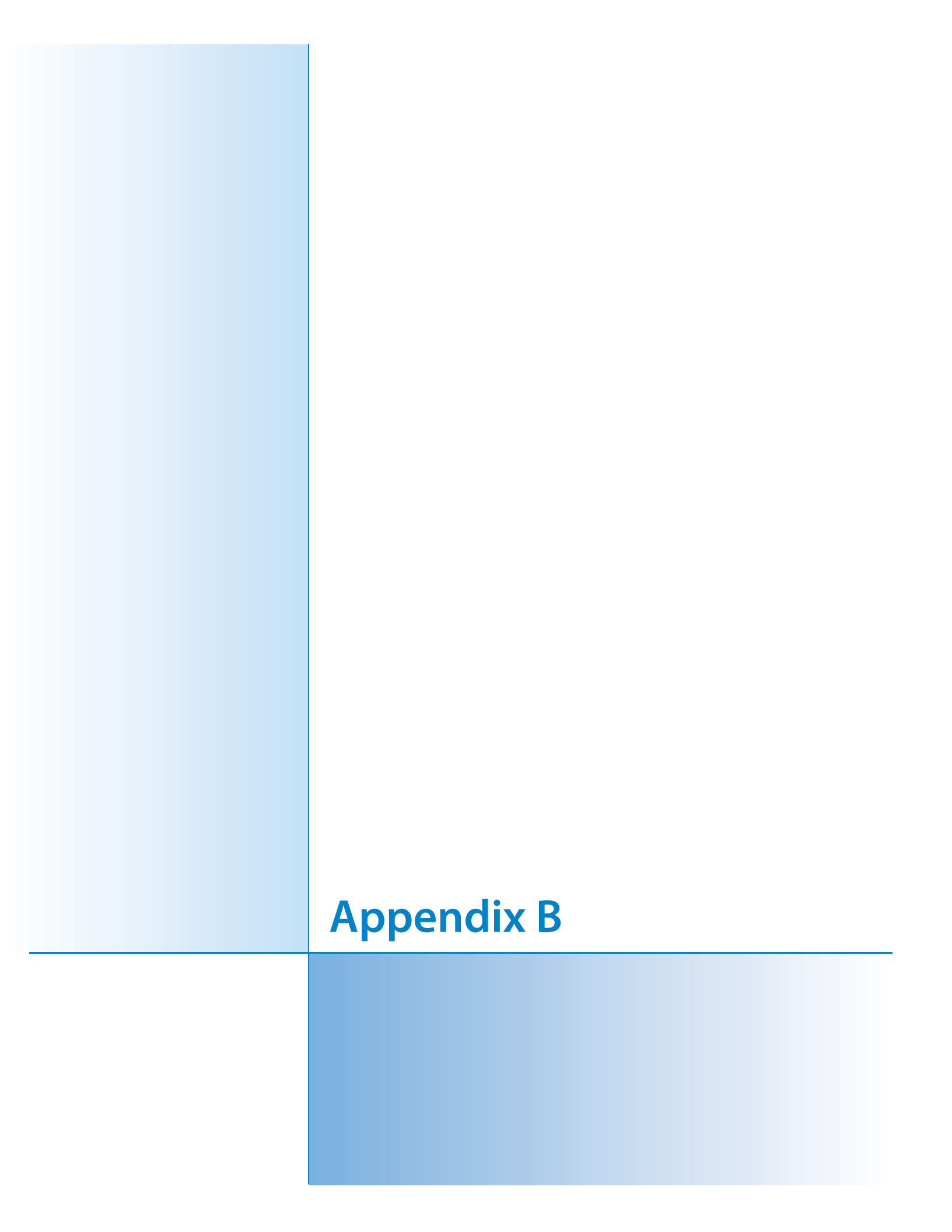
Energy Audit Building	Paterson School #27
Service Provider	PSE & G
Account Number	65 254 454 18
Meter Number	2523060

2012											
Month	Day	Month	Day	Delivery 2523060		Supply Charge	Total Charge	2523060 (therms)			Total Therms
Jan	1	Feb	1								
Feb	1	Mar	1								
Mar	1	Apr	1								
Apr	1	May	1								
May	1	June	1								
June	1	July	1								
July	1	Aug	1								
Aug	1	Sept	1								
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								

2014											
Month	Day	Month	Day	Delivery 2523060		Supply Charge	Total Charge	2523060 (therms)			Total Therms
Jan	1	Feb	1				\$ -				0
Feb	1	Mar	1				\$ -				0
Mar	24	Apr	23				\$ -				0.0
May	10	June	10	\$ 353.58		\$ 1,664.14	\$ 2,017.72	2,435.3			2,435.3
June	12	July	14	\$ 320.70		\$ 1,175.48	\$ 1,496.18	2,232.1			2,232.1
July	14	Aug	11	\$ 256.83		\$ 732.51	\$ 989.34	1,582.1			1,582.1
Aug	11	Sept	9	\$ 245.35		\$ 697.32	\$ 942.67	1,455.8			1,455.8
Sept	9	Oct	10	\$ 239.73		\$ 677.86	\$ 917.59	1,406.7			1,406.7
Oct	10	Nov	7	\$ 592.44		\$ 335.30	\$ 927.74	738.0			738.0
Nov	7	Dec	9	\$ 1,308.08		\$ 3,089.45	\$ 4,397.53	6011			6011

2015											
Month	Day	Month	Day	Delivery 2523060		Supply Charge	Total Charge	2523060 (therms)			Total Therms
Dec	11	Jan	12	\$ 1,435.12		\$ 4,407.77	\$ 5,842.89	6,908.4			6,908.4
Jan	12	Feb	9	\$ 1,127.39		\$ 2,610.61	\$ 3,738.00	4,705.0			4,705.0
Feb	9	Mar	11	\$ 1,804.43		\$ 4,840.02	\$ 6,644.45	9,261.7			9,261.7
Mar	13	Apr	10	\$ 843.53		\$ 1,693.67	\$ 2,537.20	3,336.9			3,336.9
Apr	7	May	6			\$ -	\$ -				0.0
May	6	June	5			\$ -	\$ -				0.0
June	5	July	7			\$ -	\$ -				0.0
July	7	Aug	10			\$ -	\$ -				0.0
July	8	Aug	5			\$ -	\$ -				0.0
Aug	1	Sept	1			\$ -	\$ -				0.0
Sept	1	Oct	1								
Oct	1	Nov	1								
Nov	1	Dec	1								
Dec	1	Jan	1								



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, forming an L-shape. The text "Appendix B" is positioned at this intersection point, with the "A" and "B" partially overlapping the light blue area and the "ppendix" partially overlapping the white area.

Appendix B



ENERGY STAR® Progress & Goals Report

64

ENERGY STAR®
Score¹

School 1 & 26

Primary Property Function: K-12 School
Gross Floor Area (ft²): 85,438
Built: 1950

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 1 & 26
1 East 32 Street
Paterson, New Jersey 07514

Property ID: 4582625

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 5/31/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	64	64	0	N/A	50	75

Energy

Site EUI (kBtu/ft²)	72.2	72.2	0	N/A	82.5	64.5
Source EUI (kBtu/ft²)	123.9	123.9	0	N/A	141.4	110.6
\$	121,161.17	121,161.17	0	N/A	138,332.13	108,178.5
\$/ft²	1.42	1.42	0	N/A	1.62	1.27

Greenhouse Gas Emissions

Metric Tons CO2e/year	486.3	486.3	0	N/A	555.2	434.2
kgCO2e/ ft2/year	5.7	5.7	0	N/A	6.5	5.1

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.



LEARN MORE AT
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ENERGY STAR® Scorecard

64

ENERGY STAR®
Score

School 1 & 26

Primary Function: K-12 School

Gross Floor Area (ft²): 85,438

Built: 1950

For Year Ending: July 31, 2015

Date Generated: November 25, 2015

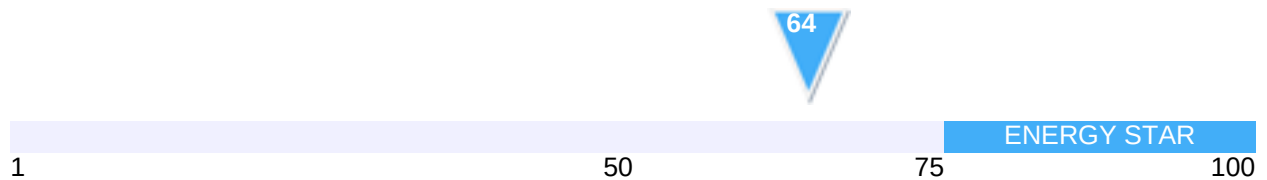
Property Address:

School 1 & 26

1 East 32 Street

Paterson, New Jersey 07514

For the year ending in July 2015, this building used 123.9 (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® Statement of Energy Performance

64

ENERGY STAR®
Score¹

School 1 & 26

Primary Property Function: K-12 School
Gross Floor Area (ft²): 85,438
Built: 1950

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 1 & 26
1 East 32 Street
Paterson, New Jersey 07514

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582625

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
72.2 kBtu/ft²	Natural Gas (kBtu)	4,207,804 (68%)	National Median Site EUI (kBtu/ft²)	82.5
	Electric - Grid (kBtu)	1,963,036 (32%)	National Median Source EUI (kBtu/ft²)	141.4
			% Diff from National Median Source EUI	-12%
Source EUI	Annual Emissions			
123.9 kBtu/ft²	Greenhouse Gas Emissions (Metric Tons CO2e/year)			
				486

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



LEARN MORE AT
energystar.gov

ENERGY STAR[®] Scorecard

80

ENERGY STAR[®]
Score

School 2

Primary Function: K-12 School

Gross Floor Area (ft²): 85,887

Built: 1922

For Year Ending: April 30, 2015

Date Generated: November 02, 2015

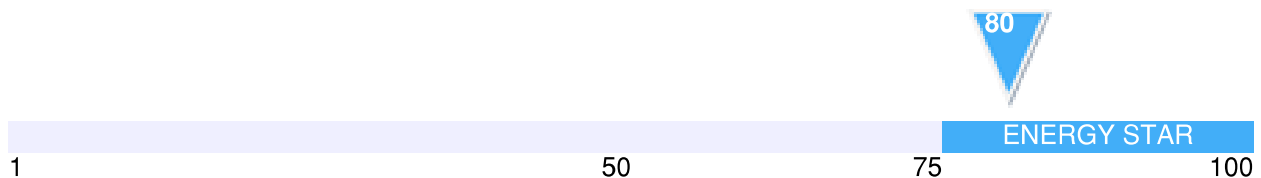
Property Address:

School 2

22 Passaic Avenue

Paterson, New Jersey 07501

For the year ending in April 2015, this building used 101.4 (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[®] Statement of Energy Performance

80

ENERGY STAR[®]
Score¹

School 2

Primary Property Function: K-12 School
Gross Floor Area (ft²): 85,887
Built: 1922

For Year Ending: April 30, 2015
Date Generated: November 02, 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

School 2
22 Passaic Avenue
Paterson, New Jersey 07501

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582626

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

77.2 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	5,797,916 (87%)
Electric - Grid (kBtu)	835,022 (13%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	106.2
National Median Source EUI (kBtu/ft ²)	139.5
% Diff from National Median Source EUI	-27%

Source EUI

101.4 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	420

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)



LEARN MORE AT
energystar.gov

ENERGY STAR® Progress & Goals Report

80

ENERGY STAR®
Score¹

School 2

Primary Property Function: K-12 School
Gross Floor Area (ft²): 85,887
Built: 1922

For Year Ending: April 30, 2015
Date Generated: November 02, 2015

Property Address:
School 2
22 Passaic Avenue
Paterson, New Jersey 07501

Property ID: 4582626

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 4/30/2015 (Baseline)	Year Ending 4/30/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	80	80	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	77.2	77.2	0	N/A	106.2	83.1
Source EUI (kBtu/ft²)	101.4	101.4	0	N/A	139.5	109.1
\$	123,631.96	123,631.96	0	N/A	170,036.35	132,971.86
\$/ft²	1.44	1.44	0	N/A	1.98	1.55
Greenhouse Gas Emissions						
Metric Tons CO2e/year	419.7	419.7	0	N/A	577.3	451.4
kgCO2e/ ft2/year	4.9	4.9	0	N/A	6.7	5.3
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.



ENERGY STAR® Progress & Goals Report

32

ENERGY STAR®
Score¹

School 3

Primary Property Function: K-12 School
Gross Floor Area (ft²): 35,500
Built: 1915

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 3
448 Main Street
Paterson, New Jersey 07501

Property ID: 4582627

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 6/30/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	32	32	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	125	125	0	N/A	106.8	83.5
Source EUI (kBtu/ft²)	182.7	182.7	0	N/A	156	122
\$	67,815.43	67,815.43	0	N/A	57,922.84	45,296.86
\$/ft²	1.91	1.91	0	N/A	1.63	1.28
Greenhouse Gas Emissions						
Metric Tons CO2e/year	306.3	306.3	0	N/A	261.6	204.6
kgCO2e/ ft2/year	8.6	8.6	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[®] Scorecard

32

ENERGY STAR[®]
Score

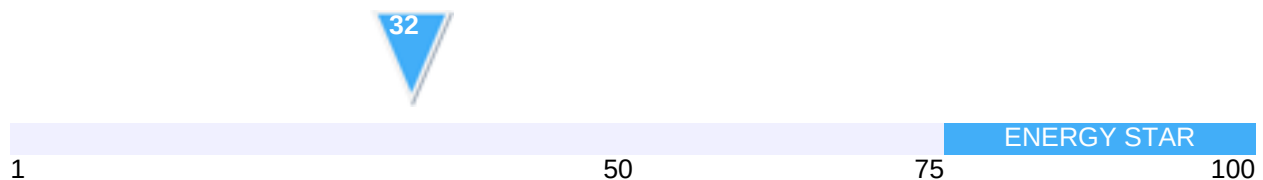
School 3

Primary Function: K-12 School
Gross Floor Area (ft²): 35,500
Built: 1915

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 3
448 Main Street
Paterson, New Jersey 07501

For the year ending in July 2015, this building used 182.7 (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® Statement of Energy Performance

32

ENERGY STAR®
Score¹

School 3

Primary Property Function: K-12 School
Gross Floor Area (ft²): 35,500
Built: 1915

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 3
448 Main Street
Paterson, New Jersey 07501

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582627

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
125 kBtu/ft²	Electric - Grid (kBtu)	872,724 (20%)	National Median Site EUI (kBtu/ft²)	106.8
	Natural Gas (kBtu)	3,566,335 (80%)	National Median Source EUI (kBtu/ft²)	156
			% Diff from National Median Source EUI	17%
Source EUI	Annual Emissions			
182.7 kBtu/ft²	Greenhouse Gas Emissions (Metric Tons CO2e/year)		306	

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



ENERGY STAR® Progress & Goals Report

58

ENERGY STAR®
Score¹

School 4

Primary Property Function: K-12 School
Gross Floor Area (ft²): 112,391
Built: 1921

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 4
55 Clinton Street
Paterson, New Jersey 07522

Property ID: 4582628

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 5/31/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	58	58	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	83	83	0	N/A	89.5	70
Source EUI (kBtu/ft²)	125.8	125.8	0	N/A	135.7	106.1
\$	148,577.41	148,577.41	0	N/A	160,264.51	125,330.11
\$/ft²	1.32	1.32	0	N/A	1.43	1.12
Greenhouse Gas Emissions						
Metric Tons CO2e/year	663.3	663.3	0	N/A	715.4	559.5
kgCO2e/ ft2/year	5.9	5.9	0	N/A	6.4	5
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

58

ENERGY STAR®
Score

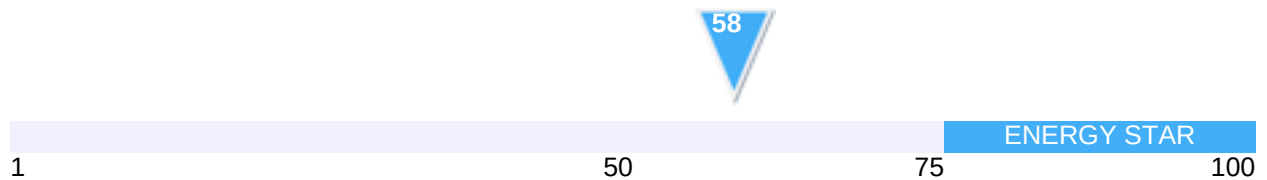
School 4

Primary Function: K-12 School
Gross Floor Area (ft²): 112,391
Built: 1921

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 4
55 Clinton Street
Paterson, New Jersey 07522

For the year ending in July 2015, this building used 125.8 (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

58

ENERGY STAR[®]
Score¹

School 4

Primary Property Function: K-12 School
Gross Floor Area (ft²): 112,391
Built: 1921

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 4
55 Clinton Street
Paterson, New Jersey 07522

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582628

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
83 kBtu/ft ²	Natural Gas (kBtu)	7,250,214 (78%)	National Median Site EUI (kBtu/ft ²)	89.5
	Electric - Grid (kBtu)	2,077,957 (22%)	National Median Source EUI (kBtu/ft ²)	135.7
			% Diff from National Median Source EUI	-7%
Source EUI	Annual Emissions			
125.8 kBtu/ft ²	Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)			
				663

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



ENERGY STAR® Progress & Goals Report

53

ENERGY STAR®
Score¹

School 5

Primary Property Function: K-12 School
Gross Floor Area (ft²): 99,735
Built: 1930

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 5
430 Totowa Avenue
Paterson, New Jersey 07502

Property ID: 4582629

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 5/31/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	53	53	0	N/A	50	75

Energy

Site EUI (kBtu/ft²)	81.3	81.3	0	N/A	84.1	65.7
Source EUI (kBtu/ft²)	133.2	133.2	0	N/A	137.8	107.8
\$	148,870.51	148,870.51	0	N/A	153,952.35	120,393.87
\$/ft²	1.49	1.49	0	N/A	1.54	1.21

Greenhouse Gas Emissions

Metric Tons CO2e/year	615.2	615.2	0	N/A	636.2	497.5
kgCO2e/ ft2/year	6.2	6.2	0	N/A	6.4	5

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.



LEARN MORE AT
energystar.gov

ENERGY STAR® Scorecard

53

ENERGY STAR®
Score

School 5

Primary Function: K-12 School

Gross Floor Area (ft²): 99,735

Built: 1930

For Year Ending: July 31, 2015

Date Generated: November 25, 2015

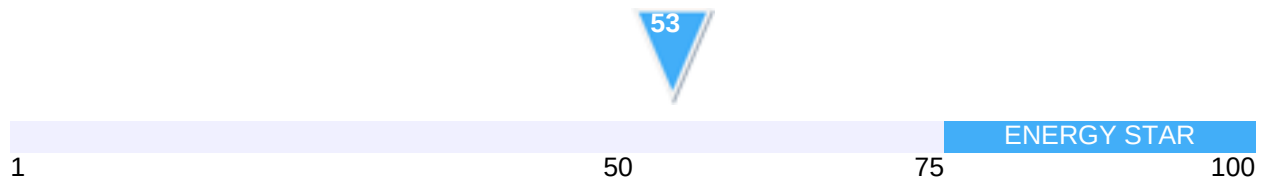
Property Address:

School 5

430 Totowa Avenue

Paterson, New Jersey 07502

For the year ending in July 2015, this building used 133.2 (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

53

ENERGY STAR[®]
Score¹

School 5

Primary Property Function: K-12 School
Gross Floor Area (ft²): 99,735
Built: 1930

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 5
430 Totowa Avenue
Paterson, New Jersey 07502

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582629

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
81.3 kBtu/ft ²	Natural Gas (kBtu)	5,820,750 (72%)	National Median Site EUI (kBtu/ft ²)	84.1
	Electric - Grid (kBtu)	2,285,763 (28%)	National Median Source EUI (kBtu/ft ²)	137.8
			% Diff from National Median Source EUI	-3%
Source EUI	Annual Emissions			
133.2 kBtu/ft ²	Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)			
				615

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



LEARN MORE AT
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ENERGY STAR® Scorecard

76

ENERGY STAR®
Score

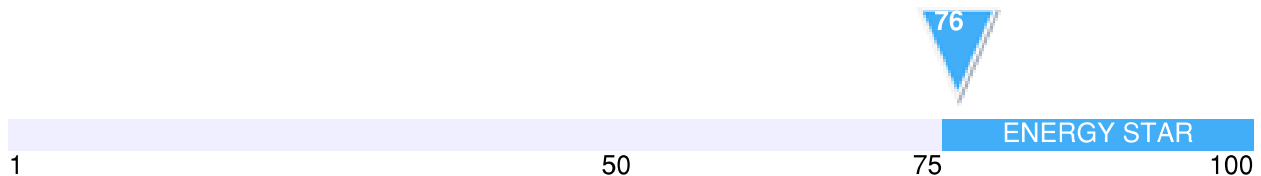
School 8

Primary Function: K-12 School
Gross Floor Area (ft²): 74,000
Built: 1885

For Year Ending: May 31, 2015
Date Generated: November 02, 2015

Property Address:
School 8
35 Chadwick Street
Paterson, New Jersey 07503

For the year ending in May 2015, this building used 110.7 (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[®] Statement of Energy Performance

76

ENERGY STAR[®]
Score¹

School 8

Primary Property Function: K-12 School
Gross Floor Area (ft²): 74,000
Built: 1885

For Year Ending: May 31, 2015
Date Generated: November 02, 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

School 8
35 Chadwick Street
Paterson, New Jersey 07503

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582630

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

78.4 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	1,004,752 (17%)
Natural Gas (kBtu)	4,794,837 (83%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	102.1
National Median Source EUI (kBtu/ft ²)	144.1
% Diff from National Median Source EUI	-23%

Source EUI

110.7 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	389

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

76

ENERGY STAR®
Score¹

School 8

Primary Property Function: K-12 School
Gross Floor Area (ft²): 74,000
Built: 1885

For Year Ending: May 31, 2015
Date Generated: November 02, 2015

Property Address:
School 8
35 Chadwick Street
Paterson, New Jersey 07503

Property ID: 4582630

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 5/31/2015 (Baseline)	Year Ending 5/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	76	76	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	78.4	78.4	0	N/A	102.1	79.8
Source EUI (kBtu/ft²)	110.7	110.7	0	N/A	144.1	112.7
\$	112,870.45	112,870.45	0	N/A	147,009.13	114,964.08
\$/ft²	1.53	1.53	0	N/A	1.99	1.55
Greenhouse Gas Emissions						
Metric Tons CO2e/year	389.2	389.2	0	N/A	506.9	396.4
kgCO2e/ ft2/year	5.3	5.3	0	N/A	6.8	5.4
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® Progress & Goals Report

65

ENERGY STAR®
Score¹

School 9

Primary Property Function: K-12 School
Gross Floor Area (ft²): 110,000
Built: 1988

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 9
6 Timothy Street
Paterson, New Jersey 07503

Property ID: 4582631

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 4/30/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	65	65	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	43.7	43.7	0	N/A	50.4	39.4
Source EUI (kBtu/ft²)	118.7	118.7	0	N/A	136.9	107.1
\$	178,308.49	178,308.49	0	N/A	205,766.21	160,913.34
\$/ft²	1.62	1.62	0	N/A	1.87	1.46
Greenhouse Gas Emissions						
Metric Tons CO2e/year	564.7	564.7	0	N/A	651.6	509.6
kgCO2e/ ft2/year	5.1	5.1	0	N/A	5.9	4.6
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

65

ENERGY STAR[®]
Score

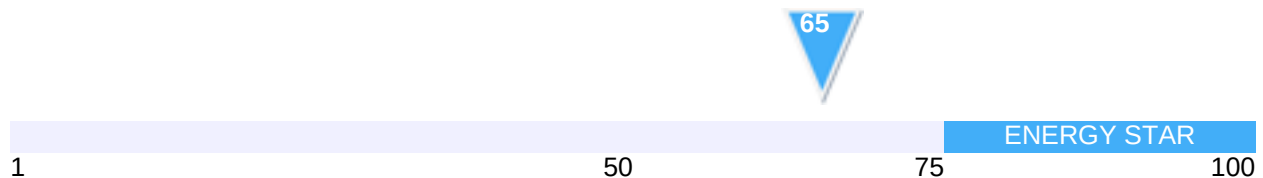
School 9

Primary Function: K-12 School
Gross Floor Area (ft²): 110,000
Built: 1988

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 9
6 Timothy Street
Paterson, New Jersey 07503

For the year ending in July 2015, this building used 118.7 (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[®] Statement of Energy Performance

65

ENERGY STAR[®]
Score¹

School 9

Primary Property Function: K-12 School
Gross Floor Area (ft²): 110,000
Built: 1988

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 9
6 Timothy Street
Paterson, New Jersey 07503

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582631

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
43.7 kBtu/ft ²	Natural Gas (kBtu)	973,520 (20%)	National Median Site EUI (kBtu/ft ²)	50.4
	Electric - Grid (kBtu)	3,831,858 (80%)	National Median Source EUI (kBtu/ft ²)	136.9
			% Diff from National Median Source EUI	-13%
Source EUI	Annual Emissions			
118.7 kBtu/ft ²	Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)		565	

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



LEARN MORE AT
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ENERGY STAR® Progress & Goals Report

65

ENERGY STAR®
Score¹

School 10

Primary Property Function: K-12 School
Gross Floor Area (ft²): 58,573
Built: 1920

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 10
48 Mercer Street
Paterson, New Jersey 07524

Property ID: 4582632

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 5/31/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	65	65	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	87.9	87.9	0	N/A	101.8	79.6
Source EUI (kBtu/ft²)	127.8	127.8	0	N/A	148.1	115.8
\$	84,770.64	84,770.64	0	N/A	98,221.45	76,811.23
\$/ft²	1.45	1.45	0	N/A	1.68	1.31
Greenhouse Gas Emissions						
Metric Tons CO2e/year	353.8	353.8	0	N/A	409.9	320.6
kgCO2e/ ft2/year	6	6	0	N/A	7	5.5
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

65

ENERGY STAR[®]
Score

School 10

Primary Function: K-12 School

Gross Floor Area (ft²): 58,573

Built: 1920

For Year Ending: July 31, 2015

Date Generated: November 25, 2015

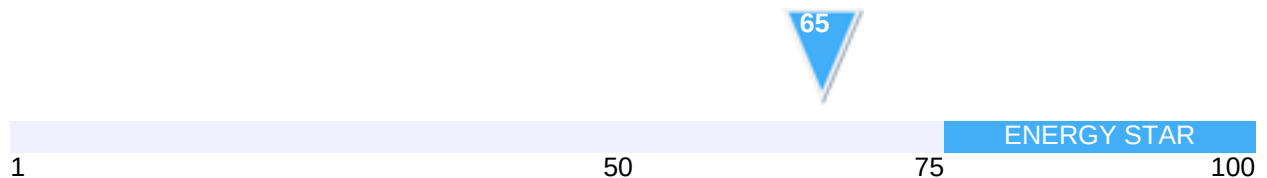
Property Address:

School 10

48 Mercer Street

Paterson, New Jersey 07524

For the year ending in July 2015, this building used 127.8 (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

65

ENERGY STAR[®]
Score¹

School 10

Primary Property Function: K-12 School
Gross Floor Area (ft²): 58,573
Built: 1920

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 10
48 Mercer Street
Paterson, New Jersey 07524

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582632

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
87.9 kBtu/ft ²	Natural Gas (kBtu)	4,152,977 (81%)	National Median Site EUI (kBtu/ft ²)	101.8
	Electric - Grid (kBtu)	995,168 (19%)	National Median Source EUI (kBtu/ft ²)	148.1
			% Diff from National Median Source EUI	-14%
Source EUI	Annual Emissions			
127.8 kBtu/ft ²	Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)			
				354

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



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ENERGY STAR® Scorecard

94

ENERGY STAR®
Score

School 11

Primary Function: K-12 School

Gross Floor Area (ft²): 35,446

Built: 1900

Property Address:

School 11

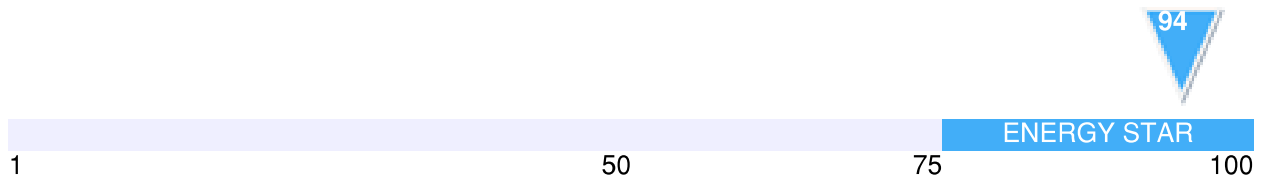
350 Market Street

Paterson, New Jersey 07501

For Year Ending: March 31, 2015

Date Generated: November 02, 2015

For the year ending in March 2015, this building used 85.9 (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[®] Statement of Energy Performance

94

ENERGY STAR[®]
Score¹

School 11

Primary Property Function: K-12 School
Gross Floor Area (ft²): 35,446
Built: 1900

For Year Ending: March 31, 2015
Date Generated: November 02, 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

School 11
350 Market Street
Paterson, New Jersey 07501

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582633

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

55.4 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	1,494,661 (76%)
Electric - Grid (kBtu)	469,672 (24%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	100.1
National Median Source EUI (kBtu/ft ²)	155.2
% Diff from National Median Source EUI	-45%

Source EUI

85.9 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	142

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®
Score¹

School 11

Primary Property Function: K-12 School
Gross Floor Area (ft²): 35,446
Built: 1900

For Year Ending: March 31, 2015
Date Generated: November 02, 2015

Property Address:
School 11
350 Market Street
Paterson, New Jersey 07501

Property ID: 4582633

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 3/31/2015 (Baseline)	Year Ending 3/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	94	94	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	55.4	55.4	0	N/A	100.1	78.3
Source EUI (kBtu/ft²)	85.9	85.9	0	N/A	155.2	121.4
\$	42,584.04	42,584.04	0	N/A	76,956.51	60,181.6
\$/ft²	1.2	1.2	0	N/A	2.17	1.7
Greenhouse Gas Emissions						
Metric Tons CO2e/year	142.3	142.3	0	N/A	257.1	201.1
kgCO2e/ ft2/year	4	4	0	N/A	7.3	5.7
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.



ENERGY STAR® Progress & Goals Report

91

ENERGY STAR®
Score¹

School 14

Primary Property Function: K-12 School
Gross Floor Area (ft²): 16,442
Built: 1885

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 14
522 Union Avenue
Paterson, New Jersey 07522

Property ID: 4582634

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 4/30/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	91	91	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	74	74	0	N/A	122.9	96.1
Source EUI (kBtu/ft²)	102.1	102.1	0	N/A	169.6	132.6
\$	19,102.91	19,102.91	0	N/A	31,731.19	24,814.45
\$/ft²	1.16	1.16	0	N/A	1.93	1.51
Greenhouse Gas Emissions						
Metric Tons CO2e/year	80.1	80.1	0	N/A	133.1	104.1
kgCO2e/ ft2/year	4.9	4.9	0	N/A	8.1	6.3
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

91

ENERGY STAR[®]
Score

School 14

Primary Function: K-12 School

Gross Floor Area (ft²): 16,442

Built: 1885

For Year Ending: July 31, 2015

Date Generated: November 25, 2015

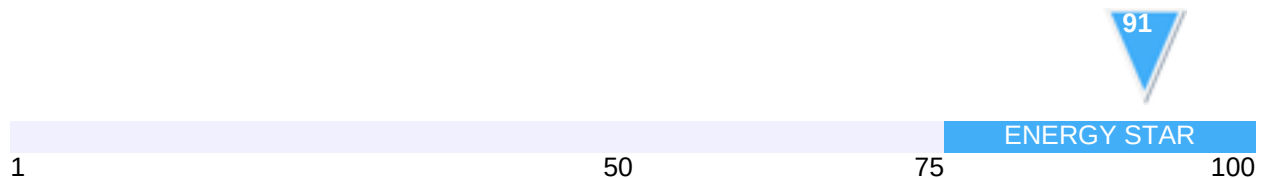
Property Address:

School 14

522 Union Avenue

Paterson, New Jersey 07522

For the year ending in July 2015, this building used 102.1 (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

91

ENERGY STAR[®]
Score¹

School 14

Primary Property Function: K-12 School
Gross Floor Area (ft²): 16,442
Built: 1885

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 14
522 Union Avenue
Paterson, New Jersey 07522

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582634

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
74 kBtu/ft ²	Natural Gas (kBtu)	1,024,234 (84%)	National Median Site EUI (kBtu/ft ²)	122.9
	Electric - Grid (kBtu)	192,195 (16%)	National Median Source EUI (kBtu/ft ²)	169.6
			% Diff from National Median Source EUI	-40%
Source EUI	Annual Emissions			
102.1 kBtu/ft ²	Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)			
				80

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



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ENERGY STAR® Progress & Goals Report

76

ENERGY STAR®
Score¹

School 15

Primary Property Function: K-12 School
Gross Floor Area (ft²): 110,104
Built: 1915

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 15
98 Oak Street
Paterson, New Jersey 07501

Property ID: 4582635

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 4/30/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	75	76	-1	N/A	50	75

Energy

Site EUI (kBtu/ft²)	73.8	73.8	0	N/A	96.1	75.2
Source EUI (kBtu/ft²)	104.4	104.4	0	N/A	136	106.4
\$	135,627.39	135,627.39	0	N/A	176,663.36	138,154.27
\$/ft²	1.23	1.23	0	N/A	1.6	1.25

Greenhouse Gas Emissions

Metric Tons CO2e/year	546.2	546.2	0	N/A	711.5	556.4
kgCO2e/ ft2/year	5	5	0	N/A	6.5	5.1

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

76

ENERGY STAR®
Score

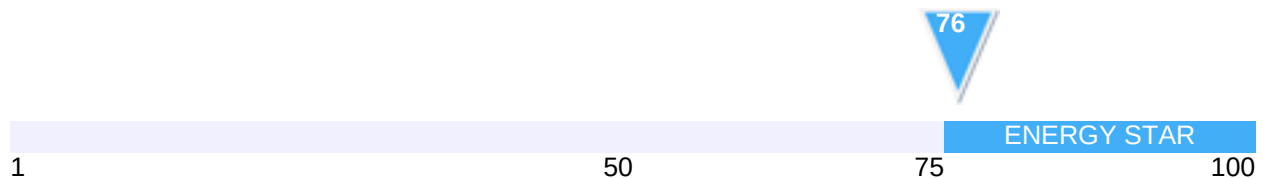
School 15

Primary Function: K-12 School
Gross Floor Area (ft²): 110,104
Built: 1915

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 15
98 Oak Street
Paterson, New Jersey 07501

For the year ending in July 2015, this building used 104.4 (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® Statement of Energy Performance

76

ENERGY STAR®
Score¹

School 15

Primary Property Function: K-12 School
Gross Floor Area (ft²): 110,104
Built: 1915

For Year Ending: July 31, 2015
Date Generated: November 25, 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

School 15
98 Oak Street
Paterson, New Jersey 07501

Property Owner

CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact

Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582635

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

73.8 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	6,702,312 (82%)
Electric - Grid (kBtu)	1,421,139 (18%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	96.1
National Median Source EUI (kBtu/ft²)	136
% Diff from National Median Source EUI	-23%

Source EUI

104.4 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	546

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



ENERGY STAR® Progress & Goals Report

77

ENERGY STAR®
Score¹

School 19

Primary Property Function: K-12 School
Gross Floor Area (ft²): 34,869
Built: 1896

For Year Ending: July 31, 2015
Date Generated: November 25, 2015

Property Address:
School 19
31 James Street
Paterson, New Jersey 07502

Property ID: 4582636

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 5/31/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	77	77	0	N/A	50	75

Energy

Site EUI (kBtu/ft²)	78.4	78.4	0	N/A	103.9	81.3
Source EUI (kBtu/ft²)	117.9	117.9	0	N/A	156.3	122.3
\$	50,904.75	50,904.75	0	N/A	67,515.83	52,798.76
\$/ft²	1.46	1.46	0	N/A	1.94	1.51

Greenhouse Gas Emissions

Metric Tons CO2e/year	193.1	193.1	0	N/A	256.1	200.3
kgCO2e/ ft2/year	5.5	5.5	0	N/A	7.3	5.7

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

77

ENERGY STAR[®]
Score

School 19

Primary Function: K-12 School

Gross Floor Area (ft²): 34,869

Built: 1896

For Year Ending: July 31, 2015

Date Generated: November 25, 2015

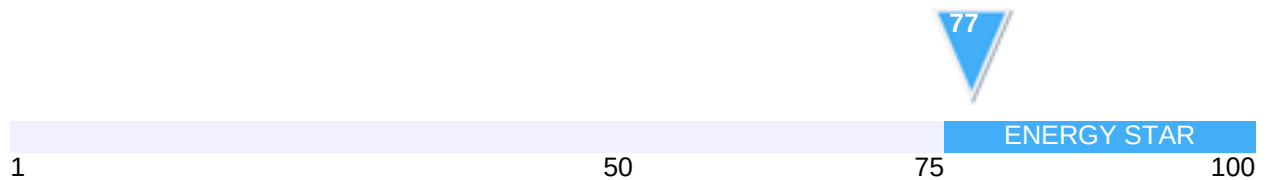
Property Address:

School 19

31 James Street

Paterson, New Jersey 07502

For the year ending in July 2015, this building used 117.9 (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® Statement of Energy Performance

77

ENERGY STAR®
Score¹

School 19

Primary Property Function: K-12 School
Gross Floor Area (ft²): 34,869
Built: 1896

For Year Ending: July 31, 2015
Date Generated: November 25, 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
School 19
31 James Street
Paterson, New Jersey 07502

Property Owner
CDM Smith
11 British American Boulevard
Latham, NY 12110
() -

Primary Contact
Connor Dowd
11 British American Boulevard
Latham, NY 12110
518-782-4571
dowdcj@cdmsmith.com

Property ID: 4582636

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
78.4 kBtu/ft²	Natural Gas (kBtu)	2,138,438 (78%)	National Median Site EUI (kBtu/ft²)	103.9
	Electric - Grid (kBtu)	593,938 (22%)	National Median Source EUI (kBtu/ft²)	156.3
			% Diff from National Median Source EUI	-25%
Source EUI	Annual Emissions			
117.9 kBtu/ft²	Greenhouse Gas Emissions (Metric Tons CO2e/year)		193	

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

Brian McLean
11 British American Boulevard Ste 200
Latham, NY 12306
518-782-4508
mcleanbr@cdmsmith.com



Professional Engineer Stamp
(if applicable)



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ENERGY STAR® Scorecard

77

ENERGY STAR®
Score

School 20

Primary Function: K-12 School

Gross Floor Area (ft²): 83,064

Built: 1926

For Year Ending: April 30, 2015

Date Generated: November 02, 2015

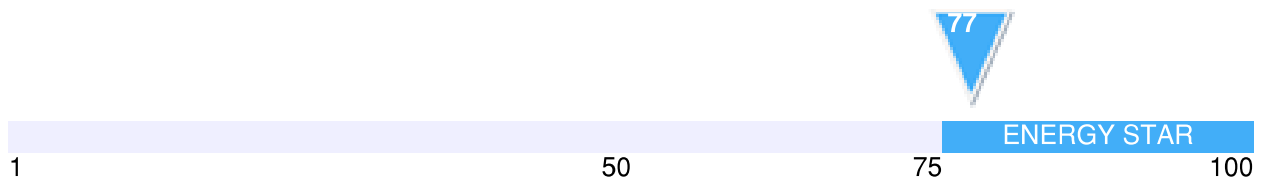
Property Address:

School 20

500 E. 37th Street

Paterson, New Jersey 07504

For the year ending in April 2015, this building used 107.7 (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® Statement of Energy Performance

77

ENERGY STAR®
Score¹

School 20

Primary Property Function: K-12 School
Gross Floor Area (ft²): 83,064
Built: 1926

For Year Ending: April 30, 2015
Date Generated: November 02, 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

School 20
500 E. 37th Street
Paterson, New Jersey 07504

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582637

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

71.9 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	4,695,229 (79%)
Electric - Grid (kBtu)	1,279,731 (21%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	94.7
National Median Source EUI (kBtu/ft²)	141.8
% Diff from National Median Source EUI	-24%

Source EUI

107.7 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	421

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

77

ENERGY STAR®
Score¹

School 20

Primary Property Function: K-12 School
Gross Floor Area (ft²): 83,064
Built: 1926

For Year Ending: April 30, 2015
Date Generated: November 02, 2015

Property Address:
School 20
500 E. 37th Street
Paterson, New Jersey 07504

Property ID: 4582637

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 4/30/2015 (Baseline)	Year Ending 4/30/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	77	77	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	71.9	71.9	0	N/A	94.7	74.1
Source EUI (kBtu/ft²)	107.7	107.7	0	N/A	141.8	110.9
\$	124,999.29	124,999.29	0	N/A	164,582.44	128,706.89
\$/ft²	1.5	1.5	0	N/A	1.98	1.55
Greenhouse Gas Emissions						
Metric Tons CO2e/year	420.7	420.7	0	N/A	553.9	433.2
kgCO2e/ ft2/year	5.1	5.1	0	N/A	6.7	5.2
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

90

ENERGY STAR®
Score

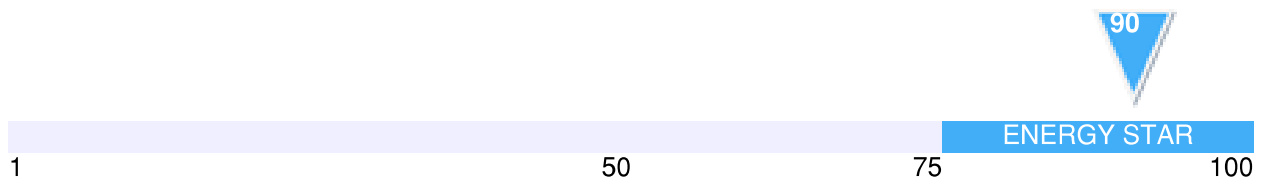
School 21

Primary Function: K-12 School
Gross Floor Area (ft²): 103,516
Built: 1950

For Year Ending: April 30, 2015
Date Generated: November 02, 2015

Property Address:
School 21
322 10th Avenue
Paterson, New Jersey 07514

For the year ending in April 2015, this building used 85.2 (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

90

ENERGY STAR[®]
Score¹

School 21

Primary Property Function: K-12 School
Gross Floor Area (ft²): 103,516
Built: 1950

For Year Ending: April 30, 2015
Date Generated: November 02, 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

School 21
322 10th Avenue
Paterson, New Jersey 07514

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582638

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

58.3 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	1,190,455 (20%)
Natural Gas (kBtu)	4,841,732 (80%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	94.3
National Median Source EUI (kBtu/ft ²)	138
% Diff from National Median Source EUI	-38%

Source EUI

85.2 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	416

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

90

ENERGY STAR®
Score¹

School 21

Primary Property Function: K-12 School
Gross Floor Area (ft²): 103,516
Built: 1950

For Year Ending: April 30, 2015
Date Generated: November 02, 2015

Property Address:
School 21
322 10th Avenue
Paterson, New Jersey 07514

Property ID: 4582638

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 4/30/2015 (Baseline)	Year Ending 4/30/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	90	90	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	58.3	58.3	0	N/A	94.3	73.8
Source EUI (kBtu/ft²)	85.2	85.2	0	N/A	138	107.9
\$	139,755.94	139,755.94	0	N/A	226,235.11	176,920.4
\$/ft²	1.35	1.35	0	N/A	2.19	1.71
Greenhouse Gas Emissions						
Metric Tons CO2e/year	416.5	416.5	0	N/A	674.3	527.3
kgCO2e/ ft2/year	4	4	0	N/A	6.5	5.1
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

48

ENERGY STAR®
Score

School 24

Primary Function: K-12 School
Gross Floor Area (ft²): 100,800
Built: 1950

Property Address:
School 24
50 19th Avenue
Paterson, New Jersey 07513

For Year Ending: April 30, 2015
Date Generated: November 02, 2015

For the year ending in April 2015, this building used 140.6 (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[®] Statement of Energy Performance

48

ENERGY STAR[®]
Score¹

School 24

Primary Property Function: K-12 School
Gross Floor Area (ft²): 100,800
Built: 1950

For Year Ending: April 30, 2015
Date Generated: November 02, 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

School 24
50 19th Avenue
Paterson, New Jersey 07513

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582639

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

69.2 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	3,701,235 (53%)
Electric - Grid (kBtu)	3,276,386 (47%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	68.1
National Median Source EUI (kBtu/ft ²)	138.4
% Diff from National Median Source EUI	2%

Source EUI

140.6 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	635

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

48

ENERGY STAR®
Score¹

School 24

Primary Property Function: K-12 School
Gross Floor Area (ft²): 100,800
Built: 1950

For Year Ending: April 30, 2015
Date Generated: November 02, 2015

Property Address:
School 24
50 19th Avenue
Paterson, New Jersey 07513

Property ID: 4582639

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 4/30/2015 (Baseline)	Year Ending 4/30/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	48	48	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	69.2	69.2	0	N/A	68.1	53.3
Source EUI (kBtu/ft²)	140.6	140.6	0	N/A	138.4	108.3
\$	195,866.63	195,866.63	0	N/A	192,815.07	150,785.36
\$/ft²	1.94	1.94	0	N/A	1.91	1.5
Greenhouse Gas Emissions						
Metric Tons CO2e/year	635.2	635.2	0	N/A	625.3	489
kgCO2e/ ft2/year	6.3	6.3	0	N/A	6.2	4.9
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

83

ENERGY STAR[®]
Score

School 25

Primary Function: K-12 School

Gross Floor Area (ft²): 72,564

Built: 1930

For Year Ending: May 31, 2015

Date Generated: November 02, 2015

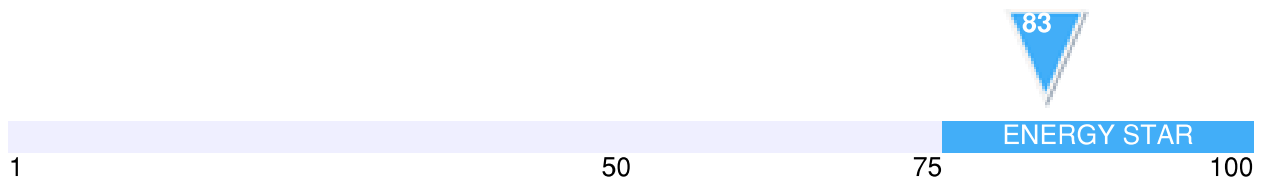
Property Address:

School 25

287 Trenton Avenue

Paterson, New Jersey 07503

For the year ending in May 2015, this building used 101.1 (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

83

ENERGY STAR[®]
Score¹

School 25

Primary Property Function: K-12 School
Gross Floor Area (ft²): 72,564
Built: 1930

For Year Ending: May 31, 2015
Date Generated: November 02, 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

School 25
287 Trenton Avenue
Paterson, New Jersey 07503

Property Owner

' () - _____

Primary Contact

' () - _____

Property ID: 4582640

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

68.2 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	3,922,432 (79%)
Electric - Grid (kBtu)	1,023,931 (21%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	97.5
National Median Source EUI (kBtu/ft ²)	144.5
% Diff from National Median Source EUI	-30%

Source EUI

101.1 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	345

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

83

ENERGY STAR®
Score¹

School 25

Primary Property Function: K-12 School
Gross Floor Area (ft²): 72,564
Built: 1930

For Year Ending: May 31, 2015
Date Generated: November 02, 2015

Property Address:
School 25
287 Trenton Avenue
Paterson, New Jersey 07503

Property ID: 4582640

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 5/31/2015 (Baseline)	Year Ending 5/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	83	83	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	68.2	68.2	0	N/A	97.5	76.2
Source EUI (kBtu/ft²)	101.1	101.1	0	N/A	144.5	113
\$	104,801.32	104,801.32	0	N/A	149,828.89	117,169.34
\$/ft²	1.44	1.44	0	N/A	2.06	1.61
Greenhouse Gas Emissions						
Metric Tons CO2e/year	345.4	345.4	0	N/A	493.8	386.2
kgCO2e/ ft2/year	4.8	4.8	0	N/A	6.8	5.3
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

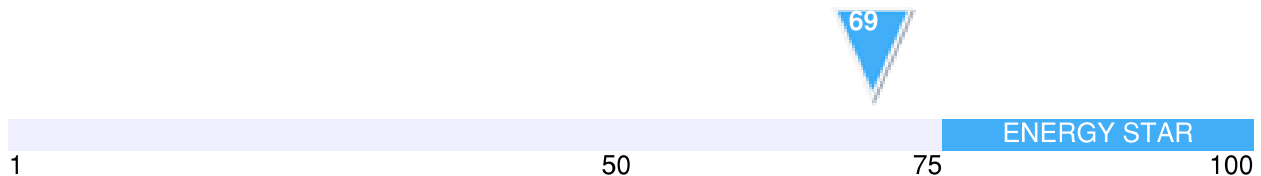
School 27

Primary Function: K-12 School
Gross Floor Area (ft²): 103,926
Built: 1951

For Year Ending: July 31, 2015
Date Generated: November 02, 2015

Property Address:
School 27
250 Richmond Avenue
Paterson, New Jersey 07502

For the year ending in July 2015, this building used 113.9 (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[®] Statement of Energy Performance

69

ENERGY STAR[®]
Score¹

School 27

Primary Property Function: K-12 School
Gross Floor Area (ft²): 103,926
Built: 1951

For Year Ending: July 31, 2015
Date Generated: November 02, 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

School 27
250 Richmond Avenue
Paterson, New Jersey 07502

Property Owner

,
() -

Primary Contact

,
() -

Property ID: 4582641

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

60.2 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	3,731,286 (60%)
Electric - Grid (kBtu)	2,520,601 (40%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	72.4
National Median Source EUI (kBtu/ft ²)	137.1
% Diff from National Median Source EUI	-17%

Source EUI

113.9 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	536

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®
Score¹

School 27

Primary Property Function: K-12 School
Gross Floor Area (ft²): 103,926
Built: 1951

For Year Ending: July 31, 2015
Date Generated: November 02, 2015

Property Address:
School 27
250 Richmond Avenue
Paterson, New Jersey 07502

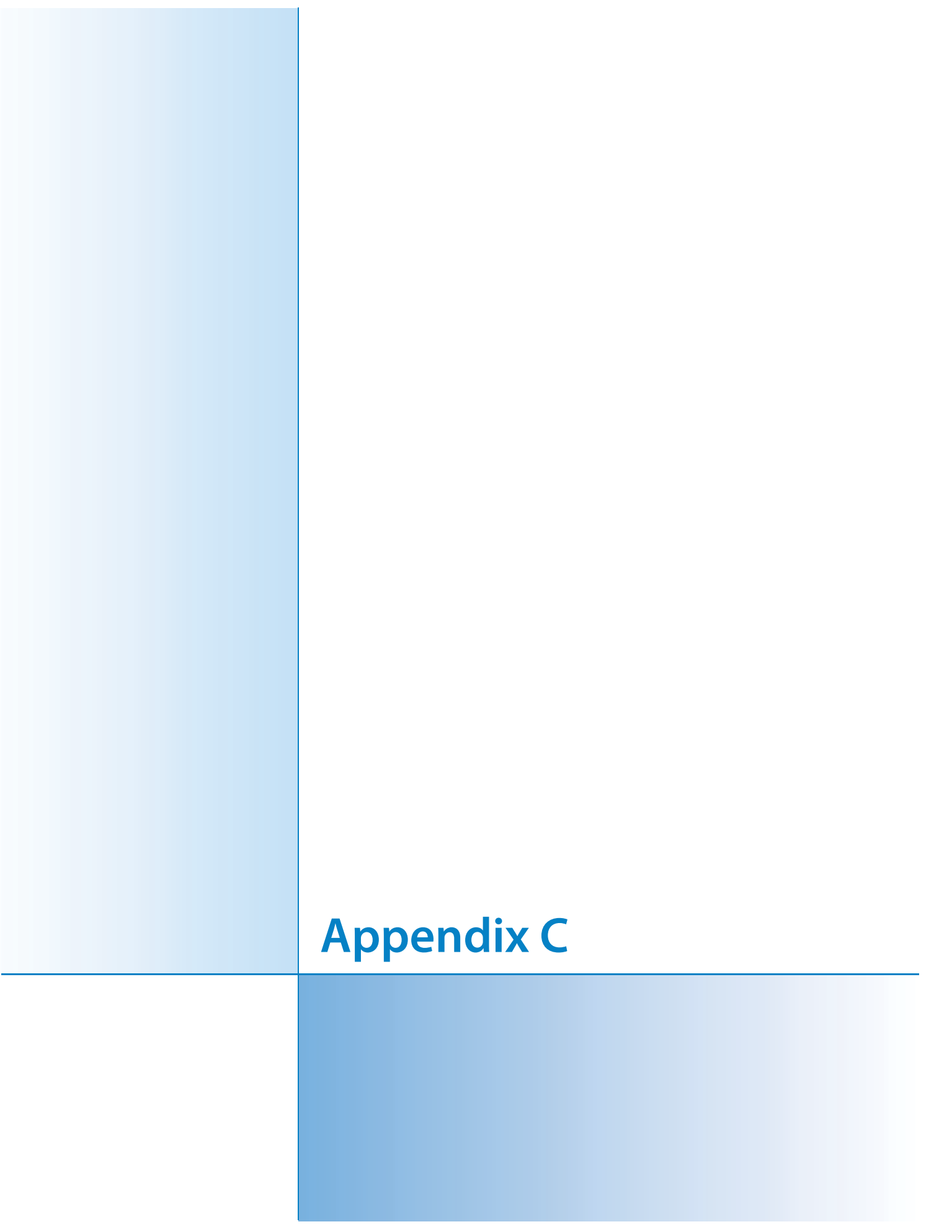
Property ID: 4582641

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 7/31/2015 (Baseline)	Year Ending 7/31/2015 (Selected)	% Change	Property's Target	National Median	ENERGY STAR Score of 75
ENERGY STAR Score	69	69	0	N/A	50	75
Energy						
Site EUI (kBtu/ft²)	60.2	60.2	0	N/A	72.4	56.6
Source EUI (kBtu/ft²)	113.9	113.9	0	N/A	137.1	107.2
\$	160,815.09	160,815.09	0	N/A	193,598.38	151,397.84
\$/ft²	1.55	1.55	0	N/A	1.86	1.46
Greenhouse Gas Emissions						
Metric Tons CO2e/year	535.6	535.6	0	N/A	644.8	504.2
kgCO2e/ ft2/year	5.2	5.2	0	N/A	6.2	4.9
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.

The page features a decorative design with two blue squares and two intersecting lines. One square is in the top-left corner, and the other is in the bottom-right corner. A horizontal blue line and a vertical blue line intersect at the center of the page, creating a cross shape.

Appendix C

Building	School 2	
Address	22 Passaic Ave	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	29600	sqft
Wall Conductivity	0.25	u Value
Window Area	7024	sqft
Window Conductivity	0.737471526	u Value
Roof Area	77280	sqft
Roof Conductivity	0.25	u Value
Floor Area	85887	sqft
Volume	1030644	cuft

Set Points		
Heating Set Point	72	deg F
Cooling Set Point	79	deg F

Internal Loads		
Lighting Density	0.28	w/sqft
Equipment Density	0.10	w/sqft
Occupancy	694	people
Occupant Sensible Load	160	btu/person
Infiltration	8,588.7	cfm
Exhaust	25	cfm
Equipment Density	0.17	therms
Building Equipment		
Heating System	2,446,000	Btuh
Heating Efficiency	75	%
Cooling System	340,000	Btuh
Cooling Efficiency	10.0	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	29600	sqft
Wall Conductivity	0.25	u Value
Window Area	7024	sqft
Window Conductivity	0.737471526	u Value
Roof Area	77280	sqft
Roof Conductivity	0.25	u Value
Floor Area	85887	sqft
Volume	1030644	cuft

Set Points		
Heating Set Point	72	deg F
Cooling Set Point	79	deg F

Internal Loads		
Lighting Density	0.28	w/sqft
Equipment Density	0.10	w/sqft
Occupancy	694	people
Occupant Sensible Load	160	btu/person
Infiltration	8,588.7	cfm
Exhaust	25	cfm
Equipment Density	0.17	therms/sqft
Building Equipment		
Heating System	2,446,000	Btuh
Heating Efficiency	92	%
Cooling System	340,000	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	-749,650	-239,430	-218,616	-1,207,696
97.5	23	0	1	-590,150	-239,430	-172,102	-1,001,682
92.5	93	0	1	-430,650	-239,430	-125,588	-795,668
87.5	237	0	1	-271,150	-239,430	-79,074	-589,654
82.5	452	0	1	-111,650	-239,430	-32,560	-383,640
77.5	692	0	1	47,850	-239,430	13,954	-177,626
72.5	858	0	1	207,350	-239,430	60,468	0
67.5	753	1	0	143,550	-239,430	41,863	0
62.5	735	1	0	303,050	-239,430	88,377	151,996
57.5	671	1	0	462,550	-239,430	134,891	358,010
52.5	736	1	0	622,050	-239,430	181,405	564,024
47.5	708	1	0	781,550	-239,430	227,919	770,038
42.5	756	1	0	941,050	-239,430	274,432	976,052
37.5	705	1	0	1,100,550	-239,430	320,946	1,182,066
32.5	546	1	0	1,260,050	-239,430	367,460	1,388,080
27.5	340	1	0	1,419,550	-239,430	413,974	1,594,094
22.5	229	1	0	1,579,050	-239,430	460,488	1,800,108
17.5	134	1	0	1,738,550	-239,430	507,002	2,006,122
12.5	57	1	0	1,898,050	-239,430	553,516	2,212,136
7.5	22	1	0	2,057,550	-239,430	600,030	2,418,150
2.5	9	1	0	2,217,050	-239,430	646,544	2,624,164
-2.5	2	1	0	2,376,550	-239,430	693,058	2,830,178
-7.5	0	1	0	2,536,050	-239,430	739,572	3,036,192
Total	8,760	6,403	2,357				

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	-749,650	-239,430	-218,616	-1,207,696
97.5	23	0	1	-590,150	-239,430	-172,102	-1,001,682
92.5	93	0	1	-430,650	-239,430	-125,588	-795,668
87.5	237	0	1	-271,150	-239,430	-79,074	-589,654
82.5	452	0	1	-111,650	-239,430	-32,560	-383,640
77.5	692	0	1	47,850	-239,430	13,954	-177,626
72.5	858	0	1	207,350	-239,430	60,468	0
67.5	753	1	0	143,550	-239,430	41,863	0
62.5	735	1	0	303,050	-239,430	88,377	151,996
57.5	671	1	0	462,550	-239,430	134,891	358,010
52.5	736	1	0	622,050	-239,430	181,405	564,024
47.5	708	1	0	781,550	-239,430	227,919	770,038
42.5	756	1	0	941,050	-239,430	274,432	976,052
37.5	705	1	0	1,100,550	-239,430	320,946	1,182,066
32.5	546	1	0	1,260,050	-239,430	367,460	1,388,080
27.5	340	1	0	1,419,550	-239,430	413,974	1,594,094
22.5	229	1	0	1,579,050	-239,430	460,488	1,800,108
17.5	134	1	0	1,738,550	-239,430	507,002	2,006,122
12.5	57	1	0	1,898,050	-239,430	553,516	2,212,136
7.5	22	1	0	2,057,550	-239,430	600,030	2,418,150
2.5	9	1	0	2,217,050	-239,430	646,544	2,624,164
-2.5	2	1	0	2,376,550	-239,430	693,058	2,830,178
-7.5	0	1	0	2,536,050	-239,430	739,572	3,036,192
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	-408,000	-960,000	80	0	100	0
0	0	0	-408,000	-10,426,667	869	0	100	0
0	0	0	-408,000	-39,941,053	3,328	0	100	0
0	0	0	-408,000	-96,696,000	8,058	0	100	0
0	0	0	-408,000	-167,650,909	13,971	0	100	0
0	0	0	-213,151	-122,917,256	10,243	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
202,662	148,956,351	1,490	0	0	0	0	0	0
477,347	320,299,843	3,203	0	0	0	0	0	0
752,032	553,495,784	5,535	0	0	0	0	0	0
1,026,718	726,916,076	7,269	0	0	0	0	0	0
1,301,403	983,860,614	9,839	0	0	0	0	0	0
1,576,088	1,111,142,206	11,111	0	0	0	0	0	0
1,850,774	1,010,522,354	10,105	0	0	0	0	0	0
2,125,459	722,656,008	7,227	0	0	0	0	0	0
2,400,144	549,633,011	5,496	0	0	0	0	0	0
2,674,829	358,427,148	3,584	0	0	0	0	0	0
2,949,515	168,122,342	1,681	0	0	0	0	0	0
3,224,200	70,932,402	709	0	0	0	0	0	0
3,261,333	29,352,000	294	0	0	0	0	0	0
3,261,333	6,522,667	65	0	0	0	0	0	0
3,261,333	0	0	0	0	0	0	0	0
	6,760,838,804	67,608		-438,591,884	36,549		149,900	0

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	-408,000	-960,000	80	0	100	0
0	0	0	-408,000	-10,426,667	869	0	100	0
0	0	0	-408,000	-39,941,053	3,328	0	100	0
0	0	0	-408,000	-96,696,000	8,058	0	100	0
0	0	0	-408,000	-167,650,909	13,971	0	100	0
0	0	0	-213,151	-122,917,256	10,243	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
165,213	121,431,808	1,214	0	0	0	0	0	0
389,142	261,114,002	2,611	0	0	0	0	0	0
613,070	451,219,389	4,512	0	0	0	0	0	0
836,998	592,594,627	5,926	0	0	0	0	0	0
1,060,926	802,060,283	8,021	0	0	0	0	0	0
1,284,855	905,822,450	9,058	0	0	0	0	0	0
1,508,783	823,795,397	8,238	0	0	0	0	0	0
1,732,711	589,121,746	5,891	0	0	0	0	0	0
1,956,639	448,070,390	4,481	0	0	0	0	0	0
2,180,567	292,196,044	2,922	0	0	0	0	0	0
2,404,496	137,056,257	1,371	0	0	0	0	0	0
2,628,424	57,825,327	578	0	0	0	0	0	0
2,658,696	23,928,261	239	0	0	0	0	0	0
2,658,696	5,317,391	53	0	0	0	0	0	0
2,658,696	0	0	0	0	0	0	0	0
	5,511,553,373	55,116		-438,591,884	36,549		149,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	67,608
Cooling	36,549	0
Vent Cooling	0	0
Lighting	210,664	0
Equipment	75,237	1,489
Total	322,450	69,098

311,110 73705
-4% 6%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	55,116
Cooling	36,549	0
Vent Cooling	0	0
Lighting	210,664	0
Equipment	75,237	1,489
Total	322,450	56,605

Proposed Savings		
Estimated	kWh	therms
Savings	0	12,493

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.

Atlantic City, 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.

Building	School 8	
Address	35 Chadwick St.	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	20250	sqft
Wall Conductivity	0.25	u Value
Window Area	3063	sqft
Window Conductivity	0.70747633	u Value
Roof Area	25080	sqft
Roof Conductivity	0.25	u Value
Floor Area	74000	sqft
Volume	888000	cuft

Set Points		
Heating Set Point	72	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.38	w/sqft
Equipment Density	0.18	w/sqft
Occupancy	560	people
Occupant Sensible Load	120	btu/person
Infiltration	14,800.0	cfm
Exhaust	2000	cfm
Equipment Density	0.12	therms
Building Equipment		
Heating System	7,188,000	Btuh
Heating Efficiency	74	%
Cooling System	165,900	Btuh
Cooling Efficiency	10.0	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	20250	sqft
Wall Conductivity	0.25	u Value
Window Area	3063	sqft
Window Conductivity	0.70747633	u Value
Roof Area	25080	sqft
Roof Conductivity	0.25	u Value
Floor Area	74000	sqft
Volume	888000	cuft

Set Points		
Heating Set Point	72	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.38	w/sqft
Equipment Density	0.18	w/sqft
Occupancy	560	people
Occupant Sensible Load	120	btu/person
Infiltration	14,800.0	cfm
Exhaust	2000	cfm
Equipment Density	0.12	therms/sqft
Building Equipment		
Heating System	7,188,000	Btuh
Heating Efficiency	83	%
Cooling System	165,900	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	0	0	1	-411,735	-220,635	-553,392	-1,185,761
97.5	9	0	1	-344,237	-220,635	-462,672	-1,027,544
92.5	56	0	1	-276,740	-220,635	-371,952	-869,326
87.5	170	0	1	-209,242	-220,635	-281,232	-711,109
82.5	355	0	1	-141,745	-220,635	-190,512	-552,891
77.5	573	0	1	-74,247	-220,635	-99,792	-394,674
72.5	846	0	1	-6,750	-220,635	-9,072	-236,456
67.5	771	1	0	60,748	-220,635	81,648	0
62.5	787	1	0	128,245	-220,635	172,368	79,979
57.5	771	1	0	195,743	-220,635	263,088	238,196
52.5	789	1	0	263,240	-220,635	353,808	396,414
47.5	750	1	0	330,738	-220,635	444,528	554,631
42.5	738	1	0	398,235	-220,635	535,248	712,849
37.5	673	1	0	465,733	-220,635	625,968	871,066
32.5	578	1	0	533,230	-220,635	716,688	1,029,284
27.5	382	1	0	600,728	-220,635	807,408	1,187,501
22.5	242	1	0	668,225	-220,635	898,128	1,345,719
17.5	148	1	0	735,723	-220,635	988,848	1,503,936
12.5	70	1	0	803,220	-220,635	1,079,568	1,662,154
7.5	31	1	0	870,718	-220,635	1,170,288	1,820,371
2.5	14	1	0	938,215	-220,635	1,261,008	1,978,589
-2.5	4	1	0	1,005,713	-220,635	1,351,728	2,136,806
-7.5	3	1	0	1,073,210	-220,635	1,442,448	2,295,024
Total	8,760	6,751	2,009				

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	0	0	1	-411,735	-220,635	-553,392	-1,185,761
97.5	9	0	1	-344,237	-220,635	-462,672	-1,027,544
92.5	56	0	1	-276,740	-220,635	-371,952	-869,326
87.5	170	0	1	-209,242	-220,635	-281,232	-711,109
82.5	355	0	1	-141,745	-220,635	-190,512	-552,891
77.5	573	0	1	-74,247	-220,635	-99,792	-394,674
72.5	846	0	1	-6,750	-220,635	-9,072	-236,456
67.5	771	1	0	60,748	-220,635	81,648	0
62.5	787	1	0	128,245	-220,635	172,368	79,979
57.5	771	1	0	195,743	-220,635	263,088	238,196
52.5	789	1	0	263,240	-220,635	353,808	396,414
47.5	750	1	0	330,738	-220,635	444,528	554,631
42.5	738	1	0	398,235	-220,635	535,248	712,849
37.5	673	1	0	465,733	-220,635	625,968	871,066
32.5	578	1	0	533,230	-220,635	716,688	1,029,284
27.5	382	1	0	600,728	-220,635	807,408	1,187,501
22.5	242	1	0	668,225	-220,635	898,128	1,345,719
17.5	148	1	0	735,723	-220,635	988,848	1,503,936
12.5	70	1	0	803,220	-220,635	1,079,568	1,662,154
7.5	31	1	0	870,718	-220,635	1,170,288	1,820,371
2.5	14	1	0	938,215	-220,635	1,261,008	1,978,589
-2.5	4	1	0	1,005,713	-220,635	1,351,728	2,136,806
-7.5	3	1	0	1,073,210	-220,635	1,442,448	2,295,024
Total	8,760	6,751	2,009				

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	-199,080	0	0	0	100	0
0	0	0	-199,080	-1,990,800	166	0	100	0
0	0	0	-199,080	-11,735,242	978	0	100	0
0	0	0	-199,080	-33,843,600	2,820	0	100	0
0	0	0	-199,080	-64,248,545	5,354	0	100	0
0	0	0	-199,080	-95,060,700	7,922	0	100	0
0	0	0	-199,080	-129,555,138	10,796	0	100	0
0	0	0	0	0	0	0	0	0
108,079	85,058,247	851	0	0	0	0	0	0
321,887	248,174,512	2,482	0	0	0	0	0	0
535,694	422,662,534	4,227	0	0	0	0	0	0
749,501	562,126,044	5,621	0	0	0	0	0	0
963,309	710,921,912	7,109	0	0	0	0	0	0
1,177,116	792,199,241	7,922	0	0	0	0	0	0
1,390,924	803,953,892	8,040	0	0	0	0	0	0
1,604,731	613,007,288	6,130	0	0	0	0	0	0
1,818,539	440,086,330	4,401	0	0	0	0	0	0
2,032,346	300,787,206	3,008	0	0	0	0	0	0
2,246,153	157,230,739	1,572	0	0	0	0	0	0
2,459,961	76,258,786	763	0	0	0	0	0	0
2,673,768	37,432,756	374	0	0	0	0	0	0
2,887,576	11,550,303	116	0	0	0	0	0	0
3,101,383	9,304,149	93	0	0	0	0	0	0
	5,270,753,942	52,708		-336,434,026	28,036		200,900	0

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	-199,080	0	0	0	100	0
0	0	0	-199,080	-1,990,800	166	0	100	0
0	0	0	-199,080	-11,735,242	978	0	100	0
0	0	0	-199,080	-33,843,600	2,820	0	100	0
0	0	0	-199,080	-64,248,545	5,354	0	100	0
0	0	0	-199,080	-95,060,700	7,922	0	100	0
0	0	0	-199,080	-129,555,138	10,796	0	100	0
0	0	0	0	0	0	0	0	0
96,360	75,835,064	758	0	0	0	0	0	0
286,983	221,264,023	2,213	0	0	0	0	0	0
477,607	376,831,657	3,768	0	0	0	0	0	0
668,230	501,172,617	5,012	0	0	0	0	0	0
858,854	633,833,994	6,338	0	0	0	0	0	0
1,049,477	706,298,118	7,063	0	0	0	0	0	0
1,240,101	716,778,169	7,168	0	0	0	0	0	0
1,430,724	546,536,619	5,465	0	0	0	0	0	0
1,621,348	392,366,126	3,924	0	0	0	0	0	0
1,811,971	268,171,726	2,682	0	0	0	0	0	0
2,002,595	140,181,623	1,402	0	0	0	0	0	0
2,193,218	67,989,761	680	0	0	0	0	0	0
2,383,842	33,373,782	334	0	0	0	0	0	0
2,574,465	10,297,860	103	0	0	0	0	0	0
2,765,089	8,295,266	83	0	0	0	0	0	0
	4,699,226,406	46,992		-336,434,026	28,036		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	52,708
Cooling	28,036	0
Vent Cooling	0	0
Lighting	246,331	0
Equipment	116,683	1,051
Total	391,051	53,759

368,70060034

-6%10%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	46,992
Cooling	28,036	0
Vent Cooling	0	0
Lighting	246,331	0
Equipment	116,683	1,051
Total	391,051	48,043

Proposed Savings		
Estimated Savings	kWh	therms
	0	5,715

- 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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Building	School 10	
Address	48 Mercer Street	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	25200	sqft
Wall Conductivity	0.25	u Value
Window Area	4866	sqft
Window Conductivity	1	u Value
Roof Area	11550	sqft
Roof Conductivity	0.25	u Value
Floor Area	58573	sqft
Volume	702876	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.45	w/sqft
Equipment Density	0.19	w/sqft
Occupancy	660	people
Occupant Sensible Load	200	btu/person
Infiltration	8,200.2	cfm
Exhaust	600	cfm
Equipment Density	0.14	therms
Building Equipment		
Heating System	6,360,000	Btuh
Heating Efficiency	75	%
Cooling System	60,000	Btuh
Cooling Efficiency	12.0	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	25200	sqft
Wall Conductivity	0.25	u Value
Window Area	4866	sqft
Window Conductivity	1	u Value
Roof Area	11550	sqft
Roof Conductivity	0.25	u Value
Floor Area	58573	sqft
Volume	702876	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.45	w/sqft
Equipment Density	0.19	w/sqft
Occupancy	660	people
Occupant Sensible Load	200	btu/person
Infiltration	8,200.2	cfm
Exhaust	600	cfm
Equipment Density	0.14	therms/sqft
Building Equipment		
Heating System	6,360,000	Btuh
Heating Efficiency	93	%
Cooling System	60,000	Btuh
Cooling Efficiency	12.0	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	0	0	1	-428,632	-273,442	-289,879	-991,953
97.5	9	0	1	-358,364	-273,442	-242,358	-874,164
92.5	56	0	1	-288,097	-273,442	-194,837	-756,376
87.5	170	0	1	-217,829	-273,442	-147,316	-638,587
82.5	355	0	1	-147,562	-273,442	-99,794	-520,798
77.5	573	0	1	-77,294	-273,442	-52,273	-403,010
72.5	846	0	1	-7,027	-273,442	-4,752	-285,221
67.5	771	1	0	7,027	-273,442	4,752	0
62.5	787	1	0	77,294	-273,442	52,273	0
57.5	771	1	0	147,562	-273,442	99,794	0
52.5	789	1	0	217,829	-273,442	147,316	91,703
47.5	750	1	0	288,097	-273,442	194,837	209,491
42.5	738	1	0	358,364	-273,442	242,358	327,280
37.5	673	1	0	428,632	-273,442	289,879	445,069
32.5	578	1	0	498,899	-273,442	337,400	562,858
27.5	382	1	0	569,167	-273,442	384,922	680,646
22.5	242	1	0	639,434	-273,442	432,443	798,435
17.5	148	1	0	709,702	-273,442	479,964	916,224
12.5	70	1	0	779,969	-273,442	527,485	1,034,012
7.5	31	1	0	850,237	-273,442	575,006	1,151,801
2.5	14	1	0	920,504	-273,442	622,528	1,269,590
-2.5	4	1	0	990,772	-273,442	670,049	1,387,378
-7.5	3	1	0	1,061,039	-273,442	717,570	1,505,167
Total	8,760	6,751	2,009				

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	0	0	1	-428,632	-273,442	-289,879	-991,953
97.5	9	0	1	-358,364	-273,442	-242,358	-874,164
92.5	56	0	1	-288,097	-273,442	-194,837	-756,376
87.5	170	0	1	-217,829	-273,442	-147,316	-638,587
82.5	355	0	1	-147,562	-273,442	-99,794	-520,798
77.5	573	0	1	-77,294	-273,442	-52,273	-403,010
72.5	846	0	1	-7,027	-273,442	-4,752	-285,221
67.5	771	1	0	7,027	-273,442	4,752	0
62.5	787	1	0	77,294	-273,442	52,273	0
57.5	771	1	0	147,562	-273,442	99,794	0
52.5	789	1	0	217,829	-273,442	147,316	91,703
47.5	750	1	0	288,097	-273,442	194,837	209,491
42.5	738	1	0	358,364	-273,442	242,358	327,280
37.5	673	1	0	428,632	-273,442	289,879	445,069
32.5	578	1	0	498,899	-273,442	337,400	562,858
27.5	382	1	0	569,167	-273,442	384,922	680,646
22.5	242	1	0	639,434	-273,442	432,443	798,435
17.5	148	1	0	709,702	-273,442	479,964	916,224
12.5	70	1	0	779,969	-273,442	527,485	1,034,012
7.5	31	1	0	850,237	-273,442	575,006	1,151,801
2.5	14	1	0	920,504	-273,442	622,528	1,269,590
-2.5	4	1	0	990,772	-273,442	670,049	1,387,378
-7.5	3	1	0	1,061,039	-273,442	717,570	1,505,167
Total	8,760	6,751	2,009				

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	-60,000	0	0	0	100	0
0	0	0	-60,000	-600,000	50	0	100	0
0	0	0	-60,000	-3,536,842	295	0	100	0
0	0	0	-60,000	-10,200,000	850	0	100	0
0	0	0	-60,000	-19,363,636	1,614	0	100	0
0	0	0	-60,000	-28,650,000	2,388	0	100	0
0	0	0	-60,000	-39,046,154	3,254	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
122,270	96,471,301	965	0	0	0	0	0	0
279,322	209,491,445	2,095	0	0	0	0	0	0
436,374	322,043,651	3,220	0	0	0	0	0	0
593,425	399,375,089	3,994	0	0	0	0	0	0
750,477	433,775,521	4,338	0	0	0	0	0	0
907,528	346,675,797	3,467	0	0	0	0	0	0
1,064,580	257,628,323	2,576	0	0	0	0	0	0
1,221,631	180,801,452	1,808	0	0	0	0	0	0
1,378,683	96,507,811	965	0	0	0	0	0	0
1,535,735	47,607,773	476	0	0	0	0	0	0
1,692,786	23,699,007	237	0	0	0	0	0	0
1,849,838	7,399,351	74	0	0	0	0	0	0
2,006,889	6,020,668	60	0	0	0	0	0	0
	2,427,497,188	24,275		-101,396,632	8,450		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	24,275
Cooling	8,450	0
Vent Cooling	0	0
Lighting	230,895	0
Equipment	97,489	1,183
Total	336,833	25,458

363,58526357.9

7%3%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	19,577
Cooling	8,450	0
Vent Cooling	0	0
Lighting	230,895	0
Equipment	97,489	1,183
Total	336,833	20,759

Proposed Savings		
Estimated Savings	kWh	therms
	0	4,698

- 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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Building	School 11	
Address	350 Market St.	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	49680	sqft
Wall Conductivity	0.25	u Value
Window Area	3156	sqft
Window Conductivity	0.698352345	u Value
Roof Area	8900	sqft
Roof Conductivity	0.25	u Value
Floor Area	35446	sqft
Volume	425352	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.15	w/sqft
Occupancy	263	people
Occupant Sensible Load	220	btu/person
Infiltration	3,544.6	cfm
Exhaust	50	cfm
Equipment Density	0.12	therms

Building Equipment		
Heating System	3,092,000	Btuh
Heating Efficiency	80	%
Cooling System	252,150	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	0	0	1	-513,895	-137,607	-118,406	-769,908
97.5	9	0	1	-429,650	-137,607	-98,995	-666,252
92.5	56	0	1	-345,405	-137,607	-79,584	-562,596
87.5	170	0	1	-261,160	-137,607	-60,174	-458,940
82.5	355	0	1	-176,915	-137,607	-40,763	-355,284
77.5	573	0	1	-92,670	-137,607	-21,352	-251,629
72.5	846	0	1	-8,425	-137,607	-1,941	-147,973
67.5	771	1	0	8,425	-137,607	1,941	0
62.5	787	1	0	92,670	-137,607	21,352	0
57.5	771	1	0	176,915	-137,607	40,763	80,070
52.5	789	1	0	261,160	-137,607	60,174	183,726
47.5	750	1	0	345,405	-137,607	79,584	287,382
42.5	738	1	0	429,650	-137,607	98,995	391,038
37.5	673	1	0	513,895	-137,607	118,406	494,693
32.5	578	1	0	598,140	-137,607	137,817	598,349
27.5	382	1	0	682,385	-137,607	157,228	702,005
22.5	242	1	0	766,630	-137,607	176,639	805,661
17.5	148	1	0	850,875	-137,607	196,049	909,317
12.5	70	1	0	935,120	-137,607	215,460	1,012,973
7.5	31	1	0	1,019,365	-137,607	234,871	1,116,628
2.5	14	1	0	1,103,610	-137,607	254,282	1,220,284
-2.5	4	1	0	1,187,855	-137,607	273,693	1,323,940
-7.5	3	1	0	1,272,100	-137,607	293,104	1,427,596
Total	8,760	6,751	2,009				

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	-302,580	0	0	0	100	0
0	0	0	-302,580	-3,025,800	252	0	100	0
0	0	0	-302,580	-17,836,295	1,486	0	100	0
0	0	0	-302,580	-51,438,600	4,287	0	100	0
0	0	0	-302,580	-97,650,818	8,138	0	100	0
0	0	0	-301,954	-144,183,219	12,015	0	100	0
0	0	0	-177,567	-115,555,386	9,630	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
100,088	77,167,494	772	0	0	0	0	0	0
229,657	181,199,642	1,812	0	0	0	0	0	0
359,227	269,420,356	2,694	0	0	0	0	0	0
488,797	360,732,143	3,607	0	0	0	0	0	0
618,367	416,160,817	4,162	0	0	0	0	0	0
747,937	432,307,321	4,323	0	0	0	0	0	0
877,506	335,207,422	3,352	0	0	0	0	0	0
1,007,076	243,712,426	2,437	0	0	0	0	0	0
1,136,646	168,223,599	1,682	0	0	0	0	0	0
1,266,216	88,635,102	886	0	0	0	0	0	0
1,395,786	43,269,352	433	0	0	0	0	0	0
1,525,355	21,354,975	214	0	0	0	0	0	0
1,654,925	6,619,701	66	0	0	0	0	0	0
1,784,495	5,353,485	54	0	0	0	0	0	0
	2,649,363,835	26,494		-429,690,118	35,808		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	26,494
Cooling	35,808	0
Vent Cooling	0	0
Lighting	127,308	0
Equipment	46,576	1,051
Total	209,691	27,545

194,60021130

-8%-30%

Proposed Building Envelope		
Wall Area	49680	sqft
Wall Conductivity	0.25	u Value
Window Area	3156	sqft
Window Conductivity	0.350877193	u Value
Roof Area	8900	sqft
Roof Conductivity	0.25	u Value
Floor Area	35446	sqft
Volume	425352	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.15	w/sqft
Occupancy	263	people
Occupant Sensible Load	220	btu/person
Infiltration	3,544.6	cfm
Exhaust	50	cfm
Equipment Density	0.12	therms/sqft

Building Equipment		
Heating System	3,092,000	Btuh
Heating Efficiency	80	%
Cooling System	252,150	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	0	0	1	-480,447	-137,607	-118,406	-736,461
97.5	9	0	1	-401,685	-137,607	-98,995	-638,288
92.5	56	0	1	-322,924	-137,607	-79,584	-540,115
87.5	170	0	1	-244,162	-137,607	-60,174	-441,943
82.5	355	0	1	-165,400	-137,607	-40,763	-343,770
77.5	573	0	1	-86,638	-137,607	-21,352	-245,597
72.5	846	0	1	-7,876	-137,607	-1,941	-147,424
67.5	771	1	0	7,876	-137,607	1,941	0
62.5	787	1	0	86,638	-137,607	21,352	0
57.5	771	1	0	165,400	-137,607	40,763	68,555
52.5	789	1	0	244,162	-137,607	60,174	166,728
47.5	750	1	0	322,924	-137,607	79,584	264,901
42.5	738	1	0	401,685	-137,607	98,995	363,073
37.5	673	1	0	480,447	-137,607	118,406	461,246
32.5	578	1	0	559,209	-137,607	137,817	559,419
27.5	382	1	0	637,971	-137,607	157,228	657,591
22.5	242	1	0	716,733	-137,607	176,639	755,764
17.5	148	1	0	795,495	-137,607	196,049	853,937
12.5	70	1	0	874,256	-137,607	215,460	952,110
7.5	31	1	0	953,018	-137,607	234,871	1,050,282
2.5	14	1	0	1,031,780	-137,607	254,282	1,148,455
-2.5	4	1	0	1,110,542	-137,607	273,693	1,246,628
-7.5	3	1	0	1,189,304	-137,607	293,104	1,344,800
Total	8,760	6,751	2,009				

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	-302,580	0	0	0	100	0
0	0	0	-302,580	-3,025,800	252	0	100	0
0	0	0	-302,580	-17,836,295	1,486	0	100	0
0	0	0	-302,580	-51,438,600	4,287	0	100	0
0	0	0	-302,580	-97,650,818	8,138	0	100	0
0	0	0	-294,717	-140,727,185	11,727	0	100	0
0	0	0	-176,909	-115,127,193	9,594	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
85,694	66,070,268	661	0	0	0	0	0	0
208,410	164,435,572	1,644	0	0	0	0	0	0
331,126	248,344,468	2,483	0	0	0	0	0	0
453,842	334,935,256	3,349	0	0	0	0	0	0
576,558	388,023,307	3,880	0	0	0	0	0	0
699,274	404,180,092	4,042	0	0	0	0	0	0
821,989	313,999,938	3,140	0	0	0	0	0	0
944,705	228,618,663	2,286	0	0	0	0	0	0
1,067,421	157,978,319	1,580	0	0	0	0	0	0
1,190,137	83,309,585	833	0	0	0	0	0	0
1,312,853	40,698,436	407	0	0	0	0	0	0
1,435,569	20,097,961	201	0	0	0	0	0	0
1,558,284	6,233,138	62	0	0	0	0	0	0
1,681,000	5,043,001	50	0	0	0	0	0	0
	2,461,968,004	24,620		-425,805,891	35,484		200,900	0

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	24,620
Cooling	35,484	0
Vent Cooling	0	0
Lighting	127,308	0
Equipment	46,576	1,051
Total	209,368	25,671

Proposed Savings		
Estimated Savings	kWh	therms
	324	1,874

- 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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Existing Envelope						
	Wall 1	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	36	6	4	2	5	
Width (ft)	1380	3	3	3	2	
Count	1	103	54	59	30	246
R-value	4	1.5	1.5	1.5	1	
U-value	0.25	0.6666667	0.6666667	0.6666667	1	0.698352345
Area	49680	1854	648	354	300	3156
	Wall 2	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	1	3	3	0	0	
Width (ft)	0	1	1	0	0	
Count	1	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Wall Area (sqft)		49680				
Average U-value		0.25				
	Roof 1	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	89	0	0	0	0	
Width (ft)	100	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	8900	0	0	0	0	0
	Roof 2	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	1	0	0	0	0	
Width (ft)	0	0	0	0	0	
Count	0	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Roof Area (sqft)		8900				
Average U-value		0.25				
Total Window Area (sqft)		3156				
Average U-value		0.6983523				

Proposed Envelope						
	Wall 1	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	36	6	4	2	5	
Width (ft)	1380	3	3	3	2	
Count	1	103	54	59	30	246
R-value	4	2.85	2.85	2.85	2.85	
U-value	0.25	0.350877193	0.350877193	0.350877193	0.3508772	0.350877193
Area	49680	1854	648	354	300	3156
	Wall 2	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	1	3	3	0	0	
Width (ft)	0	1	1	0	0	
Count	1	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Wall Area (sqft) 49680 Average U-value 0.25						
	Roof 1	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	89	0	0	0	0	
Width (ft)	100	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	8900	0	0	0	0	0
	Roof 2	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	1	0	0	0	0	
Width (ft)	0	0	0	0	0	
Count	0	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Roof Area (sqft) 8900 Average U-value 0.25						
Total Window Area (sqft)		3156				
Average U-value		0.350877193				

Building	School 14	
Address	522 Union Ave	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	8250	sqft
Wall Conductivity	0.25	u Value
Window Area	1791	sqft
Window Conductivity	1	u Value
Roof Area	5400	sqft
Roof Conductivity	0.25	u Value
Floor Area	16442	sqft
Volume	197304	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	79	deg F

Internal Loads		
Lighting Density	0.34	w/sqft
Equipment Density	0.11	w/sqft
Occupancy	215	people
Occupant Sensible Load	220	btu/person
Infiltration	1,644.2	cfm
Exhaust	120	cfm
Equipment Density	0.07	therms
Building Equipment		
Heating System	1,626,000	Btuh
Heating Efficiency	75	%
Cooling System	174,000	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	0	0	1	-122,282	-79,052	-44,775	-246,110	
97.5	9	0	1	-96,265	-79,052	-35,249	-210,566	
92.5	56	0	1	-70,247	-79,052	-25,722	-175,022	
87.5	170	0	1	-44,230	-79,052	-16,195	-139,478	
82.5	355	0	1	-18,212	-79,052	-6,669	-103,933	
77.5	573	0	1	7,805	-79,052	2,858	-68,389	
72.5	846	0	1	33,823	-79,052	12,385	-32,845	
67.5	771	1	0	2,602	-79,052	953	0	
62.5	787	1	0	28,619	-79,052	10,479	0	
57.5	771	1	0	54,637	-79,052	20,006	0	
52.5	789	1	0	80,654	-79,052	29,533	31,135	
47.5	750	1	0	106,672	-79,052	39,059	66,679	
42.5	738	1	0	132,689	-79,052	48,586	102,223	
37.5	673	1	0	158,707	-79,052	58,113	137,767	
32.5	578	1	0	184,724	-79,052	67,639	173,311	
27.5	382	1	0	210,742	-79,052	77,166	208,855	
22.5	242	1	0	236,759	-79,052	86,693	244,400	
17.5	148	1	0	262,777	-79,052	96,219	279,944	
12.5	70	1	0	288,794	-79,052	105,746	315,488	
7.5	31	1	0	314,812	-79,052	115,273	351,032	
2.5	14	1	0	340,829	-79,052	124,800	386,576	
-2.5	4	1	0	366,847	-79,052	134,326	422,120	
-7.5	3	1	0	392,864	-79,052	143,853	457,665	
Total	8,760	6,751	2,009					

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	-208,800	0	0	0	100	0
0	0	0	-208,800	-2,088,000	174	0	100	0
0	0	0	-208,800	-12,308,211	1,026	0	100	0
0	0	0	-167,373	-28,453,421	2,371	0	100	0
0	0	0	-124,720	-40,250,560	3,354	0	100	0
0	0	0	-82,067	-39,187,007	3,266	0	100	0
0	0	0	-39,414	-25,649,428	2,137	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
41,513	32,753,507	328	0	0	0	0	0	0
88,905	66,678,692	667	0	0	0	0	0	0
136,297	100,587,306	1,006	0	0	0	0	0	0
183,689	123,622,968	1,236	0	0	0	0	0	0
231,082	133,565,190	1,336	0	0	0	0	0	0
278,474	106,377,023	1,064	0	0	0	0	0	0
325,866	78,859,602	789	0	0	0	0	0	0
373,258	55,242,238	552	0	0	0	0	0	0
420,651	29,445,542	294	0	0	0	0	0	0
468,043	14,509,328	145	0	0	0	0	0	0
515,435	7,216,091	72	0	0	0	0	0	0
562,827	2,251,309	23	0	0	0	0	0	0
610,220	1,830,659	18	0	0	0	0	0	0
	752,939,456	7,529		-147,936,626	12,328		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	7,529
Cooling	12,328	0
Vent Cooling	0	0
Lighting	48,971	0
Equipment	15,844	569
Total	77,142	8,099

75,620 7398.9
-2% -9%

Proposed Building Envelope		
Wall Area	8250	sqft
Wall Conductivity	0.25	u Value
Window Area	1791	sqft
Window Conductivity	1	u Value
Roof Area	5400	sqft
Roof Conductivity	0.25	u Value
Floor Area	16442	sqft
Volume	197304	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	79	deg F

Internal Loads		
Lighting Density	0.34	w/sqft
Equipment Density	0.11	w/sqft
Occupancy	215	people
Occupant Sensible Load	220	btu/person
Infiltration	1,644.2	cfm
Exhaust	120	cfm
Equipment Density	0.07	therms/sqft
Building Equipment		
Heating System	1,626,000	Btuh
Heating Efficiency	83	%
Cooling System	174,000	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	0	0	1	-122,282	-79,052	-44,775	-246,110	
97.5	9	0	1	-96,265	-79,052	-35,249	-210,566	
92.5	56	0	1	-70,247	-79,052	-25,722	-175,022	
87.5	170	0	1	-44,230	-79,052	-16,195	-139,478	
82.5	355	0	1	-18,212	-79,052	-6,669	-103,933	
77.5	573	0	1	7,805	-79,052	2,858	-68,389	
72.5	846	0	1	33,823	-79,052	12,385	-32,845	
67.5	771	1	0	2,602	-79,052	953	0	
62.5	787	1	0	28,619	-79,052	10,479	0	
57.5	771	1	0	54,637	-79,052	20,006	0	
52.5	789	1	0	80,654	-79,052	29,533	31,135	
47.5	750	1	0	106,672	-79,052	39,059	66,679	
42.5	738	1	0	132,689	-79,052	48,586	102,223	
37.5	673	1	0	158,707	-79,052	58,113	137,767	
32.5	578	1	0	184,724	-79,052	67,639	173,311	
27.5	382	1	0	210,742	-79,052	77,166	208,855	
22.5	242	1	0	236,759	-79,052	86,693	244,400	
17.5	148	1	0	262,777	-79,052	96,219	279,944	
12.5	70	1	0	288,794	-79,052	105,746	315,488	
7.5	31	1	0	314,812	-79,052	115,273	351,032	
2.5	14	1	0	340,829	-79,052	124,800	386,576	
-2.5	4	1	0	366,847	-79,052	134,326	422,120	
-7.5	3	1	0	392,864	-79,052	143,853	457,665	
Total	8,760	6,751	2,009					

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	-208,800	0	0	0	100	0
0	0	0	-208,800	-2,088,000	174	0	100	0
0	0	0	-208,800	-12,308,211	1,026	0	100	0
0	0	0	-167,373	-28,453,421	2,371	0	100	0
0	0	0	-124,720	-40,250,560	3,354	0	100	0
0	0	0	-82,067	-39,187,007	3,266	0	100	0
0	0	0	-39,414	-25,649,428	2,137	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
37,511	29,596,542	296	0	0	0	0	0	0
80,336	60,251,830	603	0	0	0	0	0	0
123,160	90,892,144	909	0	0	0	0	0	0
165,984	111,707,501	1,117	0	0	0	0	0	0
208,809	120,691,436	1,207	0	0	0	0	0	0
251,633	96,123,816	961	0	0	0	0	0	0
294,457	71,258,676	713	0	0	0	0	0	0
337,282	49,917,685	499	0	0	0	0	0	0
380,106	26,607,418	266	0	0	0	0	0	0
422,930	13,110,839	131	0	0	0	0	0	0
465,755	6,520,564	65	0	0	0	0	0	0
508,579	2,034,316	20	0	0	0	0	0	0
551,403	1,654,210	17	0	0	0	0	0	0
	680,366,978	6,804		-147,936,626	12,328		200,900	0

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	6,804
Cooling	12,328	0
Vent Cooling	0	0
Lighting	48,971	0
Equipment	15,844	569
Total	77,142	7,373

Proposed Savings		
Estimated Savings	kWh	therms
	0	726

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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Building	School 14	
Address	522 Union Ave	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	8250	sqft
Wall Conductivity	0.25	u Value
Window Area	1791	sqft
Window Conductivity	1	u Value
Roof Area	5400	sqft
Roof Conductivity	0.25	u Value
Floor Area	16442	sqft
Volume	197304	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	79	deg F

Internal Loads		
Lighting Density	0.34	w/sqft
Equipment Density	0.11	w/sqft
Occupancy	215	people
Occupant Sensible Load	220	btu/person
Infiltration	1,644.2	cfm
Exhaust	120	cfm
Equipment Density	0.07	therms
Building Equipment		
Heating System	1,626,000	Btuh
Heating Efficiency	75	%
Cooling System	174,000	Btuh
Cooling Efficiency	10.0	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	8250	sqft
Wall Conductivity	0.25	u Value
Window Area	1791	sqft
Window Conductivity	0.344827586	u Value
Roof Area	5400	sqft
Roof Conductivity	0.25	u Value
Floor Area	16442	sqft
Volume	197304	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	79	deg F

Internal Loads		
Lighting Density	0.34	w/sqft
Equipment Density	0.11	w/sqft
Occupancy	215	people
Occupant Sensible Load	220	btu/person
Infiltration	1,644.2	cfm
Exhaust	120	cfm
Equipment Density	0.07	therms/sqft
Building Equipment		
Heating System	1,626,000	Btuh
Heating Efficiency	75	%
Cooling System	174,000	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	0	0	1	-122,282	-79,052	-44,775	-246,110	
97.5	9	0	1	-96,265	-79,052	-35,249	-210,566	
92.5	56	0	1	-70,247	-79,052	-25,722	-175,022	
87.5	170	0	1	-44,230	-79,052	-16,195	-139,478	
82.5	355	0	1	-18,212	-79,052	-6,669	-103,933	
77.5	573	0	1	7,805	-79,052	2,858	-68,389	
72.5	846	0	1	33,823	-79,052	12,385	-32,845	
67.5	771	1	0	2,602	-79,052	953	0	
62.5	787	1	0	28,619	-79,052	10,479	0	
57.5	771	1	0	54,637	-79,052	20,006	0	
52.5	789	1	0	80,654	-79,052	29,533	31,135	
47.5	750	1	0	106,672	-79,052	39,059	66,679	
42.5	738	1	0	132,689	-79,052	48,586	102,223	
37.5	673	1	0	158,707	-79,052	58,113	137,767	
32.5	578	1	0	184,724	-79,052	67,639	173,311	
27.5	382	1	0	210,742	-79,052	77,166	208,855	
22.5	242	1	0	236,759	-79,052	86,693	244,400	
17.5	148	1	0	262,777	-79,052	96,219	279,944	
12.5	70	1	0	288,794	-79,052	105,746	315,488	
7.5	31	1	0	314,812	-79,052	115,273	351,032	
2.5	14	1	0	340,829	-79,052	124,800	386,576	
-2.5	4	1	0	366,847	-79,052	134,326	422,120	
-7.5	3	1	0	392,864	-79,052	143,853	457,665	
Total	8,760	6,751	2,009					

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	0	0	1	-94,707	-79,052	-44,775	-218,535	
97.5	9	0	1	-74,557	-79,052	-35,249	-188,858	
92.5	56	0	1	-54,406	-79,052	-25,722	-159,181	
87.5	170	0	1	-34,256	-79,052	-16,195	-129,504	
82.5	355	0	1	-14,105	-79,052	-6,669	-99,826	
77.5	573	0	1	6,045	-79,052	2,858	-70,149	
72.5	846	0	1	26,196	-79,052	12,385	-40,472	
67.5	771	1	0	2,015	-79,052	953	0	
62.5	787	1	0	22,165	-79,052	10,479	0	
57.5	771	1	0	42,316	-79,052	20,006	0	
52.5	789	1	0	62,466	-79,052	29,533	12,947	
47.5	750	1	0	82,617	-79,052	39,059	42,624	
42.5	738	1	0	102,767	-79,052	48,586	72,301	
37.5	673	1	0	122,918	-79,052	58,113	101,978	
32.5	578	1	0	143,068	-79,052	67,639	131,655	
27.5	382	1	0	163,218	-79,052	77,166	161,332	
22.5	242	1	0	183,369	-79,052	86,693	191,009	
17.5	148	1	0	203,519	-79,052	96,219	220,686	
12.5	70	1	0	223,670	-79,052	105,746	250,363	
7.5	31	1	0	243,820	-79,052	115,273	280,041	
2.5	14	1	0	263,971	-79,052	124,800	309,718	
-2.5	4	1	0	284,121	-79,052	134,326	339,395	
-7.5	3	1	0	304,272	-79,052	143,853	369,072	
Total	8,760	6,751	2,009					

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	-208,800	0	0	0	100	0
0	0	0	-208,800	-2,088,000	174	0	100	0
0	0	0	-208,800	-12,308,211	1,026	0	100	0
0	0	0	-167,373	-28,453,421	2,371	0	100	0
0	0	0	-124,720	-40,250,560	3,354	0	100	0
0	0	0	-82,067	-39,187,007	3,266	0	100	0
0	0	0	-39,414	-25,649,428	2,137	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
41,513	32,753,507	328	0	0	0	0	0	0
88,905	66,678,692	667	0	0	0	0	0	0
136,297	100,587,306	1,006	0	0	0	0	0	0
183,689	123,622,968	1,236	0	0	0	0	0	0
231,082	133,565,190	1,336	0	0	0	0	0	0
278,474	106,377,023	1,064	0	0	0	0	0	0
325,866	78,859,602	789	0	0	0	0	0	0
373,258	55,242,238	552	0	0	0	0	0	0
420,651	29,445,542	294	0	0	0	0	0	0
468,043	14,509,328	145	0	0	0	0	0	0
515,435	7,216,091	72	0	0	0	0	0	0
562,827	2,251,309	23	0	0	0	0	0	0
610,220	1,830,659	18	0	0	0	0	0	0
	752,939,456	7,529		-147,936,626	12,328		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	7,529
Cooling	12,328	0
Vent Cooling	0	0
Lighting	48,971	0
Equipment	15,844	569
Total	77,142	8,099

75,620 7398.9
-2% -9%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	5,517
Cooling	12,519	0
Vent Cooling	0	0
Lighting	48,971	0
Equipment	15,844	569
Total	77,333	6,087

Proposed Savings		
Estimated Savings	kWh	therms
	-191	2,012

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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Proposed Envelope						
	Wall 1	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	25	6	3	6	0	
Width (ft)	330	3	3	1	0	
Count	1	88	19	6	0	113
R-value	4	2.9	2.9	2.9	2.9	
U-value	0.25	0.344827586	0.344827586	0.344827586	0.3448276	0.344827586
Area	8250	1584	171	36	0	1791
	Wall 2	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	1	3	3	0	0	
Width (ft)	0	1	1	0	0	
Count	1	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Wall Area (sqft)		8250				
Average U-value		0.25				
	Roof 1	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	90	0	0	0	0	
Width (ft)	60	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	5400	0	0	0	0	0
	Roof 2	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	1	0	0	0	0	
Width (ft)	0	0	0	0	0	
Count	0	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Roof Area (sqft)		5400				
Average U-value		0.25				
Total Window Area (sqft)		1791				
Average U-value		0.344827586				

Building	School 3	
Address	31 James St	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	16920	sqft
Wall Conductivity	0.25	u Value
Window Area	2229	sqft
Window Conductivity	1	u Value
Roof Area	11550	sqft
Roof Conductivity	0.25	u Value
Floor Area	34869	sqft
Volume	418428	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	78	deg F

Internal Loads		
Lighting Density	0.45	w/sqft
Equipment Density	0.15	w/sqft
Occupancy	441	people
Occupant Sensible Load	220	btu/person
Infiltration	4,533.0	cfm
Exhaust	200	cfm
Equipment Density	0.11	therms

Building Equipment		
Heating System	4,658,000	Btuh
Heating Efficiency	75	%
Cooling System	306,000	Btuh
Cooling Efficiency	10.0	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	16920	sqft
Wall Conductivity	0.25	u Value
Window Area	2229	sqft
Window Conductivity	0.344827586	u Value
Roof Area	11550	sqft
Roof Conductivity	0.25	u Value
Floor Area	34869	sqft
Volume	418428	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	78	deg F

Internal Loads		
Lighting Density	0.45	w/sqft
Equipment Density	0.15	w/sqft
Occupancy	441	people
Occupant Sensible Load	220	btu/person
Infiltration	4,533.0	cfm
Exhaust	200	cfm
Equipment Density	0.11	therms/sqft

Building Equipment		
Heating System	4,658,000	Btuh
Heating Efficiency	75	%
Cooling System	306,000	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	0	0	1	-228,989	-179,425	-125,234	-533,648
97.5	9	0	1	-182,257	-179,425	-99,676	-461,358
92.5	56	0	1	-135,524	-179,425	-74,118	-389,067
87.5	170	0	1	-88,792	-179,425	-48,560	-316,777
82.5	355	0	1	-42,059	-179,425	-23,002	-244,486
77.5	573	0	1	4,673	-179,425	2,556	-172,196
72.5	846	0	1	51,406	-179,425	28,114	-99,905
67.5	771	1	0	4,673	-179,425	2,556	0
62.5	787	1	0	51,406	-179,425	28,114	0
57.5	771	1	0	98,138	-179,425	53,672	0
52.5	789	1	0	144,871	-179,425	79,230	44,676
47.5	750	1	0	191,603	-179,425	104,788	116,966
42.5	738	1	0	238,336	-179,425	130,346	189,257
37.5	673	1	0	285,068	-179,425	155,904	261,548
32.5	578	1	0	331,801	-179,425	181,462	333,838
27.5	382	1	0	378,533	-179,425	207,020	406,129
22.5	242	1	0	425,266	-179,425	232,578	478,419
17.5	148	1	0	471,998	-179,425	258,136	550,710
12.5	70	1	0	518,731	-179,425	283,694	623,000
7.5	31	1	0	565,463	-179,425	309,252	695,291
2.5	14	1	0	612,196	-179,425	334,814	767,581
-2.5	4	1	0	658,928	-179,425	360,368	839,872
-7.5	3	1	0	705,661	-179,425	385,926	912,162
Total	8,760	6,751	2,009				

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	0	0	1	-193,210	-179,425	-125,234	-497,869
97.5	9	0	1	-153,779	-179,425	-99,676	-432,880
92.5	56	0	1	-114,349	-179,425	-74,118	-367,892
87.5	170	0	1	-74,918	-179,425	-48,560	-302,903
82.5	355	0	1	-35,488	-179,425	-23,002	-237,915
77.5	573	0	1	3,943	-179,425	2,556	-172,926
72.5	846	0	1	43,374	-179,425	28,114	-107,937
67.5	771	1	0	3,943	-179,425	2,556	0
62.5	787	1	0	43,374	-179,425	28,114	0
57.5	771	1	0	82,804	-179,425	53,672	0
52.5	789	1	0	122,235	-179,425	79,230	22,040
47.5	750	1	0	161,665	-179,425	104,788	87,029
42.5	738	1	0	201,096	-179,425	130,346	152,017
37.5	673	1	0	240,527	-179,425	155,904	217,006
32.5	578	1	0	279,957	-179,425	181,462	281,995
27.5	382	1	0	319,388	-179,425	207,020	346,983
22.5	242	1	0	358,818	-179,425	232,578	411,972
17.5	148	1	0	398,249	-179,425	258,136	476,961
12.5	70	1	0	437,680	-179,425	283,694	541,949
7.5	31	1	0	477,110	-179,425	309,252	606,938
2.5	14	1	0	516,541	-179,425	334,814	671,926
-2.5	4	1	0	555,972	-179,425	360,368	736,915
-7.5	3	1	0	595,402	-179,425	385,926	801,904
Total	8,760	6,751	2,009				

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	-367,200	0	0	0	100	0
0	0	0	-367,200	-3,672,000	306	0	100	0
0	0	0	-367,200	-21,645,474	1,804	0	100	0
0	0	0	-367,200	-62,424,000	5,202	0	100	0
0	0	0	-293,383	-94,682,846	7,890	0	100	0
0	0	0	-206,635	-98,668,127	8,222	0	100	0
0	0	0	-119,886	-78,018,234	6,502	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
59,568	46,999,078	470	0	0	0	0	0	0
155,955	116,966,468	1,170	0	0	0	0	0	0
252,343	186,228,894	1,862	0	0	0	0	0	0
348,730	234,695,329	2,347	0	0	0	0	0	0
445,117	257,277,882	2,573	0	0	0	0	0	0
541,505	206,854,844	2,069	0	0	0	0	0	0
637,892	154,369,915	1,544	0	0	0	0	0	0
734,280	108,673,380	1,087	0	0	0	0	0	0
830,667	58,146,688	581	0	0	0	0	0	0
927,054	28,738,685	287	0	0	0	0	0	0
1,023,442	14,328,184	143	0	0	0	0	0	0
1,119,829	4,479,317	45	0	0	0	0	0	0
1,216,217	3,648,650	36	0	0	0	0	0	0
	1,421,407,312	14,214		-359,110,681	29,926		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	14,214
Cooling	29,926	0
Vent Cooling	0	0
Lighting	137,454	0
Equipment	45,818	964
Total	213,197	15,178

218,426 15691.1
2% 3%

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	-367,200	0	0	0	100	0
0	0	0	-367,200	-3,672,000	306	0	100	0
0	0	0	-367,200	-21,645,474	1,804	0	100	0
0	0	0	-363,484	-61,792,244	5,149	0	100	0
0	0	0	-285,497	-92,137,803	7,678	0	100	0
0	0	0	-207,511	-99,086,526	8,257	0	100	0
0	0	0	-129,525	-84,290,676	7,024	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
29,387	23,186,133	232	0	0	0	0	0	0
116,038	87,028,692	870	0	0	0	0	0	0
202,690	149,585,056	1,496	0	0	0	0	0	0
289,341	194,726,695	1,947	0	0	0	0	0	0
375,993	217,323,851	2,173	0	0	0	0	0	0
462,644	176,730,139	1,767	0	0	0	0	0	0
549,296	132,929,599	1,329	0	0	0	0	0	0
635,947	94,120,213	941	0	0	0	0	0	0
722,599	50,581,924	506	0	0	0	0	0	0
809,250	25,086,763	251	0	0	0	0	0	0
895,902	12,542,627	125	0	0	0	0	0	0
982,553	3,930,214	39	0	0	0	0	0	0
1,069,205	3,207,615	32	0	0	0	0	0	0
	1,170,979,521	11,710		-362,624,723	30,219		200,900	0

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	11,710
Cooling	30,219	0
Vent Cooling	0	0
Lighting	137,454	0
Equipment	45,818	964
Total	213,490	12,673

Proposed Savings		
Estimated Savings	kWh	therms
	-293	2,504

- 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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Existing Envelope						
	Wall 1	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	36	6	6	4	5	
Width (ft)	470	3	2	3	3	
Count	1	90	6	36	7	139
R-value	4	1	1	1	1	
U-value	0.25	1	1	1	1	1
Area	16920	1620	72	432	105	2229
	Wall 2	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	1	3	3	0	0	
Width (ft)	0	1	1	0	0	
Count	1	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Wall Area (sqft)		16920				
Average U-value		0.25				
	Roof 1	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	165	0	0	0	0	
Width (ft)	70	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	11550	0	0	0	0	0
	Roof 2	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	1	0	0	0	0	
Width (ft)	0	0	0	0	0	
Count	0	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Roof Area (sqft)		11550				
Average U-value		0.25				
Total Window Area (sqft)		2229				
Average U-value		1				

Proposed Envelope						
	Wall 1	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	36	6	6	4	5	
Width (ft)	470	3	2	3	3	
Count	1	90	6	36	7	139
R-value	4	2.9	2.9	2.9	2.9	
U-value	0.25	0.344827586	0.344827586	0.344827586	0.3448276	0.344827586
Area	16920	1620	72	432	105	2229
	Wall 2	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	1	3	3	0	0	
Width (ft)	0	1	1	0	0	
Count	1	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Wall Area (sqft) 16920						
Average U-value 0.25						
	Roof 1	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	165	0	0	0	0	
Width (ft)	70	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	11550	0	0	0	0	0
	Roof 2	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	1	0	0	0	0	
Width (ft)	0	0	0	0	0	
Count	0	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Roof Area (sqft)		11550				
Average U-value		0.25				
Total Window Area (sqft)		2229				
Average U-value		0.344827586				

Building	School 21	
Address	322 Tenth Avenue Paterson, NJ 0751	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	35500	sqft
Wall Conductivity	0.25	u Value
Window Area	5180	sqft
Window Conductivity	1	u Value
Roof Area	41860	sqft
Roof Conductivity	0.25	u Value
Floor Area	103516	sqft
Volume	1242192	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.07	w/sqft
Occupancy	720	people
Occupant Sensible Load	160	btu/person
Infiltration	19,668.0	cfm
Exhaust	1700	cfm
Equipment Density	0.15	therms

Building Equipment		
Heating System	6,427,000	Btuh
Heating Efficiency	80	%
Cooling System	400,000	Btuh
Cooling Efficiency	10.5	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	35500	sqft
Wall Conductivity	0.25	u Value
Window Area	5180	sqft
Window Conductivity	1	u Value
Roof Area	41860	sqft
Roof Conductivity	0.25	u Value
Floor Area	103516	sqft
Volume	1242192	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.07	w/sqft
Occupancy	720	people
Occupant Sensible Load	160	btu/person
Infiltration	19,668.0	cfm
Exhaust	1700	cfm
Equipment Density	0.15	therms/sqft

Building Equipment		
Heating System	6,427,000	Btuh
Heating Efficiency	84	%
Cooling System	400,000	Btuh
Cooling Efficiency	10.5	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	0	0	1	-747,860	-299,784	-703,863	-1,751,507
97.5	9	0	1	-625,260	-299,784	-588,476	-1,513,520
92.5	56	0	1	-502,660	-299,784	-473,088	-1,275,532
87.5	170	0	1	-380,060	-299,784	-357,701	-1,037,545
82.5	355	0	1	-257,460	-299,784	-242,314	-799,558
77.5	573	0	1	-134,860	-299,784	-126,926	-561,570
72.5	846	0	1	-12,260	-299,784	-11,539	-323,583
67.5	771	1	0	12,260	-299,784	11,539	0
62.5	787	1	0	134,860	-299,784	126,926	0
57.5	771	1	0	257,460	-299,784	242,314	199,990
52.5	789	1	0	380,060	-299,784	357,701	437,977
47.5	750	1	0	502,660	-299,784	473,088	675,964
42.5	738	1	0	625,260	-299,784	588,476	913,952
37.5	673	1	0	747,860	-299,784	703,863	1,151,939
32.5	578	1	0	870,460	-299,784	819,251	1,389,927
27.5	382	1	0	993,060	-299,784	934,638	1,627,914
22.5	242	1	0	1,115,660	-299,784	1,050,025	1,865,901
17.5	148	1	0	1,238,260	-299,784	1,165,413	2,103,889
12.5	70	1	0	1,360,860	-299,784	1,280,800	2,341,876
7.5	31	1	0	1,483,460	-299,784	1,396,188	2,579,864
2.5	14	1	0	1,606,060	-299,784	1,511,575	2,817,851
-2.5	4	1	0	1,728,660	-299,784	1,626,963	3,055,839
-7.5	3	1	0	1,851,260	-299,784	1,742,350	3,293,826
Total	8,760	6,751	2,009				

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	-457,143	0	0	0	100	0
0	0	0	-457,143	-4,571,429	381	0	100	0
0	0	0	-457,143	-26,947,368	2,246	0	100	0
0	0	0	-457,143	-77,714,286	6,476	0	100	0
0	0	0	-457,143	-147,532,468	12,294	0	100	0
0	0	0	-457,143	-218,285,714	18,190	0	100	0
0	0	0	-369,809	-240,660,258	20,055	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
249,987	192,739,902	1,927	0	0	0	0	0	0
547,471	431,954,755	4,320	0	0	0	0	0	0
844,955	633,716,582	6,337	0	0	0	0	0	0
1,142,440	843,120,508	8,431	0	0	0	0	0	0
1,439,924	969,068,840	9,691	0	0	0	0	0	0
1,737,408	1,004,221,970	10,042	0	0	0	0	0	0
2,034,893	777,328,943	7,773	0	0	0	0	0	0
2,332,377	564,435,184	5,644	0	0	0	0	0	0
2,629,861	389,219,437	3,892	0	0	0	0	0	0
2,927,345	204,914,173	2,049	0	0	0	0	0	0
3,224,830	99,969,718	1,000	0	0	0	0	0	0
3,522,314	49,312,394	493	0	0	0	0	0	0
3,819,798	15,279,193	153	0	0	0	0	0	0
4,117,282	12,351,847	124	0	0	0	0	0	0
	6,187,633,445	61,876		-715,711,522	59,643		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	61,876
Cooling	59,643	0
Vent Cooling	0	0
Lighting	371,788	0
Equipment	63,476	1,314
Total	494,907	63,190

464,566

-7%

64468

2%

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	0	0	1	-747,860	-299,784	-703,863	-1,751,507
97.5	9	0	1	-625,260	-299,784	-588,476	-1,513,520
92.5	56	0	1	-502,660	-299,784	-473,088	-1,275,532
87.5	170	0	1	-380,060	-299,784	-357,701	-1,037,545
82.5	355	0	1	-257,460	-299,784	-242,314	-799,558
77.5	573	0	1	-134,860	-299,784	-126,926	-561,570
72.5	846	0	1	-12,260	-299,784	-11,539	-323,583
67.5	771	1	0	12,260	-299,784	11,539	0
62.5	787	1	0	134,860	-299,784	126,926	0
57.5	771	1	0	257,460	-299,784	242,314	199,990
52.5	789	1	0	380,060	-299,784	357,701	437,977
47.5	750	1	0	502,660	-299,784	473,088	675,964
42.5	738	1	0	625,260	-299,784	588,476	913,952
37.5	673	1	0	747,860	-299,784	703,863	1,151,939
32.5	578	1	0	870,460	-299,784	819,251	1,389,927
27.5	382	1	0	993,060	-299,784	934,638	1,627,914
22.5	242	1	0	1,115,660	-299,784	1,050,025	1,865,901
17.5	148	1	0	1,238,260	-299,784	1,165,413	2,103,889
12.5	70	1	0	1,360,860	-299,784	1,280,800	2,341,876
7.5	31	1	0	1,483,460	-299,784	1,396,188	2,579,864
2.5	14	1	0	1,606,060	-299,784	1,511,575	2,817,851
-2.5	4	1	0	1,728,660	-299,784	1,626,963	3,055,839
-7.5	3	1	0	1,851,260	-299,784	1,742,350	3,293,826
Total	8,760	6,751	2,009				

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	-457,143	0	0	0	100	0
0	0	0	-457,143	-4,571,429	381	0	100	0
0	0	0	-457,143	-26,947,368	2,246	0	100	0
0	0	0	-457,143	-77,714,286	6,476	0	100	0
0	0	0	-457,143	-147,532,468	12,294	0	100	0
0	0	0	-457,143	-218,285,714	18,190	0	100	0
0	0	0	-369,809	-240,660,258	20,055	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
238,083	183,561,811	1,836	0	0	0	0	0	0
521,401	411,385,481	4,114	0	0	0	0	0	0
804,719	603,539,602	6,035	0	0	0	0	0	0
1,088,038	802,971,912	8,030	0	0	0	0	0	0
1,371,356	922,922,705	9,229	0	0	0	0	0	0
1,654,675	956,401,876	9,564	0	0	0	0	0	0
1,937,993	740,313,280	7,403	0	0	0	0	0	0
2,221,311	537,557,318	5,376	0	0	0	0	0	0
2,504,630	370,685,178	3,707	0	0	0	0	0	0
2,787,948	195,156,355	1,952	0	0	0	0	0	0
3,071,266	95,209,255	952	0	0	0	0	0	0
3,354,585	46,964,185	470	0	0	0	0	0	0
3,637,903	14,551,612	146	0	0	0	0	0	0
3,921,221	11,763,664	118	0	0	0	0	0	0
	5,892,984,233	58,930		-715,711,522	59,643		200,900	0

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	58,930
Cooling	59,643	0
Vent Cooling	0	0
Lighting	371,788	0
Equipment	63,476	1,314
Total	494,907	60,244

Proposed Savings		
Estimated	kWh	therms
Savings	0	2,946

- 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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Building	School 21	
Address	322 Tenth Avenue Paterson, NJ 0751	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	35500	sqft
Wall Conductivity	0.25	u Value
Window Area	5180	sqft
Window Conductivity	1	u Value
Roof Area	41860	sqft
Roof Conductivity	0.25	u Value
Floor Area	103516	sqft
Volume	1242192	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.07	w/sqft
Occupancy	720	people
Occupant Sensible Load	160	btu/person
Infiltration	19,668.0	cfm
Exhaust	1700	cfm
Equipment Density	0.15	therms
Building Equipment		
Heating System	6,427,000	Btuh
Heating Efficiency	83	%
Cooling System	400,000	Btuh
Cooling Efficiency	10.5	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	35500	sqft
Wall Conductivity	0.25	u Value
Window Area	5180	sqft
Window Conductivity	0.350877193	u Value
Roof Area	41860	sqft
Roof Conductivity	0.25	u Value
Floor Area	103516	sqft
Volume	1242192	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.07	w/sqft
Occupancy	720	people
Occupant Sensible Load	160	btu/person
Infiltration	19,668.0	cfm
Exhaust	1700	cfm
Equipment Density	0.15	therms/sqft
Building Equipment		
Heating System	6,427,000	Btuh
Heating Efficiency	83	%
Cooling System	400,000	Btuh
Cooling Efficiency	10.5	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	0	0	1	-747,860	-299,784	-703,863	-1,751,507
97.5	9	0	1	-625,260	-299,784	-588,476	-1,513,520
92.5	56	0	1	-502,660	-299,784	-473,088	-1,275,532
87.5	170	0	1	-380,060	-299,784	-357,701	-1,037,545
82.5	355	0	1	-257,460	-299,784	-242,314	-799,558
77.5	573	0	1	-134,860	-299,784	-126,926	-561,570
72.5	846	0	1	-12,260	-299,784	-11,539	-323,583
67.5	771	1	0	12,260	-299,784	11,539	0
62.5	787	1	0	134,860	-299,784	126,926	0
57.5	771	1	0	257,460	-299,784	242,314	199,990
52.5	789	1	0	380,060	-299,784	357,701	437,977
47.5	750	1	0	502,660	-299,784	473,088	675,964
42.5	738	1	0	625,260	-299,784	588,476	913,952
37.5	673	1	0	747,860	-299,784	703,863	1,151,939
32.5	578	1	0	870,460	-299,784	819,251	1,389,927
27.5	382	1	0	993,060	-299,784	934,638	1,627,914
22.5	242	1	0	1,115,660	-299,784	1,050,025	1,865,901
17.5	148	1	0	1,238,260	-299,784	1,165,413	2,103,889
12.5	70	1	0	1,360,860	-299,784	1,280,800	2,341,876
7.5	31	1	0	1,483,460	-299,784	1,396,188	2,579,864
2.5	14	1	0	1,606,060	-299,784	1,511,575	2,817,851
-2.5	4	1	0	1,728,660	-299,784	1,626,963	3,055,839
-7.5	3	1	0	1,851,260	-299,784	1,742,350	3,293,826
Total	8,760	6,751	2,009				

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	0	0	1	-645,305	-299,784	-703,863	-1,648,952
97.5	9	0	1	-539,517	-299,784	-588,476	-1,427,777
92.5	56	0	1	-433,730	-299,784	-473,088	-1,206,602
87.5	170	0	1	-327,942	-299,784	-357,701	-985,427
82.5	355	0	1	-222,154	-299,784	-242,314	-764,252
77.5	573	0	1	-116,366	-299,784	-126,926	-543,077
72.5	846	0	1	-10,579	-299,784	-11,539	-321,902
67.5	771	1	0	10,579	-299,784	11,539	0
62.5	787	1	0	116,366	-299,784	126,926	0
57.5	771	1	0	222,154	-299,784	242,314	164,684
52.5	789	1	0	327,942	-299,784	357,701	385,859
47.5	750	1	0	433,730	-299,784	473,088	607,034
42.5	738	1	0	539,517	-299,784	588,476	828,209
37.5	673	1	0	645,305	-299,784	703,863	1,049,384
32.5	578	1	0	751,093	-299,784	819,251	1,270,559
27.5	382	1	0	856,881	-299,784	934,638	1,491,735
22.5	242	1	0	962,668	-299,784	1,050,025	1,712,910
17.5	148	1	0	1,068,456	-299,784	1,165,413	1,934,085
12.5	70	1	0	1,174,244	-299,784	1,280,800	2,155,260
7.5	31	1	0	1,280,031	-299,784	1,396,188	2,376,435
2.5	14	1	0	1,385,819	-299,784	1,511,575	2,597,610
-2.5	4	1	0	1,491,607	-299,784	1,626,963	2,818,785
-7.5	3	1	0	1,597,395	-299,784	1,742,350	3,039,960
Total	8,760	6,751	2,009				

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	-457,143	0	0	0	100	0
0	0	0	-457,143	-4,571,429	381	0	100	0
0	0	0	-457,143	-26,947,368	2,246	0	100	0
0	0	0	-457,143	-77,714,286	6,476	0	100	0
0	0	0	-457,143	-147,532,468	12,294	0	100	0
0	0	0	-457,143	-218,285,714	18,190	0	100	0
0	0	0	-369,809	-240,660,258	20,055	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
240,951	185,773,399	1,858	0	0	0	0	0	0
527,683	416,341,932	4,163	0	0	0	0	0	0
814,415	610,811,163	6,108	0	0	0	0	0	0
1,101,147	812,646,272	8,126	0	0	0	0	0	0
1,387,879	934,042,255	9,340	0	0	0	0	0	0
1,674,610	967,924,790	9,679	0	0	0	0	0	0
1,961,342	749,232,717	7,492	0	0	0	0	0	0
2,248,074	544,033,912	5,440	0	0	0	0	0	0
2,534,806	375,151,265	3,752	0	0	0	0	0	0
2,821,538	197,507,637	1,975	0	0	0	0	0	0
3,108,269	96,356,354	964	0	0	0	0	0	0
3,395,001	47,530,019	475	0	0	0	0	0	0
3,681,733	14,726,933	147	0	0	0	0	0	0
3,968,465	11,905,395	119	0	0	0	0	0	0
	5,963,984,043	59,640		-715,711,522	59,643		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	59,640
Cooling	59,643	0
Vent Cooling	0	0
Lighting	371,788	0
Equipment	63,476	1,314
Total	494,907	60,954

464,56664468

-7%5%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	54,102
Cooling	59,538	0
Vent Cooling	0	0
Lighting	371,788	0
Equipment	63,476	1,314
Total	494,803	55,416

Proposed Savings		
Estimated Savings	kWh	therms
	104	5,538

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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Proposed Envelope						
	Wall 1	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	40	7	7	4	3	
Width (ft)	700	3	2	3	2	
Count	1	156	76	52	36	320
R-value	4	2.85	2.85	2.85	2.85	
U-value	0.25	0.350877193	0.350877193	0.350877193	0.3508772	0.350877193
Area	28000	3276	1064	624	216	5180
	Wall 2	Window 1	Window 2	Window 3	Window 4	Wall Window Total
Height (ft)	20	3	3	0	0	
Width (ft)	375	1	1	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	7500	0	0	0	0	0
Total Wall Area (sqft) 35500 Average U-value 0.25						
	Roof 1	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	230	0	0	0	0	
Width (ft)	182	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	41860	0	0	0	0	0
	Roof 2	Window 1	Window 2	Window 3	Window 4	Roof Window Total
Length (ft)	1	0	0	0	0	
Width (ft)	0	0	0	0	0	
Count	0	0	0	0	0	0
R-value	1	1	1	1	1	
U-value	1	1	1	1	1	0
Area	0	0	0	0	0	0
Total Roof Area (sqft) 41860 Average U-value 0.25						
Total Window Area (sqft)		5180				
Average U-value		0.350877193				

Building	School 24	
Address	50 Nineteenth Avenue	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	49250	sqft
Wall Conductivity	0.25	u Value
Window Area	7298	sqft
Window Conductivity	0.625	u Value
Roof Area	41860	sqft
Roof Conductivity	0.25	u Value
Floor Area	100800	sqft
Volume	1209600	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	1.10	w/sqft
Equipment Density	0.15	w/sqft
Occupancy	937	people
Occupant Sensible Load	160	btu/person
Infiltration	17,136.0	cfm
Exhaust	1750	cfm
Equipment Density	0.15	therms
Building Equipment		
Heating System	2,520,000	Btuh
Heating Efficiency	79	%
Cooling System	480,000	Btuh
Cooling Efficiency	16.5	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	49250	sqft
Wall Conductivity	0.25	u Value
Window Area	7298	sqft
Window Conductivity	0.625	u Value
Roof Area	41860	sqft
Roof Conductivity	0.25	u Value
Floor Area	100800	sqft
Volume	1209600	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	1.10	w/sqft
Equipment Density	0.15	w/sqft
Occupancy	937	people
Occupant Sensible Load	160	btu/person
Infiltration	17,136.0	cfm
Exhaust	1750	cfm
Equipment Density	0.15	therms/sqft
Building Equipment		
Heating System	2,520,000	Btuh
Heating Efficiency	83	%
Cooling System	480,000	Btuh
Cooling Efficiency	16.5	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	0	0	1	-833,832	-594,958	-622,105	-2,050,895
97.5	9	0	1	-697,138	-594,958	-520,120	-1,812,217
92.5	56	0	1	-560,444	-594,958	-418,136	-1,573,538
87.5	170	0	1	-423,751	-594,958	-316,152	-1,334,860
82.5	355	0	1	-287,057	-594,958	-214,167	-1,096,182
77.5	573	0	1	-150,363	-594,958	-112,183	-857,504
72.5	846	0	1	-13,669	-594,958	-10,198	-618,826
67.5	771	1	0	13,669	-594,958	10,198	0
62.5	787	1	0	150,363	-594,958	112,183	0
57.5	771	1	0	287,057	-594,958	214,167	0
52.5	789	1	0	423,751	-594,958	316,152	144,944
47.5	750	1	0	560,444	-594,958	418,136	383,622
42.5	738	1	0	697,138	-594,958	520,120	622,301
37.5	673	1	0	833,832	-594,958	622,105	860,979
32.5	578	1	0	970,526	-594,958	724,089	1,099,657
27.5	382	1	0	1,107,219	-594,958	826,074	1,338,335
22.5	242	1	0	1,243,913	-594,958	928,058	1,577,013
17.5	148	1	0	1,380,607	-594,958	1,030,042	1,815,691
12.5	70	1	0	1,517,301	-594,958	1,132,027	2,054,369
7.5	31	1	0	1,653,994	-594,958	1,234,011	2,293,048
2.5	14	1	0	1,790,688	-594,958	1,335,996	2,531,726
-2.5	4	1	0	1,927,382	-594,958	1,437,980	2,770,404
-7.5	3	1	0	2,064,076	-594,958	1,539,964	3,009,082
Total	8,760	6,751	2,009				

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	0	0	1	-833,832	-594,958	-622,105	-2,050,895
97.5	9	0	1	-697,138	-594,958	-520,120	-1,812,217
92.5	56	0	1	-560,444	-594,958	-418,136	-1,573,538
87.5	170	0	1	-423,751	-594,958	-316,152	-1,334,860
82.5	355	0	1	-287,057	-594,958	-214,167	-1,096,182
77.5	573	0	1	-150,363	-594,958	-112,183	-857,504
72.5	846	0	1	-13,669	-594,958	-10,198	-618,826
67.5	771	1	0	13,669	-594,958	10,198	0
62.5	787	1	0	150,363	-594,958	112,183	0
57.5	771	1	0	287,057	-594,958	214,167	0
52.5	789	1	0	423,751	-594,958	316,152	144,944
47.5	750	1	0	560,444	-594,958	418,136	383,622
42.5	738	1	0	697,138	-594,958	520,120	622,301
37.5	673	1	0	833,832	-594,958	622,105	860,979
32.5	578	1	0	970,526	-594,958	724,089	1,099,657
27.5	382	1	0	1,107,219	-594,958	826,074	1,338,335
22.5	242	1	0	1,243,913	-594,958	928,058	1,577,013
17.5	148	1	0	1,380,607	-594,958	1,030,042	1,815,691
12.5	70	1	0	1,517,301	-594,958	1,132,027	2,054,369
7.5	31	1	0	1,653,994	-594,958	1,234,011	2,293,048
2.5	14	1	0	1,790,688	-594,958	1,335,996	2,531,726
-2.5	4	1	0	1,927,382	-594,958	1,437,980	2,770,404
-7.5	3	1	0	2,064,076	-594,958	1,539,964	3,009,082
Total	8,760	6,751	2,009				

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	-349,091	0	0	0	100	0
0	0	0	-349,091	-3,490,909	291	0	100	0
0	0	0	-349,091	-20,577,990	1,715	0	100	0
0	0	0	-349,091	-59,345,455	4,945	0	100	0
0	0	0	-349,091	-112,661,157	9,388	0	100	0
0	0	0	-349,091	-166,690,909	13,891	0	100	0
0	0	0	-349,091	-227,177,622	18,931	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
183,474	144,760,791	1,448	0	0	0	0	0	0
485,598	364,198,495	3,642	0	0	0	0	0	0
787,722	581,339,009	5,813	0	0	0	0	0	0
1,089,846	733,466,677	7,335	0	0	0	0	0	0
1,391,971	804,559,073	8,046	0	0	0	0	0	0
1,694,095	647,144,273	6,471	0	0	0	0	0	0
1,996,219	483,085,045	4,831	0	0	0	0	0	0
2,298,343	340,154,829	3,402	0	0	0	0	0	0
2,600,468	182,032,737	1,820	0	0	0	0	0	0
2,902,592	89,980,349	900	0	0	0	0	0	0
3,189,873	44,658,228	447	0	0	0	0	0	0
3,189,873	12,759,494	128	0	0	0	0	0	0
3,189,873	9,569,620	96	0	0	0	0	0	0
	4,437,708,622	44,377		-589,944,043	49,162		200,900	0

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	-349,091	0	0	0	100	0
0	0	0	-349,091	-3,490,909	291	0	100	0
0	0	0	-349,091	-20,577,990	1,715	0	100	0
0	0	0	-349,091	-59,345,455	4,945	0	100	0
0	0	0	-349,091	-112,661,157	9,388	0	100	0
0	0	0	-349,091	-166,690,909	13,891	0	100	0
0	0	0	-349,091	-227,177,622	18,931	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
174,632	137,784,368	1,378	0	0	0	0	0	0
462,196	346,646,761	3,466	0	0	0	0	0	0
749,760	553,322,671	5,533	0	0	0	0	0	0
1,037,324	698,118,886	6,981	0	0	0	0	0	0
1,324,888	765,785,142	7,658	0	0	0	0	0	0
1,612,452	615,956,597	6,160	0	0	0	0	0	0
1,900,016	459,803,838	4,598	0	0	0	0	0	0
2,187,580	323,761,825	3,238	0	0	0	0	0	0
2,475,144	173,260,075	1,733	0	0	0	0	0	0
2,762,708	85,643,947	856	0	0	0	0	0	0
3,036,145	42,506,024	425	0	0	0	0	0	0
3,036,145	12,144,578	121	0	0	0	0	0	0
3,036,145	9,108,434	91	0	0	0	0	0	0
	4,223,843,146	42,238		-589,944,043	49,162		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	44,377
Cooling	49,162	0
Vent Cooling	0	0
Lighting	971,309	0
Equipment	132,451	1,314
Total	1,152,922	45,691

1,260,213
9%

48371
6%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	42,238
Cooling	49,162	0
Vent Cooling	0	0
Lighting	971,309	0
Equipment	132,451	1,314
Total	1,152,922	43,552

Proposed Savings		
Estimated	kWh	therms
Savings	0	2,139

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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

Building	School 25	
Address	287 Trenton Avenue	
Heating Fuel	Gas	100000
Cooling System	DX	

Existing Building Envelope		
Wall Area	34200	sqft
Wall Conductivity	0.25	u Value
Window Area	5738	sqft
Window Conductivity	1	u Value
Roof Area	24420	sqft
Roof Conductivity	0.25	u Value
Floor Area	72564	sqft
Volume	870768	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.12	w/sqft
Occupancy	764	people
Occupant Sensible Load	200	btu/person
Infiltration	7,256.4	cfm
Exhaust	9000	cfm
Equipment Density	0.11	therms
Building Equipment		
Heating System	6,746,000	Btuh
Heating Efficiency	78	%
Cooling System	151,700	Btuh
Cooling Efficiency	10.0	SEER
Vent Cooling	0	CFM
Vent Power	0	kW

Proposed Building Envelope		
Wall Area	34200	sqft
Wall Conductivity	0.25	u Value
Window Area	5738	sqft
Window Conductivity	1	u Value
Roof Area	24420	sqft
Roof Conductivity	0.25	u Value
Floor Area	72564	sqft
Volume	870768	cuft

Set Points		
Heating Set Point	68	deg F
Cooling Set Point	72	deg F

Internal Loads		
Lighting Density	0.41	w/sqft
Equipment Density	0.12	w/sqft
Occupancy	764	people
Occupant Sensible Load	200	btu/person
Infiltration	7,256.4	cfm
Exhaust	9000	cfm
Equipment Density	0.11	therms/sqft
Building Equipment		
Heating System	6,746,000	Btuh
Heating Efficiency	83	%
Cooling System	151,700	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	0	0	1	-621,987	-295,060	-535,486	-1,452,533
97.5	9	0	1	-520,022	-295,060	-447,701	-1,262,783
92.5	56	0	1	-418,057	-295,060	-359,917	-1,073,033
87.5	170	0	1	-316,092	-295,060	-272,132	-883,284
82.5	355	0	1	-214,127	-295,060	-184,348	-693,534
77.5	573	0	1	-112,162	-295,060	-96,563	-503,785
72.5	846	0	1	-10,197	-295,060	-8,778	-314,035
67.5	771	1	0	10,197	-295,060	8,778	0
62.5	787	1	0	112,162	-295,060	96,563	0
57.5	771	1	0	214,127	-295,060	184,348	103,414
52.5	789	1	0	316,092	-295,060	272,132	293,163
47.5	750	1	0	418,057	-295,060	359,917	482,913
42.5	738	1	0	520,022	-295,060	447,701	672,662
37.5	673	1	0	621,987	-295,060	535,486	862,412
32.5	578	1	0	723,952	-295,060	623,270	1,052,162
27.5	382	1	0	825,917	-295,060	711,055	1,241,911
22.5	242	1	0	927,882	-295,060	798,839	1,431,661
17.5	148	1	0	1,029,847	-295,060	886,624	1,621,410
12.5	70	1	0	1,131,812	-295,060	974,409	1,811,160
7.5	31	1	0	1,233,777	-295,060	1,062,193	2,000,909
2.5	14	1	0	1,335,742	-295,060	1,149,978	2,190,659
-2.5	4	1	0	1,437,707	-295,060	1,237,762	2,380,409
-7.5	3	1	0	1,539,672	-295,060	1,325,547	2,570,158
Total	8,760	6,751	2,009				

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	0	0	1	-621,987	-295,060	-535,486	-1,452,533
97.5	9	0	1	-520,022	-295,060	-447,701	-1,262,783
92.5	56	0	1	-418,057	-295,060	-359,917	-1,073,033
87.5	170	0	1	-316,092	-295,060	-272,132	-883,284
82.5	355	0	1	-214,127	-295,060	-184,348	-693,534
77.5	573	0	1	-112,162	-295,060	-96,563	-503,785
72.5	846	0	1	-10,197	-295,060	-8,778	-314,035
67.5	771	1	0	10,197	-295,060	8,778	0
62.5	787	1	0	112,162	-295,060	96,563	0
57.5	771	1	0	214,127	-295,060	184,348	103,414
52.5	789	1	0	316,092	-295,060	272,132	293,163
47.5	750	1	0	418,057	-295,060	359,917	482,913
42.5	738	1	0	520,022	-295,060	447,701	672,662
37.5	673	1	0	621,987	-295,060	535,486	862,412
32.5	578	1	0	723,952	-295,060	623,270	1,052,162
27.5	382	1	0	825,917	-295,060	711,055	1,241,911
22.5	242	1	0	927,882	-295,060	798,839	1,431,661
17.5	148	1	0	1,029,847	-295,060	886,624	1,621,410
12.5	70	1	0	1,131,812	-295,060	974,409	1,811,160
7.5	31	1	0	1,233,777	-295,060	1,062,193	2,000,909
2.5	14	1	0	1,335,742	-295,060	1,149,978	2,190,659
-2.5	4	1	0	1,437,707	-295,060	1,237,762	2,380,409
-7.5	3	1	0	1,539,672	-295,060	1,325,547	2,570,158
Total	8,760	6,751	2,009				

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	-182,040	0	0	0	100	0
0	0	0	-182,040	-1,820,400	152	0	100	0
0	0	0	-182,040	-10,730,779	894	0	100	0
0	0	0	-182,040	-30,946,800	2,579	0	100	0
0	0	0	-182,040	-58,749,273	4,896	0	100	0
0	0	0	-182,040	-86,924,100	7,244	0	100	0
0	0	0	-182,040	-118,466,031	9,872	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
132,582	102,220,546	1,022	0	0	0	0	0	0
375,850	296,545,996	2,965	0	0	0	0	0	0
619,119	464,339,329	4,643	0	0	0	0	0	0
862,388	636,442,176	6,364	0	0	0	0	0	0
1,105,656	744,106,783	7,441	0	0	0	0	0	0
1,348,925	779,678,711	7,797	0	0	0	0	0	0
1,592,194	608,218,021	6,082	0	0	0	0	0	0
1,835,462	444,181,910	4,442	0	0	0	0	0	0
2,078,731	307,652,204	3,077	0	0	0	0	0	0
2,322,000	162,539,984	1,625	0	0	0	0	0	0
2,565,268	79,523,322	795	0	0	0	0	0	0
2,808,537	39,319,519	393	0	0	0	0	0	0
3,051,806	12,207,223	122	0	0	0	0	0	0
3,295,074	9,885,223	99	0	0	0	0	0	0
	4,686,860,947	46,869		-307,637,382	25,636		200,900	0

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	-182,040	0	0	0	100	0
0	0	0	-182,040	-1,820,400	152	0	100	0
0	0	0	-182,040	-10,730,779	894	0	100	0
0	0	0	-182,040	-30,946,800	2,579	0	100	0
0	0	0	-182,040	-58,749,273	4,896	0	100	0
0	0	0	-182,040	-86,924,100	7,244	0	100	0
0	0	0	-182,040	-118,466,031	9,872	0	100	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
124,595	96,062,682	961	0	0	0	0	0	0
353,209	278,681,779	2,787	0	0	0	0	0	0
581,823	436,367,080	4,364	0	0	0	0	0	0
810,437	598,102,286	5,981	0	0	0	0	0	0
1,039,051	699,281,073	6,993	0	0	0	0	0	0
1,267,665	732,710,114	7,327	0	0	0	0	0	0
1,496,278	571,578,381	5,716	0	0	0	0	0	0
1,724,892	417,423,964	4,174	0	0	0	0	0	0
1,953,506	289,118,938	2,891	0	0	0	0	0	0
2,182,120	152,748,419	1,527	0	0	0	0	0	0
2,410,734	74,732,760	747	0	0	0	0	0	0
2,639,348	36,950,874	370	0	0	0	0	0	0
2,867,962	11,471,848	115	0	0	0	0	0	0
3,096,576	9,289,728	93	0	0	0	0	0	0
	4,404,519,926	44,045		-307,637,382	25,636		200,900	0

System Summary		
Existing	Usage	
System	kWh	therms
Heating	0	46,869
Cooling	25,636	0
Vent Cooling	0	0
Lighting	260,621	0
Equipment	76,279	964
Total	362,537	47,832

369,80947708

2%0%

System Summary		
Proposed	Usage	
System	kWh	therms
Heating	0	44,045
Cooling	25,636	0
Vent Cooling	0	0
Lighting	260,621	0
Equipment	76,279	964
Total	362,537	45,009

Proposed Savings		
Estimated Savings	kWh	therms
	0	2,823

- 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.

Newark, NJ		Day Time Hours		
Deg F	Hours	01 to 08	09 to 16	17 to 00
102.5	0	0	0	0
97.5	9	0	8	1
92.5	56	0	50	6
87.5	170	1	146	23
82.5	355	16	262	77
77.5	573	98	288	187
72.5	846	270	272	304
67.5	771	265	245	261
62.5	787	269	246	272
57.5	771	270	236	265
52.5	789	270	249	270
47.5	750	261	230	259
42.5	738	258	226	254
37.5	673	255	176	242
32.5	578	240	135	203
27.5	382	170	75	137
22.5	242	119	43	80
17.5	148	82	20	46
12.5	70	42	9	19
7.5	31	21	3	7
2.5	14	7	2	5
-2.5	4	3	0	1
-7.5	3	3	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.

WindCad Turbine Performance Model

Endurance S-343 Wind Turbine, Grid - Intertie

Prepared For: **Paterson BOE**
Site Location: **Paterson, NJ**
Data Source: **NASA Atmospheric Science Data Center**
Date: **10/30/2015**

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.

Combined heat and power Analysis	- (system usage) + (system production)					
School 1 and 26	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$11.70	\$13.81	\$2.10
Hourly Boiler Production **	0	-5	408	-\$7.09	\$5.71	-\$1.38

Annual Hours of Generator operation	4320			-\$50,560	-36,374	therms
Electrical used	100%			\$43,006	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				\$762		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-56.7		

Utility Cost	
Therm	\$1.39
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)

Combined heat and power Analysis	- (system usage) + (system production)					
School 3	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$11.70	\$13.81	\$2.10
Hourly Boiler Production **	0	-5	408	-\$7.09	\$5.71	-\$1.38

Annual Hours of Generator operation	4320			-\$50,560	-36,374	therms
Electrical used	100%			\$43,535	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				\$1,291		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-81.0		

Utility Cost	
Therm	\$1.39
kWh	\$0.16
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)				
School 2	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$11.70	\$13.81	\$2.10
Hourly Boiler Production **	0	-5	408	-\$7.09	\$5.71	-\$1.38
Annual Hours of Generator operation	4320		-\$53,185		-36,374	therms
Electrical used	100%		\$44,584		280,800	kWh
Thermal used	50%		\$8,316		594,000	kBtuh
Annual Generator Savings			-\$286			
Estimate Cost of 65 kW Generator			\$143,000			
Incentive			\$42,900			
Final Cost			\$100,100			
Annual Maintenance***			\$2,527			
Simple Payback			-35.6			
Utility Cost						
Therm	\$1.46					
kWh	\$0.16					
kBtuh	\$0.01					

Combined heat and power Analysis		- (system usage) + (system production)				
School 4	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$11.70	\$13.81	\$2.10
Hourly Boiler Production **	0	-5	408	-\$7.09	\$5.71	-\$1.38
Annual Hours of Generator operation	4320		-\$50,924		-36,374	therms
Electrical used	100%		\$41,847		280,800	kWh
Thermal used	50%		\$8,316		594,000	kBtuh
Annual Generator Savings			-\$761			
Estimate Cost of 65 kW Generator			\$143,000			
Incentive			\$42,900			
Final Cost			\$100,100			
Annual Maintenance***			\$2,527			
Simple Payback			-30.4			
Utility Cost						
Therm	\$1.40					
kWh	\$0.15					
kBtuh	\$0.01					

Combined heat and power Analysis		- (system usage) + (system production)				
School 8	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$11.70	\$13.81	\$2.10
Hourly Boiler Production **	0	-5	408	-\$7.09	\$5.71	-\$1.38
Annual Hours of Generator operation	4320		-\$51,727		-36,374	therms
Electrical used	100%		\$42,609		280,800	kWh
Thermal used	50%		\$8,316		594,000	kBtuh
Annual Generator Savings			-\$803			
Estimate Cost of 65 kW Generator			\$143,000			
Incentive			\$42,900			
Final Cost			\$100,100			
Annual Maintenance***			\$2,527			
Simple Payback			-30.1			
Utility Cost						
Therm	\$1.42					
kWh	\$0.15					
kBtuh	\$0.01					

Combined heat and power Analysis		- (system usage) + (system production)				
School 19	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.89	\$13.15	\$0.27
Hourly Boiler Production **	0	-5	408	-\$7.81	\$5.71	-\$2.09
Annual Hours of Generator operation	4320		-\$64,019		-36,374	therms
Electrical used	100%		\$42,175		280,800	kWh
Thermal used	50%		\$8,316		594,000	kBtuh
Annual Generator Savings			-\$13,528			
Estimate Cost of 65 kW Generator			\$143,000			
Incentive			\$42,900			
Final Cost			\$100,100			
Annual Maintenance***			\$2,527			
Simple Payback			-6.2			
Utility Cost						
Therm	\$1.76					
kWh	\$0.15					
kBtuh	\$0.01					

Combined heat and power Analysis	- (system usage) + (system production)					
School 9	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$54,198	-36,374	therms
Electrical used	100%			\$42,413	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				-\$3,469		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-16.7		

Utility Cost	
Therm	\$1.49
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)

Combined heat and power Analysis	- (system usage) + (system production)					
School 14	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$55,653	-36,374	therms
Electrical used	100%			\$47,957	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				\$620		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-52.5		

Utility Cost	
Therm	\$1.53
kWh	\$0.17
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)					
School 20	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$53,922	-36,374	therms
Electrical used	100%			\$41,473	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				-\$4,134		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-15.0		

Utility Cost	
Therm	\$1.48
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

Combined heat and power Analysis	- (system usage) + (system production)					
School 24	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$50,979	-36,374	therms
Electrical used	100%			\$42,107	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				-\$555		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-32.5		

Utility Cost	
Therm	\$1.40
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

Combined heat and power Analysis		- (system usage) + (system production)				
School 27	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89
Annual Hours of Generator operation	4320		-\$49,465		-36,374	therms
Electrical used	100%		\$41,839		280,800	kWh
Thermal used	50%		\$8,316		594,000	kBtuh
Annual Generator Savings			\$690			
Estimate Cost of 65 kW Generator			\$143,000			
Incentive			\$42,900			
Final Cost			\$100,100			
Annual Maintenance***			\$2,527			
Simple Payback			-54.5			
Utility Cost						
Therm	\$1.36					
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						

Combined heat and power Analysis	- (system usage) + (system production)					
School 10	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$52,743	-36,374	therms
Electrical used	100%			\$47,674	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				\$3,247		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				139.1		

Utility Cost	
Therm	\$1.45
kWh	\$0.17
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)					
School 15	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$60,745	-36,374	therms
Electrical used	100%			\$43,233	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				-\$9,196		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-8.5		

Utility Cost	
Therm	\$1.67
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)

Combined heat and power Analysis	- (system usage) + (system production)					
School 21	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$50,886	-36,374	therms
Electrical used	100%			\$57,964	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				\$15,394		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				7.8		

Utility Cost	
Therm	\$1.40
kWh	\$0.21
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)					
School 25	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*	65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **	0	-5	408	-\$7.60	\$5.71	-\$1.89

Annual Hours of Generator operation	4320			-\$51,935	-36,374	therms
Electrical used	100%			\$45,659	280,800	kWh
Thermal used	50%			\$8,316	594,000	kBtuh
Annual Generator Savings				\$2,040		
Estimate Cost of 65 kW Generator				\$143,000		
Incentive				\$42,900		
Final Cost				\$100,100		
Annual Maintenance***				\$2,527		
Simple Payback				-205.3		

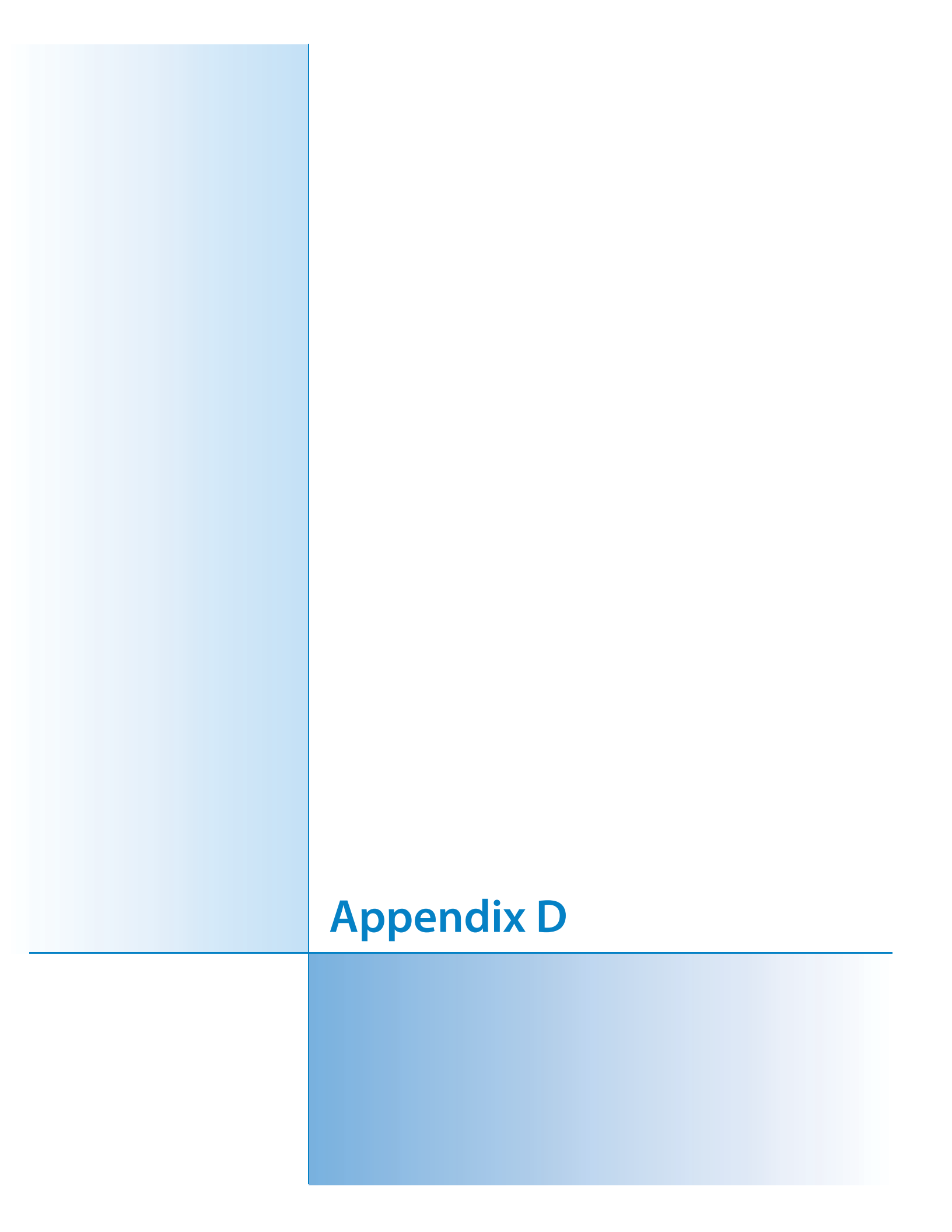
Utility Cost	
Therm	\$1.43
kWh	\$0.16
kBtuh	\$0.01

* 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)					
	0	kwh	Therms	Kbtuh	\$ Cost	\$ Produced	\$ Net
Hourly Generator Production*		65	-8	275	-\$12.55	\$13.67	\$1.12
Hourly Boiler Production **		0	-5	408	-\$7.60	\$5.71	-\$1.89
Annual Hours of Generator operation			4320		\$0	-36,374	therms
Electrical used			100%		\$0	280,800	kWh
Thermal used			50%		\$8,316	594,000	kBtuh
Annual Generator Savings					\$8,316		
Estimate Cost of 65 kW Generator					\$143,000		
Incentive					\$42,900		
Final Cost					\$100,100		
Annual Maintenance***					\$2,527		
Simple Payback					17.3		
Utility Cost							
	Therm	\$0.00					
	kWh	\$0.00					
	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)							

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 extends from the vertical line across the page. The text "Appendix D" is located in the bottom right corner of the page, overlapping the horizontal line and the light blue rectangle.

Appendix D

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 01 & 26 - Interior	001	119	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	4	360	60	2160	777.6	\$116.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	4	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$956.0	\$31.2	1	C	0	15	0	\$60
PS 01 & 26 - Interior	001	103A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	104A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	32	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	105A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	106A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	107A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	70	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	108A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	66	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	110A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	001	Boy's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	28	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	42.1	\$945.0	\$26.0	1	C	0	10	0	\$50
PS 01 & 26 - Interior	001	café	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	37	3330	50	2160	7192.8	\$1,078.9	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	37	1887	1.887	2160	2160	4075.92	4075.92	None Proposed	0	1.443	3116.88	467.5	\$8,843.0	\$288.6	1	C	0	15	0	\$555
PS 01 & 26 - Interior	001	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	36	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	42.1	\$945.0	\$26.0	1	C	0	10	0	\$50
PS 01 & 26 - Interior	001	STARWELL	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	4	480	16	3000	1440	\$216.0	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	4	272	0.272	3000	3000	816	816	None Proposed	0	0.208	624	93.6	\$1,156.0	\$41.6	1	C	0	20	0	\$80
PS 01 & 26 - Interior	002	203	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	72	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	002	204	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	63	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	002	205	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	72	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	0	0	\$0
PS 01 & 26 - Interior	002	206	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	80	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	002	207A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	90	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	002	208A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	86	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	15	0	\$240
PS 01 & 26 - Interior	002	210A	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	68	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	1	C	0	100	0	\$1,600
PS 01 & 26 - Interior	002	Boy's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	45	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	42.1	\$945.0	\$26.0	1	C	0	10	0	\$50
PS 01 & 26 - Interior	002	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	52	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	42.1	\$945.0	\$26.0	1	C	0	10	0	\$50
PS 01 & 26 - Interior	002	Hall	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	30	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84									

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 02 - Interior	001	Office	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	65	2160	1814.4	\$290.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	125.8	\$2,646.0	\$72.8	2	C	0	10	0	\$140
PS 02 - Interior	002	16	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	28	2160	1296	\$207.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	89.9	\$1,890.0	\$52.0	2	C	0	10	0	\$100
PS 02 - Interior	002	26	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	24	2160	518.4	\$82.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	35.9	\$756.0	\$20.8	2	C	0	10	0	\$40
PS 02 - Interior	002	27	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	900	40	2160	1944	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	15	510	0.51	2160	2160	1101.6	1101.6	None Proposed	0	0.39	842.4	134.8	\$2,835.0	\$78.0	2	C	0	10	0	\$150
PS 02 - Interior	002	30	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	11	660	22	2160	1425.6	\$228.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	11	374	0.374	2160	2160	807.84	807.84	None Proposed	0	0.286	617.76	98.8	\$2,079.0	\$57.2	2	C	0	10	0	\$110
PS 02 - Interior	002	30	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	12	2160	129.6	\$20.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	9.0	\$189.0	\$5.2	2	C	0	10	0	\$10
PS 02 - Interior	002	38	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	30	2160	1296	\$207.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	89.9	\$1,890.0	\$52.0	2	C	0	10	0	\$100
PS 02 - Interior	002	41	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	20	500	300	\$48.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	500	500	170	170	None Proposed	0	0.26	130	20.8	\$1,890.0	\$52.0	2	C	0	10	0	\$100
PS 02 - Interior	002	201	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	500	360	\$57.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	500	500	204	204	None Proposed	0	0.312	156	25.0	\$2,268.0	\$62.4	2	C	0	10	0	\$120
PS 02 - Interior	002	202	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	42	2160	1555.2	\$248.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	107.8	\$2,268.0	\$62.4	2	C	0	10	0	\$120
PS 02 - Interior	002	203	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$248.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	107.8	\$2,268.0	\$62.4	2	C	0	0	0	\$0
PS 02 - Interior	002	204	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	88	2160	1555.2	\$248.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	107.8	\$2,268.0	\$62.4	2	C	0	0	0	\$0
PS 02 - Interior	002	205	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$210.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	61.0	\$3,540.0	\$140.9	2	0	0	0	0	\$0
PS 02 - Interior	002	207	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$210.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	61.0	\$3,540.0	\$140.9	2	0	0	0	0	\$0
PS 02 - Interior	002	208	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$210.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	61.0	\$3,540.0	\$140.9	2	0	0	0	0	\$0
PS 02 - Interior	002	209	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	54	2160	1314.144	\$210.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	61.0	\$3,540.0	\$140.9	2	0	0	0	0	\$0
PS 02 - Interior	002	210	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	18	912.6	NR	2160	1971.216	\$315.4	Replace T8 Fixture with 36W Linear Panel LED Fixture	18	648	0.648	2160	2160	1399.68	1399.68	None Proposed	0	0.2646	571.536	91.4	\$5,310.0	\$211.3	2	0	0	0	0	\$0
PS 02 - Interior	002	211	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	18	912.6	70	2160	1971.216	\$315.4	Replace T8 Fixture with 36W Linear Panel LED Fixture	18	648	0.648	2160	2160	1399.68	1399.68	None Proposed	0	0.2646	571.536	91.4	\$5,310.0	\$211.3	2	0	0	0	0	\$0
PS 02 - Interior	002	212	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	4	480	30	2160	1036.8	\$165.9	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	4	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	71.9	\$1,156.0	\$41.6	2	C	0	20	0	\$80
PS 02 - Interior	002	Annex Hallway	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	60	2160	648	\$103.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	44.9	\$945.0	\$26.0	2	C	0	10	0	\$50
PS 02 - Interior	002	Boy's Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	5	160	34	2160	345.6	\$55.3	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	5	85	0.085	2160	2160	183.6	183.6	None Proposed	0	0.075	162	25.9	\$695.0	\$13.0	2	C	0	5	0	\$25
PS 02 - Interior	002	Girl's Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	13	2160	276.48	\$44.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.06	129.6	20.7	\$556.0	\$10.4	2	C	0	5	0	\$20
PS 02 - Interior	002	Hall	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	50	1270	14	2160	2743.2	\$438.9	Replace T8 Fixture with 22W Linear Panel LED Fixture	50	1100	1.1	2160	2160	2376	2376	None Proposed	0	0.17										

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 02 - Interior	B	B - 8	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	17	1020	68	2160	2203.2	\$352.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	17	578	0.578	2160	2160	1248.48	1248.48	None Proposed	0	0.442	954.72	152.8	\$3,213.0	\$88.4	2	C	0	10	0	\$170
PS 02 - Interior	B	B - 9 - 10	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	42	2160	259.2	\$41.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	18.0	\$378.0	\$10.4	2	C	0	10	0	\$20
PS 02 - Interior	B	B - 9 - 10	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	20	640	42	2160	1382.4	\$221.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	20	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.3	648	103.7	\$2,780.0	\$52.0	2	C	0	5	0	\$100
PS 02 - Interior	B	Cafeteria	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	32	1024	53	2160	2211.84	\$353.9	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	32	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.48	1036.8	165.9	\$4,448.0	\$83.2	2	C	0	5	0	\$160
PS 02 - Interior	B	Cafeteria	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	53	2160	388.8	\$62.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	27.0	\$567.0	\$15.6	2	C	0	10	0	\$30
PS 02 - Interior	B	Chief	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	5	160	50	500	80	\$12.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	5	85	0.085	500	500	42.5	42.5	None Proposed	0	0.075	37.5	6.0	\$695.0	\$13.0	2	C	0	5	0	\$25
PS 02 - Interior	B	Electric	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	3	96	NR	500	48	\$7.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	3	51	0.051	500	500	25.5	25.5	None Proposed	0	0.045	22.5	3.6	\$417.0	\$7.8	2	C	0	5	0	\$15
PS 02 - Interior	B	Girl's Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	7	224	50	2160	483.84	\$77.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	7	119	0.119	2160	2160	257.04	257.04	None Proposed	0	0.105	226.8	36.3	\$973.0	\$18.2	2	C	0	5	0	\$35
PS 02 - Interior	B	GYM	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	42	2520	38	2160	5443.2	\$870.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	42	1428	1.428	2160	2160	3084.48	3084.48	None Proposed	0	1.092	2358.72	377.4	\$7,938.0	\$218.4	2	C	0	10	0	\$420
PS 02 - Interior	B	HALL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	52	1664	20	2160	3594.24	\$575.1	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	52	884	0.884	2160	2160	1909.44	1909.44	None Proposed	0	0.78	1684.8	269.6	\$7,228.0	\$135.2	2	C	0	5	0	\$260
PS 03 - Interior	001	1	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	32	2160	1814.4	\$290.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	125.8	\$2,646.0	\$72.8	3	C	0	10	0	\$140
PS 03 - Interior	001	2	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	900	58	2160	1944	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	15	510	0.51	2160	2160	1101.6	1101.6	None Proposed	0	0.39	842.4	134.8	\$2,835.0	\$78.0	3	C	0	0	0	\$0
PS 03 - Interior	001	3	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	30	2160	1814.4	\$290.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	125.8	\$2,646.0	\$72.8	3	C	0	10	0	\$140
PS 03 - Interior	001	4	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	NR	2160	1814.4	\$290.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	125.8	\$2,646.0	\$72.8	3	C	0	10	0	\$140
PS 03 - Interior	001	5	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	50	2160	1036.8	\$165.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	71.9	\$1,512.0	\$41.6	3	C	0	10	0	\$80
PS 03 - Interior	001	2A	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	48	2160	388.8	\$62.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	27.0	\$567.0	\$15.6	3	C	0	10	0	\$30
PS 03 - Interior	001	6 (GYM)	150W MH Fixture	8	1512	28	2160	3265.92	\$522.5	Replace 150W Fixture with 90W LED Fixture	8	720	0.72	2160	2160	1555.2	1555.2	None Proposed	0	0.792	1710.72	273.7	\$4,136.0	\$197.4	3	E	0	0	0	\$0
PS 03 - Interior	001	Cafeteria	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1465	87900	28	2160	189864	\$30,378.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1465	49810	49.81	2160	2160	107589.6	107589.6	None Proposed	0	38.09	82274.4	13,163.9	\$276,885.0	\$7,618.0	3	C	0	10	0	\$14,650
PS 03 - Interior	001	Girl's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	28	2160	388.8	\$62.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	27.0	\$567.0	\$15.6	3	C	0	10	0	\$30
PS 03 - Interior	001	HALL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	22	2160	1296	\$207.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	89.9	\$1,890.0	\$52.0	3	C	0	10	0	\$100
PS 03 - Interior	002	200	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	900	54	2160	1944	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	15	510	0.51	2160	2160	1101.6	1101.6	None Proposed	0	0.39	842.4	134.8	\$2,835.0	\$78.0	3	C	0	10	0	\$150
PS 03 - Interior	002	201	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	88	2160	1814.4	\$290.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	125.8	\$2,646.0	\$72.8	3	C	0	10	0	\$140
PS 03 - Interior	002	202	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	28	2160	518.4	\$82.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104										

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 03 - Interior	003	312	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	900	52	2160	1944	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	15	510	0.51	2160	2160	1101.6	1101.6	None Proposed	0	0.39	842.4	134.8	\$2,835.0	\$78.0	3	C	0	10	0	\$150
PS 03 - Interior	003	313	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	NR	2160	1814.4	\$290.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	125.8	\$2,646.0	\$72.8	3	C	0	10	0	\$140
PS 03 - Interior	003	STARWELL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	NR	2160	777.6	\$124.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	53.9	\$1,134.0	\$31.2	3	C	0	10	0	\$60
PS 04 - Interior	002	Exterior of School	Exterior Wall Packs (Assume 70w)	2	180	NR	4380	788.4	\$118.3	Replace 70W Fixture with 44W LED Fixture	2	88	0.088	4380	4380	385.44	385.44	None Proposed	265	0.092	402.96	60.4	\$1,034.0	\$16.7	4	E	0	0	0	\$0
PS 04 - Interior	001	101	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	28	2160	1296	\$194.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	157	0.26	561.6	84.2	\$1,890.0	\$52.0	4	C	0	0	0	\$0
PS 04 - Interior	001	102	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	27	1620	39	2160	3499.2	\$524.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	27	918	0.918	2160	2160	1982.88	1982.88	None Proposed	158	0.702	1516.32	227.4	\$5,103.0	\$140.4	4	C	0	0	0	\$0
PS 04 - Interior	001	103	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	21	1260	47	2160	2721.6	\$408.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	21	714	0.714	2160	2160	1542.24	1542.24	None Proposed	159	0.546	1179.36	176.9	\$3,969.0	\$109.2	4	C	0	10	0	\$210
PS 04 - Interior	001	104	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	32	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	160	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	001	105	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1200	67	2160	2592	\$388.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	20	680	0.68	2160	2160	1468.8	1468.8	None Proposed	161	0.52	1123.2	168.5	\$3,780.0	\$104.0	4	C	0	10	0	\$200
PS 04 - Interior	001	105 Food Pantry	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	16	1000	64	\$9.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	1000	1000	34	34	None Proposed	162	0.03	30	4.5	\$278.0	\$5.2	4	C	0	5	0	\$10
PS 04 - Interior	001	1st Floor Hallway	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	40	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	172	0.052	112.32	16.8	\$378.0	\$10.4	4	C	0	10	0	\$20
PS 04 - Interior	001	1st Floor Hallway	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	94	5640	40	2160	12182.4	\$1,827.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	94	3196	3.196	2160	2160	6903.36	6903.36	None Proposed	173	2.444	5279.04	791.9	\$17,766.0	\$488.8	4	C	0	10	0	\$940
PS 04 - Interior	001	1st Floor Hallway	1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	40	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	174	0.026	56.16	8.4	\$189.0	\$5.2	4	C	0	10	0	\$10
PS 04 - Interior	001	Auditorium Back	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	20	640	20	2160	1382.4	\$207.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	20	340	0.34	2160	2160	734.4	734.4	None Proposed	169	0.3	648	97.2	\$2,780.0	\$52.0	4	C	0	5	0	\$100
PS 04 - Interior	001	Auditorium Main	90W Halogen Fixture	26	2340	20	2160	5054.4	\$758.2	Replace 90W Fixture with 44W LED Fixture	26	1144	1.144	2160	2160	2471.04	2471.04	None Proposed	168	1.196	2583.36	387.5	\$13,702.0	\$476.6	4	E	0	0	0	\$0
PS 04 - Interior	001	Back Auditorium	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	7	420	57	2160	907.2	\$136.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	7	238	0.238	2160	2160	514.08	514.08	None Proposed	170	0.182	393.12	59.0	\$1,323.0	\$36.4	4	C	0	0	0	\$0
PS 04 - Interior	001	Back Auditorium	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	32	57	2160	69.12	\$10.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	1	17	0.017	2160	2160	36.72	36.72	None Proposed	171	0.015	32.4	4.9	\$139.0	\$2.6	4	C	0	0	0	\$0
PS 04 - Interior	002	Bathroom	26W CFL Fixture	1	26	10	500	13	\$2.0	None Proposed	1	26	0.026	500	500	13	13	None Proposed	163	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	001	Boiler Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	11	660	32	2160	1425.6	\$213.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	11	374	0.374	2160	2160	807.84	807.84	None Proposed	178	0.286	617.76	92.7	\$2,079.0	\$57.2	4	C	0	10	0	\$110
PS 04 - Interior	001	Boiler Room	26W CFL Fixture	2	52	32	2160	112.32	\$16.8	None Proposed	2	52	0.052	2160	2160	112.32	112.32	None Proposed	179	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	001	Café	26W CFL Fixture	3	78	40	2160	168.48	\$25.3	None Proposed	3	78	0.078	2160	2160	168.48	168.48	None Proposed	176	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	001	Cafeteria	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	30	1800	32	2160	3888	\$583.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	30	1020	1.02	2160	2160	2203.2	2203.2	None Proposed	165	0.78	1684.8	252.7	\$5,670.0	\$156.0	4	C	0	0	0	\$0
PS 04 - Interior	001	Girls Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	36	2160	1296	\$194.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	167	0.26	561.6	84.2	\$1,890.0	\$52.0	4	C	0	0	0	\$0
PS 04 - Interior	001	Kitchen Cafeteria	1X4 Fixtures																											

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	Existing Fixture Watts	Approximate Measured Lighting Level (footcandles) "N/A" - Not Recorded	Operating Hours	Existing kWh	Existing Annual Energy Cost	Proposed Replacement Solution	Qty of Proposed Fixtures	Proposed Fixture Watts	Proposed kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 04 - Interior	002	Closet	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	25.4	15	2160	54.864	\$8.2	Replace T8 Fixture with 22W Linear Panel LED Fixture	1	22	0.022	2160	2160	47.52	47.52	None Proposed	198	0.0034	7.344	1.1	\$290.0	\$4.1	4	0	0	0	0	\$0
PS 04 - Interior	002	Girls Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	16	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	199	0.052	112.32	16.8	\$378.0	\$10.4	4	C	0	0	0	\$0
PS 04 - Interior	002	Girls locker Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	52	2160	1036.8	\$155.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	191	0.208	449.28	67.4	\$1,512.0	\$41.6	4	C	0	0	0	\$0
PS 04 - Interior	002	Nurse	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	17	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	208	0.104	224.64	33.7	\$756.0	\$20.8	4	C	0	0	0	\$0
PS 04 - Interior	002	Nurse	26W CFL Fixture	2	52	17	2160	112.32	\$16.8	None Proposed	2	52	0.052	2160	2160	112.32	112.32	None Proposed	209	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	002	Office	1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	507	40	2160	1095.12	\$164.3	Replace 32W T8 Lamps with 25W T8 Lamps	10	397	0.397	2160	2160	857.52	857.52	None Proposed	184	0.11	237.6	35.6	\$130.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	002	Office	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	40	2160	777.6	\$116.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	2160	2160	440.64	440.64	None Proposed	185	0.156	336.96	50.5	\$1,134.0	\$31.2	4	C	0	0	0	\$0
PS 04 - Interior	002	Office	26W CFL Fixture	2	52	40	2160	112.32	\$16.8	None Proposed	2	52	0.052	2160	2160	112.32	112.32	None Proposed	186	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	002	Staircase	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	30	2160	1814.4	\$272.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	212	0.364	786.24	117.9	\$2,646.0	\$72.8	4	C	0	100	0	\$1,400
PS 04 - Interior	002	Storage Closet	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	101.6	15	2160	219.456	\$32.9	Replace T8 Fixture with 22W Linear Panel LED Fixture	4	88	0.088	2160	2160	190.08	190.08	None Proposed	189	0.0136	29.376	4.4	\$1,160.0	\$16.5	4	0	0	100	0	\$400
PS 04 - Interior	002	Teacher Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	25	1000	240	\$36.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	1000	1000	136	136	None Proposed	205	0.104	104	15.6	\$756.0	\$20.8	4	C	0	10	0	\$40
PS 04 - Interior	002	Teacher Room	26W CFL Fixture	1	26	25	1000	26	\$3.9	None Proposed	1	26	0.026	1000	1000	26	26	None Proposed	206	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	002	Teacher Room	26W CFL Fixture	7	182	25	1000	182	\$27.3	None Proposed	7	182	0.182	1000	1000	182	182	None Proposed	207	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	003	301	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	57	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	261	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	003	302	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	53	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	260	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	003	303	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	56	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	259	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	003	304	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	53	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	257	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	003	305	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	55	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	255	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	003	306	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	26	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	254	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	0	0	\$0
PS 04 - Interior	003	307	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	42	2160	1814.4	\$272.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	256	0.364	786.24	117.9	\$2,646.0	\$72.8	4	C	0	10	0	\$140
PS 04 - Interior	003	308	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	13	780	32	2160	1684.8	\$252.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	13	442	0.442	2160	2160	954.72	954.72	None Proposed	250	0.338	730.08	109.5	\$2,457.0	\$67.6	4	C	0	10	0	\$130
PS 04 - Interior	003	309	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	18	1080	33	2160	2332.8	\$349.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	18	612	0.612	2160	2160	1321.92	1321.92	None Proposed	238	0.468	1010.88	151.6	\$3,402.0	\$93.6	4	C	0	10	0	\$180
PS 04 - Interior	003	310	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	40	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	239	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	003	311	1X4 Fixtures w																											

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 04 - Interior	004	407	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	7	420	41	2160	907.2	\$136.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	7	238	0.238	2160	2160	514.08	514.08	None Proposed	220	0.182	393.12	59.0	\$1,323.0	\$36.4	4	C	0	10	0	\$70
PS 04 - Interior	004	408	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	7	420	55	2160	907.2	\$136.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	7	238	0.238	2160	2160	514.08	514.08	None Proposed	225	0.182	393.12	59.0	\$1,323.0	\$36.4	4	C	0	10	0	\$70
PS 04 - Interior	004	409	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	43	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	235	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	004	410	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	32	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	234	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	004	411	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	30	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	233	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	004	412	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	25	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	231	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	0	0	\$0
PS 04 - Interior	004	413	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	39	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	230	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	10	0	\$120
PS 04 - Interior	002	414	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	12	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	229	0.312	673.92	101.1	\$2,268.0	\$62.4	4	C	0	0	0	\$0
PS 04 - Interior	004	415	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	50	2160	777.6	\$116.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	2160	2160	440.64	440.64	None Proposed	226	0.156	336.96	50.5	\$1,134.0	\$31.2	4	C	0	10	0	\$60
PS 04 - Interior	004	415	26W CFL Fixture	2	52	50	2160	112.32	\$16.8	None Proposed	2	52	0.052	2160	2160	112.32	112.32	None Proposed	227	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	004	4th Floor Hall	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	82	4920	48	2160	10627.2	\$1,594.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	82	2788	2.788	2160	2160	6022.08	6022.08	None Proposed	236	2.132	4605.12	690.8	\$15,498.0	\$426.4	4	C	0	10	0	\$820
PS 04 - Interior	004	A12A	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	26	1000	240	\$36.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	1000	1000	136	136	None Proposed	232	0.104	104	15.6	\$756.0	\$20.8	4	C	0	10	0	\$40
PS 04 - Interior	004	Boys Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	38	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	221	0.104	224.64	33.7	\$756.0	\$20.8	4	C	0	10	0	\$40
PS 04 - Interior	004	Closet	26W CFL Fixture	1	26	N/A	2160	56.16	\$8.4	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	222	0	0	0.0	\$0.0	\$0.0	4	N	0	0	0	\$0
PS 04 - Interior	004	Girls Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	38	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	228	0.104	224.64	33.7	\$756.0	\$20.8	4	C	0	10	0	\$40
PS 04 - Interior	004	Teacher Room	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	50	1000	128	\$19.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	1000	1000	68	68	None Proposed	223	0.06	60	9.0	\$556.0	\$10.4	4	C	0	5	0	\$20
PS 04 - Interior	004	Teacher Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	50	1000	60	\$9.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	1000	1000	34	34	None Proposed	224	0.026	26	3.9	\$189.0	\$5.2	4	C	0	10	0	\$10
PS 04 - Interior	004	Vice Principle	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	36	1000	240	\$36.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	1000	1000	136	136	None Proposed	216	0.104	104	15.6	\$756.0	\$20.8	4	C	0	10	0	\$40
PS 05 - Interior	001	101	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	001	102	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	54	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	001	103	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	60	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	0	0	\$0
PS 05 - Interior	001	104	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	50	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	0	0	\$0
PS 05 - Interior	001	105	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0			

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 05 - Interior	002	201	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	40	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	002	203	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	002	204	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	002	205	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	002	206	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	002	207	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 05 - Interior	002	208	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	209	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	24	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	210	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	211	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	212	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	213	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	50	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	214	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	50	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	215	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	216	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	217	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	218	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	5	0	0	0	0	\$0
PS 05 - Interior	002	221	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	22	1115.4	28	2160	2409.264	\$361.4	Replace T8 Fixture with 36W Linear Panel LED Fixture	22	792	0.792	2160	2160	1710.72	1710.72	None Proposed	0	0.3234	698.544	104.8	\$6,490.0	\$258.3	5	0	0	0	0	\$0
PS 05 - Interior	002	222	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	NR	2160	138.24	\$20.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.03	64.8	9.7	\$278.0	\$5.2	5	C	0	5	0	\$10
PS 05 - Interior	002	Girl's Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	44	2160	518.4	\$77.8	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$578.0	\$20.8	5	C	0	20	0	\$40
PS 05 - Interior	002	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	36	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	5	C	0	0	0	\$0
PS 05 - Interior	002	HALL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	27	1368.9	32	2160	2956.824	\$443.5	Replace T8 Fixture with 36W Linear Panel LED Fixture	27	972	0.972	2160	2160	2099.52	2099.52	None Proposed	0	0.3969	857.304	128.6	\$7,965.0	\$317.0	5	0	0	0	0	\$0
PS 05 - Interior	003	301	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ball																				

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 05 - Interior	B	GSA	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	24	609.6	64	500	304.8	\$45.7	Replace T8 Fixture with 22W Linear Panel LED Fixture	24	528	0.528	500	500	264	264	None Proposed	0	0.0816	40.8	6.1	\$6,960.0	\$98.9	5	0	0	0	0	\$0
PS 05 - Interior	B	Gym	400W Metal Halide Fixtures	18	8244	10	500	4122	\$618.3	Replace Metal Halide Fixtures with 6-Lamp Fluorescent Highbay Fixtures	18	4068	4.068	500	500	2034	2034	None Proposed	0	4.176	2088	313.2	\$5,724.0	\$128.9	5	H	0	0	0	\$0
PS 05 - Interior	B	Gym	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	30	2160	518.4	\$77.8	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$578.0	\$20.8	5	C	0	20	0	\$40
PS 05 - Interior	B	Hall	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	20	2160	1296	\$194.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	84.2	\$1,890.0	\$52.0	5	C	0	10	0	\$100
PS 05 - Interior	B	Kitchen	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	46	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	5	C	0	10	0	\$120
PS 08 - Interior	001	101	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	32	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	102	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	36	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	103	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	104	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	105	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	26	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	106	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	107	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	108	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	40	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	109	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	0	0	\$0
PS 08 - Interior	001	110	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	111	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	40	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	001	auditorium	100W Incandescent Fixture	25	2500	NR	2160	5400	\$810.0	Replace 100W Incandescent Fixture with 25W CFL	25	625	0.625	2160	2160	1350	1350	None Proposed	0	1.875	4050	607.5	\$275.0	\$840.0	6	N	0	0	0	\$0
PS 08 - Interior	001	auditorium	26W CFL Fixture	16	416	NR	2160	898.56	\$134.8	None Proposed	16	416	0.416	2160	2160	898.56	898.56	None Proposed	0	0	0	0.0	\$0.0	\$0.0	6	N	0	0	0	\$0
PS 08 - Interior	001	Hall	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	67	2144	10	3000	6432	\$964.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	67	1139	1.139	3000	3000	3417	3417	None Proposed	0	1.005	3015	452.3	\$9,313.0	\$174.2	6	C	0	5	0	\$335
PS 08 - Interior	001	Main Entrance	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	6	C	0	10	0	\$10
PS 08 - Interior	001	Main Entrance	26W CFL Fixture	3	78	12	2160	168.48	\$25.3	None Proposed	3	78	0.078	2160	2160	168.48	168.48	None Proposed	0	0	0	0.0	\$0.0	\$0.0	6	N	0	0	0	\$0
PS 08 - Interior	001	Nurse	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	24	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$756.0	\$20.8	6	C	0	10	0	\$40
PS 08 - Interior	001	Office	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	50	2160	777.6	\$116.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$1,134.0	\$31.2	6	C	0	10	0	\$60
PS 08 - Interior	001	Principle																												

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 08 - Interior	B	B1 Bathroom	1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	44	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	16.8	\$378.0	\$10.4	6	C	0	0	0	\$0
PS 08 - Interior	B	B2	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	9	540	34	2160	1166.4	\$175.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	9	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.234	505.44	75.8	\$1,701.0	\$46.8	6	C	0	0	0	\$0
PS 08 - Interior	B	B3	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	NR	2160	1814.4	\$272.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	117.9	\$2,646.0	\$72.8	6	C	0	10	0	\$140
PS 08 - Interior	B	B4	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	36	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	6	C	0	10	0	\$120
PS 08 - Interior	B	B5	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	31	2160	1036.8	\$155.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	67.4	\$1,512.0	\$41.6	6	C	0	10	0	\$80
PS 08 - Interior	B	B6	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	960	86	2160	2073.6	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	16	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.416	898.56	134.8	\$3,024.0	\$83.2	6	C	0	10	0	\$160
PS 08 - Interior	B	B7	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	34	2160	1814.4	\$272.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	117.9	\$2,646.0	\$72.8	6	C	0	10	0	\$140
PS 08 - Interior	B	B8	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1200	30	2160	2592	\$388.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	20	680	0.68	2160	2160	1468.8	1468.8	None Proposed	0	0.52	1123.2	168.5	\$3,780.0	\$104.0	6	C	0	10	0	\$200
PS 08 - Interior	B	Boy's Bathroom	1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	35	2160	1036.8	\$155.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	67.4	\$1,512.0	\$41.6	6	C	0	10	0	\$80
PS 08 - Interior	B	Girl's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	50	2160	1036.8	\$155.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	67.4	\$1,512.0	\$41.6	6	C	0	10	0	\$80
PS 08 - Interior	B	Gym/ Café	250W Metal Halide Fixtures	18	5130	12	2160	11080.8	\$1,662.1	Replace Metal Halide Fixtures with 4-Lamp Fluorescent Highbay Fixtures	18	1980	1.98	2160	2160	4276.8	4276.8	None Proposed	0	3.15	6804	1,020.6	\$5,724.0	\$72.0	6	I	0	0	0	\$0
PS 08 - Interior	B	STARWELL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	6	192	6	3000	576	\$86.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	6	102	0.102	3000	3000	306	306	None Proposed	0	0.09	270	40.5	\$834.0	\$15.6	6	C	0	5	0	\$30
PS 08 - Interior	B	Text Book Storage Rm	1X4 Suspended Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	40	500	180	\$27.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	500	500	102	102	None Proposed	0	0.156	78	11.7	\$1,134.0	\$31.2	6	C	0	10	0	\$60
PS 09 - Interior	001	102	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	50	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	001	103	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	44	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	001	104	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	46	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	001	105	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	001	106	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	28	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	001	107	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	22	2160	388.8	\$58.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	25.3	\$567.0	\$15.6	7	C	0	10	0	\$30
PS 09 - Interior	001	108	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	38	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	001	111	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	14	1680	36	2160	3628.8	\$544.3	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	14	952	0.952	2160	2160	2056.32	2056.32	None Proposed	0	0.728	1572.48	235.9	\$4,046.0	\$145.6	7	C	0	0	0	\$0
PS 09 - Interior	001	111 Bathroom	26W CFL Fixture	1	26	14	2160	56.16	\$8.4	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	0	0	0	0.0	\$0.0	\$0.0	7	N	0	0	0	\$0
PS 09 - Interior	001	AHU	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	11	660	10	500	330	\$49.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	11	374	0.374	500	500	187	187	None Proposed	0	0.286	143	21.5	\$2							

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 09 - Interior	002	211	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	002	212	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	002	213	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	002	214	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	002	215	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	0	0	\$0
PS 09 - Interior	002	216	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	002	217	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	0	0	\$0
PS 09 - Interior	002	Boy's Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	3	360	NR	2160	777.6	\$116.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	3	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$867.0	\$31.2	7	C	0	20	0	\$60
PS 09 - Interior	002	Boy's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	7	C	0	0	0	\$0
PS 09 - Interior	002	Girl's Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	3	360	50	2160	777.6	\$116.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	3	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$867.0	\$31.2	7	C	0	20	0	\$60
PS 09 - Interior	002	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	38	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	7	C	0	10	0	\$10
PS 09 - Interior	002	LIBRARY	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	38	2160	388.8	\$58.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	25.3	\$567.0	\$15.6	7	C	0	10	0	\$30
PS 09 - Interior	002	LIBRARY	26W CFL Fixture	6	156	10	2160	336.96	\$50.5	None Proposed	6	156	0.156	2160	2160	336.96	336.96	None Proposed	0	0	0	0.0	\$0.0	\$0.0	7	N	0	0	0	\$0
PS 09 - Interior	002	LIBRARY	1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	110	3520	46	2160	7603.2	\$1,140.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	110	1870	1.87	2160	2160	4039.2	4039.2	None Proposed	0	1.65	3564	534.6	\$15,290.0	\$286.0	7	C	0	5	0	\$550
PS 09 - Interior	003	303	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	15	1800	44	2160	3888	\$583.2	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	15	1020	1.02	2160	2160	2203.2	2203.2	None Proposed	0	0.78	1684.8	252.7	\$4,335.0	\$156.0	7	C	0	20	0	\$300
PS 09 - Interior	003	314	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	38	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	003	315	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	0	0	\$0
PS 09 - Interior	003	316	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	003	317	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	003	318	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	003	319	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	003	320	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,468.0	\$124.8	7	C	0	20	0	\$240
PS 09 - Interior	003	321	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs																				

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 10 - Interior	001	Sink Room	26W CFL Fixture	1	26	7	500	13	\$2.2	None Proposed	1	26	0.026	500	500	13	13	None Proposed	0	0	0	0.0	\$0.0	\$0.0	8	N	0	0	0	\$0
PS 10 - Interior	001	Sink Room	26W CFL Fixture	1	26	4	500	13	\$2.2	None Proposed	1	26	0.026	500	500	13	13	None Proposed	0	0	0	0.0	\$0.0	\$0.0	8	N	0	0	0	\$0
PS 10 - Interior	002	201	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	62	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	0	0	\$0
PS 10 - Interior	002	202	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	62	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	0	0	\$0
PS 10 - Interior	002	203	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	71	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	0	0	\$0
PS 10 - Interior	002	204	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	64	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	205	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	57	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	206	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	51	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	207	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	73	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	208	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	61	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	209	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	60	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	210	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	54	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	211	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	57	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	212	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	52	500	360	\$61.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	500	500	204	204	None Proposed	0	0.312	156	26.5	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	213	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	95	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	214	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	52	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	215	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	57	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	216	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	64	2160	1555.2	\$264.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	114.6	\$2,268.0	\$62.4	8	C	0	10	0	\$120
PS 10 - Interior	002	2nd Floor Hall	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	21	1260	30	500	630	\$107.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	21	714	0.714	500	500	357	357	None Proposed	0	0.546	273	46.4	\$3,969.0	\$109.2	8	C	0	10	0	\$210
PS 10 - Interior	002	Book Room	26W CFL Fixture	1	26	N/A	2160	56.16	\$9.5	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	0	0	0	0.0	\$0.0	\$0.0	8	N	0	0	0	\$0
PS 10 - Interior	002	Boys Room	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	35	2160	138.24	\$23.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.03	64.8	11.0	\$278.0	\$5.2	8	C	0	5	0	\$10
PS 10 - Interior	002	Boys Room	65W Incandescent Fixture	2	130	35	500	65	\$11.1	Replace 65W Incandescent Fixture with 13W CFL	2	26	0.026	500	500	13	13	None Proposed	0	0.104	52	8.8	\$20.5	\$42.7	8	N	0	0	0	\$0
PS 10 - Interior	002	C Stairs	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	31	500	240	\$40.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	500	500	136	136	None Proposed	0	0.208	104	17.7	\$1,512.0	\$41.6	8	C	0	10	0	\$80
PS 10 - Interior	002	D Stairs	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	53	500	180	\$30																					

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID				Total Incentive	
																									Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive		
PS 10 - Interior	003	Boys Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	36	2160	259.2	\$44.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	19.1	\$378.0	\$10.4	8	C	0	10	0	\$20
PS 10 - Interior	003	Closet by 312	26W CFL Fixture	1	26	5	2160	56.16	\$9.5	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	0	0	0	0.0	\$0.0	\$0.0	8	N	0	0	0	\$0
PS 10 - Interior	003	Custodian Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	N/A	2160	129.6	\$22.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	9.5	\$189.0	\$5.2	8	C	0	0	0	\$0
PS 10 - Interior	003	Girls Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	38	2160	388.8	\$66.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	28.6	\$567.0	\$15.6	8	C	0	10	0	\$30
PS 10 - Interior	003	Men Teacher Room	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	43	2160	276.48	\$47.0	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.06	129.6	22.0	\$556.0	\$10.4	8	C	0	5	0	\$20
PS 10 - Interior	003	Men Teacher Room	26W CFL Fixture	1	26	43	2160	56.16	\$9.5	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	0	0	0	0.0	\$0.0	\$0.0	8	N	0	0	0	\$0
PS 10 - Interior	003	Vice Principle	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	6	192	27	2160	414.72	\$70.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	6	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.09	194.4	33.0	\$834.0	\$15.6	8	C	0	5	0	\$30
PS 10 - Interior	003	Vice Principle	26W CFL Fixture	1	26	27	500	13	\$2.2	None Proposed	1	26	0.026	500	500	13	13	None Proposed	0	0	0	0.0	\$0.0	\$0.0	8	N	0	0	0	\$0
PS 10 - Interior	A	Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	N/A	500	60	\$10.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	500	500	34	34	None Proposed	0	0.052	26	4.4	\$378.0	\$10.4	8	C	0	10	0	\$20
PS 10 - Interior	B	001	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	18	1080	31	2160	2332.8	\$396.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	18	612	0.612	2160	2160	1321.92	1321.92	None Proposed	0	0.468	1010.88	171.8	\$3,402.0	\$93.6	8	C	0	10	0	\$180
PS 10 - Interior	B	002	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	56	2160	1814.4	\$308.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	0	0.364	786.24	133.7	\$2,646.0	\$72.8	8	C	0	10	0	\$140
PS 10 - Interior	B	003	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	38	2160	1036.8	\$176.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	76.4	\$1,512.0	\$41.6	8	C	0	10	0	\$80
PS 10 - Interior	B	004	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	35	2160	1036.8	\$176.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	76.4	\$1,512.0	\$41.6	8	C	0	10	0	\$80
PS 10 - Interior	B	007	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	30	2160	1296	\$220.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	95.5	\$1,890.0	\$52.0	8	C	0	10	0	\$100
PS 10 - Interior	B	011	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	50	2160	1296	\$220.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	95.5	\$1,890.0	\$52.0	8	C	0	0	0	\$0
PS 10 - Interior	B	014	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	960	13	2160	2073.6	\$352.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	16	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.416	898.56	152.8	\$3,024.0	\$83.2	8	C	0	10	0	\$160
PS 10 - Interior	B	015	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1200	51	2160	2592	\$440.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	20	680	0.68	2160	2160	1468.8	1468.8	None Proposed	0	0.52	1123.2	190.9	\$3,780.0	\$104.0	8	C	0	10	0	\$200
PS 10 - Interior	B	B Stairs	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	38	3000	1440	\$244.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	3000	3000	816	816	None Proposed	0	0.208	624	106.1	\$1,512.0	\$41.6	8	C	0	10	0	\$80
PS 10 - Interior	B	Boiler Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	8	500	30	\$5.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	0	0.026	13	2.2	\$189.0	\$5.2	8	C	0	10	0	\$10
PS 10 - Interior	B	Boiler Room	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	8	500	192	\$32.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	500	500	102	102	None Proposed	0	0.18	90	15.3	\$1,668.0	\$31.2	8	C	0	5	0	\$60
PS 10 - Interior	B	Custodian	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	13	2160	259.2	\$44.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	19.1	\$378.0	\$10.4	8	C	0	10	0	\$20
PS 10 - Interior	B	Girls Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	19	2160	777.6	\$132.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	57.3	\$1,134.0	\$31.2	8	C	0	10	0	\$60
PS 10 - Interior	B	Gym	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	16	2160	259.2	\$44.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	19.1	\$378.0	\$10.4	8	C	0	10	0	\$20
PS 10 - Interior	B	Gym	65W Incandescent Fixture	14	910	16	2160	1965.6	\$334.2	Replace 65W Incandescent Fixture with 13W CFL	14	182	0.182	2160	2160	393.12	393.12	None Proposed	0	0.728	1572.48									

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	Incentives				Total Incentive	
																									ID	Incentive Code	Incentive Code OS	Lighting Incentive		OS Incentive
PS 11 - Interior	002	206	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	61	2160	1244.16	\$174.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	81.6	\$2,502.0	\$46.8	9	C	0	0	0	\$0
PS 11 - Interior	002	207	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	900	46	2160	1944	\$272.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	15	510	0.51	2160	2160	1101.6	1101.6	None Proposed	0	0.39	842.4	117.9	\$2,835.0	\$78.0	9	C	0	0	0	\$0
PS 11 - Interior	002	208	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	58	2160	1244.16	\$174.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	81.6	\$2,502.0	\$46.8	9	C	0	0	0	\$0
PS 11 - Interior	002	209	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	28	2160	138.24	\$19.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.03	64.8	9.1	\$278.0	\$5.2	9	C	0	0	0	\$0
PS 11 - Interior	002	Boy's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$18.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	7.9	\$189.0	\$5.2	9	C	0	10	0	\$10
PS 11 - Interior	002	Boy's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	NR	2160	109.512	\$15.3	Replace T8 Fixture with 35W Linear Panel LED Fixture	1	35	0.035	2160	2160	75.6	75.6	None Proposed	0	0.0157	33.912	4.7	\$295.0	\$11.7	9	0	0	0	0	\$0
PS 11 - Interior	002	Girl's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	NR	2160	259.2	\$36.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	15.7	\$378.0	\$10.4	9	C	0	10	0	\$20
PS 11 - Interior	002	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	NR	2160	259.2	\$36.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	15.7	\$378.0	\$10.4	9	C	0	10	0	\$20
PS 11 - Interior	002	HALL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	14	448	17	2160	967.68	\$135.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	14	238	0.238	2160	2160	514.08	514.08	None Proposed	0	0.21	453.6	63.5	\$1,946.0	\$36.4	9	C	0	5	0	\$70
PS 11 - Interior	002	Nurse	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	480	56	2160	1036.8	\$145.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	15	255	0.255	2160	1512	550.8	385.56	None Proposed	1	0.225	651.24	91.2	\$2,085.0	\$39.0	9	C	0	10	0	\$150
PS 11 - Interior	003	301	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	15	480	78	2160	1036.8	\$145.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	15	255	0.255	2160	2160	550.8	550.8	None Proposed	0	0.225	486	68.0	\$2,085.0	\$39.0	9	C	0	0	0	\$0
PS 11 - Interior	003	302	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	15	480	32	2160	1036.8	\$145.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	15	255	0.255	2160	2160	550.8	550.8	None Proposed	0	0.225	486	68.0	\$2,085.0	\$39.0	9	C	0	0	0	\$0
PS 11 - Interior	003	303	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	75	2160	1244.16	\$174.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	81.6	\$2,502.0	\$46.8	9	C	0	0	0	\$0
PS 11 - Interior	003	305	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	NR	2160	259.2	\$36.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	15.7	\$378.0	\$10.4	9	C	0	10	0	\$20
PS 11 - Interior	003	306	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	54	2160	1244.16	\$174.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	81.6	\$2,502.0	\$46.8	9	C	0	5	0	\$90
PS 11 - Interior	003	307	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	900	78	2160	1944	\$272.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	15	510	0.51	2160	2160	1101.6	1101.6	None Proposed	0	0.39	842.4	117.9	\$2,835.0	\$78.0	9	C	0	10	0	\$150
PS 11 - Interior	003	308	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	72	2160	1244.16	\$174.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	81.6	\$2,502.0	\$46.8	9	C	0	5	0	\$90
PS 11 - Interior	003	310	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	33	2160	276.48	\$38.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.06	129.6	18.1	\$556.0	\$10.4	9	C	0	5	0	\$20
PS 11 - Interior	003	Boy's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$18.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	7.9	\$189.0	\$5.2	9	C	0	10	0	\$10
PS 11 - Interior	003	Girl's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	202.8	NR	2160	438.048	\$61.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	4	144	0.144	2160	2160	311.04	311.04	None Proposed	0	0.0588	127.008	17.8	\$1,180.0	\$47.0	9	0	0	0	0	\$0
PS 11 - Interior	003	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$18.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	7.9	\$189.0	\$5.2	9	C	0	10	0	\$10
PS 11 - Interior	003	HALL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	13	416	20	2160	898.56	\$125.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	13	221	0.221	2160	2160	477.36	477.36	None Proposed	0	0.195	421.2	59.0	\$1,807.0	\$33.8	9	C	0	5	0	\$65
PS 11 - Interior	B	Basement Rm	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	30	2160	1244.16	\$174.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	81.6	\$2,502.0	\$46.8	9	C	0	0		

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 14 - Interior	B	Teacher's Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	46	1000	152.1	\$25.9	Replace 32W T8 Lamps with 25W T8 Lamps	3	119.1	0.1191	1000	1000	119.1	119.1	None Proposed	0	0.033	33	5.6	\$39.0	\$0.0	10	N	0	0	0	\$0
PS 15 - Interior	001	101	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	45	2160	328.536	\$49.3	Replace 32W T8 Lamps with 25W T8 Lamps	3	119.1	0.1191	2160	2160	257.256	257.256	None Proposed	0	0.033	71.28	10.7	\$39.0	\$0.0	11	N	0	0	0	\$0
PS 15 - Interior	001	101	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	NR	2160	518.4	\$77.8	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$578.0	\$20.8	11	C	0	20	0	\$40
PS 15 - Interior	001	102	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	4	360	35	2160	777.6	\$116.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	4	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$956.0	\$31.2	11	C	0	15	0	\$60
PS 15 - Interior	001	103	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	1	112	NR	2160	241.92	\$36.3	Replace 32W T8 Lamps with 25W T8 Lamps	1	79.2	0.0792	2160	2160	171.072	171.072	None Proposed	0	0.0328	70.848	10.6	\$26.0	\$0.0	11	N	0	0	0	\$0
PS 15 - Interior	001	103	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	33	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	11	C	0	100	0	\$100
PS 15 - Interior	001	104	1X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$5,868.0	\$124.8	11	C	0	20	0	\$240
PS 15 - Interior	001	105	1X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	1512	1762.56	1233.792	None Proposed	1	0.624	1876.608	281.5	\$5,868.0	\$124.8	11	C	0	20	0	\$240
PS 15 - Interior	001	106	1X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	12	1440	NR	2160	3110.4	\$466.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	1512	1762.56	1233.792	None Proposed	1	0.624	1876.608	281.5	\$5,868.0	\$124.8	11	C	0	20	0	\$240
PS 15 - Interior	001	109	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	001	110	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	45	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	001	111	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	28	2160	518.4	\$77.8	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$578.0	\$20.8	11	C	0	20	0	\$40
PS 15 - Interior	001	112	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	100	0	\$1,200
PS 15 - Interior	001	112	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	42	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	001	114	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	51	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	001	115	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	48	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	0	0	\$0
PS 15 - Interior	001	116	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	0	0	\$0
PS 15 - Interior	001	117	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	001	118	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	32	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	001	107-108	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	24	1440	50	2160	3110.4	\$466.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	24	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$4,536.0	\$124.8	11	C	0	10	0	\$240
PS 15 - Interior	001	Auditorium	300W Incandescent Fixture	44	13200	NR	2160	28512	\$4,276.8	Replace 300W Incandescent Fixture with 65W CFL	44	2860	2.86	2160	2160	6177.6	6177.6	None Proposed	0	10.34	22334.4	3,350.2	\$1,889.8	\$1,478.4	11	N	0	0	0	\$0
PS 15 - Interior	001	Auditorium	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	10	2160	138.24	\$20.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.03	64.8	9.7	\$278.0	\$5.2	11	C	0	5	0	\$10
PS 15 - Interior	001	Auditorium	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	5	450	12	2160	972	\$145.8	Remove Ballast, Install 3-17W LED Tube																				

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 15 - Interior	002	218	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	9	288	35	2160	622.08	\$93.3	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	9	153	0.153	2160	2160	330.48	330.48	None Proposed	0	0.135	291.6	43.7	\$1,251.0	\$23.4	11	C	0	5	0	\$45
PS 15 - Interior	002	221	100W Incandescent Fixture	1	100	8	500	50	\$7.5	Replace 100W Incandescent Fixture with 25W CFL	1	25	0.025	500	500	12.5	12.5	None Proposed	0	0.075	37.5	5.6	\$11.0	\$33.6	11	N	0	0	0	\$0
PS 15 - Interior	002	Boy's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	NR	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$756.0	\$20.8	11	C	0	10	0	\$40
PS 15 - Interior	002	Boy's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	11	C	0	10	0	\$10
PS 15 - Interior	002	Girl's Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	4	480	70	2160	1036.8	\$155.5	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	4	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	67.4	\$1,156.0	\$41.6	11	C	0	20	0	\$80
PS 15 - Interior	002	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	11	C	0	10	0	\$10
PS 15 - Interior	002	HALL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	30	1800	17	3000	5400	\$810.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	30	1020	1.02	3000	3000	3060	3060	None Proposed	0	0.78	2340	351.0	\$5,670.0	\$156.0	11	C	0	10	0	\$300
PS 15 - Interior	003	301	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	960	46	2160	2073.6	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	16	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.416	898.56	134.8	\$3,024.0	\$83.2	11	C	0	10	0	\$160
PS 15 - Interior	003	302	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	87	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	303	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	304	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	305	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	306	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	307	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	309	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	310	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	NR	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	311	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	26	2160	276.48	\$41.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.06	129.6	19.4	\$556.0	\$10.4	11	C	0	5	0	\$20
PS 15 - Interior	003	312	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	40	2160	1036.8	\$155.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	0	0.208	449.28	67.4	\$1,512.0	\$41.6	11	C	0	10	0	\$80
PS 15 - Interior	003	313	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	960	62	2160	2073.6	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	16	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.416	898.56	134.8	\$3,024.0	\$83.2	11	C	0	10	0	\$160
PS 15 - Interior	003	314	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	35	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.18	388.8	58.3	\$1,668.0	\$31.2	11	C	0	5	0	\$60
PS 15 - Interior	003	315	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	62	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	316	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	54	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$2,268.0	\$62.4	11	C	0	10	0	\$120
PS 15 - Interior	003	317	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	44	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160															

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 19 - Interior	001	102	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	42	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	25	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	001	103	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	42	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	20	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	001	104	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	48	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	23	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	001	105	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	50	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	26	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	001	106	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	52	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	29	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	001	107	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	26	500	192	\$28.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	500	500	102	102	None Proposed	28	0.18	90	13.5	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	001	108	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	45	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	816	0.816	2160	2160	1762.56	1762.56	None Proposed	27	-0.432	-933.12	-140.0	\$3,468.0	\$124.8	12	C	0	5	0	\$60
PS 19 - Interior	001	Boys Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	NR	2160	518.4	\$77.8	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	21	0.172	371.52	55.7	\$378.0	\$10.4	12	C	0	0	0	\$0
PS 19 - Interior	001	Boys Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	60	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	68	0.068	2160	2160	146.88	146.88	None Proposed	22	-0.008	-17.28	-2.6	\$289.0	\$10.4	12	C	0	10	0	\$10
PS 19 - Interior	001	Girl's Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	21	2160	518.4	\$77.8	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	30	0.172	371.52	55.7	\$378.0	\$10.4	12	C	0	20	0	\$40
PS 19 - Interior	001	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	40	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	17	0.017	2160	2160	36.72	36.72	None Proposed	31	0.043	92.88	13.9	\$139.0	\$2.6	12	C	0	10	0	\$10
PS 19 - Interior	001	Main Entrance	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	26	832	30	2160	1797.12	\$269.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	26	442	0.442	2160	2160	954.72	954.72	None Proposed	18	0.39	842.4	126.4	\$3,614.0	\$67.6	12	C	0	5	0	\$130
PS 19 - Interior	001	Main Office	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	10	320	28	2160	691.2	\$103.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	10	170	0.17	2160	2160	367.2	367.2	None Proposed	24	0.15	324	48.6	\$1,390.0	\$26.0	12	C	0	5	0	\$50
PS 19 - Interior	001	Secretary	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	26	2160	276.48	\$41.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	60	0.06	2160	2160	129.6	129.6	None Proposed	32	0.068	146.88	22.0	\$580.0	\$0.0	12	N	0	5	0	\$20
PS 19 - Interior	001	Secretary bathroom	Circline FC8T9 Fixture	1	26	NR	2160	56.16	\$8.4	LED Surface Fixture 15W	1	34	0.034	2160	2160	73.44	73.44	None Proposed	33	-0.008	-17.28	-2.6	\$189.0	\$5.2	12	C	0	0	0	\$0
PS 19 - Interior	001	STARWELL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	25	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	85	0.085	2160	2160	183.6	183.6	None Proposed	34	0.215	464.4	69.7	\$695.0	\$13.0	12	C	0	10	0	\$50
PS 19 - Interior	002	201	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	56	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	39	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	002	202	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	22	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	37	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	0	0	\$0
PS 19 - Interior	002	203	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	38	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	36	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	002	204	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	48	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	38	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	002	205	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	42	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	002	206	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	30	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.18	388.8	58.3	\$1,668.0	\$31.2	12	C	0	5	0	\$60
PS 19 - Interior	002	207	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	30	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.18	388.8	58.3	\$1,66							

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID				Total Incentive	
																									Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive		
PS 20 - Interior	001	109	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	25	2160	1244.16	\$186.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	87.5	\$2,502.0	\$46.8	13	C	0	0	0	\$0
PS 20 - Interior	001	110	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	38	2160	1244.16	\$186.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	87.5	\$2,502.0	\$46.8	13	C	0	0	0	\$0
PS 20 - Interior	001	111	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	19	1710	68	2160	3693.6	\$554.0	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	19	969	0.969	2160	2160	2093.04	2093.04	None Proposed	0	0.741	1600.56	240.1	\$4,541.0	\$148.2	13	C	0	0	0	\$0
PS 20 - Interior	001	112	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1200	25	2160	2592	\$388.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	20	680	0.68	2160	2160	1468.8	1468.8	None Proposed	0	0.52	1123.2	168.5	\$3,780.0	\$104.0	13	C	0	0	0	\$0
PS 20 - Interior	001	113	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1200	70	2160	2592	\$388.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	20	680	0.68	2160	2160	1468.8	1468.8	None Proposed	0	0.52	1123.2	168.5	\$3,780.0	\$104.0	13	C	0	0	0	\$0
PS 20 - Interior	001	1st Floor Hall	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	48	2880	28	3000	8640	\$1,296.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	48	1632	1.632	3000	3000	4896	4896	None Proposed	0	1.248	3744	561.6	\$9,072.0	\$249.6	13	C	0	0	0	\$0
PS 20 - Interior	001	1st Floor Hall	26W CFL Fixture	19	494	28	3000	1482	\$222.3	None Proposed	19	494	0.494	3000	3000	1482	1482	None Proposed	0	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	001	Auditorium	26W CFL Fixture	73	1898	19	500	949	\$142.4	None Proposed	73	1898	1.898	500	500	949	949	None Proposed	0	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	001	Back of Stage	Circline FC12T9 Fixture	3	108	N/A	500	54	\$8.1	LED Surface Fixture 20W	3	60	0.06	500	500	30	30	None Proposed	0	0.048	24	3.6	\$465.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	001	Boys Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	52	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$756.0	\$20.8	13	C	0	0	0	\$0
PS 20 - Interior	001	Closet by Room 5	26W CFL Fixture	1	26	8	500	13	\$2.0	None Proposed	1	26	0.026	500	500	13	13	None Proposed	0	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	001	Counselors Office	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	33	1000	60	\$9.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	1000	1000	34	34	None Proposed	0	0.026	26	3.9	\$189.0	\$5.2	13	C	0	0	0	\$0
PS 20 - Interior	001	Electric Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	49	500	90	\$13.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	500	500	51	51	None Proposed	0	0.078	39	5.9	\$567.0	\$15.6	13	C	0	0	0	\$0
PS 20 - Interior	001	Elevator Machine Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	37	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	16.8	\$378.0	\$10.4	13	C	0	0	0	\$0
PS 20 - Interior	001	Girls Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	55	2160	518.4	\$77.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.104	224.64	33.7	\$756.0	\$20.8	13	C	0	0	0	\$0
PS 20 - Interior	001	Janitor	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	17	500	30	\$4.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	0	0.026	13	2.0	\$189.0	\$5.2	13	C	0	0	0	\$0
PS 20 - Interior	001	Kindergarten Floor Hall	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	17	1020	31	3000	3060	\$459.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	17	578	0.578	3000	3000	1734	1734	None Proposed	0	0.442	1326	198.9	\$3,213.0	\$88.4	13	C	0	0	0	\$0
PS 20 - Interior	001	Main Office	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	28	2160	388.8	\$58.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	25.3	\$567.0	\$15.6	13	C	0	0	0	\$0
PS 20 - Interior	001	Office in Main Office	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	15	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	13	C	0	0	0	\$0
PS 20 - Interior	001	Office in Main Office	26W CFL Fixture	1	26	15	2160	56.16	\$8.4	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	0	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	001	Parent Resource Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	18	500	60	\$9.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	500	500	34	34	None Proposed	0	0.052	26	3.9	\$378.0	\$10.4	13	C	0	0	0	\$0
PS 20 - Interior	001	Room 1	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	19	608	55	2160	1313.28	\$197.0	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	19	323	0.323	2160	2160	697.68	697.68	None Proposed	0	0.285	615.6	92.3	\$2,641.0	\$49.4	13	C	0	100	0	\$1,900
PS 20 - Interior	001	Room 1A	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	14	448	57	2160	967.68	\$145.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	14	238	0.238	2160	2160	514.08	514.08	None Proposed	0	0.21	453.6	68.0	\$1,946.0	\$36.4	13	C	0	0	0	\$0
PS 20 - Interior	001	Room 2	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	15	480	40	2160	1036.8	\$155.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	15	255	0.255	2160	2160	550.8	550.8	None Proposed	0	0.225	486	72.9	\$2,085.0	\$39.0	13	C	0	0	0</	

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 20 - Interior	002	Faculty Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	34	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	2	0.052	112.32	16.8	\$378.0	\$10.4	13	C	0	0	0	\$0
PS 20 - Interior	002	Faculty Female Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	39	500	60	\$9.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	500	500	34	34	None Proposed	5	0.052	26	3.9	\$378.0	\$10.4	13	C	0	0	0	\$0
PS 20 - Interior	002	Men's Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	35	500	120	\$18.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	500	500	68	68	None Proposed	8	0.104	52	7.8	\$756.0	\$20.8	13	C	0	0	0	\$0
PS 20 - Interior	002	MP Room	26W CFL Fixture	1	26	N/a	2160	56.16	\$8.4	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	0	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	002	MP Room	65W Incandescent Fixture	1	65	N/A	2160	140.4	\$21.1	Replace 65W Incandescent Fixture with 13W CFL	1	13	0.013	2160	2160	28.08	28.08	None Proposed	0	0.052	112.32	16.8	\$10.3	\$21.3	13	N	0	0	0	\$0
PS 20 - Interior	002	Nurse	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	15	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.052	112.32	16.8	\$378.0	\$10.4	13	C	0	10	0	\$20
PS 20 - Interior	002	Storage Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	N/A	500	60	\$9.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	500	500	34	34	None Proposed	6	0.052	26	3.9	\$378.0	\$10.4	13	C	0	0	0	\$0
PS 20 - Interior	A	A Stairwell	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	15	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	9	0.13	280.8	42.1	\$945.0	\$26.0	13	C	0	0	0	\$0
PS 20 - Interior	A	A Stairwell	26W CFL Fixture	1	26	15	500	13	\$2.0	None Proposed	1	26	0.026	500	500	13	13	None Proposed	10	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	A	AA Stairs	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	3	96	13	3000	288	\$43.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	3	51	0.051	3000	3000	153	153	None Proposed	0	0.045	135	20.3	\$417.0	\$7.8	13	C	0	0	0	\$0
PS 20 - Interior	B	B1	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	21	1260	34	2160	2721.6	\$408.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	21	714	0.714	2160	2160	1542.24	1542.24	None Proposed	23	0.546	1179.36	176.9	\$3,969.0	\$109.2	13	C	0	0	0	\$0
PS 20 - Interior	B	B2	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	32	2160	1036.8	\$155.5	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	22	0.208	449.28	67.4	\$1,512.0	\$41.6	13	C	0	0	0	\$0
PS 20 - Interior	B	B3	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	44	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	19	0.312	673.92	101.1	\$2,268.0	\$62.4	13	C	0	0	0	\$0
PS 20 - Interior	B	B4	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	720	52	2160	1555.2	\$233.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	12	408	0.408	2160	2160	881.28	881.28	None Proposed	18	0.312	673.92	101.1	\$2,268.0	\$62.4	13	C	0	0	0	\$0
PS 20 - Interior	B	B5	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	256	27	2160	552.96	\$82.9	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	8	136	0.136	2160	2160	293.76	293.76	None Proposed	16	0.12	259.2	38.9	\$1,112.0	\$20.8	13	C	0	0	0	\$0
PS 20 - Interior	B	Back room of Café	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	98	2160	388.8	\$58.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	34	0.078	168.48	25.3	\$567.0	\$15.6	13	C	0	0	0	\$0
PS 20 - Interior	B	Basement Hall	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	18	1080	18	2160	2332.8	\$349.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	18	612	0.612	2160	2160	1321.92	1321.92	None Proposed	13	0.468	1010.88	151.6	\$3,402.0	\$93.6	13	C	0	0	0	\$0
PS 20 - Interior	B	Basement Hall	26W CFL Fixture	7	182	18	2160	393.12	\$59.0	None Proposed	7	182	0.182	2160	2160	393.12	393.12	None Proposed	14	0	0	0.0	\$0.0	\$0.0	13	N	0	0	0	\$0
PS 20 - Interior	B	Basement Hall (elevator)	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	30	2160	388.8	\$58.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	12	0.078	168.48	25.3	\$567.0	\$15.6	13	C	0	0	0	\$0
PS 20 - Interior	B	Basement Stairwell	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	16	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	42.1	\$945.0	\$26.0	13	C	0	0	0	\$0
PS 20 - Interior	B	Basketball Court	90W Halogen Fixture	9	810	50	500	405	\$60.8	Replace 90W Fixture with 44W LED Fixture	9	396	0.396	500	500	198	198	None Proposed	29	0.414	207	31.1	\$4,743.0	\$165.0	13	E	0	0	0	\$0
PS 20 - Interior	B	Boiler Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	11	660	15	2160	1425.6	\$213.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	11	374	0.374	2160	2160	807.84	807.84	None Proposed	24	0.286	617.76	92.7	\$2,079.0	\$57.2	13	C	0	10	0	\$110
PS 20 - Interior	B	Boiler Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	15	500	60	\$9.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	500	500	34	34	None Proposed	25	0.052	26	3.9	\$378.0	\$10.4	13	C	0	0	0	\$0
PS 20 - Interior	B	C Stairwell	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	5	160	22	3000	480	\$72.0	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	5	85	0.085	3000	3000	255	255	None Proposed	36	0.075	225	33.8	\$695.0	\$13.0	13	C	0	0	0	\$0
PS																														

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Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 21 - Interior	001	109	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	47	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	44	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	10	0	\$140
PS 21 - Interior	001	110	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	40	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	46	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	10	0	\$140
PS 21 - Interior	001	101 Closet	26W CFL Fixture	1	26	12	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	65	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	001	102 Closet	26W CFL Fixture	1	26	9	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	63	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	001	103 Closet	26W CFL Fixture	1	26	10	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	61	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	001	104 Closet	PL4 CFL Fixture	1	26	N/A	500	13	\$2.7	Remove CFL Bulb, Install Terralux DLR7-H Retrofit Kit	1	16	0.016	500	500	8	8	None Proposed	59	0.01	5	1.1	\$140.0	\$6.0	14	0	0	0	0	\$0
PS 21 - Interior	001	105 Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	17	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	57	0.026	13	2.7	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	106 Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	13	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	39	0.026	13	2.7	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	107 Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	16	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	41	0.026	13	2.7	\$189.0	\$5.2	14	C	0	0	0	\$0
PS 21 - Interior	001	108 Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	19	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	43	0.026	13	2.7	\$189.0	\$5.2	14	C	0	0	0	\$0
PS 21 - Interior	001	109 closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	18	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	45	0.026	13	2.7	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	110 Closet	26W CFL Fixture	1	26	2.5	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	47	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	001	Boys Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	50	2160	388.8	\$81.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	67	0.078	168.48	35.4	\$567.0	\$15.6	14	C	0	0	0	\$0
PS 21 - Interior	001	C Stairwell	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	5	600	25	3000	1800	\$378.0	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	5	340	0.34	3000	3000	1020	1020	None Proposed	71	0.26	780	163.8	\$1,445.0	\$52.0	14	C	0	20	0	\$100
PS 21 - Interior	001	Girls Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	39	2160	129.6	\$27.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	48	0.026	56.16	11.8	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	Gym	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	80	4800	16	2160	10368	\$2,177.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	80	2720	2.72	2160	2160	5875.2	5875.2	None Proposed	70	2.08	4492.8	943.5	\$15,120.0	\$416.0	14	C	0	10	0	\$800
PS 21 - Interior	001	Ladies Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	35	2160	129.6	\$27.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	52	0.026	56.16	11.8	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	Mr. Contini	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	53	2160	259.2	\$54.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	50	0.052	112.32	23.6	\$378.0	\$10.4	14	C	0	10	0	\$20
PS 21 - Interior	001	Mr. Contini	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	53	2160	109.512	\$23.0	Replace 32W T8 Lamps with 25W T8 Lamps	1	39.7	0.0397	2160	2160	85.752	85.752	None Proposed	51	0.011	23.76	5.0	\$13.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	001	Ms. Damarest	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	32	9	2160	69.12	\$14.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	1	17	0.017	2160	2160	36.72	36.72	None Proposed	49	0.015	32.4	6.8	\$139.0	\$2.6	14	C	0	5	0	\$5
PS 21 - Interior	001	Principle	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	85	2160	276.48	\$58.1	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	53	0.06	129.6	27.2	\$556.0	\$10.4	14	C	0	5	0	\$20
PS 21 - Interior	001	Principle Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	32	30	500	16	\$3.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	1	17	0.017	500	500	8.5	8.5	None Proposed	54	0.015	7.5	1.6	\$139.0	\$2.6	14	C	0	5	0	\$5
PS 21 - Interior	001	Restroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	50	2160	129.6	\$27.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	66	0.026	56.16	11.8	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	Room next to 100	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	24	2160	129.6	\$27.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	69	0.026	56.16	11.8	\$189.0	\$5.2	14	C	0	10	0	\$10
PS 21 - Interior	001	Secretaries	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ball																											

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 21 - Interior	002	A Stairwell	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	5	600	64	3000	1800	\$378.0	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	5	340	0.34	3000	3000	1020	1020	None Proposed	89	0.26	780	163.8	\$1,445.0	\$52.0	14	C	0	0	0	\$0
PS 21 - Interior	002	Boys Room	PL4 CFL Fixture	2	52	60	500	26	\$5.5	Remove CFL Bulb, Install Terralux DLR7-H Retrofit Kit	2	32	0.032	500	500	16	16	None Proposed	74	0.02	10	2.1	\$280.0	\$12.0	14	0	0	0	0	\$0
PS 21 - Interior	002	Boys Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	18	500	90	\$18.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	500	500	51	51	None Proposed	100	0.078	39	8.2	\$567.0	\$15.6	14	C	0	0	0	\$0
PS 21 - Interior	002	Employee Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	37	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	98	0.026	13	2.7	\$189.0	\$5.2	14	C	0	0	0	\$0
PS 21 - Interior	002	Employee Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	32	37	500	16	\$3.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	1	17	0.017	500	500	8.5	8.5	None Proposed	99	0.015	7.5	1.6	\$139.0	\$2.6	14	C	0	0	0	\$0
PS 21 - Interior	002	Girls Room	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	1	120	25	2160	259.2	\$54.4	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	1	68	0.068	2160	2160	146.88	146.88	None Proposed	73	0.052	112.32	23.6	\$289.0	\$10.4	14	C	0	20	0	\$20
PS 21 - Interior	002	Nurse	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	70	2160	648	\$136.1	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	72	0.13	280.8	59.0	\$945.0	\$26.0	14	C	0	10	0	\$50
PS 21 - Interior	002	Teachers Room	26W CFL Fixture	14	364	33	1000	364	\$76.4	None Proposed	14	364	0.364	1000	1000	364	364	None Proposed	85	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	002	Vice Principle	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	21	2160	388.8	\$81.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	86	0.078	168.48	35.4	\$567.0	\$15.6	14	C	0	0	0	\$0
PS 21 - Interior	003	301	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	32	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	123	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	302	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	38	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	125	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	303	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	42	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	127	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	304	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	39	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	131	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	305	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	37	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	129	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	306	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	13	780	23	2160	1684.8	\$353.8	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	13	442	0.442	2160	2160	954.72	954.72	None Proposed	107	0.338	730.08	153.3	\$2,457.0	\$67.6	14	C	0	0	0	\$0
PS 21 - Interior	003	306	26W CFL Fixture	1	26	23	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	108	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	003	307	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	22	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	105	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	308	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	53	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	103	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	309	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	36	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	112	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	310	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	840	71	2160	1814.4	\$381.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	14	476	0.476	2160	2160	1028.16	1028.16	None Proposed	115	0.364	786.24	165.1	\$2,646.0	\$72.8	14	C	0	0	0	\$0
PS 21 - Interior	003	301 Closet	26W CFL Fixture	1	26	11	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	124	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	003	302 Closet	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	32	8	500	16	\$3.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	1	17	0.017	500	500	8.5	8.5	None Proposed	126	0.015	7.5	1.6	\$139.0	\$2.6	14	C	0	0	0	\$0
PS 21 - Interior	003	303 Closet	26W CFL Fixture	1	26	12	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	128	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	003	304 Closet	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	8	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	132	0.026	13	2.7								

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 21 - Interior	B	B4	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	13	2160	518.4	\$108.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	145	0.104	224.64	47.2	\$756.0	\$20.8	14	C	0	0	0	\$0
PS 21 - Interior	B	B5	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	N/A	2160	1036.8	\$217.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	146	0.208	449.28	94.3	\$1,512.0	\$41.6	14	C	0	0	0	\$0
PS 21 - Interior	B	B6	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	30	2160	1036.8	\$217.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	147	0.208	449.28	94.3	\$1,512.0	\$41.6	14	C	0	0	0	\$0
PS 21 - Interior	B	B6	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	1	120	30	2160	259.2	\$54.4	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	1	68	0.068	2160	2160	146.88	146.88	None Proposed	148	0.052	112.32	23.6	\$289.0	\$10.4	14	C	0	0	0	\$0
PS 21 - Interior	B	B7	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	3	96	9	2160	207.36	\$43.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	3	51	0.051	2160	2160	110.16	110.16	None Proposed	149	0.045	97.2	20.4	\$417.0	\$7.8	14	C	0	5	0	\$15
PS 21 - Interior	B	B8	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	240	24	2160	518.4	\$108.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	4	136	0.136	2160	2160	293.76	293.76	None Proposed	150	0.104	224.64	47.2	\$756.0	\$20.8	14	C	0	10	0	\$40
PS 21 - Interior	B	B9	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	480	73	2160	1036.8	\$217.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	8	272	0.272	2160	2160	587.52	587.52	None Proposed	151	0.208	449.28	94.3	\$1,512.0	\$41.6	14	C	0	0	0	\$0
PS 21 - Interior	B	CAF	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	54	3240	22	2160	6998.4	\$1,469.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	54	1836	1.836	2160	2160	3965.76	3965.76	None Proposed	140	1.404	3032.64	636.9	\$10,206.0	\$280.8	14	C	0	10	0	\$540
PS 21 - Interior	B	Custodian	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	22	500	30	\$6.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	500	500	17	17	None Proposed	152	0.026	13	2.7	\$189.0	\$5.2	14	C	0	0	0	\$0
PS 21 - Interior	B	Custodian	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	9	288	22	500	144	\$30.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	9	153	0.153	500	500	76.5	76.5	None Proposed	153	0.135	67.5	14.2	\$1,251.0	\$23.4	14	C	0	5	0	\$45
PS 21 - Interior	B	Drum Closet	26W CFL Fixture	1	26	8	2160	56.16	\$11.8	None Proposed	1	26	0.026	2160	2160	56.16	56.16	None Proposed	143	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	B	Generator Room	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	15	480	15	500	240	\$50.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	15	255	0.255	500	500	127.5	127.5	None Proposed	154	0.225	112.5	23.6	\$2,085.0	\$39.0	14	C	0	5	0	\$75
PS 21 - Interior	B	Girls Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	35	2160	388.8	\$81.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	136	0.078	168.48	35.4	\$567.0	\$15.6	14	C	0	0	0	\$0
PS 21 - Interior	B	Janitors Closet	26W CFL Fixture	1	26	7	500	13	\$2.7	None Proposed	1	26	0.026	500	500	13	13	None Proposed	135	0	0	0.0	\$0.0	\$0.0	14	N	0	0	0	\$0
PS 21 - Interior	B	Kitchen Staff	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	NR	2160	259.2	\$54.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068	2160	2160	146.88	146.88	None Proposed	137	0.052	112.32	23.6	\$378.0	\$10.4	14	C	0	0	0	\$0
PS 21 - Interior	B	Ladies Room	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	NR	500	32	\$6.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	500	500	17	17	None Proposed	138	0.03	15	3.2	\$278.0	\$5.2	14	C	0	0	0	\$0
PS 24 - Interior	000	003	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	20	1760	41	2160	3801.6	\$570.2	Replace T8 Fixture with 50W Linear Panel LED Fixture	20	1000	1	2160	2160	2160	2160	None Proposed	0	0.76	1641.6	246.2	\$6,500.0	\$317.2	15	0	0	0	0	\$0
PS 24 - Interior	000	004	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	19	1672	33	2160	3611.52	\$541.7	Replace T8 Fixture with 50W Linear Panel LED Fixture	19	950	0.95	2160	2160	2052	2052	None Proposed	0	0.722	1559.52	233.9	\$6,175.0	\$301.3	15	0	0	0	0	\$0
PS 24 - Interior	000	005	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	19	1672	33	2160	3611.52	\$541.7	Replace T8 Fixture with 50W Linear Panel LED Fixture	19	950	0.95	2160	2160	2052	2052	None Proposed	0	0.722	1559.52	233.9	\$6,175.0	\$301.3	15	0	0	0	0	\$0
PS 24 - Interior	000	005?	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	10	880	29	2160	1900.8	\$285.1	Replace T8 Fixture with 50W Linear Panel LED Fixture	10	500	0.5	2160	2160	1080	1080	None Proposed	0	0.38	820.8	123.1	\$3,250.0	\$158.6	15	0	0	0	0	\$0
PS 24 - Interior	000	008	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	12	1056	39	2160	2280.96	\$342.1	Replace T8 Fixture with 50W Linear Panel LED Fixture	12	600	0.6	2160	2160	1296	1296	None Proposed	0	0.456	984.96	147.7	\$3,900.0	\$190.3	15	0	0	0	0	\$0
PS 24 - Interior	000	009	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	6	528	32	2160	1140.48	\$171.1	Replace T8 Fixture with 50W Linear Panel LED Fixture	6	300	0.3	2160	2160	648	648	None Proposed	0	0.228	492.48	73.9	\$1,950.0	\$95.2	15	0	0	0	0	\$0
PS 24 - Interior	000	010	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	968	28	2160	2090.88	\$313.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	11	550	0.55	2160	2160	1188	1188	None Proposed	0	0.418	902.88	135.4	\$3,575.0	\$174.5	15	0	0	0	0	\$0
PS 24 - Interior	000	011	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	792	35	2160	1710.72	\$256.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	9	450	0.45	2160																

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 24 - Interior	000	Men's Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	253.5	41	2160	547.56	\$82.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	5	180	0.18	2160	2160	388.8	388.8	None Proposed	0	0.0735	158.76	23.8	\$1,475.0	\$58.7	15	0	0	0	0	\$0
PS 24 - Interior	000	Men's Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	4	2160	328.536	\$49.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	14.3	\$885.0	\$35.2	15	0	0	0	0	\$0
PS 24 - Interior	000	Security Office	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	25	2160	328.536	\$49.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	14.3	\$885.0	\$35.2	15	0	0	0	0	\$0
PS 24 - Interior	000	Sprinkler	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	50.8	18	500	25.4	\$3.8	Replace T8 Fixture with 22W Linear Panel LED Fixture	2	44	0.044	500	500	22	22	None Proposed	0	0.0068	3.4	0.5	\$580.0	\$8.2	15	0	0	0	0	\$0
PS 24 - Interior	000	Storage	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	25.4	29	500	12.7	\$1.9	Replace T8 Fixture with 22W Linear Panel LED Fixture	1	22	0.022	500	500	11	11	None Proposed	0	0.0034	1.7	0.3	\$290.0	\$4.1	15	0	0	0	0	\$0
PS 24 - Interior	000	Women's Bathroom	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	5	440	32	2160	950.4	\$142.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	5	250	0.25	2160	2160	540	540	None Proposed	0	0.19	410.4	61.6	\$1,625.0	\$79.3	15	0	0	0	0	\$0
PS 24 - Interior	000	Women's Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	42	2160	328.536	\$49.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	14.3	\$885.0	\$35.2	15	0	0	0	0	\$0
PS 24 - Interior	001	100	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	1	90	72	500	45	\$6.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	1	51	0.051	500	500	25.5	25.5	None Proposed	0	0.039	19.5	2.9	\$239.0	\$7.8	15	C	0	15	0	\$15
PS 24 - Interior	001	101	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	8	720	24	2160	1555.2	\$233.3	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	8	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$1,912.0	\$62.4	15	C	0	0	0	\$0
PS 24 - Interior	001	104	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	17	1496	39	2160	3231.36	\$484.7	Replace T8 Fixture with 50W Linear Panel LED Fixture	17	850	0.85	2160	2160	1836	1836	None Proposed	0	0.646	1395.36	209.3	\$5,525.0	\$269.6	15	0	0	0	0	\$0
PS 24 - Interior	001	105	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	6	528	35	2160	1140.48	\$171.1	Replace T8 Fixture with 50W Linear Panel LED Fixture	6	300	0.3	2160	2160	648	648	None Proposed	0	0.228	492.48	73.9	\$1,950.0	\$95.2	15	0	0	0	0	\$0
PS 24 - Interior	001	105	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	35	2160	219.024	\$32.9	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2160	2160	155.52	155.52	None Proposed	0	0.0294	63.504	9.5	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	106	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	15	1320	45	2160	2851.2	\$427.7	Replace T8 Fixture with 50W Linear Panel LED Fixture	15	750	0.75	2160	2160	1620	1620	None Proposed	0	0.57	1231.2	184.7	\$4,875.0	\$237.9	15	0	0	0	0	\$0
PS 24 - Interior	001	107	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	15	1320	47	2160	2851.2	\$427.7	Replace T8 Fixture with 50W Linear Panel LED Fixture	15	750	0.75	2160	2160	1620	1620	None Proposed	0	0.57	1231.2	184.7	\$4,875.0	\$237.9	15	0	0	0	0	\$0
PS 24 - Interior	001	108	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	792	52	2160	1710.72	\$256.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	9	450	0.45	2160	2160	972	972	None Proposed	0	0.342	738.72	110.8	\$2,925.0	\$142.7	15	0	0	0	0	\$0
PS 24 - Interior	001	108	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	52	2160	219.024	\$32.9	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2160	2160	155.52	155.52	None Proposed	0	0.0294	63.504	9.5	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	109	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	792	33	2160	1710.72	\$256.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	9	450	0.45	2160	2160	972	972	None Proposed	0	0.342	738.72	110.8	\$2,925.0	\$142.7	15	0	0	0	0	\$0
PS 24 - Interior	001	109	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	33	2160	219.024	\$32.9	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2160	2160	155.52	155.52	None Proposed	0	0.0294	63.504	9.5	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	110	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	792	41	2160	1710.72	\$256.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	9	450	0.45	2160	2160	972	972	None Proposed	0	0.342	738.72	110.8	\$2,925.0	\$142.7	15	0	0	0	0	\$0
PS 24 - Interior	001	110	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	41	2160	219.024	\$32.9	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2160	2160	155.52	155.52	None Proposed	0	0.0294	63.504	9.5	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	111	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	792	37	2160	1710.72	\$256.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	9	450	0.45	2160	2160	972	972	None Proposed	0	0.342	738.72	110.8	\$2,925.0	\$142.7	15	0	0	0	0	\$0
PS 24 - Interior	001	111	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	37	2160	219.024	\$32.9	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2160	2160	155.52	155.52	None Proposed	0	0.0294	63.504	9.5	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	112	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	792	42	2160	1710.72	\$256.6	Replace T8 Fixture with 50W Linear Panel LED Fixture	9	450	0.45	2160	2160	972	972	None Proposed	0	0.342	738.72	110.8	\$2,925.0	\$142.7	15	0	0	0	0	\$0
PS 24 - Interior	001	112	1X4 Fix																											

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	Existing Fixture Watts	Approximate Measured Lighting Level (footcandles) "N/A" - Not Recorded	Operating Hours	Existing kWh	Existing Annual Energy Cost	Proposed Replacement Solution	Qty of Proposed Fixtures	Proposed Fixture Watts	Proposed kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 24 - Interior	001	Storage	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	21	500	50.7	\$7.6	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	500	500	36	36	None Proposed	0	0.0294	14.7	2.2	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	Storage in Gym	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	12	500	50.7	\$7.6	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	500	500	36	36	None Proposed	0	0.0294	14.7	2.2	\$590.0	\$23.5	15	0	0	0	0	\$0
PS 24 - Interior	001	Women's Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	36	2160	328.536	\$49.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	14.3	\$885.0	\$35.2	15	0	0	0	0	\$0
PS 24 - Interior	001	Women's Locker Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	11	557.7	21	2160	1204.632	\$180.7	Replace T8 Fixture with 36W Linear Panel LED Fixture	11	396	0.396	2160	2160	855.36	855.36	None Proposed	0	0.1617	349.272	52.4	\$3,245.0	\$129.1	15	0	0	0	0	\$0
PS 24 - Interior	002	201	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	9	540	25	2160	1166.4	\$175.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	9	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.234	505.44	75.8	\$1,701.0	\$46.8	15	C	0	10	0	\$90
PS 24 - Interior	002	202	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	10	320	27	2160	691.2	\$103.7	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	10	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.15	324	48.6	\$1,390.0	\$26.0	15	C	0	0	0	\$0
PS 24 - Interior	002	203	1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	9	288	28	2160	622.08	\$93.3	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	9	153	0.153	2160	2160	330.48	330.48	None Proposed	0	0.135	291.6	43.7	\$1,251.0	\$23.4	15	C	0	0	0	\$0
PS 24 - Interior	002	204	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	9	540	24	2160	1166.4	\$175.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	9	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.234	505.44	75.8	\$1,701.0	\$46.8	15	C	0	10	0	\$90
PS 24 - Interior	002	205	1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	256	30	2160	552.96	\$82.9	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	8	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.12	259.2	38.9	\$1,112.0	\$20.8	15	C	0	5	0	\$40
PS 24 - Interior	002	206	1X4 Suspended Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	256	30	2160	552.96	\$82.9	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	8	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.12	259.2	38.9	\$1,112.0	\$20.8	15	C	0	5	0	\$40
PS 24 - Interior	002	207	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	41	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	0	0	\$0
PS 24 - Interior	002	208	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	44	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	15	0	\$165
PS 24 - Interior	002	209	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	57	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	15	0	\$165
PS 24 - Interior	002	210	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	45	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	0	0	\$0
PS 24 - Interior	002	211	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	360	57	2160	777.6	\$116.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	6	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$1,134.0	\$31.2	15	C	0	10	0	\$60
PS 24 - Interior	002	212	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	27	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	15	0	\$165
PS 24 - Interior	002	213	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	9	810	35	2160	1749.6	\$262.4	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	9	459	0.459	2160	2160	991.44	991.44	None Proposed	0	0.351	758.16	113.7	\$2,151.0	\$70.2	15	C	0	15	0	\$135
PS 24 - Interior	002	214	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	27	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	15	0	\$165
PS 24 - Interior	002	215	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	11	990	29	2160	2138.4	\$320.8	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	11	561	0.561	2160	2160	1211.76	1211.76	None Proposed	0	0.429	926.64	139.0	\$2,629.0	\$85.8	15	C	0	15	0	\$165
PS 24 - Interior	002	2nd Floor Hall	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	28	1680	24	2160	3628.8	\$544.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	28	952	0.952	2160	2160	2056.32	2056.32	None Proposed	0	0.728	1572.48	235.9	\$5,292.0	\$145.6	15	C	0	0	0	\$0
PS 24 - Interior	002	2nd Floor New Wing Hall	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	30	1800	104	2160	3888	\$583.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	30	1020	1.02	2160	2160	2203.2	2203.2	None Proposed	0	0.78	1684.8	252.7	\$5,670.0	\$156.0	15	C	0	10	0	\$300
PS 24 - Interior	002	Men's Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	22	2160	388.8	\$58.3	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	2160	2160	220.32	220.32	None Proposed	0	0.078	168.48	25.3	\$567.0	\$15.6	15	C	0	10	0	\$30
PS 24 - Interior	002	Men's Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	120	26	2160	259.2	\$38.9	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	2	68	0.068																	

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 24 - Interior		Stair 3	42W CFL Fixture	2	98	15	3000	294	\$44.1	None Proposed	2	98	0.098	3000	3000	294	294	None Proposed	0	0	0	0.0	\$0.0	\$0.0	15	N	0	0	0	\$0
PS 24 - Interior		Stair 4	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	19	3000	540	\$81.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	3000	3000	306	306	None Proposed	0	0.078	234	35.1	\$567.0	\$15.6	15	C	0	100	0	\$300
PS 24 - Interior		Stair 5	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	13	3000	456.3	\$68.4	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	3000	3000	324	324	None Proposed	0	0.0441	132.3	19.8	\$885.0	\$35.2	15	0	0	0	0	\$0
PS 24 - Interior		Stair 6	26W CFL Fixture	18	468	16	3000	1404	\$210.6	None Proposed	18	468	0.468	3000	3000	1404	1404	None Proposed	0	0	0	0.0	\$0.0	\$0.0	15	N	0	0	0	\$0
PS 25 - Interior	001	101	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	30	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	102	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	42	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	103	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	24	1216.8	50	2160	2628.288	\$420.5	Replace T8 Fixture with 36W Linear Panel LED Fixture	24	864	0.864	2160	2160	1866.24	1866.24	None Proposed	0	0.3528	762.048	121.9	\$7,080.0	\$281.8	16	0	0	0	0	\$0
PS 25 - Interior	001	104	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	35	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	105	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	30	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	106	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	NR	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	107	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	NR	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	108	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	NR	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	109	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	26	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	110	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	44	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	111	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	4	448	36	2160	967.68	\$154.8	Replace T8 Fixture with 50W Linear Panel LED Fixture	4	200	0.2	2160	2160	432	432	None Proposed	0	0.248	535.68	85.7	\$1,300.0	\$79.9	16	0	0	0	0	\$0
PS 25 - Interior	001	112	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	36	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	001	103 Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	NR	2160	109.512	\$17.5	Replace T8 Fixture with 36W Linear Panel LED Fixture	1	36	0.036	2160	2160	77.76	77.76	None Proposed	0	0.0147	31.752	5.1	\$295.0	\$11.7	16	0	0	0	0	\$0
PS 25 - Interior	001	Boy's Bathroom	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	NR	2160	328.536	\$52.6	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	15.2	\$885.0	\$35.2	16	0	0	0	0	\$0
PS 25 - Interior	001	Boy's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	NR	2160	109.512	\$17.5	Replace T8 Fixture with 35W Linear Panel LED Fixture	1	35	0.035	2160	2160	75.6	75.6	None Proposed	0	0.0157	33.912	5.4	\$295.0	\$11.7	16	0	0	0	0	\$0
PS 25 - Interior	001	Girl's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	46	2160	328.536	\$52.6	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	15.2	\$885.0	\$35.2	16	0	0	0	0	\$0
PS 25 - Interior	001	Girl's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	NR	2160	109.512	\$17.5	Replace T8 Fixture with 35W Linear Panel LED Fixture	1	35	0.035	2160	2160	75.6	75.6	None Proposed	0	0.0157	33.912	5.4	\$295.0	\$11.7	16	0	0	0	0	\$0
PS 25 - Interior	001	Nurse	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	40	2160	328.536	\$52.6	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	15.2	\$885.0	\$35.2	16	0	0	0	0	\$0
PS 25 - Interior	001	Nurse's Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	NR	500	25.35	\$4.1	Replace T8 Fixture with 35W Linear Panel LED Fixture	1	35	0.035	500	500	17.5	17.5	None Proposed	0	0.0157	7.85	1.3	\$295.0	\$11.7	16	0	0			

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentives				Total Incentive
																										Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	
PS 25 - Interior	B	B10	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	202.8	45	2160	438.048	\$70.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	4	144	0.144	2160	2160	311.04	311.04	None Proposed	0	0.0588	127.008	20.3	\$1,180.0	\$47.0	16	0	0	0	0	\$0
PS 25 - Interior	B	B11	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	4	202.8	28	2160	438.048	\$70.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	4	144	0.144	2160	2160	311.04	311.04	None Proposed	0	0.0588	127.008	20.3	\$1,180.0	\$47.0	16	0	0	0	0	\$0
PS 25 - Interior	B	B1A	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	3	336	37	2160	725.76	\$116.1	Replace T8 Fixture with 50W Linear Panel LED Fixture	3	150	0.15	2160	2160	324	324	None Proposed	0	0.186	401.76	64.3	\$975.0	\$59.9	16	0	0	0	0	\$0
PS 25 - Interior	B	B2	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	14	355.6	24	2160	768.096	\$122.9	Replace T8 Fixture with 22W Linear Panel LED Fixture	14	308	0.308	2160	2160	665.28	665.28	None Proposed	0	0.0476	102.816	16.5	\$4,060.0	\$57.7	16	0	0	0	0	\$0
PS 25 - Interior	B	B3	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	13	659.1	45	2160	1423.656	\$227.8	Replace T8 Fixture with 36W Linear Panel LED Fixture	13	468	0.468	2160	2160	1010.88	1010.88	None Proposed	0	0.1911	412.776	66.0	\$3,835.0	\$152.6	16	0	0	0	0	\$0
PS 25 - Interior	B	B4	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	NR	2160	1314.144	\$210.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	61.0	\$3,540.0	\$140.9	16	0	0	0	0	\$0
PS 25 - Interior	B	B5	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	10	600	30	2160	1296	\$207.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	10	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.26	561.6	89.9	\$1,890.0	\$52.0	16	C	0	10	0	\$100
PS 25 - Interior	B	B6	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	NR	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	B	B7	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	48	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	B	B8	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	50	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	B	B9	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	30	2160	1533.168	\$245.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	71.1	\$4,130.0	\$164.4	16	0	0	0	0	\$0
PS 25 - Interior	B	Boys Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	224	15	2160	483.84	\$77.4	Replace T8 Fixture with 50W Linear Panel LED Fixture	2	100	0.1	2160	2160	216	216	None Proposed	0	0.124	267.84	42.9	\$650.0	\$39.9	16	0	0	0	0	\$0
PS 25 - Interior	B	Girl's Bathroom	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	224	60	2160	483.84	\$77.4	Replace T8 Fixture with 50W Linear Panel LED Fixture	2	100	0.1	2160	2160	216	216	None Proposed	0	0.124	267.84	42.9	\$650.0	\$39.9	16	0	0	0	0	\$0
PS 25 - Interior	B	GYM	250W Metal Halide Fixtures	20	5700	31	2160	12312	\$1,969.9	Replace Metal Halide Fixtures with 4-Lamp Fluorescent Highbay Fixtures	20	2200	2.2	2160	2160	4752	4752	None Proposed	0	3.5	7560	1,209.6	\$6,360.0	\$80.0	16	I	0	0	0	\$0
PS 25 - Interior	B	HALL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	55	1397	30	3000	4191	\$670.6	Replace T8 Fixture with 22W Linear Panel LED Fixture	55	1210	1.21	3000	3000	3630	3630	None Proposed	0	0.187	561	89.8	\$15,950.0	\$226.6	16	0	0	0	0	\$0
PS 25 - Interior	B	KITCHEN	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	54	2160	648	\$103.7	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	44.9	\$945.0	\$26.0	16	C	0	10	0	\$50
PS 25 - Interior	B	KITCHEN Bathroom	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	NR	1000	60	\$9.6	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	1000	1000	34	34	None Proposed	0	0.026	26	4.2	\$189.0	\$5.2	16	C	0	10	0	\$10
PS 25 - Interior	B	Office	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	6	304.2	42	2160	657.072	\$105.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	6	216	0.216	2160	2160	466.56	466.56	None Proposed	0	0.0882	190.512	30.5	\$1,770.0	\$70.4	16	0	0	0	0	\$0
PS 25 - Interior	B	STARWELL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	203.2	NR	2160	438.912	\$70.2	Replace T8 Fixture with 22W Linear Panel LED Fixture	8	176	0.176	2160	2160	380.16	380.16	None Proposed	0	0.0272	58.752	9.4	\$2,320.0	\$33.0	16	0	0	0	0	\$0
PS 01 & 26 - Interior	001	108	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	960	35	2160	2073.6	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	16	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.416	898.56	134.8	\$3,024.0	\$83.2	1	C	0	10	0	\$160
PS 01 & 26 - Interior	001	109	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	960	52	2160	2073.6	\$311.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	16	544	0.544	2160	2160	1175.04	1175.04	None Proposed	0	0.416	898.56	134.8	\$3,024.0	\$83.2	1	C	0	10	0	\$160
PS 01 & 26 - Interior	001	110	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	15	760.5	28	2160	1642.68	\$246.4	Replace T8 Fixture with 36W Linear Panel LED Fixture	15	540	0.54	2160	2160	1166.4	1166.4	None Proposed	0	0.2205	476.28	71.4	\$4,425.0	\$176.1	1	0	0	0	0	\$0
PS 01 & 26 - Interior	001	111	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	14	709.8	30	2160	1533.168	\$230.0	Replace T8 Fixture with 36W Linear Panel LED Fixture	14	504	0.504	2160	2160	1088.64	1088.64	None Proposed	0	0.2058	444.528	66.7	\$4,13							

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 01 & 26 - Interior	002	Office	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	3	360	48	2160	777.6	\$116.6	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	3	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.156	336.96	50.5	\$867.0	\$31.2	1	C	0	0	0	\$0
PS 01 & 26 - Interior	B	B2	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	811.2	35	2160	1752.192	\$262.8	Replace T8 Fixture with 36W Linear Panel LED Fixture	16	576	0.576	2160	2160	1244.16	1244.16	None Proposed	0	0.2352	508.032	76.2	\$4,720.0	\$187.8	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	B5	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	152.1	30	2160	328.536	\$49.3	Replace T8 Fixture with 36W Linear Panel LED Fixture	3	108	0.108	2160	2160	233.28	233.28	None Proposed	0	0.0441	95.256	14.3	\$885.0	\$35.2	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	B6	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	20	1014	68	2160	2190.24	\$328.5	Replace T8 Fixture with 36W Linear Panel LED Fixture	20	720	0.72	2160	2160	1555.2	1555.2	None Proposed	0	0.294	635.04	95.3	\$5,900.0	\$234.8	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	B7	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	24	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	Boy's Bathroom	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	15	2160	219.024	\$32.9	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2160	2160	155.52	155.52	None Proposed	0	0.0294	63.504	9.5	\$590.0	\$23.5	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	ELECTRICAL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	50.7	12	500	25.35	\$3.8	Replace T8 Fixture with 36W Linear Panel LED Fixture	1	36	0.036	500	500	18	18	None Proposed	0	0.0147	7.35	1.1	\$295.0	\$11.7	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	GENTLEMEN	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	16	811.2	14	500	405.6	\$60.8	Replace T8 Fixture with 36W Linear Panel LED Fixture	16	576	0.576	500	500	288	288	None Proposed	0	0.2352	117.6	17.6	\$4,720.0	\$187.8	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	GYM	250W MH Fixture	24	6840	NR	2160	14774.4	\$2,216.2	Replace 250W Fixture with 110W LED Fixture	24	2640	2.64	2160	2160	5702.4	5702.4	None Proposed	0	4.2	9072	1,360.8	\$12,648.0	\$640.1	1	E	0	0	0	\$0
PS 01 & 26 - Interior	B	Ladies Locker Room	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	7	354.9	18	2160	766.584	\$115.0	Replace T8 Fixture with 36W Linear Panel LED Fixture	7	252	0.252	2160	2160	544.32	544.32	None Proposed	0	0.1029	222.264	33.3	\$2,065.0	\$82.2	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	Ladies Locker Room	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	1	112	30	2160	241.92	\$36.3	Replace T8 Fixture with 50W Linear Panel LED Fixture	1	50	0.05	2160	2160	108	108	None Proposed	0	0.062	133.92	20.1	\$325.0	\$20.0	1	0	0	0	0	\$0
PS 01 & 26 - Interior	B	Resource Room	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	40	2160	1314.144	\$197.1	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2160	2160	933.12	933.12	None Proposed	0	0.1764	381.024	57.2	\$3,540.0	\$140.9	1	0	0	0	0	\$0
PS 27 - Interior	001	101	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	24	768	10	2160	1658.88	\$248.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	24	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.36	777.6	116.6	\$3,336.0	\$62.4	18	C	0	5	0	\$120
PS 27 - Interior	001	102	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	24	768	18	2160	1658.88	\$248.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	24	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.36	777.6	116.6	\$3,336.0	\$62.4	18	C	0	5	0	\$120
PS 27 - Interior	001	103	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	24	768	44	2160	1658.88	\$248.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	24	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.36	777.6	116.6	\$3,336.0	\$62.4	18	C	0	5	0	\$120
PS 27 - Interior	001	107	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	28	711.2	54	2160	1536.192	\$230.4	Replace T8 Fixture with 22W Linear Panel LED Fixture	28	616	0.616	2160	2160	1330.56	1330.56	None Proposed	0	0.0952	205.632	30.8	\$8,120.0	\$115.4	18	0	0	0	0	\$0
PS 27 - Interior	001	113	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	36	914.4	50	2160	1975.104	\$296.3	Replace T8 Fixture with 22W Linear Panel LED Fixture	36	792	0.792	2160	2160	1710.72	1710.72	None Proposed	0	0.1224	264.384	39.7	\$10,440.0	\$148.3	18	0	0	0	0	\$0
PS 27 - Interior	001	114	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	457.2	42	2160	987.552	\$148.1	Replace T8 Fixture with 22W Linear Panel LED Fixture	18	396	0.396	2160	2160	855.36	855.36	None Proposed	0	0.0612	132.192	19.8	\$5,220.0	\$74.2	18	0	0	0	0	\$0
PS 27 - Interior	001	115	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	457.2	NR	2160	987.552	\$148.1	Replace T8 Fixture with 22W Linear Panel LED Fixture	18	396	0.396	2160	2160	855.36	855.36	None Proposed	0	0.0612	132.192	19.8	\$5,220.0	\$74.2	18	0	0	0	0	\$0
PS 27 - Interior	001	116	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	457.2	50	2160	987.552	\$148.1	Replace T8 Fixture with 22W Linear Panel LED Fixture	18	396	0.396	2160	2160	855.36	855.36	None Proposed	0	0.0612	132.192	19.8	\$5,220.0	\$74.2	18	0	0	0	0	\$0
PS 27 - Interior	001	117	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	42	2160	276.48	\$41.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.06	129.6	19.4	\$556.0	\$10.4	18	C	0	5	0	\$20
PS 27 - Interior	001	118	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	3	96	25	2160	207.36	\$31.1	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	3	51	0.051	2160	2160	110.16	110.16	None Proposed	0	0.045	97.2	14.6	\$417.0	\$7.8	18	C	0	5	0	\$15
PS 27 - Interior	001	119	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	15	480	60	2160	1036.8	\$155.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	15	255	0.255	2160																

Appendix D - Lighting Upgrades

Building	Floor	Location/Room #	Existing Fixture/Lamp & Ballast Description	Qty of Existing Fixtures	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 kW Base	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	Labor & Materials Total	Maintenance Cost Savings	ID	Incentive Code	Incentive Code OS	Lighting Incentive	OS Incentive	Total Incentive
PS 27 - Interior	002	210	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	256	20	2160	552.96	\$82.9	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	8	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.12	259.2	38.9	\$1,112.0	\$20.8	18	C	0	0	0	\$0
PS 27 - Interior	002	210	Circline FC8T9 Fixture	2	52	7	2160	112.32	\$16.8	LED Surface Fixture 15W	2	30	0.03	2160	2160	64.8	64.8	None Proposed	0	0.022	47.52	7.1	\$290.0	\$0.0	18	N	0	0	0	\$0
PS 27 - Interior	002	212	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	4	128	45	2160	276.48	\$41.5	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	4	68	0.068	2160	2160	146.88	146.88	None Proposed	0	0.06	129.6	19.4	\$556.0	\$10.4	18	C	0	0	0	\$0
PS 27 - Interior	002	212	Circline FC8T9 Fixture	1	26	NR	2160	56.16	\$8.4	LED Surface Fixture 15W	1	15	0.015	2160	2160	32.4	32.4	None Proposed	0	0.011	23.76	3.6	\$145.0	\$0.0	18	N	0	0	0	\$0
PS 27 - Interior	002	215	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	30	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.18	388.8	58.3	\$1,668.0	\$31.2	18	C	0	5	0	\$60
PS 27 - Interior	002	221	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	NR	2160	1244.16	\$186.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	87.5	\$2,502.0	\$46.8	18	C	0	5	0	\$90
PS 27 - Interior	002	222	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	18	576	70	2160	1244.16	\$186.6	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	18	306	0.306	2160	2160	660.96	660.96	None Proposed	0	0.27	583.2	87.5	\$2,502.0	\$46.8	18	C	0	0	0	\$0
PS 27 - Interior	002	223	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	20	640	NR	2160	1382.4	\$207.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	20	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.3	648	97.2	\$2,780.0	\$52.0	18	C	0	0	0	\$0
PS 27 - Interior	002	224	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	20	640	70	2160	1382.4	\$207.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	20	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.3	648	97.2	\$2,780.0	\$52.0	18	C	0	5	0	\$100
PS 27 - Interior	002	201 Bathroom	Circline FC8T9 Fixture	1	26	20	500	13	\$2.0	LED Surface Fixture 15W	1	15	0.015	500	500	7.5	7.5	None Proposed	0	0.011	5.5	0.8	\$145.0	\$0.0	18	N	0	0	0	\$0
PS 27 - Interior	002	212 Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	1	32	40	500	16	\$2.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	1	17	0.017	500	500	8.5	8.5	None Proposed	0	0.015	7.5	1.1	\$139.0	\$2.6	18	C	0	0	0	\$0
PS 27 - Interior	002	219A	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	12	384	NR	2160	829.44	\$124.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	12	204	0.204	2160	2160	440.64	440.64	None Proposed	0	0.18	388.8	58.3	\$1,668.0	\$31.2	18	C	0	5	0	\$60
PS 27 - Interior	002	219B	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	20	640	NR	2160	1382.4	\$207.4	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	20	340	0.34	2160	2160	734.4	734.4	None Proposed	0	0.3	648	97.2	\$2,780.0	\$52.0	18	C	0	5	0	\$100
PS 27 - Interior	002	Boy's Bathroom	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	3	96	43	2160	207.36	\$31.1	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	3	51	0.051	2160	1512	110.16	77.112	None Proposed	1	0.045	130.248	19.5	\$417.0	\$7.8	18	C	0	5	0	\$15
PS 27 - Interior	002	HALL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	50	1600	50	3000	4800	\$720.0	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	50	850	0.85	3000	3000	2550	2550	None Proposed	0	0.75	2250	337.5	\$6,950.0	\$130.0	18	C	0	5	0	\$250
PS 27 - Interior	B	Cafeteria	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	50	1270	28	2400	3048	\$457.2	Replace T8 Fixture with 22W Linear Panel LED Fixture	50	1100	1.1	2400	2400	2640	2640	None Proposed	0	0.17	408	61.2	\$14,500.0	\$206.0	18	0	0	0	0	\$0
PS 27 - Interior	B	Cafeteria	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	2	101.4	28	2400	243.36	\$36.5	Replace T8 Fixture with 36W Linear Panel LED Fixture	2	72	0.072	2400	2400	172.8	172.8	None Proposed	0	0.0294	70.56	10.6	\$590.0	\$23.5	18	0	0	0	0	\$0
PS 27 - Interior	B	G - 11	Circline FC8T9 Fixture	2	52	10	2400	124.8	\$18.7	LED Surface Fixture 15W	2	30	0.03	2400	2400	72	72	None Proposed	0	0.022	52.8	7.9	\$290.0	\$0.0	18	N	0	0	0	\$0
PS 27 - Interior	B	G - 12	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	28	2400	1460.16	\$219.0	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2400	2400	1036.8	1036.8	None Proposed	0	0.1764	423.36	63.5	\$3,540.0	\$140.9	18	0	0	0	0	\$0
PS 27 - Interior	B	G - 12 B	2X4 Fixtures w/ 4-T8 Lamps w/ Electronic Ballasts	2	240	42	2400	576	\$86.4	Remove Ballast, Install 4-17W LED Tube Retrofit Bulbs	2	136	0.136	2400	2400	326.4	326.4	None Proposed	0	0.104	249.6	37.4	\$578.0	\$20.8	18	C	0	20	0	\$40
PS 27 - Interior	B	G - 16	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	12	608.4	28	2400	1460.16	\$219.0	Replace T8 Fixture with 36W Linear Panel LED Fixture	12	432	0.432	2400	2400	1036.8	1036.8	None Proposed	0	0.1764	423.36	63.5	\$3,540.0	\$140.9	18	0	0	0	0	\$0
PS 27 - Interior	B	G - 17	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	256	15	2400	614.4	\$92.2	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	8	136	0.136	2400	2400	326.4	326.4	None Proposed	0	0.12	288	43.2	\$1,112.0	\$20.8	18	C	0	5	0	\$40
PS 27 - Interior	B	G - 19	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	8	256	15	2160	552.96	\$82.9	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	8	136	0.136	2160	2160	293.76	293.76	None Proposed	0	0.12	259.2	38.9	\$1,112.0	\$20.8	18	C	0	5	0	\$40
PS 27 - Interior	B	G - 9	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	48	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	18	C	0	10	0	\$10
PS 27 - Interior	B	HALL	2X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	24	1440	50	3000	4320	\$648.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	24	816	0.816	3000	3000	2448	2448	None Proposed	0	0.624	1872	280.8	\$4,536.0	\$124.8	18	C	0	10	0	\$240
PS 27 - Interior	B	HALL	PL4 CFL Fixture	12	312	26	3000	936	\$140.4	Remove CFL Bulb, Install Terralux DLR7-H Retrofit Kit	12	192	0.192	3000	3000	576	576	None Proposed	0	0.12	360	54.0	\$1,680.0	\$72.0	18	0	0	0	0	\$0
PS 27 - Interior	B	Kitchen	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	8	405.6	80	2160	876.096	\$131.4	Replace T8 Fixture with 36W Linear Panel LED Fixture	8	288	0.288	2160	2160	622.08	622.08	None Proposed	0	0.1176	254.016	38.1	\$2,360.0	\$93.9	18	0	0	0	0	\$0
PS 27 - Interior	B	MAIN ENTERANCE	2X2 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	5	300	50	2160	648	\$97.2	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	5	170	0.17	2160	2160	367.2	367.2	None Proposed	0	0.13	280.8	42.1	\$945.0	\$26.0	18	C	0	10	0	\$50
PS 27 - Interior	B	N 101	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	35	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	18	C	0	15	0	\$240
PS 27 - Interior	B	N 102	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	32	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	18	C	0	15	0	\$240
PS 27 - Interior	B	N 103	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	38	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	18	C	0	15	0	\$240
PS 27 - Interior	B	N 104	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	16	1440	24	2160	3110.4	\$466.6	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	16	816	0.816	2160	2160	1762.56	1762.56	None Proposed	0	0.624	1347.84	202.2	\$3,824.0	\$124.8	18	C	0	15	0	\$240
PS 27 - Interior	B	N 105	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	28	2520	54	2160	5443.2	\$816.5	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	28	1428	1.428	2160	2160	3084.48	3084.48	None Proposed	0	1.092	2358.72	353.8	\$6,692.0	\$218.4	18	C	0	15	0	\$420
PS 27 - Interior	B	N 108	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	1	60	15	2160	129.6	\$19.4	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	1	34	0.034	2160	2160	73.44	73.44	None Proposed	0	0.026	56.16	8.4	\$189.0	\$5.2	18	C	0	10	0	\$10
PS 27 - Interior	B	N 109	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	8	720	40	2160	1555.2	\$233.3	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	8	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$1,912.0	\$62.4	18	C	0	15	0	\$120
PS 27 - Interior	B	N 110	2X4 Fixtures w/ 3-T8 Lamps w/ Electronic Ballasts	8	720	48	2160	1555.2	\$233.3	Remove Ballast, Install 3-17W LED Tube Retrofit Bulbs	8	408	0.408	2160	2160	881.28	881.28	None Proposed	0	0.312	673.92	101.1	\$1,912.0	\$62.4	18	C	0	15	0	\$120
PS 27 - Interior		STARWELL	1X4 Fixtures w/ 2-T8 Lamps w/ Electronic Ballasts	3	180	16	3000	540	\$81.0	Remove Ballast, Install 2-17W LED Tube Retrofit Bulbs	3	102	0.102	3000	3000	306	306	None Proposed	0	0.078	234	35.1	\$567.0	\$15.6	18	C	0	10	0	\$30
PS 27 - Interior		STARWELL	1X4 Fixtures w/ 1-T8 Lamps w/ Electronic Ballasts	2	64	NR	3000	192	\$28.8	Remove Ballast, Install 1-17W LED Tube Retrofit Bulbs	2	34	0.034	3000	3000	102	102	None Proposed	0	0.03	90	13.5	\$278.0	\$5.2	18	C	0	5	0	\$10

ECM	PS 01 & 26 - Interior	PS 04 - Interior	PS 09 - Interior	PS 14 - Interior	PS 20 -Interior	PS 25 - Interior
Assumed Inflation (Gas)	2%	2%	2%	2%	2%	2%
Initial Yearly Savings (Gas)						
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$15,068.27	\$17,217.37	\$18,005.69	\$2,167.84	\$10,712.08	\$12,054.74
Assumed Average Useful Life (Years)	15	15	15	15	15	15
Lifetime Savings	\$280,253.46	\$320,224.31	\$334,886.26	\$40,319.44	\$199,233.05	\$224,205.14
<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>
1	\$15,068.27	\$17,217.37	\$18,005.69	\$2,167.84	\$10,712.08	\$12,054.74
2	\$15,520.32	\$17,733.89	\$18,545.86	\$2,232.87	\$11,033.44	\$12,416.39
3	\$15,985.93	\$18,265.90	\$19,102.24	\$2,299.86	\$11,364.45	\$12,788.88
4	\$16,465.51	\$18,813.88	\$19,675.30	\$2,368.86	\$11,705.38	\$13,172.54
5	\$16,959.47	\$19,378.30	\$20,265.56	\$2,439.92	\$12,056.54	\$13,567.72
6	\$17,468.25	\$19,959.65	\$20,873.53	\$2,513.12	\$12,418.24	\$13,974.75
7	\$17,992.30	\$20,558.44	\$21,499.73	\$2,588.51	\$12,790.78	\$14,393.99
8	\$18,532.07	\$21,175.19	\$22,144.73	\$2,666.17	\$13,174.51	\$14,825.81
9	\$19,088.03	\$21,810.44	\$22,809.07	\$2,746.15	\$13,569.74	\$15,270.59
10	\$19,660.67	\$22,464.76	\$23,493.34	\$2,828.54	\$13,976.83	\$15,728.71
11	\$20,250.49	\$23,138.70	\$24,198.14	\$2,913.39	\$14,396.14	\$16,200.57
12	\$20,858.01	\$23,832.86	\$24,924.08	\$3,000.80	\$14,828.02	\$16,686.58
13	\$21,483.75	\$24,547.85	\$25,671.81	\$3,090.82	\$15,272.86	\$17,187.18
14	\$22,128.26	\$25,284.28	\$26,441.96	\$3,183.54	\$15,731.05	\$17,702.80
15	\$22,792.11	\$26,042.81	\$27,235.22	\$3,279.05	\$16,202.98	\$18,233.88
ECM	PS 02 - Interior	PS 05 - Interior	PS 10 - Interior	PS 15 - Interior	PS 21 - Interior	Label Removed
Assumed Inflation (Gas)	2%	2%	2%	2%	2%	2%
Initial Yearly Savings (Gas)						
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$11,959.40	\$11,947.81	\$11,258.35	\$18,046.54	\$12,817.99	\$0.00
Assumed Average Useful Life (Years)	15	15	15	15	15	15
Lifetime Savings	\$222,431.88	\$222,216.35	\$209,393.16	\$335,646.06	\$238,400.68	\$0.00
<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>
1	\$11,959.40	\$11,947.81	\$11,258.35	\$18,046.54	\$12,817.99	\$0.00
2	\$12,318.18	\$12,306.25	\$11,596.10	\$18,587.94	\$13,202.53	\$0.00
3	\$12,687.73	\$12,675.44	\$11,943.99	\$19,145.58	\$13,598.61	\$0.00
4	\$13,068.36	\$13,055.70	\$12,302.31	\$19,719.94	\$14,006.56	\$0.00
5	\$13,460.41	\$13,447.37	\$12,671.38	\$20,311.54	\$14,426.76	\$0.00
6	\$13,864.22	\$13,850.79	\$13,051.52	\$20,920.89	\$14,859.56	\$0.00
7	\$14,280.15	\$14,266.31	\$13,443.06	\$21,548.51	\$15,305.35	\$0.00
8	\$14,708.56	\$14,694.30	\$13,846.36	\$22,194.97	\$15,764.51	\$0.00
9	\$15,149.81	\$15,135.13	\$14,261.75	\$22,860.82	\$16,237.45	\$0.00
10	\$15,604.31	\$15,589.19	\$14,689.60	\$23,546.64	\$16,724.57	\$0.00
11	\$16,072.44	\$16,056.86	\$15,130.29	\$24,253.04	\$17,226.31	\$0.00
12	\$16,554.61	\$16,538.57	\$15,584.19	\$24,980.63	\$17,743.10	\$0.00
13	\$17,051.25	\$17,034.72	\$16,051.72	\$25,730.05	\$18,275.39	\$0.00
14	\$17,562.78	\$17,545.77	\$16,533.27	\$26,501.95	\$18,823.65	\$0.00
15	\$18,089.67	\$18,072.14	\$17,029.27	\$27,297.01	\$19,388.36	\$0.00

ECM	PS 03 - Interior	PS 08 - Interior	PS 11 - Interior	PS 19 - Interior	PS 24 - Interior	PS 27 - Interior
Assumed Inflation (Gas)	2%	2%	2%	2%	2%	2%
Initial Yearly Savings (Gas)						
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$27,027.67	\$29,165.18	\$29,264.04	\$20,214.38	\$23,530.07	\$12,054.74
Assumed Average Useful Life (Years)	15	15	15	15	15	15
Lifetime Savings	\$502,685.34	\$542,440.65	\$544,279.42	\$375,965.50	\$437,633.73	\$224,205.14
<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>
1	\$27,027.67	\$29,165.18	\$29,264.04	\$20,214.38	\$23,530.07	\$12,054.74
2	\$27,838.50	\$30,040.13	\$30,141.96	\$20,820.81	\$24,235.97	\$12,416.39
3	\$28,673.66	\$30,941.34	\$31,046.22	\$21,445.43	\$24,963.05	\$12,788.88
4	\$29,533.87	\$31,869.58	\$31,977.61	\$22,088.80	\$25,711.94	\$13,172.54
5	\$30,419.88	\$32,825.67	\$32,936.94	\$22,751.46	\$26,483.30	\$13,567.72
6	\$31,332.48	\$33,810.44	\$33,925.05	\$23,434.01	\$27,277.80	\$13,974.75
7	\$32,272.45	\$34,824.75	\$34,942.80	\$24,137.03	\$28,096.13	\$14,393.99
8	\$33,240.63	\$35,869.49	\$35,991.08	\$24,861.14	\$28,939.02	\$14,825.81
9	\$34,237.85	\$36,945.58	\$37,070.81	\$25,606.97	\$29,807.19	\$15,270.59
10	\$35,264.98	\$38,053.94	\$38,182.94	\$26,375.18	\$30,701.40	\$15,728.71
11	\$36,322.93	\$39,195.56	\$39,328.43	\$27,166.44	\$31,622.45	\$16,200.57
12	\$37,412.62	\$40,371.43	\$40,508.28	\$27,981.43	\$32,571.12	\$16,686.58
13	\$38,535.00	\$41,582.57	\$41,723.53	\$28,820.87	\$33,548.25	\$17,187.18
14	\$39,691.05	\$42,830.05	\$42,975.23	\$29,685.50	\$34,554.70	\$17,702.80
15	\$40,881.78	\$44,114.95	\$44,264.49	\$30,576.06	\$35,591.34	\$18,233.88

IRR, NPV, AROI

Inflation Rate: 3%

Lighting Upgrades PS 01 & 26 - Interior		Lighting Upgrades PS 04 - Interior		Lighting Upgrades PS 09 - 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	(\$361,413.6)	0	(\$340,726.8)	0	(\$251,274.0)
1	\$15,068.3	1	\$17,217.4	1	\$18,005.7
2	\$15,520.3	2	\$17,733.9	2	\$18,545.9
3	\$15,985.9	3	\$18,265.9	3	\$19,102.2
4	\$16,465.5	4	\$18,813.9	4	\$19,675.3
5	\$16,959.5	5	\$19,378.3	5	\$20,265.6
6	\$17,468.3	6	\$19,959.6	6	\$20,873.5
7	\$17,992.3	7	\$20,558.4	7	\$21,499.7
8	\$18,532.1	8	\$21,175.2	8	\$22,144.7
9	\$19,088.0	9	\$21,810.4	9	\$22,809.1
10	\$19,660.7	10	\$22,464.8	10	\$23,493.3
11	\$20,250.5	11	\$23,138.7	11	\$24,198.1
12	\$20,858.0	12	\$23,832.9	12	\$24,924.1
13	\$21,483.7	13	\$24,547.8	13	\$25,671.8
14	\$22,128.3	14	\$25,284.3	14	\$26,442.0
15	\$22,792.1	15	\$26,042.8	15	\$27,235.2
IRR	(2.8%)	IRR	(0.7%)	IRR	3.6%
NPV	(\$141,972.8)	NPV	(\$89,988.4)	NPV	\$10,944.7
AROI	(2.5%)	AROI	(1.6%)	AROI	0.5%
Lighting Upgrades PS 02 - Interior		Lighting Upgrades PS 05 - Interior		Lighting Upgrades PS 10 - 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	(\$254,511.4)	0	(\$264,218.3)	0	(\$217,728.0)
1	\$11,959.4	1	\$11,947.8	1	\$11,258.4
2	\$12,318.2	2	\$12,306.2	2	\$11,596.1
3	\$12,687.7	3	\$12,675.4	3	\$11,944.0
4	\$13,068.4	4	\$13,055.7	4	\$12,302.3
5	\$13,460.4	5	\$13,447.4	5	\$12,671.4
6	\$13,864.2	6	\$13,850.8	6	\$13,051.5
7	\$14,280.2	7	\$14,266.3	7	\$13,443.1
8	\$14,708.6	8	\$14,694.3	8	\$13,846.4
9	\$15,149.8	9	\$15,135.1	9	\$14,261.7
10	\$15,604.3	10	\$15,589.2	10	\$14,689.6
11	\$16,072.4	11	\$16,056.9	11	\$15,130.3
12	\$16,554.6	12	\$16,538.6	12	\$15,584.2
13	\$17,051.2	13	\$17,034.7	13	\$16,051.7
14	\$17,562.8	14	\$17,545.8	14	\$16,533.3
15	\$18,089.7	15	\$18,072.1	15	\$17,029.3
IRR	(1.5%)	IRR	(2.0%)	IRR	(0.5%)
NPV	(\$80,345.4)	NPV	(\$90,221.0)	NPV	(\$53,771.4)
AROI	(2.0%)	AROI	(2.1%)	AROI	(1.5%)
Lighting Upgrades PS 03 - Interior		Lighting Upgrades PS 08 - Interior		Lighting Upgrades PS 11 - 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	(\$615,925.0)	0	(\$604,945.0)	0	(\$469,002.0)
1	\$27,027.7	1	\$29,165.2	1	\$29,264.0
2	\$27,838.5	2	\$30,040.1	2	\$30,142.0
3	\$28,673.7	3	\$30,941.3	3	\$31,046.2
4	\$29,533.9	4	\$31,869.6	4	\$31,977.6
5	\$30,419.9	5	\$32,825.7	5	\$32,936.9
6	\$31,332.5	6	\$33,810.4	6	\$33,925.0
7	\$32,272.5	7	\$34,824.7	7	\$34,942.8
8	\$33,240.6	8	\$35,869.5	8	\$35,991.1
9	\$34,237.8	9	\$36,945.6	9	\$37,070.8
10	\$35,265.0	10	\$38,053.9	10	\$38,182.9
11	\$36,322.9	11	\$39,195.6	11	\$39,328.4
12	\$37,412.6	12	\$40,371.4	12	\$40,508.3
13	\$38,535.0	13	\$41,582.6	13	\$41,723.5
14	\$39,691.0	14	\$42,830.0	14	\$42,975.2
15	\$40,881.8	15	\$44,115.0	15	\$44,264.5
IRR	(2.3%)	IRR	(1.3%)	IRR	1.8%
NPV	(\$222,318.2)	NPV	(\$180,209.4)	NPV	(\$42,826.6)
AROI	(2.3%)	AROI	(1.8%)	AROI	(0.4%)

IRR, NPV, AROI

Paterson BOE

Inflation Rate:

CB

BRM

Lighting Upgrades PS 14 - Interior		Lighting Upgrades PS 20 -Interior		Lighting Upgrades PS 25 - 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	(\$37,494.3)	0	(\$215,405.4)	0	(\$289,875.8)
1	\$2,167.8	1	\$10,712.1	1	\$12,054.7
2	\$2,232.9	2	\$11,033.4	2	\$12,416.4
3	\$2,299.9	3	\$11,364.4	3	\$12,788.9
4	\$2,368.9	4	\$11,705.4	4	\$13,172.5
5	\$2,439.9	5	\$12,056.5	5	\$13,567.7
6	\$2,513.1	6	\$12,418.2	6	\$13,974.8
7	\$2,588.5	7	\$12,790.8	7	\$14,394.0
8	\$2,666.2	8	\$13,174.5	8	\$14,825.8
9	\$2,746.2	9	\$13,569.7	9	\$15,270.6
10	\$2,828.5	10	\$13,976.8	10	\$15,728.7
11	\$2,913.4	11	\$14,396.1	11	\$16,200.6
12	\$3,000.8	12	\$14,828.0	12	\$16,686.6
13	\$3,090.8	13	\$15,272.9	13	\$17,187.2
14	\$3,183.5	14	\$15,731.1	14	\$17,702.8
15	\$3,279.0	15	\$16,203.0	15	\$18,233.9
IRR	0.9%	IRR	(0.9%)	IRR	(2.9%)
NPV	(\$5,923.9)	NPV	(\$59,404.3)	NPV	(\$114,321.2)
AROI	(0.9%)	AROI	(1.7%)	AROI	(2.5%)
Lighting Upgrades PS 15 - Interior		Lighting Upgrades PS 21 - Interior		Lighting Upgrades Label Removed	
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	(\$243,693.1)	0	(\$215,234.2)	0	\$0.0
1	\$18,046.5	1	\$12,818.0	1	\$0.0
2	\$18,587.9	2	\$13,202.5	2	\$0.0
3	\$19,145.6	3	\$13,598.6	3	\$0.0
4	\$19,719.9	4	\$14,006.6	4	\$0.0
5	\$20,311.5	5	\$14,426.8	5	\$0.0
6	\$20,920.9	6	\$14,859.6	6	\$0.0
7	\$21,548.5	7	\$15,305.3	7	\$0.0
8	\$22,195.0	8	\$15,764.5	8	\$0.0
9	\$22,860.8	9	\$16,237.4	9	\$0.0
10	\$23,546.6	10	\$16,724.6	10	\$0.0
11	\$24,253.0	11	\$17,226.3	11	\$0.0
12	\$24,980.6	12	\$17,743.1	12	\$0.0
13	\$25,730.1	13	\$18,275.4	13	\$0.0
14	\$26,502.0	14	\$18,823.6	14	\$0.0
15	\$27,297.0	15	\$19,388.4	15	\$0.0
IRR	4.0%	IRR	1.2%	IRR	#NUM!
NPV	\$19,120.6	NPV	(\$28,564.4)	NPV	\$0.0
AROI	0.7%	AROI	(0.7%)	AROI	#DIV/0!
Lighting Upgrades PS 19 - Interior		Lighting Upgrades PS 24 - Interior		Lighting Upgrades PS 27 - 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	(\$281,187.4)	0	(\$430,639.6)	0	(\$289,875.8)
1	\$20,214.4	1	\$23,530.1	1	\$12,054.7
2	\$20,820.8	2	\$24,236.0	2	\$12,416.4
3	\$21,445.4	3	\$24,963.1	3	\$12,788.9
4	\$22,088.8	4	\$25,711.9	4	\$13,172.5
5	\$22,751.5	5	\$26,483.3	5	\$13,567.7
6	\$23,434.0	6	\$27,277.8	6	\$13,974.8
7	\$24,137.0	7	\$28,096.1	7	\$14,394.0
8	\$24,861.1	8	\$28,939.0	8	\$14,825.8
9	\$25,607.0	9	\$29,807.2	9	\$15,270.6
10	\$26,375.2	10	\$30,701.4	10	\$15,728.7
11	\$27,166.4	11	\$31,622.4	11	\$16,200.6
12	\$27,981.4	12	\$32,571.1	12	\$16,686.6
13	\$28,820.9	13	\$33,548.3	13	\$17,187.2
14	\$29,685.5	14	\$34,554.7	14	\$17,702.8
15	\$30,576.1	15	\$35,591.3	15	\$18,233.9
IRR	3.6%	IRR	0.2%	IRR	(2.9%)
NPV	\$13,196.8	NPV	(\$87,968.7)	NPV	(\$114,321.2)
AROI	0.5%	AROI	(1.2%)	AROI	(2.5%)

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 01 & 26 - Interior									
	Lighting Upgrades	1	ea.	\$ 189,068.00	\$ 189,068.00	1	ea.	\$ 65,818.00	\$ 65,818.00	\$ 254,886.00
	Subtotal				\$ 189,068.00				\$ 65,818.00	

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 =	\$	254,886.00
MARKUP % =	\$	0.15
MARKUP =	\$	38,232.90
SUB-TOTAL w/ OH & P =	\$	293,118.90
CONTINGENCY % =		0.25
CONTINGENCY =	\$	73,279.73
BUDGET COST ESTIMATE =	\$	366,398.63

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 02 - Interior									
	Lighting Upgrades	1	ea.	\$ 123,880.25	\$ 123,880.25	1	ea.	\$ 62,879.00	\$ 62,879.00	\$ 186,759.25
	Subtotal				\$ 123,880.25				\$ 62,879.00	

Notes:

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SUBTOTAL =	\$	186,759.25
MARKUP % =	\$	0.15
MARKUP =	\$	28,013.89
SUB-TOTAL w/ OH & P =	\$	214,773.14
CONTINGENCY % =		0.25
CONTINGENCY =	\$	53,693.28
BUDGET COST ESTIMATE =	\$	268,466.42

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 03 - Interior Lighting Upgrades	1	ea.	\$ 312,948.25	\$ 312,948.25	1	ea.	\$ 128,697.00	\$ 128,697.00	\$ 441,645.25
	Subtotal				\$ 312,948.25				\$ 128,697.00	

- 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 =	\$	441,645.25
MARKUP % =	\$	0.15
MARKUP =	\$	66,246.79
SUB-TOTAL w/ OH & P =	\$	507,892.04
CONTINGENCY % =		0.25
CONTINGENCY =	\$	126,973.01
BUDGET COST ESTIMATE =	\$	634,865.05

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 04 - Interior Lighting Upgrades	1	ea.	\$ 162,275.00	\$ 162,275.00	1	ea.	\$ 81,761.00	\$ 81,761.00	\$ 244,036.00
	Subtotal				\$ 162,275.00				\$ 81,761.00	

- 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 =	\$	244,036.00
MARKUP % =	\$	0.15
MARKUP =	\$	36,605.40
SUB-TOTAL w/ OH & P =	\$	280,641.40
CONTINGENCY % =		0.25
CONTINGENCY =	\$	70,160.35
BUDGET COST ESTIMATE =	\$	350,801.75

CDMSmith

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 05 - Interior Lighting Upgrades	1	ea.	\$ 132,610.00	\$ 132,610.00	1	ea.	\$ 54,394.00	\$ 54,394.00	\$ 187,004.00
	Subtotal				\$ 132,610.00				\$ 54,394.00	

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.

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SUBTOTAL =	\$	187,004.00
MARKUP % =	\$	0.15
MARKUP =	\$	28,050.60
SUB-TOTAL w/ OH & P =	\$	215,054.60
CONTINGENCY % =		0.25
CONTINGENCY =	\$	53,763.65
BUDGET COST ESTIMATE =	\$	268,818.25

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 08 - Interior Lighting Upgrades	1	ea.	\$ 294,885.00	\$ 294,885.00	1	ea.	\$ 136,155.00	\$ 136,155.00	\$ 431,040.00
	Subtotal				\$ 294,885.00				\$ 136,155.00	

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 =	\$	431,040.00
MARKUP % =	\$	0.15
MARKUP =	\$	64,656.00
SUB-TOTAL w/ OH & P =	\$	495,696.00
CONTINGENCY % =		0.25
CONTINGENCY =	\$	123,924.00
BUDGET COST ESTIMATE =	\$	619,620.00

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 09 - Interior Lighting Upgrades	1	ea.	\$ 128,405.50	\$ 128,405.50	1	ea.	\$ 51,566.00	\$ 51,566.00	\$ 179,971.50
	Subtotal				\$ 128,405.50				\$ 51,566.00	

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 =	\$	179,971.50
MARKUP % =	\$	0.15
MARKUP =	\$	26,995.73
SUB-TOTAL w/ OH & P =	\$	206,967.23
CONTINGENCY % =		0.25
CONTINGENCY =	\$	51,741.81
BUDGET COST ESTIMATE =	\$	258,709.03

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 10 - Interior Lighting Upgrades	1	ea.	\$ 97,329.50	\$ 97,329.50	1	ea.	\$ 57,483.00	\$ 57,483.00	\$ 154,812.50
	Subtotal				\$ 97,329.50				\$ 57,483.00	

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 =	\$	154,812.50
MARKUP % =	\$	0.15
MARKUP =	\$	23,221.88
SUB-TOTAL w/ OH & P =	\$	178,034.38
CONTINGENCY % =		0.25
CONTINGENCY =	\$	44,508.59
BUDGET COST ESTIMATE =	\$	222,542.97

CDMSmith

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Latham, NY 12110
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Fax (518) 786-3810

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 11 - Interior Lighting Upgrades	1	ea.	\$ 225,735.00	\$ 225,735.00	1	ea.	\$ 109,049.00	\$ 109,049.00	\$ 334,784.00
	Subtotal				\$ 225,735.00				\$ 109,049.00	

- Notes:
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 - Bonds not included in estimate.
 - Escalation not included in estimate.

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SUBTOTAL =	\$	334,784.00
MARKUP % =	\$	0.15
MARKUP =	\$	50,217.60
SUB-TOTAL w/ OH & P =	\$	385,001.60
CONTINGENCY % =		0.25
CONTINGENCY =	\$	96,250.40
BUDGET COST ESTIMATE =	\$	481,252.00

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 14 - Interior Lighting Upgrades	1	ea.	\$ 16,954.00	\$ 16,954.00	1	ea.	\$ 9,129.00	\$ 9,129.00	\$ 26,083.00
	Subtotal				\$ 16,954.00				\$ 9,129.00	

- Notes:
- 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.
 - Bonds not included in estimate.
 - Escalation not included in estimate.

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SUBTOTAL =	\$	26,083.00
CONTINGENCY % =		0.25
CONTINGENCY =	\$	6,520.75
BUDGET COST ESTIMATE =	\$	32,603.75

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 15 - Interior									
	Lighting Upgrades	1	ea.	\$ 119,513.80	\$ 119,513.80	1	ea.	\$ 54,384.00	\$ 54,384.00	\$ 173,897.80
	Subtotal				\$ 119,513.80				\$ 54,384.00	

SUBTOTAL = \$ 173,897.80
CONTINGENCY % = 0.25
CONTINGENCY = \$ 43,474.45
BUDGET COST ESTIMATE = \$ 217,372.25

- Notes:
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 3. Bonds not included in estimate.
 4. Escalation not included in estimate.

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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 19 - Interior									
	Lighting Upgrades	1	ea.	\$ 136,467.80	\$ 136,467.80	1	ea.	\$ 63,513.00	\$ 63,513.00	\$ 199,980.80
	Subtotal				\$ 136,467.80				\$ 63,513.00	

SUBTOTAL = \$ 199,980.80
CONTINGENCY % = 0.25
CONTINGENCY = \$ 49,995.20
BUDGET COST ESTIMATE = \$ 249,976.00

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 20 -Interior Lighting Upgrades	1	ea.	\$ 94,905.25	\$ 94,905.25	1	ea.	\$ 56,542.00	\$ 56,542.00	\$ 151,447.25
	Subtotal				\$ 94,905.25				\$ 56,542.00	

SUBTOTAL = \$ 151,447.25
CONTINGENCY % = 0.25
CONTINGENCY = \$ 37,861.81
BUDGET COST ESTIMATE = \$ 189,309.06

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 21 - Interior Lighting Upgrades	1	ea.	\$ 98,351.00	\$ 98,351.00	1	ea.	\$ 54,278.00	\$ 54,278.00	\$ 152,629.00
	Subtotal				\$ 98,351.00				\$ 54,278.00	

SUBTOTAL = \$ 152,629.00
CONTINGENCY % = 0.25
CONTINGENCY = \$ 38,157.25
BUDGET COST ESTIMATE = \$ 190,786.25

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
Checked by: BRM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 24 - Interior Lighting Upgrades	1	ea.	\$ 193,256.25	\$ 193,256.25	1	ea.	\$ 110,820.00	\$ 110,820.00	\$ 304,076.25
	Subtotal				\$ 193,256.25				\$ 110,820.00	

SUBTOTAL = \$ 304,076.25
CONTINGENCY % = 0.25
CONTINGENCY = \$ 76,019.06
BUDGET COST ESTIMATE = \$ 380,095.31

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 25 - Interior Lighting Upgrades	1	ea.	\$ 155,589.00	\$ 155,589.00	1	ea.	\$ 46,815.00	\$ 46,815.00	\$ 202,404.00
	Subtotal				\$ 155,589.00				\$ 46,815.00	

SUBTOTAL = \$ 202,404.00
CONTINGENCY % = 0.25
CONTINGENCY = \$ 50,601.00
BUDGET COST ESTIMATE = \$ 253,005.00

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Location: Paterson BOE
Estimate by: CB
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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	Label Removed									
	Lighting Upgrades	1	ea.	\$ -	\$ -	1	ea.	\$ -	\$ -	\$ -
	Subtotal				\$ -				\$ -	

SUBTOTAL = \$ -
CONTINGENCY % = 0.25
CONTINGENCY = \$ -
BUDGET COST ESTIMATE = \$ -

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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.

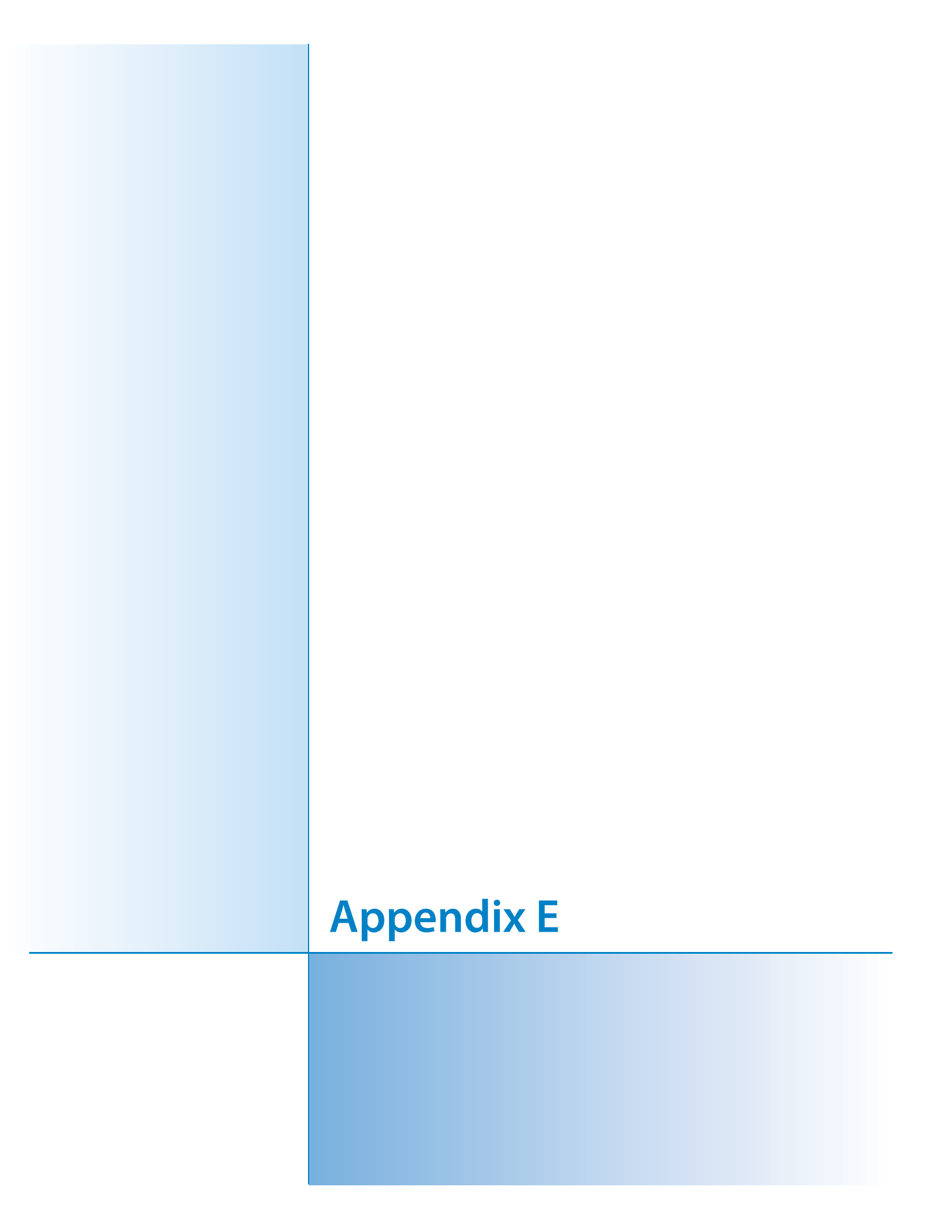
o "This is an Opinion of Probable Construction Cost only. CDM has no control over the cost of labor, materials, equipment, or services furnished, over schedules, over contractor's methods of determining prices, competitive bidding, market conditions or negotiating terms. CDM does not guarantee that this 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.

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 27 - Interior									
	Lighting Upgrades	1	ea.	\$ 155,589.00	\$ 155,589.00	1	ea.	\$ 46,815.00	\$ 46,815.00	\$ 202,404.00
	Subtotal				\$ 155,589.00				\$ 46,815.00	

SUBTOTAL = \$ 202,404.00
CONTINGENCY % = 0.25
CONTINGENCY = \$ 50,601.00
BUDGET COST ESTIMATE = \$ 253,005.00

- Notes:
1. CDM has no control over the cost of labor, materials, equipment, services furnished or market conditions.
 2. CDM 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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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 extends from the vertical line across the page. The text "Appendix E" is located at the intersection of these two lines, positioned to the right of the vertical line and above the horizontal line.

Appendix E

SUMMARY DATA		
Solar kWh:	2,790,060.0	
Utility Savings:	\$424,904.5	
SRECS:	\$509,325.5	
Maintenance Costs:	-\$55,801.2	
Total Cost (For All Systems):	\$18,175,000.0	

ID	Building Name	ARO I	IRR	NPV	Lifetime Savings	Simple Payback	Energy Savings (\$)	SRECS
1	School 01 & School 26	1.03%	1.60%	(\$335,431.32)	\$2,083,242.3	19.9	\$57,139	\$69,538.0
2	School 02	0.83%	1.35%	(\$175,727.87)	\$914,118.3	20.7	\$25,072	\$28,606.0
3	School 03	0.81%	1.31%	(\$174,078.18)	\$884,390.9	20.8	\$24,257	\$27,675.7
4	School 04	0.88%	1.34%	(\$258,718.90)	\$1,323,799.4	20.5	\$36,309	\$44,188.1
5	School 05	1.02%	1.58%	(\$326,282.13)	\$1,992,666.5	19.9	\$54,655	\$66,514.6
6	School 08	0.95%	1.46%	(\$285,462.68)	\$1,588,559.3	20.2	\$43,571	\$53,025.7
7	School 09	1.07%	1.68%	(\$378,362.12)	\$2,508,251.5	19.7	\$68,796	\$83,724.7
8	School 10	1.12%	1.95%	(\$144,369.56)	\$1,263,415.6	19.5	\$34,652.8	\$37,211.0
9	School 11	0.29%	0.14%	(\$208,592.23)	\$546,241.4	23.3	\$14,982.2	\$19,535.8
10	School 14	-1.64%	-3.93%	(\$126,452.72)	\$94,756.2	42.3	\$2,599.0	\$2,790.8
11	School 15	1.05%	1.65%	(\$356,544.83)	\$2,292,263.2	19.8	\$62,871.9	\$76,515.1

School 01 & School 26

Design Goal: Provide

53% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 718,772
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 299
 Roof Space Needed (sq-ft) 29,900.00
 Annual Solar kWh (PV Watts) 380,926
 Net System installation Cost (\$/kWh) \$1,794,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$1,894,000**
 Materials \$1,325,800
 Labor \$568,200
 Engineers Opinion of Probable Cost \$2,367,500

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	0.1500	380,926.0	\$57,138.9	\$69,538	(\$7,619)	\$119,058.4	\$119,058.4	\$0.183	
2	0.1545	379,021.4	\$58,558.8	\$69,190	(\$7,580)	\$120,168.7	\$239,227.1	\$0.183	
3	0.1591	377,126.3	\$60,014.0	\$68,844	(\$7,543)	\$121,315.9	\$360,543.0	\$0.183	
4	0.1639	375,240.6	\$61,505.3	\$68,500	(\$7,505)	\$122,500.7	\$483,043.7	\$0.183	
5	0.1688	373,364.4	\$63,033.7	\$68,158	(\$7,467)	\$123,724.1	\$606,767.8	\$0.183	
6	0.1739	371,497.6	\$64,600.1	\$67,817	(\$7,430)	\$124,987.1	\$731,754.9	\$0.183	
7	0.1791	369,640.1	\$66,205.4	\$67,478	(\$7,393)	\$126,290.4	\$858,045.4	\$0.183	
8	0.1845	367,791.9	\$67,850.7	\$67,140	(\$7,356)	\$127,635.2	\$985,680.6	\$0.183	
9	0.1900	365,953.0	\$69,536.7	\$66,805	(\$7,319)	\$129,022.4	\$1,114,703.0	\$0.183	
10	0.1957	364,123.2	\$71,264.7	\$66,471	(\$7,282)	\$130,453.0	\$1,245,155.9	\$0.183	
11	0.2016	362,302.6	\$73,035.7	\$66,138	(\$7,246)	\$131,927.9	\$1,377,083.9	\$0.183	
12	0.2076	360,491.1	\$74,850.6	\$65,808	(\$7,210)	\$133,448.4	\$1,510,532.3	\$0.183	
13	0.2139	358,688.6	\$76,710.6	\$65,479	(\$7,174)	\$135,015.5	\$1,645,547.7	\$0.183	
14	0.2203	356,895.2	\$78,616.9	\$65,151	(\$7,138)	\$136,630.2	\$1,782,177.9	\$0.183	
15	0.2269	355,110.7	\$80,570.5	\$64,825	(\$7,102)	\$138,293.8	\$1,920,471.7	\$0.183	
16	0.2337	353,335.1	\$82,572.7	\$8,833	(\$7,067)	\$84,339.4	\$2,004,811.1		\$0.025
17	0.2407	351,568.5	\$84,624.6	\$8,789	(\$7,031)	\$86,382.5	\$2,091,193.5		\$0.025
18	0.2479	349,810.6	\$86,727.5	\$8,745	(\$6,996)	\$88,476.6	\$2,179,670.1		\$0.025
19	0.2554	348,061.6	\$88,882.7	\$8,702	(\$6,961)	\$90,623.0	\$2,270,293.2		\$0.025
20	0.2630	346,321.3	\$91,091.5	\$8,658	(\$6,926)	\$92,823.1	\$2,363,116.2		\$0.025
21	0.2709	344,589.7	\$93,355.1	\$8,615	(\$6,892)	\$95,078.0	\$2,458,194.3		\$0.025
22	0.2790	342,866.7	\$95,675.0	\$8,572	(\$6,857)	\$97,389.3	\$2,555,583.6		\$0.025
23	0.2874	341,152.4	\$98,052.5	\$8,529	(\$6,823)	\$99,758.2	\$2,655,341.8		\$0.025
24	0.2960	339,446.6	\$100,489.1	\$8,486	(\$6,789)	\$102,186.3	\$2,757,528.1		\$0.025
25	0.3049	337,749.4	\$102,986.2	\$8,444	(\$6,755)	\$104,675.0	\$2,862,203.1		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 02

Design Goal: Provide

50% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 311,110
 Current Utility Price (\$/kWh) 0.16
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 123
 Roof Space Needed (sq-ft) 12,300.00
 Annual Solar kWh (PV Watts) 156,702
 Net System installation Cost (\$6/kWh) \$738,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$838,000**
 Materials \$586,600
 Labor \$251,400
 Engineers Opinion of Probable Cost \$1,047,500

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	156,702.0	\$25,072.3	\$28,606	(\$3,134)	\$50,544.2	\$50,544.2	\$0.183	
2	0.1648	155,918.5	\$25,695.4	\$28,463	(\$3,118)	\$51,039.9	\$101,584.1	\$0.183	
3	0.1697	155,138.9	\$26,333.9	\$28,321	(\$3,103)	\$51,551.7	\$153,135.9	\$0.183	
4	0.1748	154,363.2	\$26,988.3	\$28,179	(\$3,087)	\$52,080.0	\$205,215.9	\$0.183	
5	0.1801	153,591.4	\$27,659.0	\$28,038	(\$3,072)	\$52,625.2	\$257,841.1	\$0.183	
6	0.1855	152,823.4	\$28,346.3	\$27,898	(\$3,056)	\$53,187.7	\$311,028.9	\$0.183	
7	0.1910	152,059.3	\$29,050.7	\$27,758	(\$3,041)	\$53,767.9	\$364,796.8	\$0.183	
8	0.1968	151,299.0	\$29,772.6	\$27,620	(\$3,026)	\$54,366.2	\$419,163.0	\$0.183	
9	0.2027	150,542.5	\$30,512.4	\$27,482	(\$3,011)	\$54,983.1	\$474,146.2	\$0.183	
10	0.2088	149,789.8	\$31,270.7	\$27,344	(\$2,996)	\$55,619.0	\$529,765.2	\$0.183	
11	0.2150	149,040.9	\$32,047.8	\$27,207	(\$2,981)	\$56,274.3	\$586,039.5	\$0.183	
12	0.2215	148,295.7	\$32,844.1	\$27,071	(\$2,966)	\$56,949.6	\$642,989.1	\$0.183	
13	0.2281	147,554.2	\$33,660.3	\$26,936	(\$2,951)	\$57,645.2	\$700,634.4	\$0.183	
14	0.2350	146,816.4	\$34,496.8	\$26,801	(\$2,936)	\$58,361.8	\$758,996.1	\$0.183	
15	0.2420	146,082.3	\$35,354.0	\$26,667	(\$2,922)	\$59,099.7	\$818,095.8	\$0.183	
16	0.2493	145,351.9	\$36,232.6	\$3,634	(\$2,907)	\$36,959.3	\$855,055.2		\$0.025
17	0.2568	144,625.2	\$37,132.9	\$3,616	(\$2,893)	\$37,856.1	\$892,911.2		\$0.025
18	0.2645	143,902.0	\$38,055.7	\$3,598	(\$2,878)	\$38,775.2	\$931,686.5		\$0.025
19	0.2724	143,182.5	\$39,001.4	\$3,580	(\$2,864)	\$39,717.3	\$971,403.8		\$0.025
20	0.2806	142,466.6	\$39,970.6	\$3,562	(\$2,849)	\$40,682.9	\$1,012,086.7		\$0.025
21	0.2890	141,754.3	\$40,963.8	\$3,544	(\$2,835)	\$41,672.6	\$1,053,759.3		\$0.025
22	0.2976	141,045.5	\$41,981.8	\$3,526	(\$2,821)	\$42,687.0	\$1,096,446.3		\$0.025
23	0.3066	140,340.3	\$43,025.0	\$3,509	(\$2,807)	\$43,726.7	\$1,140,173.0		\$0.025
24	0.3158	139,638.6	\$44,094.2	\$3,491	(\$2,793)	\$44,792.4	\$1,184,965.4		\$0.025
25	0.3252	138,940.4	\$45,189.9	\$3,474	(\$2,779)	\$45,884.7	\$1,230,850.1		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 03

Design Goal: Provide

47% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 321,653
 Current Utility Price (\$/kWh) 0.16
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 119
 Roof Space Needed (sq-ft) 11,900.00
 Annual Solar kWh (PV Watts) 151,606
 Net System installation Cost (\$6/kWh) \$714,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$814,000**
 Materials \$569,800
 Labor \$244,200
 Engineers Opinion of Probable Cost \$1,017,500

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	151,606.0	\$24,257.0	\$27,676	(\$3,032)	\$48,900.5	\$48,900.5	\$0.183	
2	0.1648	150,848.0	\$24,859.7	\$27,537	(\$3,017)	\$49,380.1	\$98,280.6	\$0.183	
3	0.1697	150,093.7	\$25,477.5	\$27,400	(\$3,002)	\$49,875.2	\$148,155.8	\$0.183	
4	0.1748	149,343.3	\$26,110.6	\$27,263	(\$2,987)	\$50,386.4	\$198,542.2	\$0.183	
5	0.1801	148,596.5	\$26,759.5	\$27,126	(\$2,972)	\$50,913.8	\$249,456.1	\$0.183	
6	0.1855	147,853.6	\$27,424.4	\$26,991	(\$2,957)	\$51,458.0	\$300,914.1	\$0.183	
7	0.1910	147,114.3	\$28,105.9	\$26,856	(\$2,942)	\$52,019.4	\$352,933.5	\$0.183	
8	0.1968	146,378.7	\$28,804.4	\$26,721	(\$2,928)	\$52,598.2	\$405,531.7	\$0.183	
9	0.2027	145,646.8	\$29,520.2	\$26,588	(\$2,913)	\$53,195.1	\$458,726.8	\$0.183	
10	0.2088	144,918.6	\$30,253.7	\$26,455	(\$2,898)	\$53,810.3	\$512,537.0	\$0.183	
11	0.2150	144,194.0	\$31,005.5	\$26,323	(\$2,884)	\$54,444.3	\$566,981.3	\$0.183	
12	0.2215	143,473.0	\$31,776.0	\$26,191	(\$2,869)	\$55,097.6	\$622,078.9	\$0.183	
13	0.2281	142,755.7	\$32,565.7	\$26,060	(\$2,855)	\$55,770.6	\$677,849.5	\$0.183	
14	0.2350	142,041.9	\$33,374.9	\$25,930	(\$2,841)	\$56,463.8	\$734,313.3	\$0.183	
15	0.2420	141,331.7	\$34,204.3	\$25,800	(\$2,827)	\$57,177.8	\$791,491.1	\$0.183	
16	0.2493	140,625.0	\$35,054.3	\$3,516	(\$2,813)	\$35,757.4	\$827,248.5		\$0.025
17	0.2568	139,921.9	\$35,925.4	\$3,498	(\$2,798)	\$36,625.0	\$863,873.5		\$0.025
18	0.2645	139,222.3	\$36,818.1	\$3,481	(\$2,784)	\$37,514.2	\$901,387.7		\$0.025
19	0.2724	138,526.2	\$37,733.0	\$3,463	(\$2,771)	\$38,425.7	\$939,813.4		\$0.025
20	0.2806	137,833.5	\$38,670.7	\$3,446	(\$2,757)	\$39,359.9	\$979,173.3		\$0.025
21	0.2890	137,144.4	\$39,631.7	\$3,429	(\$2,743)	\$40,317.4	\$1,019,490.7		\$0.025
22	0.2976	136,458.7	\$40,616.5	\$3,411	(\$2,729)	\$41,298.8	\$1,060,789.5		\$0.025
23	0.3066	135,776.4	\$41,625.8	\$3,394	(\$2,716)	\$42,304.7	\$1,103,094.2		\$0.025
24	0.3158	135,097.5	\$42,660.3	\$3,377	(\$2,702)	\$43,335.7	\$1,146,430.0		\$0.025
25	0.3252	134,422.0	\$43,720.4	\$3,361	(\$2,688)	\$44,392.5	\$1,190,822.4		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 04

Design Goal: Provide

32% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 760,851
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 190
 Roof Space Needed (sq-ft) 19,000.00
 Annual Solar kWh (PV Watts) 242,060
 Net System installation Cost (\$6/kWh) \$1,140,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$1,240,000**
 Materials \$868,000
 Labor \$372,000
 Engineers Opinion of Probable Cost \$1,550,000

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	242,060.0	\$36,309.0	\$44,188	(\$4,841)	\$75,655.9	\$75,655.9	\$0.183	
2	0.1545	240,849.7	\$37,211.3	\$43,967	(\$4,817)	\$76,361.4	\$152,017.3	\$0.183	
3	0.1591	239,645.5	\$38,136.0	\$43,747	(\$4,793)	\$77,090.3	\$229,107.6	\$0.183	
4	0.1639	238,447.2	\$39,083.7	\$43,529	(\$4,769)	\$77,843.3	\$306,950.9	\$0.183	
5	0.1688	237,255.0	\$40,054.9	\$43,311	(\$4,745)	\$78,620.7	\$385,571.5	\$0.183	
6	0.1739	236,068.7	\$41,050.3	\$43,094	(\$4,721)	\$79,423.2	\$464,994.8	\$0.183	
7	0.1791	234,888.4	\$42,070.3	\$42,879	(\$4,698)	\$80,251.5	\$545,246.2	\$0.183	
8	0.1845	233,713.9	\$43,115.8	\$42,664	(\$4,674)	\$81,106.0	\$626,352.2	\$0.183	
9	0.1900	232,545.4	\$44,187.2	\$42,451	(\$4,651)	\$81,987.5	\$708,339.7	\$0.183	
10	0.1957	231,382.6	\$45,285.3	\$42,239	(\$4,628)	\$82,896.5	\$791,236.2	\$0.183	
11	0.2016	230,225.7	\$46,410.6	\$42,028	(\$4,605)	\$83,833.8	\$875,070.0	\$0.183	
12	0.2076	229,074.6	\$47,563.9	\$41,818	(\$4,581)	\$84,800.0	\$959,870.0	\$0.183	
13	0.2139	227,929.2	\$48,745.9	\$41,608	(\$4,559)	\$85,795.8	\$1,045,665.8	\$0.183	
14	0.2203	226,789.6	\$49,957.2	\$41,400	(\$4,536)	\$86,821.9	\$1,132,487.7	\$0.183	
15	0.2269	225,655.6	\$51,198.7	\$41,193	(\$4,513)	\$87,879.0	\$1,220,366.6	\$0.183	
16	0.2337	224,527.3	\$52,470.9	\$5,613	(\$4,491)	\$53,593.6	\$1,273,960.2		\$0.025
17	0.2407	223,404.7	\$53,774.8	\$5,585	(\$4,468)	\$54,891.9	\$1,328,852.1		\$0.025
18	0.2479	222,287.7	\$55,111.2	\$5,557	(\$4,446)	\$56,222.6	\$1,385,074.7		\$0.025
19	0.2554	221,176.2	\$56,480.7	\$5,529	(\$4,424)	\$57,586.5	\$1,442,661.2		\$0.025
20	0.2630	220,070.4	\$57,884.2	\$5,502	(\$4,401)	\$58,984.6	\$1,501,645.8		\$0.025
21	0.2709	218,970.0	\$59,322.6	\$5,474	(\$4,379)	\$60,417.5	\$1,562,063.3		\$0.025
22	0.2790	217,875.2	\$60,796.8	\$5,447	(\$4,358)	\$61,886.2	\$1,623,949.4		\$0.025
23	0.2874	216,785.8	\$62,307.6	\$5,420	(\$4,336)	\$63,391.5	\$1,687,341.0		\$0.025
24	0.2960	215,701.9	\$63,855.9	\$5,393	(\$4,314)	\$64,934.5	\$1,752,275.4		\$0.025
25	0.3049	214,623.3	\$65,442.8	\$5,366	(\$4,292)	\$66,515.9	\$1,818,791.3		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 05

Design Goal: Provide

43% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 838,775
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 286
 Roof Space Needed (sq-ft) 28,600.00
 Annual Solar kWh (PV Watts) 364,364
 Net System installation Cost (\$/kWh) \$1,716,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$1,816,000**
 Materials \$1,271,200
 Labor \$544,800
 Engineers Opinion of Probable Cost \$2,270,000

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	364,364.0	\$54,654.6	\$66,515	(\$7,287)	\$113,882.0	\$113,882.0	\$0.183	
2	0.1545	362,542.2	\$56,012.8	\$66,182	(\$7,251)	\$114,944.0	\$228,826.0	\$0.183	
3	0.1591	360,729.5	\$57,404.7	\$65,851	(\$7,215)	\$116,041.3	\$344,867.2	\$0.183	
4	0.1639	358,925.8	\$58,831.2	\$65,522	(\$7,179)	\$117,174.6	\$462,041.8	\$0.183	
5	0.1688	357,131.2	\$60,293.1	\$65,194	(\$7,143)	\$118,344.8	\$580,386.6	\$0.183	
6	0.1739	355,345.5	\$61,791.4	\$64,868	(\$7,107)	\$119,552.8	\$699,939.5	\$0.183	
7	0.1791	353,568.8	\$63,326.9	\$64,544	(\$7,071)	\$120,799.6	\$820,739.0	\$0.183	
8	0.1845	351,801.0	\$64,900.6	\$64,221	(\$7,036)	\$122,085.9	\$942,824.9	\$0.183	
9	0.1900	350,042.0	\$66,513.4	\$63,900	(\$7,001)	\$123,412.7	\$1,066,237.6	\$0.183	
10	0.1957	348,291.8	\$68,166.3	\$63,581	(\$6,966)	\$124,781.1	\$1,191,018.7	\$0.183	
11	0.2016	346,550.3	\$69,860.2	\$63,263	(\$6,931)	\$126,191.9	\$1,317,210.7	\$0.183	
12	0.2076	344,817.5	\$71,596.2	\$62,946	(\$6,896)	\$127,646.3	\$1,444,857.0	\$0.183	
13	0.2139	343,093.5	\$73,375.4	\$62,632	(\$6,862)	\$129,145.2	\$1,574,002.2	\$0.183	
14	0.2203	341,378.0	\$75,198.8	\$62,319	(\$6,828)	\$130,689.8	\$1,704,691.9	\$0.183	
15	0.2269	339,671.1	\$77,067.5	\$62,007	(\$6,793)	\$132,281.0	\$1,836,972.9	\$0.183	
16	0.2337	337,972.7	\$78,982.6	\$8,449	(\$6,759)	\$80,672.4	\$1,917,645.4		\$0.025
17	0.2407	336,282.9	\$80,945.3	\$8,407	(\$6,726)	\$82,626.7	\$2,000,272.1		\$0.025
18	0.2479	334,601.5	\$82,956.8	\$8,365	(\$6,692)	\$84,629.8	\$2,084,901.9		\$0.025
19	0.2554	332,928.5	\$85,018.3	\$8,323	(\$6,659)	\$86,682.9	\$2,171,584.8		\$0.025
20	0.2630	331,263.8	\$87,131.0	\$8,282	(\$6,625)	\$88,787.3	\$2,260,372.1		\$0.025
21	0.2709	329,607.5	\$89,296.2	\$8,240	(\$6,592)	\$90,944.2	\$2,351,316.3		\$0.025
22	0.2790	327,959.5	\$91,515.2	\$8,199	(\$6,559)	\$93,155.0	\$2,444,471.2		\$0.025
23	0.2874	326,319.7	\$93,789.3	\$8,158	(\$6,526)	\$95,420.9	\$2,539,892.2		\$0.025
24	0.2960	324,688.1	\$96,120.0	\$8,117	(\$6,494)	\$97,743.4	\$2,637,635.6		\$0.025
25	0.3049	323,064.6	\$98,508.6	\$8,077	(\$6,461)	\$100,123.9	\$2,737,759.5		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 08

Design Goal: Provide

79% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 368,700
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 228
 Roof Space Needed (sq-ft) 22,800.00
 Annual Solar kWh (PV Watts) 290,472
 Net System installation Cost (\$/kWh) \$1,368,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$1,468,000**
 Materials \$1,027,600
 Labor \$440,400
 Engineers Opinion of Probable Cost \$1,835,000

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	290,472.0	\$43,570.8	\$53,026	(\$5,809)	\$90,787.0	\$90,787.0	\$0.183	
2	0.1545	289,019.6	\$44,653.5	\$52,761	(\$5,780)	\$91,633.7	\$182,420.7	\$0.183	
3	0.1591	287,574.5	\$45,763.2	\$52,497	(\$5,751)	\$92,508.4	\$274,929.1	\$0.183	
4	0.1639	286,136.7	\$46,900.4	\$52,234	(\$5,723)	\$93,411.9	\$368,341.0	\$0.183	
5	0.1688	284,706.0	\$48,065.9	\$51,973	(\$5,694)	\$94,344.8	\$462,685.8	\$0.183	
6	0.1739	283,282.5	\$49,260.3	\$51,713	(\$5,666)	\$95,307.9	\$557,993.7	\$0.183	
7	0.1791	281,866.0	\$50,484.4	\$51,455	(\$5,637)	\$96,301.7	\$654,295.5	\$0.183	
8	0.1845	280,456.7	\$51,739.0	\$51,197	(\$5,609)	\$97,327.2	\$751,622.6	\$0.183	
9	0.1900	279,054.4	\$53,024.7	\$50,941	(\$5,581)	\$98,385.0	\$850,007.6	\$0.183	
10	0.1957	277,659.2	\$54,342.3	\$50,687	(\$5,553)	\$99,475.8	\$949,483.4	\$0.183	
11	0.2016	276,270.9	\$55,692.7	\$50,433	(\$5,525)	\$100,600.6	\$1,050,084.0	\$0.183	
12	0.2076	274,889.5	\$57,076.7	\$50,181	(\$5,498)	\$101,760.0	\$1,151,844.0	\$0.183	
13	0.2139	273,515.1	\$58,495.1	\$49,930	(\$5,470)	\$102,954.9	\$1,254,798.9	\$0.183	
14	0.2203	272,147.5	\$59,948.7	\$49,681	(\$5,443)	\$104,186.2	\$1,358,985.2	\$0.183	
15	0.2269	270,786.7	\$61,438.4	\$49,432	(\$5,416)	\$105,454.8	\$1,464,440.0	\$0.183	
16	0.2337	269,432.8	\$62,965.1	\$6,736	(\$5,389)	\$64,312.3	\$1,528,752.3		\$0.025
17	0.2407	268,085.6	\$64,529.8	\$6,702	(\$5,362)	\$65,870.2	\$1,594,622.5		\$0.025
18	0.2479	266,745.2	\$66,133.4	\$6,669	(\$5,335)	\$67,467.1	\$1,662,089.6		\$0.025
19	0.2554	265,411.5	\$67,776.8	\$6,635	(\$5,308)	\$69,103.9	\$1,731,193.5		\$0.025
20	0.2630	264,084.4	\$69,461.0	\$6,602	(\$5,282)	\$70,781.5	\$1,801,974.9		\$0.025
21	0.2709	262,764.0	\$71,187.2	\$6,569	(\$5,255)	\$72,501.0	\$1,874,475.9		\$0.025
22	0.2790	261,450.2	\$72,956.2	\$6,536	(\$5,229)	\$74,263.4	\$1,948,739.3		\$0.025
23	0.2874	260,142.9	\$74,769.1	\$6,504	(\$5,203)	\$76,069.8	\$2,024,809.1		\$0.025
24	0.2960	258,842.2	\$76,627.1	\$6,471	(\$5,177)	\$77,921.3	\$2,102,730.5		\$0.025
25	0.3049	257,548.0	\$78,531.3	\$6,439	(\$5,151)	\$79,819.1	\$2,182,549.5		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 09

Design Goal: Provide

33% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 1,406,124
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 360
 Roof Space Needed (sq-ft) 36,000.00
 Annual Solar kWh (PV Watts) 458,640
 Net System installation Cost (\$6/kWh) \$2,160,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$2,260,000**
 Materials \$1,582,000
 Labor \$678,000
 Engineers Opinion of Probable Cost \$2,825,000

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	458,640.0	\$68,796.0	\$83,725	(\$9,173)	\$143,347.9	\$143,347.9	\$0.183	
2	0.1545	456,346.8	\$70,505.6	\$83,306	(\$9,127)	\$144,684.8	\$288,032.7	\$0.183	
3	0.1591	454,065.1	\$72,257.6	\$82,890	(\$9,081)	\$146,065.9	\$434,098.6	\$0.183	
4	0.1639	451,794.7	\$74,053.2	\$82,475	(\$9,036)	\$147,492.5	\$581,591.1	\$0.183	
5	0.1688	449,535.8	\$75,893.5	\$82,063	(\$8,991)	\$148,965.5	\$730,556.6	\$0.183	
6	0.1739	447,288.1	\$77,779.4	\$81,652	(\$8,946)	\$150,486.1	\$881,042.7	\$0.183	
7	0.1791	445,051.6	\$79,712.2	\$81,244	(\$8,901)	\$152,055.4	\$1,033,098.1	\$0.183	
8	0.1845	442,826.4	\$81,693.1	\$80,838	(\$8,857)	\$153,674.5	\$1,186,772.6	\$0.183	
9	0.1900	440,612.3	\$83,723.2	\$80,434	(\$8,812)	\$155,344.7	\$1,342,117.3	\$0.183	
10	0.1957	438,409.2	\$85,803.7	\$80,032	(\$8,768)	\$157,067.1	\$1,499,184.4	\$0.183	
11	0.2016	436,217.2	\$87,935.9	\$79,631	(\$8,724)	\$158,843.0	\$1,658,027.4	\$0.183	
12	0.2076	434,036.1	\$90,121.1	\$79,233	(\$8,681)	\$160,673.7	\$1,818,701.1	\$0.183	
13	0.2139	431,865.9	\$92,360.6	\$78,837	(\$8,637)	\$162,560.4	\$1,981,261.5	\$0.183	
14	0.2203	429,706.6	\$94,655.8	\$78,443	(\$8,594)	\$164,504.6	\$2,145,766.1	\$0.183	
15	0.2269	427,558.0	\$97,008.0	\$78,051	(\$8,551)	\$166,507.5	\$2,312,273.6	\$0.183	
16	0.2337	425,420.2	\$99,418.6	\$10,636	(\$8,508)	\$101,545.7	\$2,413,819.3		\$0.025
17	0.2407	423,293.1	\$101,889.2	\$10,582	(\$8,466)	\$104,005.6	\$2,517,825.0		\$0.025
18	0.2479	421,176.7	\$104,421.1	\$10,529	(\$8,424)	\$106,527.0	\$2,624,352.0		\$0.025
19	0.2554	419,070.8	\$107,016.0	\$10,477	(\$8,381)	\$109,111.3	\$2,733,463.3		\$0.025
20	0.2630	416,975.4	\$109,675.3	\$10,424	(\$8,340)	\$111,760.2	\$2,845,223.6		\$0.025
21	0.2709	414,890.6	\$112,400.8	\$10,372	(\$8,298)	\$114,475.2	\$2,959,698.8		\$0.025
22	0.2790	412,816.1	\$115,193.9	\$10,320	(\$8,256)	\$117,258.0	\$3,076,956.8		\$0.025
23	0.2874	410,752.0	\$118,056.5	\$10,269	(\$8,215)	\$120,110.3	\$3,197,067.1		\$0.025
24	0.2960	408,698.3	\$120,990.2	\$10,217	(\$8,174)	\$123,033.7	\$3,320,100.8		\$0.025
25	0.3049	406,654.8	\$123,996.8	\$10,166	(\$8,133)	\$126,030.1	\$3,446,130.8		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 10

Existing Conditions

Average Annual Electrical Usage (kWh)	363,585
Current Utility Price (\$/kWh)	0.17
Actual SREC Market Values (January 2010-Present)	\$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501	4.50 kWh/sq-m/day
Solar Capacity Required (kW)	160
Roof Space Needed (sq-ft)	16,000.00
Annual Solar kWh (PV Watts)	203,840
Net System installation Cost (\$/kWh)	\$960,000
Electrical Service Modification Cost	\$100,000
Total System Installation Cost	\$1,060,000
Materials	\$742,000
Labor	\$318,000
Engineers Opinion of Probable Cost	\$1,325,000

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	0.1700	203,840.0	\$34,652.8	\$37,211	(\$4,077)	\$67,787.0	\$67,787.0	\$0.183	
2	0.1751	202,820.8	\$35,513.9	\$37,025	(\$4,056)	\$68,482.4	\$136,269.4	\$0.183	
3	0.1804	201,806.7	\$36,396.4	\$36,840	(\$4,036)	\$69,200.1	\$205,469.6	\$0.183	
4	0.1858	200,797.7	\$37,300.9	\$36,656	(\$4,016)	\$69,940.6	\$275,410.1	\$0.183	
5	0.1913	199,793.7	\$38,227.8	\$36,472	(\$3,996)	\$70,704.3	\$346,114.4	\$0.183	
6	0.1971	198,794.7	\$39,177.8	\$36,290	(\$3,976)	\$71,491.9	\$417,606.3	\$0.183	
7	0.2030	197,800.7	\$40,151.4	\$36,109	(\$3,956)	\$72,303.9	\$489,910.1	\$0.183	
8	0.2091	196,811.7	\$41,149.1	\$35,928	(\$3,936)	\$73,140.9	\$563,051.0	\$0.183	
9	0.2154	195,827.7	\$42,171.7	\$35,748	(\$3,917)	\$74,003.5	\$637,054.4	\$0.183	
10	0.2218	194,848.5	\$43,219.6	\$35,570	(\$3,897)	\$74,892.3	\$711,946.7	\$0.183	
11	0.2285	193,874.3	\$44,293.6	\$35,392	(\$3,877)	\$75,807.9	\$787,754.6	\$0.183	
12	0.2353	192,904.9	\$45,394.3	\$35,215	(\$3,858)	\$76,751.0	\$864,505.6	\$0.183	
13	0.2424	191,940.4	\$46,522.4	\$35,039	(\$3,839)	\$77,722.3	\$942,227.9	\$0.183	
14	0.2497	190,980.7	\$47,678.5	\$34,864	(\$3,820)	\$78,722.4	\$1,020,950.3	\$0.183	
15	0.2571	190,025.8	\$48,863.3	\$34,689	(\$3,801)	\$79,752.0	\$1,100,702.3	\$0.183	
16	0.2649	189,075.7	\$50,077.5	\$4,727	(\$3,782)	\$51,022.9	\$1,151,725.2		\$0.025
17	0.2728	188,130.3	\$51,322.0	\$4,703	(\$3,763)	\$52,262.6	\$1,203,987.8		\$0.025
18	0.2810	187,189.6	\$52,597.3	\$4,680	(\$3,744)	\$53,533.3	\$1,257,521.1		\$0.025
19	0.2894	186,253.7	\$53,904.4	\$4,656	(\$3,725)	\$54,835.6	\$1,312,356.7		\$0.025
20	0.2981	185,322.4	\$55,243.9	\$4,633	(\$3,706)	\$56,170.5	\$1,368,527.2		\$0.025
21	0.3070	184,395.8	\$56,616.7	\$4,610	(\$3,688)	\$57,538.7	\$1,426,065.8		\$0.025
22	0.3163	183,473.8	\$58,023.6	\$4,587	(\$3,669)	\$58,941.0	\$1,485,006.8		\$0.025
23	0.3257	182,556.5	\$59,465.5	\$4,564	(\$3,651)	\$60,378.3	\$1,545,385.1		\$0.025
24	0.3355	181,643.7	\$60,943.2	\$4,541	(\$3,633)	\$61,851.4	\$1,607,236.5		\$0.025
25	0.3456	180,735.5	\$62,457.7	\$4,518	(\$3,615)	\$63,361.3	\$1,670,597.9		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 11

Design Goal: Provide

55% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh)	194,600
Current Utility Price (\$/kWh)	0.14
Actual SREC Market Values (January 2010-Present)	\$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501	4.50 kWh/sq-m/day
Solar Capacity Required (kW)	84
Roof Space Needed (sq-ft)	8,400.00
Annual Solar kWh (PV Watts)	107,016
Net System installation Cost (\$6/kWh)	\$504,000
Electrical Service Modification Cost	\$100,000
Total System Installation Cost	\$604,000
Materials	\$422,800
Labor	\$181,200
Engineers Opinion of Probable Cost	\$755,000

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	0.1400	107,016.0	\$14,982.2	\$19,536	(\$2,140)	\$32,377.7	\$32,377.7	\$0.183	
2	0.1442	106,480.9	\$15,354.5	\$19,438	(\$2,130)	\$32,663.0	\$65,040.7	\$0.183	
3	0.1485	105,948.5	\$15,736.1	\$19,341	(\$2,119)	\$32,958.0	\$97,998.8	\$0.183	
4	0.1530	105,418.8	\$16,127.2	\$19,244	(\$2,108)	\$33,263.0	\$131,261.7	\$0.183	
5	0.1576	104,891.7	\$16,527.9	\$19,148	(\$2,098)	\$33,578.1	\$164,839.8	\$0.183	
6	0.1623	104,367.2	\$16,938.6	\$19,052	(\$2,087)	\$33,903.5	\$198,743.3	\$0.183	
7	0.1672	103,845.4	\$17,359.6	\$18,957	(\$2,077)	\$34,239.6	\$232,982.9	\$0.183	
8	0.1722	103,326.2	\$17,790.9	\$18,862	(\$2,067)	\$34,586.6	\$267,569.5	\$0.183	
9	0.1773	102,809.5	\$18,233.0	\$18,768	(\$2,056)	\$34,944.7	\$302,514.3	\$0.183	
10	0.1827	102,295.5	\$18,686.1	\$18,674	(\$2,046)	\$35,314.3	\$337,828.5	\$0.183	
11	0.1881	101,784.0	\$19,150.5	\$18,581	(\$2,036)	\$35,695.5	\$373,524.0	\$0.183	
12	0.1938	101,275.1	\$19,626.4	\$18,488	(\$2,026)	\$36,088.6	\$409,612.6	\$0.183	
13	0.1996	100,768.7	\$20,114.1	\$18,395	(\$2,015)	\$36,494.0	\$446,106.7	\$0.183	
14	0.2056	100,264.9	\$20,613.9	\$18,303	(\$2,005)	\$36,912.0	\$483,018.7	\$0.183	
15	0.2118	99,763.5	\$21,126.2	\$18,212	(\$1,995)	\$37,342.7	\$520,361.4	\$0.183	
16	0.2181	99,264.7	\$21,651.2	\$2,482	(\$1,985)	\$22,147.5	\$542,508.9		\$0.025
17	0.2247	98,768.4	\$22,189.2	\$2,469	(\$1,975)	\$22,683.0	\$565,191.9		\$0.025
18	0.2314	98,274.6	\$22,740.6	\$2,457	(\$1,965)	\$23,232.0	\$588,423.9		\$0.025
19	0.2383	97,783.2	\$23,305.7	\$2,445	(\$1,956)	\$23,794.6	\$612,218.5		\$0.025
20	0.2455	97,294.3	\$23,884.9	\$2,432	(\$1,946)	\$24,371.3	\$636,589.9		\$0.025
21	0.2529	96,807.8	\$24,478.4	\$2,420	(\$1,936)	\$24,962.4	\$661,552.3		\$0.025
22	0.2604	96,323.8	\$25,086.7	\$2,408	(\$1,926)	\$25,568.3	\$687,120.6		\$0.025
23	0.2683	95,842.1	\$25,710.1	\$2,396	(\$1,917)	\$26,189.3	\$713,309.9		\$0.025
24	0.2763	95,362.9	\$26,349.0	\$2,384	(\$1,907)	\$26,825.8	\$740,135.7		\$0.025
25	0.2846	94,886.1	\$27,003.8	\$2,372	(\$1,898)	\$27,478.2	\$767,613.9		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 14

Existing Conditions

Average Annual Electrical Usage (kWh)	75,620
Current Utility Price (\$/kWh)	0.17
Actual SREC Market Values (January 2010-Present)	\$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501	4.50 kWh/sq-m/day
Solar Capacity Required (kW)	12
Roof Space Needed (sq-ft)	1,200.00
Annual Solar kWh (PV Watts)	15,288
Net System installation Cost (\$/kWh)	\$72,000
Electrical Service Modification Cost	\$100,000
Total System Installation Cost	\$172,000
Materials	\$120,400
Labor	\$51,600
Engineers Opinion of Probable Cost	\$215,000

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	0.1700	15,288.0	\$2,599.0	\$2,791	(\$306)	\$5,084.0	\$5,084.0	\$0.183	
2	0.1751	15,211.6	\$2,663.5	\$2,777	(\$304)	\$5,136.2	\$10,220.2	\$0.183	
3	0.1804	15,135.5	\$2,729.7	\$2,763	(\$303)	\$5,190.0	\$15,410.2	\$0.183	
4	0.1858	15,059.8	\$2,797.6	\$2,749	(\$301)	\$5,245.5	\$20,655.8	\$0.183	
5	0.1913	14,984.5	\$2,867.1	\$2,735	(\$300)	\$5,302.8	\$25,958.6	\$0.183	
6	0.1971	14,909.6	\$2,938.3	\$2,722	(\$298)	\$5,361.9	\$31,320.5	\$0.183	
7	0.2030	14,835.1	\$3,011.4	\$2,708	(\$297)	\$5,422.8	\$36,743.3	\$0.183	
8	0.2091	14,760.9	\$3,086.2	\$2,695	(\$295)	\$5,485.6	\$42,228.8	\$0.183	
9	0.2154	14,687.1	\$3,162.9	\$2,681	(\$294)	\$5,550.3	\$47,779.1	\$0.183	
10	0.2218	14,613.6	\$3,241.5	\$2,668	(\$292)	\$5,616.9	\$53,396.0	\$0.183	
11	0.2285	14,540.6	\$3,322.0	\$2,654	(\$291)	\$5,685.6	\$59,081.6	\$0.183	
12	0.2353	14,467.9	\$3,404.6	\$2,641	(\$289)	\$5,756.3	\$64,837.9	\$0.183	
13	0.2424	14,395.5	\$3,489.2	\$2,628	(\$288)	\$5,829.2	\$70,667.1	\$0.183	
14	0.2497	14,323.6	\$3,575.9	\$2,615	(\$286)	\$5,904.2	\$76,571.3	\$0.183	
15	0.2571	14,251.9	\$3,664.7	\$2,602	(\$285)	\$5,981.4	\$82,552.7	\$0.183	
16	0.2649	14,180.7	\$3,755.8	\$355	(\$284)	\$3,826.7	\$86,379.4		\$0.025
17	0.2728	14,109.8	\$3,849.1	\$353	(\$282)	\$3,919.7	\$90,299.1		\$0.025
18	0.2810	14,039.2	\$3,944.8	\$351	(\$281)	\$4,015.0	\$94,314.1		\$0.025
19	0.2894	13,969.0	\$4,042.8	\$349	(\$279)	\$4,112.7	\$98,426.8		\$0.025
20	0.2981	13,899.2	\$4,143.3	\$347	(\$278)	\$4,212.8	\$102,639.5		\$0.025
21	0.3070	13,829.7	\$4,246.3	\$346	(\$277)	\$4,315.4	\$106,954.9		\$0.025
22	0.3163	13,760.5	\$4,351.8	\$344	(\$275)	\$4,420.6	\$111,375.5		\$0.025
23	0.3257	13,691.7	\$4,459.9	\$342	(\$274)	\$4,528.4	\$115,903.9		\$0.025
24	0.3355	13,623.3	\$4,570.7	\$341	(\$272)	\$4,638.9	\$120,542.7		\$0.025
25	0.3456	13,555.2	\$4,684.3	\$339	(\$271)	\$4,752.1	\$125,294.8		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 15

Existing Conditions

Average Annual Electrical Usage (kWh)	556,871
Current Utility Price (\$/kWh)	0.15
Actual SREC Market Values (January 2010-Present)	\$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501	4.50 kWh/sq-m/day
Solar Capacity Required (kW)	329
Roof Space Needed (sq-ft)	32,900.00
Annual Solar kWh (PV Watts)	419,146
Net System installation Cost (\$/kWh)	\$1,974,000
Electrical Service Modification Cost	\$100,000
Total System Installation Cost	\$2,074,000
Materials	\$1,451,800
Labor	\$622,200
Engineers Opinion of Probable Cost	\$2,592,500

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	0.1500	419,146.0	\$62,871.9	\$76,515	(\$8,383)	\$131,004.1	\$131,004.1	\$0.183	
2	0.1545	417,050.3	\$64,434.3	\$76,133	(\$8,341)	\$132,225.8	\$263,229.9	\$0.183	
3	0.1591	414,965.0	\$66,035.5	\$75,752	(\$8,299)	\$133,488.0	\$396,717.9	\$0.183	
4	0.1639	412,890.2	\$67,676.4	\$75,373	(\$8,258)	\$134,791.7	\$531,509.6	\$0.183	
5	0.1688	410,825.7	\$69,358.2	\$74,996	(\$8,217)	\$136,137.9	\$667,647.6	\$0.183	
6	0.1739	408,771.6	\$71,081.8	\$74,621	(\$8,175)	\$137,527.6	\$805,175.1	\$0.183	
7	0.1791	406,727.8	\$72,848.1	\$74,248	(\$8,135)	\$138,961.7	\$944,136.9	\$0.183	
8	0.1845	404,694.1	\$74,658.4	\$73,877	(\$8,094)	\$140,441.4	\$1,084,578.3	\$0.183	
9	0.1900	402,670.6	\$76,513.7	\$73,508	(\$8,053)	\$141,967.8	\$1,226,546.1	\$0.183	
10	0.1957	400,657.3	\$78,415.0	\$73,140	(\$8,013)	\$143,541.9	\$1,370,088.0	\$0.183	
11	0.2016	398,654.0	\$80,363.6	\$72,774	(\$7,973)	\$145,164.9	\$1,515,252.8	\$0.183	
12	0.2076	396,660.7	\$82,360.7	\$72,410	(\$7,933)	\$146,837.9	\$1,662,090.7	\$0.183	
13	0.2139	394,677.4	\$84,407.3	\$72,048	(\$7,894)	\$148,562.2	\$1,810,652.9	\$0.183	
14	0.2203	392,704.0	\$86,504.9	\$71,688	(\$7,854)	\$150,338.9	\$1,960,991.8	\$0.183	
15	0.2269	390,740.5	\$88,654.5	\$71,330	(\$7,815)	\$152,169.4	\$2,113,161.2	\$0.183	
16	0.2337	388,786.8	\$90,857.6	\$9,720	(\$7,776)	\$92,801.5	\$2,205,962.7		\$0.025
17	0.2407	386,842.9	\$93,115.4	\$9,671	(\$7,737)	\$95,049.6	\$2,301,012.3		\$0.025
18	0.2479	384,908.7	\$95,429.3	\$9,623	(\$7,698)	\$97,353.9	\$2,398,366.1		\$0.025
19	0.2554	382,984.1	\$97,800.7	\$9,575	(\$7,660)	\$99,715.6	\$2,498,081.8		\$0.025
20	0.2630	381,069.2	\$100,231.1	\$9,527	(\$7,621)	\$102,136.4	\$2,600,218.2		\$0.025
21	0.2709	379,163.9	\$102,721.8	\$9,479	(\$7,583)	\$104,617.6	\$2,704,835.8		\$0.025
22	0.2790	377,268.0	\$105,274.5	\$9,432	(\$7,545)	\$107,160.8	\$2,811,996.6		\$0.025
23	0.2874	375,381.7	\$107,890.5	\$9,385	(\$7,508)	\$109,767.4	\$2,921,764.1		\$0.025
24	0.2960	373,504.8	\$110,571.6	\$9,338	(\$7,470)	\$112,439.1	\$3,034,203.2		\$0.025
25	0.3049	371,637.3	\$113,319.3	\$9,291	(\$7,433)	\$115,177.5	\$3,149,380.7		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

SUMMARY DATA

Solar kWh:	942,760.0
Utility Savings:	\$148,573.9
SRECS:	\$172,100.8
Maintenance Costs:	-\$18,855.2
Total Cost (For All Systems):	\$7,300,000.0

ID	Building Name	AROI	IRR	NPV	Lifetime Savings	Simple Payback	Energy Savings (\$)	SRECS
1	School 19	0.07%	-0.17%	(\$163,708.10)	\$383,205.1	24.5	\$10,511	\$12,791.3
2	School 20	0.98%	1.52%	(\$303,057.27)	\$1,762,743.4	20.1	\$48,348	\$58,839.9
3	School 21	1.20%	2.41%	(\$44,582.12)	\$751,082.0	19.2	\$20,601	\$17,907.8
4	School 24	0.58%	0.80%	(\$198,897.29)	\$731,573.4	21.8	\$20,066	\$24,419.7
5	School 25	0.70%	1.11%	(\$166,242.17)	\$743,185.6	21.3	\$20,384	\$23,256.9
6	School 27	0.78%	1.16%	(\$230,567.55)	\$1,045,104.8	20.9	\$28,665	\$34,885.3

School 19

Design Goal: Provide

32% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 218,426
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 55
 Roof Space Needed (sq-ft) 5,500.00
 Annual Solar kWh (PV Watts) 70,070
 Net System installation Cost (\$/kW) \$330,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$430,000**
 Materials \$301,000
 Labor \$129,000
 Engineers Opinion of Probable Cost \$537,500

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	0.1500	70,070.0	\$10,510.5	\$12,791	(\$1,401)	\$21,900.4	\$21,900.4	\$0.183	
2	0.1545	69,719.7	\$10,771.7	\$12,727	(\$1,394)	\$22,104.6	\$44,005.0	\$0.183	
3	0.1591	69,371.1	\$11,039.4	\$12,664	(\$1,387)	\$22,315.6	\$66,320.6	\$0.183	
4	0.1639	69,024.2	\$11,313.7	\$12,600	(\$1,380)	\$22,533.6	\$88,854.2	\$0.183	
5	0.1688	68,679.1	\$11,594.8	\$12,537	(\$1,374)	\$22,758.6	\$111,612.8	\$0.183	
6	0.1739	68,335.7	\$11,883.0	\$12,475	(\$1,367)	\$22,990.9	\$134,603.7	\$0.183	
7	0.1791	67,994.0	\$12,178.3	\$12,412	(\$1,360)	\$23,230.7	\$157,834.4	\$0.183	
8	0.1845	67,654.0	\$12,480.9	\$12,350	(\$1,353)	\$23,478.1	\$181,312.5	\$0.183	
9	0.1900	67,315.8	\$12,791.0	\$12,288	(\$1,346)	\$23,733.2	\$205,045.7	\$0.183	
10	0.1957	66,979.2	\$13,108.9	\$12,227	(\$1,340)	\$23,996.4	\$229,042.1	\$0.183	
11	0.2016	66,644.3	\$13,434.7	\$12,166	(\$1,333)	\$24,267.7	\$253,309.7	\$0.183	
12	0.2076	66,311.1	\$13,768.5	\$12,105	(\$1,326)	\$24,547.4	\$277,857.1	\$0.183	
13	0.2139	65,979.5	\$14,110.7	\$12,045	(\$1,320)	\$24,835.6	\$302,692.7	\$0.183	
14	0.2203	65,649.6	\$14,461.3	\$11,984	(\$1,313)	\$25,132.6	\$327,825.4	\$0.183	
15	0.2269	65,321.4	\$14,820.7	\$11,924	(\$1,306)	\$25,438.7	\$353,264.0	\$0.183	
16	0.2337	64,994.8	\$15,189.0	\$1,625	(\$1,300)	\$15,513.9	\$368,778.0		\$0.025
17	0.2407	64,669.8	\$15,566.4	\$1,617	(\$1,293)	\$15,889.8	\$384,667.7		\$0.025
18	0.2479	64,346.4	\$15,953.2	\$1,609	(\$1,287)	\$16,275.0	\$400,942.7		\$0.025
19	0.2554	64,024.7	\$16,349.7	\$1,601	(\$1,280)	\$16,669.8	\$417,612.5		\$0.025
20	0.2630	63,704.6	\$16,756.0	\$1,593	(\$1,274)	\$17,074.5	\$434,686.9		\$0.025
21	0.2709	63,386.1	\$17,172.3	\$1,585	(\$1,268)	\$17,489.3	\$452,176.2		\$0.025
22	0.2790	63,069.1	\$17,599.1	\$1,577	(\$1,261)	\$17,914.4	\$470,090.6		\$0.025
23	0.2874	62,753.8	\$18,036.4	\$1,569	(\$1,255)	\$18,350.2	\$488,440.8		\$0.025
24	0.2960	62,440.0	\$18,484.6	\$1,561	(\$1,249)	\$18,796.8	\$507,237.6		\$0.025
25	0.3049	62,127.8	\$18,944.0	\$1,553	(\$1,243)	\$19,254.6	\$526,492.2		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 20

Design Goal: Provide

61% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 529,250
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 253
 Roof Space Needed (sq-ft) 25,300.00
 Annual Solar kWh (PV Watts) 322,322
 Net System installation Cost (\$6/kWh) \$1,518,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$1,618,000**
 Materials \$1,132,600
 Labor \$485,400
 Engineers Opinion of Probable Cost \$2,022,500

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	0.1500	322,322.0	\$48,348.3	\$58,840	(\$6,446)	\$100,741.7	\$100,741.7	\$0.183	
2	0.1545	320,710.4	\$49,549.8	\$58,546	(\$6,414)	\$101,681.2	\$202,423.0	\$0.183	
3	0.1591	319,106.8	\$50,781.1	\$58,253	(\$6,382)	\$102,651.9	\$305,074.9	\$0.183	
4	0.1639	317,511.3	\$52,043.0	\$57,962	(\$6,350)	\$103,654.4	\$408,729.3	\$0.183	
5	0.1688	315,923.7	\$53,336.2	\$57,672	(\$6,318)	\$104,689.6	\$513,418.9	\$0.183	
6	0.1739	314,344.1	\$54,661.6	\$57,384	(\$6,287)	\$105,758.3	\$619,177.2	\$0.183	
7	0.1791	312,772.4	\$56,020.0	\$57,097	(\$6,255)	\$106,861.1	\$726,038.4	\$0.183	
8	0.1845	311,208.5	\$57,412.1	\$56,811	(\$6,224)	\$107,999.0	\$834,037.4	\$0.183	
9	0.1900	309,652.5	\$58,838.8	\$56,527	(\$6,193)	\$109,172.8	\$943,210.2	\$0.183	
10	0.1957	308,104.2	\$60,300.9	\$56,244	(\$6,162)	\$110,383.3	\$1,053,593.5	\$0.183	
11	0.2016	306,563.7	\$61,799.4	\$55,963	(\$6,131)	\$111,631.3	\$1,165,224.8	\$0.183	
12	0.2076	305,030.9	\$63,335.1	\$55,683	(\$6,101)	\$112,917.9	\$1,278,142.7	\$0.183	
13	0.2139	303,505.7	\$64,909.0	\$55,405	(\$6,070)	\$114,243.9	\$1,392,386.5	\$0.183	
14	0.2203	301,988.2	\$66,522.0	\$55,128	(\$6,040)	\$115,610.2	\$1,507,996.7	\$0.183	
15	0.2269	300,478.3	\$68,175.1	\$54,852	(\$6,010)	\$117,017.8	\$1,625,014.5	\$0.183	
16	0.2337	298,975.9	\$69,869.2	\$7,474	(\$5,980)	\$71,364.1	\$1,696,378.6		\$0.025
17	0.2407	297,481.0	\$71,605.5	\$7,437	(\$5,950)	\$73,092.9	\$1,769,471.5		\$0.025
18	0.2479	295,993.6	\$73,384.8	\$7,400	(\$5,920)	\$74,864.8	\$1,844,336.3		\$0.025
19	0.2554	294,513.6	\$75,208.5	\$7,363	(\$5,890)	\$76,681.0	\$1,921,017.3		\$0.025
20	0.2630	293,041.1	\$77,077.4	\$7,326	(\$5,861)	\$78,542.6	\$1,999,559.9		\$0.025
21	0.2709	291,575.9	\$78,992.8	\$7,289	(\$5,832)	\$80,450.6	\$2,080,010.5		\$0.025
22	0.2790	290,118.0	\$80,955.7	\$7,253	(\$5,802)	\$82,406.3	\$2,162,416.9		\$0.025
23	0.2874	288,667.4	\$82,967.5	\$7,217	(\$5,773)	\$84,410.8	\$2,246,827.7		\$0.025
24	0.2960	287,224.1	\$85,029.2	\$7,181	(\$5,744)	\$86,465.3	\$2,333,293.0		\$0.025
25	0.3049	285,787.9	\$87,142.2	\$7,145	(\$5,716)	\$88,571.1	\$2,421,864.2		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 21

Design Goal: Provide

21% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 464,566
 Current Utility Price (\$/kWh) 0.21
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 77
 Roof Space Needed (sq-ft) 7,700.00
 Annual Solar kWh (PV Watts) 98,098
 Net System installation Cost (\$6/kWh) \$462,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$562,000**
 Materials \$393,400
 Labor \$168,600
 Engineers Opinion of Probable Cost \$702,500

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	0.2100	98,098.0	\$20,600.6	\$17,908	(\$1,962)	\$36,546.4	\$36,546.4	\$0.183	
2	0.2163	97,607.5	\$21,112.5	\$17,818	(\$1,952)	\$36,978.6	\$73,525.0	\$0.183	
3	0.2228	97,119.5	\$21,637.2	\$17,729	(\$1,942)	\$37,423.9	\$110,948.9	\$0.183	
4	0.2295	96,633.9	\$22,174.8	\$17,641	(\$1,933)	\$37,882.7	\$148,831.6	\$0.183	
5	0.2364	96,150.7	\$22,725.9	\$17,552	(\$1,923)	\$38,355.2	\$187,186.8	\$0.183	
6	0.2434	95,670.0	\$23,290.6	\$17,465	(\$1,913)	\$38,841.8	\$226,028.5	\$0.183	
7	0.2508	95,191.6	\$23,869.4	\$17,377	(\$1,904)	\$39,342.8	\$265,371.3	\$0.183	
8	0.2583	94,715.6	\$24,462.5	\$17,290	(\$1,894)	\$39,858.6	\$305,229.9	\$0.183	
9	0.2660	94,242.1	\$25,070.4	\$17,204	(\$1,885)	\$40,389.5	\$345,619.4	\$0.183	
10	0.2740	93,770.9	\$25,693.4	\$17,118	(\$1,875)	\$40,935.9	\$386,555.3	\$0.183	
11	0.2822	93,302.0	\$26,331.9	\$17,032	(\$1,866)	\$41,498.2	\$428,053.4	\$0.183	
12	0.2907	92,835.5	\$26,986.3	\$16,947	(\$1,857)	\$42,076.7	\$470,130.1	\$0.183	
13	0.2994	92,371.3	\$27,656.9	\$16,862	(\$1,847)	\$42,671.8	\$512,801.9	\$0.183	
14	0.3084	91,909.5	\$28,344.1	\$16,778	(\$1,838)	\$43,284.0	\$556,086.0	\$0.183	
15	0.3176	91,449.9	\$29,048.5	\$16,694	(\$1,829)	\$43,913.7	\$599,999.7	\$0.183	
16	0.3272	90,992.7	\$29,770.4	\$2,275	(\$1,820)	\$30,225.3	\$630,225.0		\$0.025
17	0.3370	90,537.7	\$30,510.1	\$2,263	(\$1,811)	\$30,962.8	\$661,187.8		\$0.025
18	0.3471	90,085.0	\$31,268.3	\$2,252	(\$1,802)	\$31,718.8	\$692,906.6		\$0.025
19	0.3575	89,634.6	\$32,045.3	\$2,241	(\$1,793)	\$32,493.5	\$725,400.1		\$0.025
20	0.3682	89,186.4	\$32,841.7	\$2,230	(\$1,784)	\$33,287.6	\$758,687.7		\$0.025
21	0.3793	88,740.5	\$33,657.8	\$2,219	(\$1,775)	\$34,101.5	\$792,789.2		\$0.025
22	0.3907	88,296.8	\$34,494.2	\$2,207	(\$1,766)	\$34,935.7	\$827,724.8		\$0.025
23	0.4024	87,855.3	\$35,351.4	\$2,196	(\$1,757)	\$35,790.6	\$863,515.5		\$0.025
24	0.4145	87,416.0	\$36,229.8	\$2,185	(\$1,748)	\$36,666.9	\$900,182.4		\$0.025
25	0.4269	86,978.9	\$37,130.2	\$2,174	(\$1,740)	\$37,565.1	\$937,747.5		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 24

Design Goal: Provide

10% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 1,283,846
 Current Utility Price (\$/kWh) 0.15
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 105
 Roof Space Needed (sq-ft) 10,500.00
 Annual Solar kWh (PV Watts) 133,770
 Net System installation Cost (\$6/kWh) \$630,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$730,000**
 Materials \$511,000
 Labor \$219,000
 Engineers Opinion of Probable Cost \$912,500

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	0.1500	133,770.0	\$20,065.5	\$24,420	(\$2,675)	\$41,809.8	\$41,809.8	\$0.183	
2	0.1545	133,101.2	\$20,564.1	\$24,298	(\$2,662)	\$42,199.7	\$84,009.5	\$0.183	
3	0.1591	132,435.6	\$21,075.1	\$24,176	(\$2,649)	\$42,602.6	\$126,612.1	\$0.183	
4	0.1639	131,773.5	\$21,598.9	\$24,055	(\$2,635)	\$43,018.6	\$169,630.7	\$0.183	
5	0.1688	131,114.6	\$22,135.6	\$23,935	(\$2,622)	\$43,448.3	\$213,079.0	\$0.183	
6	0.1739	130,459.0	\$22,685.7	\$23,815	(\$2,609)	\$43,891.8	\$256,970.8	\$0.183	
7	0.1791	129,806.7	\$23,249.4	\$23,696	(\$2,596)	\$44,349.5	\$301,320.3	\$0.183	
8	0.1845	129,157.7	\$23,827.2	\$23,578	(\$2,583)	\$44,821.7	\$346,142.0	\$0.183	
9	0.1900	128,511.9	\$24,419.3	\$23,460	(\$2,570)	\$45,308.9	\$391,450.9	\$0.183	
10	0.1957	127,869.3	\$25,026.1	\$23,343	(\$2,557)	\$45,811.2	\$437,262.1	\$0.183	
11	0.2016	127,230.0	\$25,648.0	\$23,226	(\$2,545)	\$46,329.2	\$483,591.3	\$0.183	
12	0.2076	126,593.9	\$26,285.3	\$23,110	(\$2,532)	\$46,863.2	\$530,454.5	\$0.183	
13	0.2139	125,960.9	\$26,938.5	\$22,994	(\$2,519)	\$47,413.5	\$577,867.9	\$0.183	
14	0.2203	125,331.1	\$27,607.9	\$22,879	(\$2,507)	\$47,980.5	\$625,848.4	\$0.183	
15	0.2269	124,704.4	\$28,294.0	\$22,765	(\$2,494)	\$48,564.7	\$674,413.1	\$0.183	
16	0.2337	124,080.9	\$28,997.1	\$3,102	(\$2,482)	\$29,617.5	\$704,030.6		\$0.025
17	0.2407	123,460.5	\$29,717.7	\$3,087	(\$2,469)	\$30,335.0	\$734,365.6		\$0.025
18	0.2479	122,843.2	\$30,456.2	\$3,071	(\$2,457)	\$31,070.4	\$765,436.0		\$0.025
19	0.2554	122,229.0	\$31,213.0	\$3,056	(\$2,445)	\$31,824.1	\$797,260.1		\$0.025
20	0.2630	121,617.8	\$31,988.6	\$3,040	(\$2,432)	\$32,596.7	\$829,856.9		\$0.025
21	0.2709	121,009.7	\$32,783.6	\$3,025	(\$2,420)	\$33,388.6	\$863,245.5		\$0.025
22	0.2790	120,404.7	\$33,598.2	\$3,010	(\$2,408)	\$34,200.3	\$897,445.7		\$0.025
23	0.2874	119,802.7	\$34,433.1	\$2,995	(\$2,396)	\$35,032.2	\$932,477.9		\$0.025
24	0.2960	119,203.7	\$35,288.8	\$2,980	(\$2,384)	\$35,884.8	\$968,362.7		\$0.025
25	0.3049	118,607.6	\$36,165.7	\$2,965	(\$2,372)	\$36,758.8	\$1,005,121.5		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 25

Design Goal: Provide

34% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 375,738
 Current Utility Price (\$/kWh) 0.16
 Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day
 Solar Capacity Required (kW) 100
 Roof Space Needed (sq-ft) 10,000.00
 Annual Solar kWh (PV Watts) 127,400
 Net System installation Cost (\$/kWh) \$600,000
 Electrical Service Modification Cost \$100,000
 Total System Installation Cost **\$700,000**
 Materials \$490,000
 Labor \$210,000
 Engineers Opinion of Probable Cost \$875,000

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	0.1600	127,400.0	\$20,384.0	\$23,257	(\$2,548)	\$41,092.9	\$41,092.9	\$0.183	
2	0.1648	126,763.0	\$20,890.5	\$23,141	(\$2,535)	\$41,495.9	\$82,588.7	\$0.183	
3	0.1697	126,129.2	\$21,409.7	\$23,025	(\$2,523)	\$41,912.0	\$124,500.7	\$0.183	
4	0.1748	125,498.5	\$21,941.7	\$22,910	(\$2,510)	\$42,341.5	\$166,842.2	\$0.183	
5	0.1801	124,871.0	\$22,487.0	\$22,795	(\$2,497)	\$42,784.7	\$209,626.9	\$0.183	
6	0.1855	124,246.7	\$23,045.8	\$22,681	(\$2,485)	\$43,242.1	\$252,869.0	\$0.183	
7	0.1910	123,625.5	\$23,618.4	\$22,568	(\$2,473)	\$43,713.8	\$296,582.8	\$0.183	
8	0.1968	123,007.3	\$24,205.4	\$22,455	(\$2,460)	\$44,200.2	\$340,783.0	\$0.183	
9	0.2027	122,392.3	\$24,806.9	\$22,343	(\$2,448)	\$44,701.7	\$385,484.7	\$0.183	
10	0.2088	121,780.3	\$25,423.3	\$22,231	(\$2,436)	\$45,218.7	\$430,703.4	\$0.183	
11	0.2150	121,171.4	\$26,055.1	\$22,120	(\$2,423)	\$45,751.5	\$476,454.9	\$0.183	
12	0.2215	120,565.6	\$26,702.6	\$22,009	(\$2,411)	\$46,300.5	\$522,755.4	\$0.183	
13	0.2281	119,962.7	\$27,366.1	\$21,899	(\$2,399)	\$46,866.1	\$569,621.4	\$0.183	
14	0.2350	119,362.9	\$28,046.2	\$21,790	(\$2,387)	\$47,448.6	\$617,070.0	\$0.183	
15	0.2420	118,766.1	\$28,743.1	\$21,681	(\$2,375)	\$48,048.5	\$665,118.6	\$0.183	
16	0.2493	118,172.3	\$29,457.4	\$2,954	(\$2,363)	\$30,048.2	\$695,166.8		\$0.025
17	0.2568	117,581.4	\$30,189.4	\$2,940	(\$2,352)	\$30,777.3	\$725,944.1		\$0.025
18	0.2645	116,993.5	\$30,939.6	\$2,925	(\$2,340)	\$31,524.6	\$757,468.7		\$0.025
19	0.2724	116,408.6	\$31,708.4	\$2,910	(\$2,328)	\$32,290.5	\$789,759.2		\$0.025
20	0.2806	115,826.5	\$32,496.4	\$2,896	(\$2,317)	\$33,075.5	\$822,834.7		\$0.025
21	0.2890	115,247.4	\$33,303.9	\$2,881	(\$2,305)	\$33,880.2	\$856,714.8		\$0.025
22	0.2976	114,671.1	\$34,131.5	\$2,867	(\$2,293)	\$34,704.9	\$891,419.7		\$0.025
23	0.3066	114,097.8	\$34,979.7	\$2,852	(\$2,282)	\$35,550.2	\$926,969.9		\$0.025
24	0.3158	113,527.3	\$35,848.9	\$2,838	(\$2,271)	\$36,416.6	\$963,386.5		\$0.025
25	0.3252	112,959.7	\$36,739.8	\$2,824	(\$2,259)	\$37,304.6	\$1,000,691.1		\$0.025

* SREC factor is referenced from the NJBPU Solar Alternative Compliance Payment (SACP) schedule.

School 27

Design Goal: Provide

24% of average annual electricity

Existing Conditions

Average Annual Electrical Usage (kWh) 793,393

Current Utility Price (\$/kWh) 0.15

Actual SREC Market Values (January 2010-Present) \$110/MWh - \$700/MWh

Calculations

Solar Rating - Zip Code: 07501 4.50 kWh/sq-m/day

Solar Capacity Required (kW) 150

Roof Space Needed (sq-ft) 15,000.00

Annual Solar kWh (PV Watts) 191,100

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

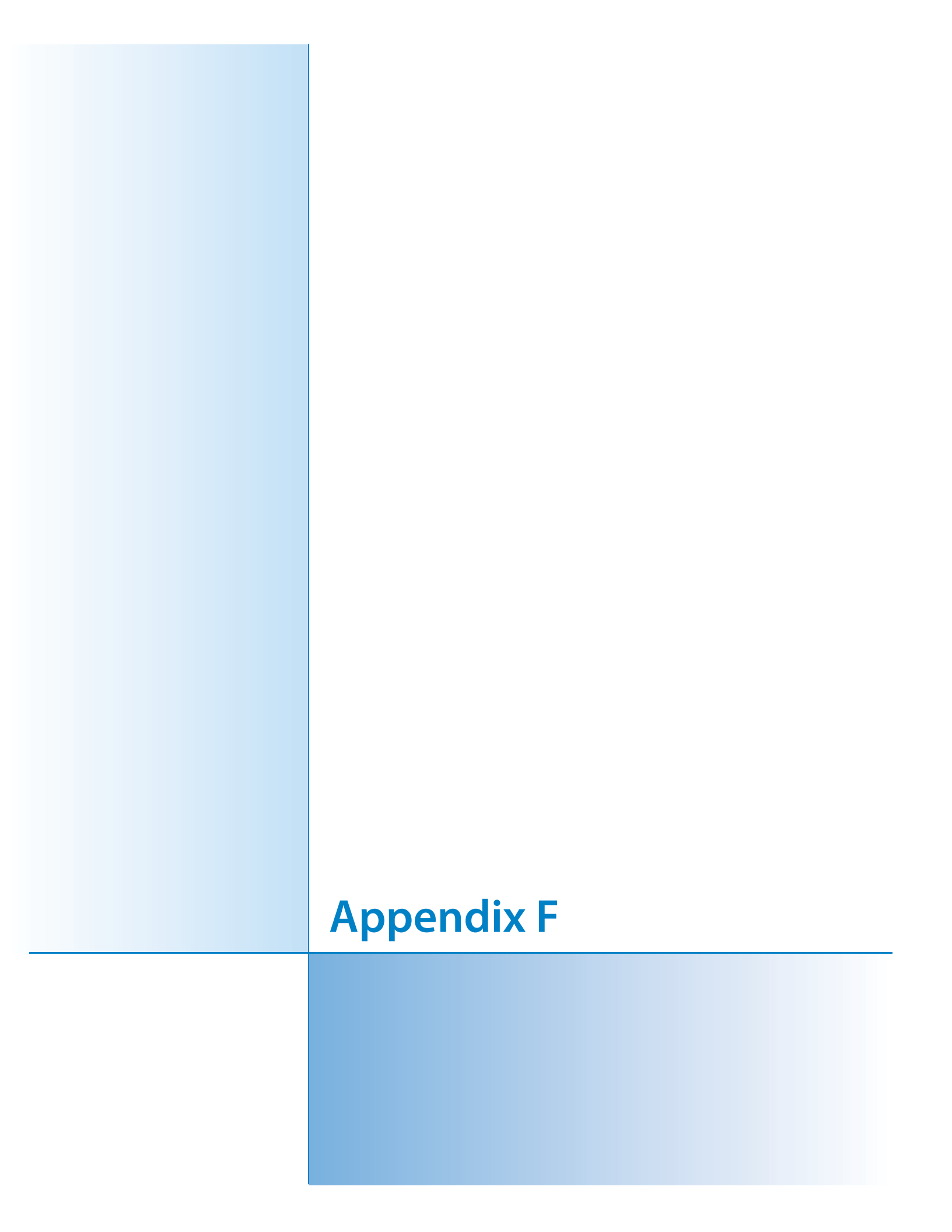
Annual System Degredation 0.50%

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	191,100.0	\$28,665.0	\$34,885	(\$3,822)	\$59,728.3	\$59,728.3	\$0.183	
2	0.1545	190,144.5	\$29,377.3	\$34,711	(\$3,803)	\$60,285.3	\$120,013.6	\$0.183	
3	0.1591	189,193.8	\$30,107.4	\$34,537	(\$3,784)	\$60,860.8	\$180,874.4	\$0.183	
4	0.1639	188,247.8	\$30,855.5	\$34,365	(\$3,765)	\$61,455.2	\$242,329.6	\$0.183	
5	0.1688	187,306.6	\$31,622.3	\$34,193	(\$3,746)	\$62,069.0	\$304,398.6	\$0.183	
6	0.1739	186,370.0	\$32,408.1	\$34,022	(\$3,727)	\$62,702.5	\$367,101.1	\$0.183	
7	0.1791	185,438.2	\$33,213.4	\$33,852	(\$3,709)	\$63,356.4	\$430,457.5	\$0.183	
8	0.1845	184,511.0	\$34,038.8	\$33,682	(\$3,690)	\$64,031.1	\$494,488.6	\$0.183	
9	0.1900	183,588.4	\$34,884.7	\$33,514	(\$3,672)	\$64,727.0	\$559,215.5	\$0.183	
10	0.1957	182,670.5	\$35,751.5	\$33,346	(\$3,653)	\$65,444.6	\$624,660.2	\$0.183	
11	0.2016	181,757.1	\$36,640.0	\$33,180	(\$3,635)	\$66,184.6	\$690,844.7	\$0.183	
12	0.2076	180,848.4	\$37,550.5	\$33,014	(\$3,617)	\$66,947.4	\$757,792.1	\$0.183	
13	0.2139	179,944.1	\$38,483.6	\$32,849	(\$3,599)	\$67,733.5	\$825,525.6	\$0.183	
14	0.2203	179,044.4	\$39,439.9	\$32,685	(\$3,581)	\$68,543.6	\$894,069.2	\$0.183	
15	0.2269	178,149.2	\$40,420.0	\$32,521	(\$3,563)	\$69,378.1	\$963,447.3	\$0.183	
16	0.2337	177,258.4	\$41,424.4	\$4,431	(\$3,545)	\$42,310.7	\$1,005,758.1		\$0.025
17	0.2407	176,372.1	\$42,453.8	\$4,409	(\$3,527)	\$43,335.7	\$1,049,093.7		\$0.025
18	0.2479	175,490.3	\$43,508.8	\$4,387	(\$3,510)	\$44,386.3	\$1,093,480.0		\$0.025
19	0.2554	174,612.8	\$44,590.0	\$4,365	(\$3,492)	\$45,463.1	\$1,138,943.1		\$0.025
20	0.2630	173,739.8	\$45,698.1	\$4,343	(\$3,475)	\$46,566.8	\$1,185,509.8		\$0.025
21	0.2709	172,871.1	\$46,833.7	\$4,322	(\$3,457)	\$47,698.0	\$1,233,207.8		\$0.025
22	0.2790	172,006.7	\$47,997.5	\$4,300	(\$3,440)	\$48,857.5	\$1,282,065.3		\$0.025
23	0.2874	171,146.7	\$49,190.2	\$4,279	(\$3,423)	\$50,045.9	\$1,332,111.3		\$0.025
24	0.2960	170,290.9	\$50,412.6	\$4,257	(\$3,406)	\$51,264.0	\$1,383,375.3		\$0.025
25	0.3049	169,439.5	\$51,665.3	\$4,236	(\$3,389)	\$52,512.5	\$1,435,887.9		\$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. In the bottom right corner of the page, there is a smaller, darker blue rectangle. The text "Appendix F" is located in the white space between the light blue rectangle and the darker blue rectangle, positioned to the right of the vertical line and above the horizontal line.

Appendix F

Building	Description (Abbreviation) [Tag ID]	Quantity	Unit Location	Service Location	Manufacturer	Model Number	Estimated Efficiency	Estimated Age (Years)	ASHRAE Expected Life (Years)
School 24	Heat Recovery Unit [HRU-7]	1	Roof	Auditorium	Venmar CES Inc.	9322	Unknown	15-20	15
School 24	Packaged AC w/ Gas Heat Rooftop Unit	1	Roof	Original Building 3rd Floor North Classrooms	Carrier	48MJD005--631--	82%	15-20	15
School 24	Air Cooled Condensing Unit (ACCU)	1	Original Building Roof	Original Building Room	Friedrich	MR24C3F	12-15 SEER	15-20	15
School 24	Packaged AC w/ Gas Heat RTU	1	2000 Addition Roof	2000 Addition	Carrier	48TCFD24ABA6AOBOAO	81%	10-15	15
School 24	ACCU	1	2000 Addition Roof	2000 Addition Room	Mitsubishi	PUY-A24NHA3	15-18 SEER	10-15	15
School 24	Packaged AC w/ Gas Heat RTU	1	Roof	2000 Addition	Carrier	48TCFD24ABA6AOBOAO	81%	10-15	15
School 24	ACCU	1	Roof	2000 Addition Room	Friedrich	MR30C3F	15-18 SEER	10-15	15
School 24	Heat Recovery Unit [HRU-1]	1	Roof	2008 Addition	Venmar CES Inc.	9310	Unknown	5-10	15
School 24	Heat Recovery Unit [HRU-2]	1	Roof	2008 Addition	Venmar CES Inc.	9318	Unknown	5-10	15
School 24	Air-Cooled Chiller	2	Roof	Entire Building Except 2000 Addition	McQuay	AGS170CH27-ER10	9-14 EER	5-10	20
School 24	Gas Fired Make-Up Air RTU [MUA-1]	1	Roof	2008 Addition	Captive-Aire Systems	A2-D.500-G15	80%	8	18
School 24	Packaged AC Heat Recovery Unit [RTU-2]	1	Roof	2008 Addition	Lennox Humidtrol	LCA090H2BNG	11.3 EER	5-10	15
School 24	Heat Recovery Unit	1	Roof	2008 Addition	Venmar CES Inc.	VHC36 NF2XWXXQHRDBAA 00023288-000408-20070206	Unknown	5-10	15
School 24	Heat Recovery Unit [HRU-3]	1	Roof	2008 Addition	Venmar CES Inc.	9315	Unknown	5-10	15
School 24	Heat Recovery Unit [HRU-5]	1	Roof	2008 Addition	Venmar CES Inc.	9315	Unknown	5-10	15
School 24	Heat Recovery Unit [HRU-4]	1	Roof	2008 Addition	Venmar CES Inc.	9310	Unknown	5-10	15
School 24	Packaged AC w/ Hot Water Coil	1	Roof	2008 Addition	Lennox	LCC072S2BN1G	10.3 EER	5-10	15
School 24	Packaged AC Rooftop Unit	1	Roof	2008 Addition	Lennox	LCC036S2BFG	11.25 SEER	5-10	15
School 24	ACCU	1	Roof	2008 Addition	Friedrich	MR30C3F	15-18 SEER	5-10	15
School 24	ACCU	1	Roof	2008 Addition	Friedrich	MR24C3F	15-18 SEER	5-10	15
School 24	ACCU	1	Outside Building on Grade	Offices	Friedrich	MR30C3F	15-18 SEER	10-15	15
School 24	ACCU	1	Outside Building on Grade	Offices	Unknown	Unknown	Unknown	Unknown	15
School 24	ACCU	1	Outside Building on Grade	East Side of Building Room	Unknown	Unknown	Unknown	Unknown	15
School 24	Domestic Hot Water Pump	2	Basement Mechanical Room	Domestic Hot Water System	Taco	Unknown	Unknown	5-10	10
School 24	Condensate Pump	3	Basement Mechanical Room	Condensate	Federal Pump Corp.	C-CH-1520-2	68%	10-15	10
School 24	Steam Boiler	2	Basement Mechanical Room	Building	Weil-McLain	1488	83%	15-20	30
School 24	Gas Burner	2	Basement Mechanical Room	Steam Boiler	Gordon-Platt Energy Group	R10.2-GO-50	83%	17	21
School 24	Low Pressure Steam to Hot Water Heat Exchanger	1	Basement Mechanical Room	Hot Water and Steam Systems	Unknown	Unknown	Unknown	Unknown	24
School 24	Hot Water Pump	2	Basement Mechanical Room	Hot Water System	Bell & Gossett	1510	89.5% motor	10-15	20
School 24	Condensate Pump	1	Basement Mechanical Room	Condensate	A.O. Smith	P48K2EB7	Unknown	15-20	10
School 24	Condensate Pump	1	Basement Mechanical Room	Condensate	A.O. Smith	P48J2EB7A1	Unknown	15-20	10
School 24	Secondary Hot Water Pump	2	Basement Mechanical Room	AHU-1 & 2	Bell & Gossett	1510	85.5% motor	5-10	20
School 24	Chilled and Hot Water Air Handling Unit [AHU-1]	1	Basement Mechanical Room	Basement and Core or Perimeter Rooms	McQuay	CAH021GDAC	Unknown	5-10	20-25
School 24	Chilled and Hot Water Air Handling Unit [AHU-2]	1	Basement Mechanical Room	Basement and Core or Perimeter Rooms	McQuay	CAH010GDAC	Unknown	5-10	20-25
School 24	Chilled Water Pump	2	1st Floor Mechanical Room	Chilled Water System	Bell & Gossett	1510	Unknown	5-10	20
School 24	Hot Water Pump	2	1st Floor Mechanical Room	Hot Water System	Bell & Gossett	1510	86.5% motor	5-10	20
School 24	Electric Unit Heater (EUH)	1	1st Floor Mechanical Room	1st Floor Mechanical Room	Berko	HUHAA54B	100%	8	13
School 24	Hot Water Boiler	3	1st Floor Mechanical Room	2008 Addition and Some Other Sections	Thermal Solutions	EVA1000BN1-UADM	88%	5-10	35
School 24	Hot Water Pump	3	1st Floor Mechanical Room	Boiler	Taco	1935C1E1	Unknown	5-10	10-20
School 24	Split System Indoor Unit	1	1st Floor Mechanical Room	1st Floor Mechanical Room	Friedrich	MW30C3F	15-18 SEER	10-15	15
School 24	Split System Indoor Unit	1	1st Floor Storage Closet 2008 Addition	1st Floor Storage Closet 2008 Addition	Friedrich	MW24C3F	15-18 SEER	5-10	15
School 10	Steam Boiler	1	Boiler Room	Building	HB Smith	28A-16	79%	21	30
School 10	Steam Boiler	1	Boiler Room	Building	HB Smith	28A-16	79%	21	30
School 10	Gas Burner	1	Boiler Room	Boiler	PowerFlame	C3-GO-25B	79%	21	21
School 10	Gas Burner	1	Boiler Room	Boiler	PowerFlame	C3-GO-25BHBS-16	79%	21	21
School 10	Steam to Hot Water Heat Exchanger	1	Boiler Room	Hot Water and Steam Systems	Unknown	Unknown	Unknown	Unknown	24
School 10	Condensate Pump	1	Boiler Room	Condensate	Unknown	Unknown	68% motor	10-15	10
School 10	Condensate Pump	2	Boiler Room	Condensate	Unknown	Unknown	Unknown	10-15	10
School 10	Hot Water Pump	1	Boiler Room	Hot Water System	Taco	Unknown	88.5% motor	15-20	20
School 10	Hot Water Pump	2	Boiler Room	Hot Water System	Taco	Unknown	88.5% motor	15-20	20
School 10	Gas Fired Make-Up Air RTU	1	Roof	Auditorium/Cafeteria	Reznor	Unknown	80%	15-20	18
School 10	ACCU	1	Lower Roof	Unknown	Trane	TTP042C100A4	12-15 SEER	16	15
School 10	ACCU	1	Lower Roof	Unknown	Trane	TTP024C100A3	12-15 SEER	16-17	15
School 10	ACCU	1	Roof	Unknown	Trane	TTP030C100B0	12-15 SEER	17	15
School 10	Window Air Conditioning Unit (WAC)	47	Exterior Walls	Various Rooms	Various (Carrier, Friedrich, Frigidaire)	Unknown	9-11.5 EER	1-15	10

School 21	Packaged AC w/ Gas Heat RTU	1	Addition Roof	Classrooms	Carrier	48TJE006---511KB	80%; 9-11 SEER	10-15	15
School 21	Packaged AC w/ Gas Heat RTU	8	Addition Roof	Classrooms	Carrier	48TJE005---511KB	80%; 9-11 SEER	10-15	15
School 21	Packaged AC w/ Gas Heat RTU	1	Addition Lower Roof	Classrooms	Carrier	48TJE008---521KB	80%; 8-10 EER	10-15	15
School 21	Packaged AC w/ Gas Heat RTU	1	Addition Lower Roof	Classrooms	Carrier	48TJE008---521KB	80%; 8-10 EER	10-15	15
School 21	Steam Boiler	1	Boiler Room	Building	Weil-McLain	1688	83%	22	30
School 21	Steam Boiler	1	Boiler Room	Building	Weil-McLain	1588	83%	22	30
School 21	Gas Burner	1	Boiler Room	Boiler	Power Flame	WCR3-GO-25B	83%	22	21
School 21	Gas Burner	1	Boiler Room	Boiler	Power Flame	CR3-GO-25B	83%	22	21
School 21	Domestic Hot Water Pump	2	Boiler Room	Domestic Hot Water System	Bell & Gossett	Unknown	Unknown	5-10	10
School 21	Condensate Pump	2	Boiler Room	Condensate	Unknown	Unknown	Unknown	5-10	10
School 21	Condensate Pump	2	Boiler Room	Condensate	Unknown	Unknown	Unknown	5-10	10
School 21	Steam Coil Air Handling Unit (AHU)	1	2nd Floor Closet	Unknown	Trane	LPCAA08D2C0EM0P0000004FAR0010	Unknown	5-10	20
School 21	Steam Coil AHU	1	2nd Floor Closet	Unknown	Trane	00000000	Unknown	5-10	20
School 21	Packaged Terminal Heat Pump	2	1st Floor North Perimeter Room	1st Floor North Perimeter Room	McQuay	Unknown	9-12 EER	Unknown	15
School 21	ACCU	1	Roof	Unknown	Trane	2TTR2042B100AA	12-18 SEER	13	15
School 20	Steam Boiler	2	Boiler Room	Building Except for 2000 Addition	HB Smith	28A-13	79%	22	30
School 20	Steam Boiler (Decommissioned)	1	Boiler Room	Building	HB Smith	28A-13	79%	22	30
School 20	Gas Burner	2	Boiler Room	Boiler	Power Flame	C3-GO-25HBS-13	79%	22	21
School 20	Gas Burner (Decommissioned)	1	Boiler Room	Boiler	Power Flame	C3-GO-25HBS-13	79%	22	21
School 20	Condensate Pump	2	Boiler Room	Condensate	Unknown	Unknown	Unknown	5-10	10
School 20	Condensate Pump	1	Boiler Room	Condensate	Unknown	Unknown	Unknown	10-15	10
School 20	Domestic Hot Water Pump	1	Boiler Room	Domestic Hot Water System	Bell & Gossett	Unknown	Unknown	1-5	10
School 20	Packaged AC w/ Gas Heat RTU [RTU-1]	1	2000 Addition Roof	2000 Addition	Carrier	48TJF024Y 670AA	81%; 9-11 SEER	15	15
School 20	Packaged AC w/ Gas Heat RTU [A/C-2]	1	2000 Addition Roof	2000 Addition	Carrier	48TJF024Y 670AA	81%; 9-11 SEER	15	15
School 20	Steam Coil AHU [20-HV-1]	1	Courtyard	Gym	Trane	TSCA021U0C000000000A00A199.5	Unknown	10-15	20
School 20	ACCU	1	Outside Building on Grade	Unknown	Trane	2TTA0060A3000AA	10-11 SEER	12	15
School 20	ACCU	1	Outside Building on Grade	Unknown	Trane	2TTA0042A3000AA	10-11 SEER	12	15
School 20	ACCU	3	Outside Building on Grade	Unknown	Trane	2TTA0036A3000AA	10-11 SEER	13	15
School 20	Steam Coil AHU [20-HV-2]	1	Outside Building on Grade	Auditorium	Trane	TSCA030U0C000000000A00A162.8	Unknown	15-20	20
School 20	Window Air Conditioning Unit (WAC)	~12	Exterior Walls	Various Rooms	Various (Frigidaire, GE, Friedrich)	Unknown	9-11.5 EER	1-15	10
School 4	ACCU	1	Roof	Unknown	Lennox	HS29-048-10Y	10-11.5 SEER	10-15	15
School 4	ACCU	1	Roof	Unknown	Lennox	Unknown	11-12 SEER	10-15	15
School 4	ACCU	1	Roof	Unknown	Lennox	HS27-030-4P	14-15.5 SEER	10-15	15
School 4	ACCU	1	Roof	Unknown	Lennox	Unknown	11-12 SEER	10-15	15
School 4	ACCU	1	Roof	Unknown	Lennox	Unknown	14-15.5 SEER	10-15	15
School 4	ACCU	2	Roof	Unknown	Lennox	Unknown	14-15.5 SEER	10-15	15
School 4	ACCU	2	Roof	Unknown	Lennox	HS29-042-9Y	10-11.8 SEER	10-15	15
School 4	Steam Boiler	2	Boiler Room	Building	Weil-McLain	1788	83%	3	30
School 4	Gas Burner	2	Boiler Room	Boiler	Power Flame	CR4-GO-25	83%	3	21
School 4	Domestic Hot Water Pump	1	Boiler Room	Domestic Hot Water System	Bell & Gossett	Unknown	Unknown	1-5	10
School 4	Domestic Hot Water Pump	1	Boiler Room	Domestic Hot Water System	Armstrong	Unknown	Unknown	5-10	10
School 4	Condensate Pump	3	Boiler Room	Condensate	Unknown	Unknown	Unknown	10-15	10
School 4	EUH	1	Kitchen	Kitchen	Singer	CI-5	100%	15-20	13
School 4	EUH	2	Kitchen	Kitchen	Unknown	Unknown	100%	15-20	13
School 4	EUH	1	1st Floor Hallway	1st Floor Hallway	Singer	CI-5	100%	15-20	13
School 4	Window Air Conditioning Unit (WAC)	38	Exterior Walls	Various Rooms	Various (Frigidaire, Sharp, Kenmore, Friedrich, LG, Fedders, Goldstar)	Unknown	9-11.5 EER	1-15	10

Building	Type	Location	Make	Storage Capacity (Gallons)	Model Number	Heating Capacity	Observed Condition
School 24	Gas	Basement Mechanical Room	Lochinvar	Indirect Storage Tank	PFN0501PM-M9	500 MBH	Good
School 10	Gas	Boiler Room	Bradford White	75	D75T3003N	300 MBH	Good
School 21	Electric	Boiler Room	Bradford White	119	M2120R6DS-1NCWW	4500 Watts	Good
School 20	Gas	Boiler Room	Bradford White	80	D80T1993N	200 MBH	Good
School 20	Gas	2000 Addition Storage Closet	State Select	50	PRX50NBRT	40 MBH	Good
School 4	Gas	Boiler Room	Lochinvar	119 Gallon Indirect Storage Tank	CWN0647PM	645 MBH	Good

Building	Compressor Motor HP	Unit Location	Comp/Mtr Model Number	Manufacturer Comp/Mtr/Rec	Receiver Capacity (Gallons)	Date	Condition
School 24	1/4	Basement Mechanical Room	/5KH35KN524KX	/GE Commercial Motors/Gast	Unknown	Unknown	Good

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	Boiler Room	Space Heat	Weil-McLain	88 Steam	1996	80.00%	5485 MBH	5000	1	
Boiler 2	Boiler Room	Space Heat	Weil-McLain	88 Steam	1996	80.00%		5000	1	
DHW	Boiler Room	Water Heating	Lochinvar	-	2005	80.00%	399 MBH	8760	1	
RTU-7	Roof	unknown	Carrier	48HJE014	99	-	250 MBH	8760	1	
RTU-3	Roof	unknown	Carrier	48HJD012	99	-	180 MBH	8760	1	
RTU-4	Roof	103	Carrier	48HJE009	99	-	180 MBH	8760	1	
RTU-6	Roof	109	Carrier	48HJE009	99	-	180 MBH	8760	1	
RTU-5	Roof	206	Carrier	48HJD012	99	-	98.4 MBH	8760	1	
RTU-9	Roof	1 Hall	Carrier	48HJE005	99	-	115 MBH	8760	1	
RTU-1	Roof	105	Carrier	48HJE006	99	-	115 MBH	8760	1	
RTU-8	Roof	Science	Carrier	48HJE007	99	-	115 MBH	8760	1	
RTU-2	Roof	101-2	Carrier	48HJE009	99	-	180 MBH	8760	1	
AC	Principal	Cod	White-Westinghouse	-	-	-	-	3000	1	
PTAC	Principal	Principal	GE	AZ35H09D3BM1	2003	11.5 EER	9000 BTU	3000	1	
PTAC	Main	Main	GE	AZ35H09D3BM1	2003	11.5 EER	9000 BTU	3000	1	
AC	Main	Main	Friedrich	-	-	-	-	3000	1	2014
PTAC	118	118	GE	AZ35H09D3BM1	2003	11.5 EER	9000 BTU	3000	1	
PTAC	117	117	GE	AZ35H09D3BM1	2003	11.5 EER	9000 BTU	3000	1	
Unitvent	Classroom	Space Heat	Trane	VUVC15011	2003	-	-	5000	1	Steam Heat + OA
PTAC	Trailer 1	Trailer 1	Bard	unknown	unknown	unknown	unknown	8760	1	
PTAC	Trailer 2	Trailer 2	Bard	unknown	unknown	unknown	unknown	8760	1	
PTAC	Trailer 3	Trailer 3	Bard	unknown	unknown	unknown	unknown	8760	1	
PTAC	Trailer 4	Trailer 4	Bard	unknown	unknown	unknown	unknown	8760	1	
DHW	NW 111	Water Heating	Slate	SBG120	1999		15 kW 119 Gallons	8760	1	Aquastat
DHW	-	Water Heating	Rheem	1PZ-27	2003		2kW 10 Gallons	8760	1	Condition: Good

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	Boiler Room	Space Heat	Weil McLain	1788	1995	75.0%	3393 MBH	5000	1	
Boiler 2	Boiler Room	Space Heat	Weil McLain	1888	1995	75.0%	3602 MBH	5000	1	
Boiler 3	Boiler Room	Space Heat	Weil McLain	1588	1995	75.0%	3175 MBH	5000	1	
Fan 1	Base	Auditorium	-	2 HP GE motor	-	-	-	4000	1	Auditorium Return
Fan 2	Base	Toilet	-	2 HP GE motor	-	-	-	4000	1	Toilet Exhaust off
AC	Faculty	Faculty	Carrier	XCE 101D	2003	10 EER	20000 Btuh	3000	1	
UV	Classroom	Classroom	Nesbitt	-	-	-	-	5000	1	OA and heat
AC	108 Office	108 Office	Friedrich	unknown	unknown	unknown	1 ton	3000	1	
AC	Principal	Principal	unknown	unknown	unknown	unknown	unknown	3000	1	No Access
AC	Library	Library	Carrier	XCE	unknown	unknown	unknown	3000	1	
AC	Library	Library	Frigidaire	No Tag	unknown	unknown	unknown	3000	1	
AC	Teacher	Teacher	Frigidaire	unknown	unknown	unknown	unknown	3000	1	
AC	Computer Lab	Computer Lab	Goldstar	unknown	unknown	unknown	unknown	3000	1	
AC	Computer Lab	Computer Lab	Frigidaire	unknown	unknown	unknown	unknown	3000	1	
AC	211	211	Goldstar	R2403	2004	8.5 EER	3500 Btuh	3000	1	
AC	211	211	Frigidaire	unknown	unknown	unknown	unknown	3000	1	
AC	212	212	Frigidaire	unknown	unknown	unknown	unknown	3000	1	
AC	Child Study	Child Study	Frigidaire	unknown	unknown	unknown	unknown	3000	1	
RTU 1	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 2	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 3	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 4	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 5	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 6	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 7	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 8	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 9	-	-	York	D2CG012N09925	2000	80.0%	125 MBH 6 tons	8760	1	
RTU 10	-	-	Carrier	unknown	unknown	unknown	10 ton	8760	1	
RTU 11	-	-	Carrier	unknown	unknown	unknown	unknown	8760	1	
ACC-1	-	-	Liebert	unknown	unknown	unknown	unknown	3000	1	
ACC-2	-	-	Liebert	unknown	unknown	unknown	unknown	3000	1	
DHW	Boiler Room	Water Heat	AO Smith	BTR 197 118	unknown	unknown	100 Gallons 199 MBH	8760	1	
DHW	Kitchen	Water Heat	Rheem	GE717A	unknown	unknown	1500 Wattss 50 Gallon	8760	1	elec

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	B1	Heat	Weil McClain	1788	1999	75.0%	5,485 MBH	5000	1	
Boiler 2	B2	Heat	Weil McClain	1788	1999	75%	5,485 MBH	5000	1	
AHU	Out	Gym	Trane	Tag Faded, Steam Heat, Make up Air	unknown	unknown	unknown	8760	1	Steam Heat, Make up Air
AHU	Out	Auditorium	Trane	Tag Faded, Steam Heat, Make up Air	unknown	unknown	unknown	8760	1	Steam Heat, Make up Air
AC	unknown	unknown	Frigidaire	unknown	unknown	unknown	9950 BTH	3000	1	
AC	B5	B5	Friedrich	KS12	unknown	unknown	unknown	3000	1	
AC	B5	B5	Commercial	CPRB08XCJ-1	2010		8000 BTUh/800W	3000	1	
AC	Teachers	Teachers	Friedrich	KS12	unknown	unknown	unknown	3000	1	
Ductless	Teachers	Teachers	Carrier	40QNB015	unknown	unknown	unknown	3000	1	
AC	Nurse	Nurse	Friedrich	KS12	unknown	unknown	unknown	3000	1	
Ductless	Principal	Principal	Carrier	40QNB015	unknown	unknown	unknown	3000	1	
AC	VP	VP	Friedrich	KS12	unknown	unknown	unknown	3000	1	
AC	2 Teachers	2 Teachers	Friedrich	KS12	unknown	unknown	unknown	3000	2	
AC	201B	201B	Trane	Unitvent w/AC	unknown	unknown	unknown	3000	1	
AC	201	201	Trane	Unitvent w/AC	unknown	unknown	unknown	3000	1	
Unitvent	Classrooms	Space Heat	Trane	Steam coil OA Damper	unknown	unknown	unknown	5000		in all classrooms
UV AC	204	204	Trane	Rx Split Steam Heat	unknown	unknown	unknown	8760	1	
UV AC	203	203	Trane	unknown	unknown	unknown	unknown	8760	1	
DHW	Boiler	Water Heating	Bradford White	D8OT1993N	unknown	75	199 MBH 80 Gallons	8760	1	Gas Fired

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
AC	103	103	Friedrich	WS10B10AB	2000	10 EER	10 MBH	3000	1	1 in each classroom
Ac	101	101	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
UV	Classroom	Heat	unknown	AZ695B7AN	2003	unknown	unknown	5000		
Ptac	Main Office	Main Office	McQuay	unknown	unknown	unknown	unknown	3000	1	
Ptac	Principal	Principal	McQuay	unknown	unknown	unknown	unknown	3000	1	
AC	105	105	Danby	DAC120EB3GDB	2014	11.3 EER	12 MBH	3000	1	
AC	107	107	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
AC	106	106	Danby	DAC120EB3GDB	2014	11.3 EER	12 MBH	3000	1	
AC	108	108	Danby	DAC120EB3GDB	2014	11.3 EER	12 MBH	3000	1	
AC	Secretary	Secretary	Emerson	No Tag	2000	unknown	unknown	3000	1	
AC	202	202	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
AC	203	203	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
AC	204A	204A	Airtemp	B3J12E2A	unknown	unknown	12000 Btu	3000	1	
UV	201	201	unknown	unknown	unknown	unknown	unknown	3000	1	
AC	204	204	Airtemp	No Tag	unknown	unknown	unknown	3000	1	
Ptac	Nurse	Nurse	McQuay	unknown	unknown	unknown	Steam and DX	5000	1	
Ptac	Faculty	Faculty	McQuay	unknown	unknown	unknown	unknown	5000	1	
AC	Faculty	Faculty	Carrier	unknown	unknown	unknown	unknown	3000	1	
AC	202	202	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
AC	206	206	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
AC	207	207	GE	AHL12ASW1	2014	11.3 EER	12000 Btu	3000	1	
Boiler 1	Boiler Room	Heat	Weil McLain	1288	2000	80%	2329 MBH gas	5000	1	
Boiler 2	Boiler Room	Heat	Weil McLain	1288	2000	80%	2329 MBH gas	5000	1	
AC	Speech	Speech	Carrier	unknown	unknown	unknown	unknown	3000	1	
AC	B1	B1	Friedrich	CP12G10A	2014	11.3 EER	12 MBH	3000	1	
AC	Super Room	Super Room	Zenith	Tag covered	Tag covered	Tag covered	1 ton	3000	1	
Water Heater	Chief Off	Water Heat	Rheem	6100-80N	2012	80%	95 Gallons 76 MBH	8760	1	good condition

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler	Boiler Room	Space Heat	Weil Mclain	-	2003	80.0%	L705 MBH to 5124 MBH	5000	2	Steam Gas
Water Heater	Boiler Room	Water Heat	Ao Smith	BTR197-118	2014	80%	199MBH @ 100 gallons	8760	1	
AC	B13	B13	LG	C1204R	2004	9.8 EER	12000 Btu	3000	2	
AC	B14	B14	Frigidaire	-	-	-	1/2 ton	3000	1	
AC	311	311	Carrier	-	-	-	-	3000	1	
AC	203	203	Carrier	VCE2136	1997	8.4 EER	10500 Btuh	3000	2	
AC	204	204	Amana	-	1990	-	1 ton	3000	1	
AC	204	204	Goodman	RC14010C10	1997	10 EER	13800 Btuh	3000	1	
HV	2	2	HVH2XA	-	-	-	-	3000	1	
EF	-	-	RFH2A	Penn SX165 BC	-	-	-	8760	1	
AC	Main Office	Main Office	Frigidaire	FAN156 TIA	-	10.7 EER	15000Btuh	3000	1	
Unitvents	Classrooms	Heat	Magic Aire	-	-	-	-	5000	1	elec OA / elec Steam Value
AC	Principal	Principal	Frigidaire	FCC1251A	-	10.8 EER	12000 Btuh	3000	1	
AC	Teachers	Teachers	Frigidaire	FCC1251A	-	10.8 EER	12000 Btuh	3000	1	
AC	108	108	-	FFRE2SL	2010	-	2 ton	3000	1	Reading
AC	Nurse	Nurse	-	FRA106	-	10.8 EER	10000 Btus	3000	1	

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	G	Heat	Weil Mclain	88 588	1998	80.0%	813 MBH	5000	1	
Boiler 2	G	Heat	Weil Mclain	88 588	1998	80.0%	813 MBH	5000	1	
AC	G	Nurse	Kenmore	253 8740990	-	10.5 EER	1 ton	3000	1	
AC	G	Principle	Unitary PG	F2RP024H06B	2010	-	2 Ton	3000	1	DX Split
AC	G	Library	Goodman	RC14010C1D	-	10 EER	138000 Btu	3000	1	

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	Boiler Room	Space Heat	Weil McLain	88	1998	75.0%	1546 MBH	5000	1	Gasfired
Boiler 2	Boiler Room	Space Heat	Weil McLain	88	2007	75.0%	1546 MBH	5000	1	Gasfired
Heat Timer	Boiler Room	Space Heat	MPC Platinum	-	-	-	-	5000	1	
Heat Timer	Boiler Room	Space Heat	MultiMOD	-	-	-	-	5000	1	
AC	Boiler Office	Boiler Office	Kenmore	-	1990	-	1 ton	3000	1	
AHU	Library	Library	-	KDB0090AA	-	-	7.5 tons	3000	1	
AC	Computer Room	Computer Room	-	1F32T8	-	-	unknown	3000	1	
AC	110A	110A	Friedrich	-	-	-	unknown	3000	1	
Heat Pump	107	107	GE	-	-	-	1 ton	8760	1	
Heat Pump	1 Office	1 Office	GE	-	-	-	1 ton	8760	1	
AC	104	104	Kenmore	253.8608	2014	9.8 EER	8000 Btuh	3000	1	
Heat Pump	1 Principal	1 Principal	GE	-	-	-	unknown	8760	1	
Heat Pump	101	101	GE	-	2003	9 EER	11600 Btuh	8760	1	
Heat Pump	200	200	GE	-	2003	9 EER	11600 Btuh	8760	1	
AC	202	202	Frigidaire	-	-	-	unknown	3000	1	
Heatpump	2 Nurse	2 Nurse	GE	-	-	-	unknown	8760	1	
AC	308	308	Friedrich	CP15G10	2014	10.7 EER	15000 Btuh	3000	1	
Heatpump	305	305	GE	-	-	-	unknown	8760	1	
AC	304	304	Frigidaire	FAC103K1A2	2002	9.8 EER	9950 Btuh	3000	1	
Heatpump	310	310	Friedrich	-	-	-	unknown	8760	1	
Heatpump	301	301	GE	-	-	-	unknown	8760	1	
AHU	Café	Café	Trane	K03G02308A	-	-	unknown	3000	1	Heat only

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
HP	Class	Class	Airdale	PA2884-U18184	2003	-	-	8760	50	OA Economizer
Duct Heat	Class	in the second classroom	Airdale	-	-	-	-	8760	1	
AHU-1	Main Office	-	Trane	TWE090A300DA	2003	-	7.5 ton	8760	1	24 KW elec heat
AHU-2	Mech Class	-	Trane	TWE090A300DA	2003	-	7.5 ton	8760	1	24 KW elec heat
EH	Hall	-	-	-	-	-	-	8760	1	
Airdale	-	-	Airdale	CM5H	-	-	-	8760	1	
AHU	Gym	-	Heatrix	-	-	-	-	8760	1	
AHU	Elec Locker	-	Trane	GGAA25ARJ	-	-	250 MBH	8760	1	
Range	Kitchen	Food Service	-	-	-	-	Gas	8760	1	
Oven	Kitchen	Food Service	-	-	-	-	Gas	8760	1	
Rack	Kitchen	Food Service	-	-	-	-	Gas	8760	1	
Cooler	Kitchen	Food Service	-	-	-	-	Gas	8760	1	
Walk in Fridge	Kitchen	Food Service	-	-	-	-	Gas	8760	1	
Walk in Freezer	Kitchen	Food Service	-	-	-	-	Gas	8760	1	
RTU-1	Roof	Café	Trane	YCD180B4HAHA	2003	-	-	8760	1	350 MBH 15 ton
RTU-2	Roof	Café	Trane	-	-	-	-	8760	1	350 MBH 15 ton
RTU-3	Roof	Café	Trane	-	-	-	-	8760	1	350 MBH 15 ton
RTU-4	Roof	Café	Trane	-	-	-	-	8760	1	350 MBH 15 ton
AHU	Roof	Kitchen	Trane	GRBA70GJL5	2003	-	700 MBH	8760	1	Makeup Air
Cond	Roof	Main OR	Trane	TTA090A400FA	-	-	-	8760	1	
Cond	Roof	Intclass	Trane	TTA090A400FA	-	-	-	8760	1	
Cond	Roof	207	Trane	TTA090A400FA	-	-	-	8760	1	
EF-7	Roof	Kitchen	Greenheck	SHB-220-60-CHUB	2003	-	-	8760	1	
RTU	Roof	324	Trane	Y102ARLA14H	2003	-	120 MBH	8760	1	
9	Roof		Trane	YSC036A4RH	2003	-	120 MBH	8760	1	
10	Roof	304	Trane	YSC048A6HA46	2003	-	120 MBH	8760	1	
11	Roof	300	Trane	YSC060A4RHA15	2003	-	130 MBH	8760	1	
7	Roof		Trane	YSC036	2003	-	120 MBH	8760	1	
5	Roof	313	Trane	YSC1024RLA	2003	-	120 MBH	8760	1	
6	Roof	311	Trane	YSC060A4RHA	2003	-	130 MBH	8760	1	
MAU	Roof	Bathroom	Trane	GRCA20GBJL	2003	-	200 MBH	8760	1	
Cond	Roof	Library	Trane	TTA120B400DA	-	-	10 Tons	8760	1	
Water Heat	Elec	Water Heat	Lochinvar	CWN0645PM	1998	-	500 Gallons	8760	1	

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	Boiler	Space Heat	Smith	28A-18	1996	80%	3594 MBH Steam	5000	1	
Boiler 2	Boiler	Space Heat	Smith	28A-18	-	80%	3594 MBH Steam	5000	1	
AC	212	212	GE	ASW18DDS1	2004	9.7 EER	17900 Btuh	3000	1	
AC	215	215	Friedrich	KS12J10B	-	10 EER	11500 Btuh	3000	1	
AC	217	217	Friedrich	KS12J10B	-	10 EER	11500 Btuh	3000	1	
AC	VP	VP	Maytag	M3X05F2AK	-	9.7 EER	5000 Btuh	3000	1	
AC	213	213	Friedrich	KS12J10B	-	10 EER	11500 Btuh	3000	1	
AC	213	213	Friedrich	KS12J10B	-	10 EER	11500 Btuh	3000	1	
AC	206	206	Emerson	Unknown	Unknown	Unknown	Unknown	3000	1	
AC	206	206	Carrier	Unknown	Unknown	Unknown	Unknown	3000	1	
AC	Main	Main	GE	AGL12ADG1	2004	9.8 EER	12000 Btuh	3000	1	
AC	Sec	Sec	GE	AGL12ADG1	2004	9.8 EER	12000 Btuh	3000	1	
AC	Principal	Principal	GE	AGL12ADG1	2004	9.8 EER	12000 Btuh	3000	1	
AC	SAC	SAC	Friedrich	KS12J10B	-	10 EER	11500 Btuh	3000	2	
AC	Nurse	Nurse	Carrier	XCB153D	2005	10.2 EER	15000 Btuh	3000	1	
AC	Nurse	Nurse	Friedrich	KS12J10B	-	10 EER	11500 Btuh	3000	1	Steam + OA
AHU	Boiler	Café	Unknown	Unknown	Unknown	-	-	3000	1	
Water Heater	Boiler Room	Water Heat	AO Smith	BT100 112	2004	75%	751 MBH	8760	1	95 Gallons
Water Heater	Kitchen	Water Heat	Rheem	6E722	2001	-	4500W	8760	1	50 Gallons

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
P-1	Boiler	Heat	B & G	-	1993	89.5%	5 HP 1735 RMP	5000	1	
P-2	Boiler	Heat	B & G	-	1993	89.5%	5 HP 1735 RMP	5000	1	
P-3	Boiler	Heat	B & G	-	1993	91.7%	75 HP 1760 RPM	5000	1	
P-4	Boiler	Heat	B & G	-	1993	88.5%	75 HP 1760 RPM	5000	1	
P-5	Boiler	Heat	B & G	-	1993	89.5%	10 HP 1750 RPM	5000	1	
P-6	Boiler	Heat	B & G	-	1993	89.5%	10 HP 1750 RPM	5000	1	
Boiler 1	Boiler	Heat	Weil McLain	94 1594	1993	83.0%	5052 MBH Hotwater	5000	1	
Boiler 2	Boiler	Heat	Weil McLain	94 1594	1993	83.0%	5052 MBH Hotwater	5000	1	
HV	Café	Café	Trane	MCCB018	-	-	-	5000	1	
Unitvent	Classrooms	Heat and Vent	Trane	Unknown	-	-	-	8760	1	Elec HW valve/adapter
AC	Main	Main	Amana	Unknown	-	-	-	3000	1	
AC	Main	Main	GE	AGQ14AJG1	2002	10 EER	13800 Btuh	3000	1	broken
AC	Main	Main	Amana	Unknown	-	-	-	3000	1	
AC	Staff	Staff	Frigidaire	Unknown	-	-	1.5 ton	3000	1	broken
AC	111A	111A	Westnalong	WAL12CP1A1	1996	9.6 EER	11500 Btuh	3000	1	
AC	112	112	Sharp	AFS12EX	2004	10.8 EER	12000 Btuh	3000	1	
AC	112	112	GE	AMD120B1	1995	9.1 EER	12000 Btuh	3000	1	
RTU	Roof		Trane	Tag Faded	-	-	-	3000	1	
Cond	Roof	221	Trane	Tag Faded	-	-	-	3000	1	
AC	221	221	Goodman	RC14010C1D	-	10 EER	13800 Btuh	3000	1	
RTU	Roof		Trane	Tag Faded	-	-	-	3000	1	Hotwater
AC	312	312	Carrier		-	-	-	3000	1	
AC	312	312	Frigidaire	FAC107P1A1	-	10.8 EER	10000 Btuh	3000	1	
AC	Teacher	Teacher	GE	Unknown	1990	-	12000 Btuh	3000	1	
AC	Teacher	Teacher	GE	Unknown	2000	-	12000 Btuh	3000	1	
AC	308A	308A	Ceiling unit	Unknown	-	-	-	3000	1	
Water Heater	Boiler room	Water Heating	Bradford	D80T2503NA	2011	-	250 MBH	8760	1	80 Gallons
Elec Water Heater	Cleaner	Water Heating	Emay	EMT4	2012	-	1400W	8760	1	

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
Boiler 1	Boiler Room	Space Heat	Weil McLain	88	1998	75.0%	5124 MBH	5000	1	Steam Gas
Boiler 2	Boiler Room	Space Heat	Weil McLain	88	1998	75%	5124 MBH	5000	1	Steam Gas
Water Heater	Boiler Room	Water heating	A.O. Smith	BTR 154 110	2001	78.0%	154 MBH 81 Gallon	8760	1	
AC	2A	2A	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	Café	Café	unknown	unknown	-	unknown	1 ton	3000	1	Cover Missing
AC	Elec Room	Elec Room	Friedrich	KS12J10B-A	-	unknown	1 ton ac	3000	2	Covers Missing
AC	202	202	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	203	203	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	205	205	Gibson	GAL108T1A1	-	9.3 EER	9800 Btuh	3000	1	
AC	206	206	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	207	207	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	208	208	unknown	unknown	-	unknown	unknown	3000	1	
AC	209	209	Amana	12C2MB	1990	unknown	11800 Btuh 1215 Watts	3000	1	
AC	212	212	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	211 Main Office	212 Main Office	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	300	300	unknown	unknown	-	unknown	1 ton	3000	1	hidden
AC	302	302	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	303	303	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
Unitvent	303	Classrooms	Magic Aire	unknown	-	unknown	unknown	8760	1	
AC	304	304	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	305	305	Sharp	AFM609X	1998	9.7 EER	5500 Btuh	3000	1	
AC	306	306	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	308	308	Emerson	16HD14	-	unknown	8000 Btuh	3000	1	
AC	309	309	Emerson	16HD14	-	unknown	8000 Btuh	3000	1	
AC	312	312	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	
AC	311	311	Friedrich	KS12J10B-A	-	10.8 EER	11500 Btuh	3000	1	

Designation	Location	Floor/Serves	Manufacturer	Model/Make	Date	Efficiency	Capacity	Operating Hours/Year	Quantity	Remarks
AC	Roof	Annex 1 & 2	Season 4	3CHK 31-0422-HW60-145E	2006	-	HW heat DXCooling	8760	1	(Typically Multizone)
Condenser	Library	Library	American Standard	Not Visible	2006	-	about 5 tons	3000	1	
HW Tank	Boiler Room	Hot water Annex	A.O. Smith	BTR197-118	2014	-	100 Gallons, 199 MBH	8760	1	
Boiler1	Boiler Room	Heating Annex	HB Smith	Series 28A-06	1992	-	1223 MBH	5000	1	Gas Hot water
Boiler2	Boiler Room	Heating Annex	HB Smith	Series 28A-06	1992	-	1223 MBH	5000	1	Gas Hot water
Annex HWP 1	Boiler Room	Heating Annex	-	ITT	1992	78.5%	3 HP 1730 RPM	5000	1	AC 1+2
Annex HWP 2	Boiler Room	Heating Annex	-	ITT	1992	78.5%	3 HP 1730 RPM	5000	1	AC 1+2
Annex HWP 3	Boiler Room	Heating Annex	-	ITT	1992	80.0%	1.5 HP 1735 RPM	5000	1	Radiation
HWP 1	Main Building	Heating Main	-	ITT	1992	88.5%	7.5 HP 1760 RPM	5000	1	
HWP 2	Main BUilding	Heating Main	-	ITT	1992	88.5%	7.5 HP 1760 RPM	5000	1	
HWP 3	Main Building	Heating Main	-	ITT	1992	88.5%	7.5 HP 1760 RPM	5000	1	
AC	Main Office	Main Office	GE	Not Visible	-	-	unknown	3000	1	
DHW	Boiler Room	Water Heating	American Water Heater	BCG310012508N118	2010	-	250 MBH, 100 Gallons	8760	1	
Boiler	Boiler Room	Heating Main	HB Smith	Not Visible	1992	-	5189 MBH	5000	1	Steam Gasfired HW HX
AC Roof Unit	103	103	Not Visible	Not Visible	-	-	unknown	3000	1	2800
AC	2 Nurse	2 Nurse	Fedders	A6T12F2A	-	-	12000	3000	1	
ACx2	212	212	White Westinghouse	WAS1835242	1996	9.5 EER	18000 Btuh	3000	2	
AC	310	310	Friedrich	Not Visible	2014	-	1.5 Ton	3000	1	
AC	311	311	Friedrich	Not Visible	2014	-	1.5 Ton	3000	1	
AC	312	312	Friedrich	Not Visible	2014	-	1.5 Ton	3000	1	
AC	300	300	Goodman	Not Visible	1997	-	1.5 ton	3000	1	
AC	300	300	Frigidaire	FRA226ST2	2010	9.4 EER	22000 Btu	3000	1	
AC	307 Annex 3	307 Annex 3	Not Visible	Not Visible	2006	-	unknown	3000	1	
AC	308 Annex 3	308 Annex 3	Not Visible	Not Visible	2006	-	unknown	3000	1	
RTU	Library Annex 3	Library Annex 3	Not Visible	Not Visible	2006	-	unknown	8760	1	

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 G" is positioned at this intersection point, with the "A" and "G" being larger and bolder than the word "Appendix".

Appendix G

		Fixture Type	Shower		Sink (auto / manual)			Toilet		Urinal		Slop Sink		Extra		Drinking Fountain	
Building	Floor	Room	Qty	GPM	Qty	GPM	Control	Qty	GPF	Qty	GPF	Qty	GPM	Qty	GPM	Qty	GPM
School 27	G	25	1					1				1					
School 27	G	Caf Bath			4	0.5	A	4	3.5								
School 27	G	Boys			3	0.5	A	3	3.5	3	1.5						
School 27	G	11			1	-	A	1	3.5	1	1.5						
School 27	G	13										1					
School 27	G	Boys Locker	-	-	2	2.2	M	1	3.5	2	1.5						
School 27	G	Girls Locker	-	-	3	2.2	M	2	3.5								
School 27	N2	Boys			3	2.2	M	2		2							
School 27	N2	208										1					
School 27	N1	Girls			3	2.2	M	4									
School 27	N1	Staff			1		M	1		1							
School 27	N1	101A			1	2.0	M	1									
School 27	1	102A			1		M	1									
School 27	1	103A			1		M	1									
School 27	1	104A			1		M	1									
School 27	1	105A			1		M	1									
School 27	1	Nurse			1		M	1									
School 27	1	108										1					
School 27	1	107			2	-	M	2	3.5								
School 27	1	101			2	2.0	M	2	3.5								
School 27	1	102			2	2.0	M	2	3.5								
School 27	1	103			2	2.0	M	2	3.5								
School 27	2	201			2	2.0	M	2	3.5								
School 27	2	202			2	2.0	M	2	3.5								
School 27	2	203			2	2.0	M	2	3.5								
School 27	1	123 Boy			4		M	4	3.5	4	3.5						
School 27	1	135 Girls			4		M	6									
School 27	2	226 Girls			4			6									
School 27	2	216			4		M	4		5	1.5						
School 27	T	Trailer 1			2	2.0	M	1	1.6								
School 27	T	Trailer 2			2	2.0	M	1	1.6								
School 27	T	Trailer 3			2	2.0	M	1	1.6								
School 27	T	Trailer 4			2	2.0	M	1	1.6								

		Fixture Type	Shower		Sink			Toilet		Urinal		Slop Sink		Extra		Drinking Fountain	
Building	Floor	Room	Qty	GPM	Qty	GPM	Control (A/M)	Qty	GPF	Qty	GPF	Qty	GPM	Qty	GPM	Qty	GPM
School 25	B	Kitchen			2		M	1									
School 25	B	B10			1		M	1	-								
School 25	B	B11			1		-	1									
School 25	B	Boys			2		M	2	-	4							
School 25	B	Girls			2		M	5									
School 25	1	103			1	2.2	M	1									
School 25	1	Girls			1		M	5	1.6								
School 25	1	Nurse			1		M	1									
School 25	1	Boys			2		M	2		4							
School 25	2	Boys			2		A										
School 25	2	Girls			2		A										
School 25	2	Teachers			2	2	M	1	1.6								

		Fixture Type	Shower		Sink		Toilet			Urinal			Slop Sink/ Mop Receptor		Extra		Drinking Fountain			
Building	Floor	Room	Qty	GPM	Control (A/M)	Qty	GPM	Control (A/M)	Qty	GPF	Control (A/M)	Qty	GPF	Qty	GPM	Qty	GPM	Control (A/M)	Qty	GPM
School 24	3rd	Hallway																M	1	
School 24	3rd	Hallway																A	1	
School 24	3rd	Hallway			A	2		M	1	1.6	M	1	1.0					M	1	
School 24	3rd	Women's			A	2		M	2	1.6										
School 24	3rd	Hallway																A	1	
School 24	3rd	Hallway																M	1	
School 24	3rd	Teacher's Bathroom			A	2		M	2	1.6	M	2	1.0	1						
School 24	2nd	Hallway																M	1	
School 24	2nd	Hallway																A	1	
School 24	2nd	Hallway																M	1	
School 24	2nd	Men's			M	2		M	1	1.6	M	1	1.0							
School 24	2nd	Hallway																M	1	
School 24	2nd	Women's			M	1		M	1	1.6										
School 24	2nd	Women's			A	1														
School 24	New 2nd	Hallway																A	1	
School 24	New 2nd	Hallway																M	1	
School 24	New 2nd	Men's			A	3		A	2	1.6	A	1	1.0							
School 24	New 2nd	Women's			A	3		A	3											
School 24	1st	Teacher's Breakroom			A	1		M	2	1.6										
School 24	1st	Teacher's Breakroom			M	1														
School 24	1st	Men's			A	3		M	2	1.6										
School 24	1st	Hallway																M	1	
School 24	1st	Women's			A	2		M	2	1.6										
School 24	1st	Hallway																M	1	
School 24	1st	Men's			A	2		M	1	1.6	M	1	1.0							
School 24	1st	Hallway																A	2	
School 24	1st	Hallway																M	2	
School 24	New 1st	Men's			A	3		A	2	1.6	A	1	1.0							
School 24	New 1st	Women's			A	3		A	3											
School 24	New 1st	Hallway																A	1	
School 24	New 1st	Hallway																M	1	
School 24	Basement	Men's			A	4		A	4	1.6	A	4	1.0					A	1	
School 24	Basement	Hallway																M	2	
School 24	Basement	Kindergarten			A	1		M	1	1.6								A	1	
School 24	Basement	Hallway																M	1	
School 24	Basement	Hallway																		
School 24	Basement	Women's			A	4		A	7	1.6										
School 24	New Basement	Hallway																A	1	
School 24	New Basement	Hallway																M	1	
School 24	New Basement	Kitchen			M	4														
School 24	New Basement	Kitchen Bathroom			A	1		A	1	1.6										
School 24	New Basement	Women's			A	4		A	5	1.6										
School 24	New Basement	Room												1						
School 24	New Basement	Men's			A	4		A	2	1.6	A	3	1.0							
School 24	New Basement	Women's Gym Locker Room			A	3		A	3	1.6										
School 24	New Basement	Men's Gym Locker Room			A	3		A	2	1.6	A	1	1.0							
School 24	New Basement	Gym																A	1	
School 24	New Basement	Gym																M	1	

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School 20

School 20		Fixture Type	Shower		Sink			Toilet			Urinal			bp Sink/ Mop Recep		Extra		Drinking Fountain		
Building	Floor	Room	Qty	GPM	Control (A/M)	Qty	GPM	Control (A/M)	Qty	GPF	Control (A/M)	Qty	GPF	Qty	GPM	Qty	GPM	Control (A/M)	Qty	GPM
School 20	1969 Basement	Hallway																M	2	
School 20	1969 Basement	Men's			M	3		M	3	1.6	M	3	1.0							
School 20	1969 Basement	Closet												1						
School 20	1969 Basement	Women's			M	2		M	4	1.6										
School 20	Original Basement	Cafeteria																M	2	
School 20	Original Basement	Men's			M	3		M	3	1.6	M	5	1.0							
School 20	Original Basement	Women's			M	3		M	5	1.6										
School 20	Original Basement	Women's			A	1														
School 20	Original Basement	Kitchen			M	1														
School 20	Original 1st	Parent Resource Room			M	1		M	1	1.6										
School 20	Original 1st	Hallway																M	2	
School 20	Original 2nd	Hallway																M	1	
School 20	Original 2nd	Bathroom			A	2		M	1	1.6										
School 20	1969 1st	Women's (Locked; Assumption)			M	2		M	4	1.6										
School 20	1969 1st	Hallway																M	2	
School 20	1969 1st	Men's			M	3		M	3	1.6	M	4	1.0							
School 20	1969 2nd	Men's (Locked; Assumption)			M	3		M	3	1.6	M	3	1.0							
School 20	1969 2nd	Women's (Locked; Assumption)			M	2		M	4	1.6										
School 20	1969 2nd	Hallway																M	3	
School 20	1969 2nd	Faculty Room			M	1		M	1	1.6										
School 20	2000 Basement	Kindergarten			M	2		M	1	1.6										
School 20	2000 Basement	Kindergarten			M	2		M	1	1.6										
School 20	2000 Basement	Kindergarten			M	1		M	1	1.6										
School 20	2000 1st	Faculty Bathroom			A	2		M	2	1.6										
School 20	2000 1st	Women's			A	3		M	2	1.6										
School 20	2000 1st	Hallway																M	1	

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		Fixture Type	Shower		Sink			Toilet		Urinal		Slop Sink		Extra		Drinking Fountain	
Building	Floor	Room	Qty	GPM	Qty	GPM	Control (A/M)	Qty	GPF	Qty	GPF	Qty	GPM	Qty	GPM	Qty	GPM
School 14	G	Nurse			1		A										
School 14	G	Boys			2	0.5	A	3	-	6							
School 14	G	Girls			4	2	A	6				1					
School 14	G	Teachers			1	-	M	1	-								

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		Fixture Type	Shower		Sink			Toilet			Urinal			Slop Sink/ Mop Receptor		Extra		Drinking Fountain		
Building	Floor	Room	Qty	GPM	Control (A/M)	Qty	GPM	Control (A/M)	Qty	GPF	Control (A/M)	Qty	GPF	Qty	GPM	Qty	GPM	Control (A/M)	Qty	GPM
School 10	3rd	Teacher's Room Men's			M	2		M	1	1.6										
School 10	3rd	Hallway																M	2	
School 10	3rd	Closet												1						
School 10	3rd	Women's			M	1		M	4	1.6										
School 10	3rd	Men's			M	1		M	2	1.6	M	5	1.0							
School 10	3rd	Men's			A	1														
School 10	2nd	Hallway																M	2	
School 10	2nd	Men's			A	2		M	3	1.6	M	5	1.0							
School 10	2nd	Women's			M	1		M	6	1.6										
School 10	2nd	Closet												1						
School 10	2nd	Teacher's Room Women's			M	2		M	1	1.6										
School 10	1st	Hallway																M	2	
School 10	1st	Closet												1						
School 10	1st	Nurse			M	2		M	1	1.6										
School 10	1st	Room			M	1		M	1	1.6										
School 10	1st	Room			M	1		M	1	1.6										
School 10	Basement	002			M	1		M	1	1.6										
School 10	Basement	001			M	2		M	1	1.6										
School 10	Basement	Men's			M	2		M	9	1.6	M	10	1.0							
	Basement	Women's				3 circular faucets (1 broken, 1 missing spigot)														
School 10	Basement	Women's			M	1		M	9	1.6										
School 10	Basement	Kitchen			M	2												M	1	
School 10	Basement	Closet												1						

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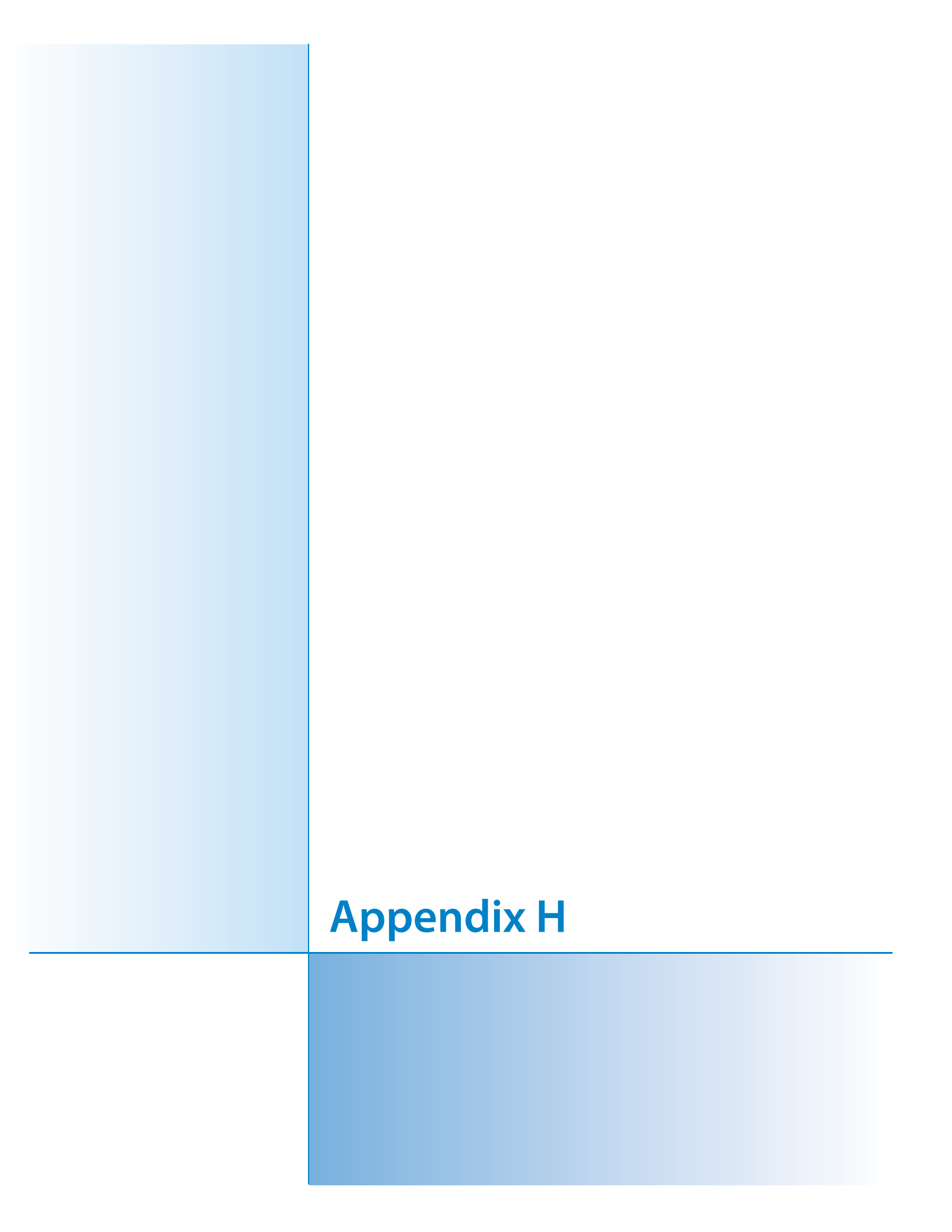
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Appendix H



11 British American Blvd
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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**
Reviewed By **B. McLean**

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
PS 2: Condensing Boiler										
1	Boiler Removal	4	Ea	\$ -	\$ -	2	Ea	\$ 2,950.00	\$ 5,900.00	5,900.00
2	Condensing Boiler (2000 MBH, 95% AFUE)	3	Ea	\$ 37,000.00	\$ 111,000.00	3	Ea	\$ 9,050.00	\$ 27,150.00	138,150.00
3	Condensing Boiler (1500 MBH, 95% AFUE)	2	Ea	\$ 32,000.00	\$ 64,000.00	2	Ea	\$ 9,050.00	\$ 18,100.00	82,100.00
4	Stainless Steel Chimney (8 inch)	80	L.F.	\$ 57.00	\$ 4,560.00	80	L.F.	\$ 28.00	\$ 2,240.00	6,800.00
5	Stainless Steel Chimney (6 inch)	80	L.F.	\$ 47.50	\$ 3,800.00	80	L.F.	\$ 20.00	\$ 1,600.00	5,400.00
6	Steel Piping	80	L.F.	\$ 64.00	\$ 5,120.00	80	L.F.	\$ 26.00	\$ 2,080.00	7,200.00
Subtotal					188,480.00				57,070.00	

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

SUBTOTAL =	\$	245,550.00
MARKUP % =	\$	0.15
MARKUP =	\$	36,832.50
SUB-TOTAL w/ OH & P =	\$	282,382.50
CONTINGENCY % =		0.25
CONTINGENCY =	\$	70,595.63
BUDGET COST ESTIMATE =	\$	352,978.13

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.

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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Created By **C. Dowd**
Reviewed By **B. McLean**

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	PS 8: High Efficiency Steam Boiler									
1	Boiler Removal (3600 MBH)	2	Ea	0.00	\$ -	2	Ea	\$ 4,725.00	\$ 9,450.00	9,450.00
2	Premium Efficiency Steam boiler (3600 MBH) 83% efficient	2	Ea	\$27,700.00	\$ 55,400.00	2	Ea	\$ 13,400.00	\$ 26,800.00	82,200.00
3	Stainless Steel Chimney	40	L.F.	\$12.55	\$ 502.00	40	L.F.	\$ 19.85	\$ 794.00	1,296.00
4	Boiler Steam and Gas Piping	80	Ea	\$64.00	\$ 5,120.00	60	Ea	\$ 26.00	\$ 1,560.00	6,680.00
	Subtotal				61,022.00				38,604.00	

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

SUBTOTAL =	\$	99,626.00
MARKUP % =	\$	0.15
MARKUP =	\$	14,943.90
SUB-TOTAL w/ OH & P =	\$	114,569.90
CONTINGENCY % =		0.25
CONTINGENCY =	\$	28,642.48
BUDGET COST ESTIMATE =	\$	143,212.38

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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- 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 UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
PS 10: Condensing Boiler										
1	Boiler Removal	2	Ea	\$ -	\$ -	2	Ea	\$ 2,950.00	\$ 5,900.00	5,900.00
2	Condensing Boiler (2000 MBH, 95% AFUE)	2	Ea	\$ 37,000.00	\$ 74,000.00	2	Ea	\$ 9,050.00	\$ 18,100.00	92,100.00
3	Stainless Steel Chimney (8 inch)	80	L.F.	\$ 57.00	\$ 4,560.00	80	L.F.	\$ 28.00	\$ 2,240.00	6,800.00
4	Steel Piping	80	L.F.	\$ 64.00	\$ 5,120.00	80	L.F.	\$ 26.00	\$ 2,080.00	7,200.00
Subtotal					83,680.00				28,320.00	

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

SUBTOTAL =	\$	112,000.00
MARKUP % =	\$	0.15
MARKUP =	\$	16,800.00
SUB-TOTAL w/ OH & P =	\$	128,800.00
CONTINGENCY % =		0.25
CONTINGENCY =	\$	32,200.00
BUDGET COST ESTIMATE =	\$	161,000.00

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.
- 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 UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	PS 14: High Efficiency Steam Boiler									
1	Boiler Removal (813 MBH)	2	Ea	0.00	\$ -	2	Ea	\$ 2,950.00	\$ 5,900.00	5,900.00
2	Premium Efficiency Steam boiler (813 MBH) 83% efficient	2	Ea	\$9,450.00	\$ 18,900.00	2	Ea	\$ 5,500.00	\$ 11,000.00	29,900.00
3	Stainless Steel Chimney	40	L.F.	\$12.55	\$ 502.00	40	L.F.	\$ 19.85	\$ 794.00	1,296.00
4	Boiler Steam and Gas Piping	80	Ea	\$64.00	\$ 5,120.00	60	Ea	\$ 26.00	\$ 1,560.00	6,680.00
	Subtotal				24,522.00				19,254.00	

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

SUBTOTAL =	\$	43,776.00
MARKUP % =	\$	0.15
MARKUP =	\$	6,566.40
SUB-TOTAL w/ OH & P =	\$	50,342.40
CONTINGENCY % =		0.25
CONTINGENCY =	\$	12,585.60
BUDGET COST ESTIMATE =	\$	62,928.00

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.
- 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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Latham, NY 12110
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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Created By **C. Dowd**
Reviewed By **B. McLean**

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	PS 21: High Efficiency Steam Boiler									
1	Boiler Removal (4000 MBH)	2	Ea	0.00	\$ -	2	Ea	\$ 4,725.00	\$ 9,450.00	9,450.00
2	Premium Efficiency Steam boiler (4500 MBH) 83% efficient	2	Ea	\$58,000.00	\$ 116,000.00	2	Ea	\$ 15,600.00	\$ 31,200.00	147,200.00
3	Stainless Steel Chimney	40	L.F.	\$12.55	\$ 502.00	40	L.F.	\$ 19.85	\$ 794.00	1,296.00
4	Boiler Steam and Gas Piping	80	Ea	\$64.00	\$ 5,120.00	60	Ea	\$ 26.00	\$ 1,560.00	6,680.00
	Subtotal				121,622.00				43,004.00	

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

SUBTOTAL =	\$	164,626.00
MARKUP % =	\$	0.15
MARKUP =	\$	24,693.90
SUB-TOTAL w/ OH & P =	\$	189,319.90
CONTINGENCY % =		0.25
CONTINGENCY =	\$	47,329.98
BUDGET COST ESTIMATE =	\$	236,649.88

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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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	PS 24: High Efficiency Steam Boiler									
1	Boiler Removal (4000 MBH)	2	Ea	0.00	\$ -	2	Ea	\$ 4,725.00	\$ 9,450.00	9,450.00
2	Premium Efficiency Steam boiler (4500 MBH) 83% efficient	2	Ea	\$58,000.00	\$ 116,000.00	2	Ea	\$ 15,600.00	\$ 31,200.00	147,200.00
3	Stainless Steel Chimney	40	L.F.	\$12.55	\$ 502.00	40	L.F.	\$ 19.85	\$ 794.00	1,296.00
4	Boiler Steam and Gas Piping	80	Ea	\$64.00	\$ 5,120.00	60	Ea	\$ 26.00	\$ 1,560.00	6,680.00
	Subtotal				121,622.00				43,004.00	

Cost data obtained from RSMeans CostWorks 2015 and vendor pricing.

SUBTOTAL =	\$	164,626.00
MARKUP % =	\$	0.15
MARKUP =	\$	24,693.90
SUB-TOTAL w/ OH & P =	\$	189,319.90
CONTINGENCY % =		0.25
CONTINGENCY =	\$	47,329.98
BUDGET COST ESTIMATE =	\$	236,649.88

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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- 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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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 11: Windows Upgrade									
	Removal of Windows	3,156	S.F.		\$ -	3,156	S.F.	\$ 3.00	\$ 9,468.00	9,468.00
2	New Windows	3,156	S.F.	76.00	\$ 239,856.00	3,156	S.F.	\$ 11.00	\$ 34,716.00	274,572.00
	Subtotal				0.00				9,468.00	

Cost data obtained from RSMeans CostWorks 2015

SUBTOTAL =	\$	284,040.00
MARKUP % =	\$	0.15
MARKUP =	\$	42,606.00
SUB-TOTAL w/ OH & P =	\$	326,646.00
CONTINGENCY % =		0.25
CONTINGENCY =	\$	81,661.50
BUDGET COST ESTIMATE =	\$	408,307.50

Notes:

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- Escalation not included in estimate.
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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 14: Windows Upgrade									
	Removal of Windows	1,791	S.F.		\$ -	1,791	S.F.	\$ 3.00	\$ 5,373.00	5,373.00
2	New Windows	1,791	S.F.	76.00	\$ 136,116.00	1,791	S.F.	\$ 11.00	\$ 19,701.00	155,817.00
	Subtotal				0.00				5,373.00	

Cost data obtained from RSMeans CostWorks 2015

SUBTOTAL =	\$	161,190.00
MARKUP % =	\$	0.15
MARKUP =	\$	24,178.50
SUB-TOTAL w/ OH & P =	\$	185,368.50
CONTINGENCY % =		0.25
CONTINGENCY =	\$	46,342.13
BUDGET COST ESTIMATE =	\$	231,710.63

Notes:

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ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

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ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 19: Windows Upgrade									
	Removal of Windows	2,229	S.F.		\$ -	2,229	S.F.	\$ 3.00	\$ 6,687.00	6,687.00
2	New Windows	2,229	S.F.	76.00	\$ 169,404.00	2,229	S.F.	\$ 11.00	\$ 24,519.00	193,923.00
	Subtotal				0.00				6,687.00	

Cost data obtained from RSMeans CostWorks 2015

SUBTOTAL =	\$	200,610.00
MARKUP % =	\$	0.15
MARKUP =	\$	30,091.50
SUB-TOTAL w/ OH & P =	\$	230,701.50
CONTINGENCY % =		0.25
CONTINGENCY =	\$	57,675.38
BUDGET COST ESTIMATE =	\$	288,376.88

Notes:

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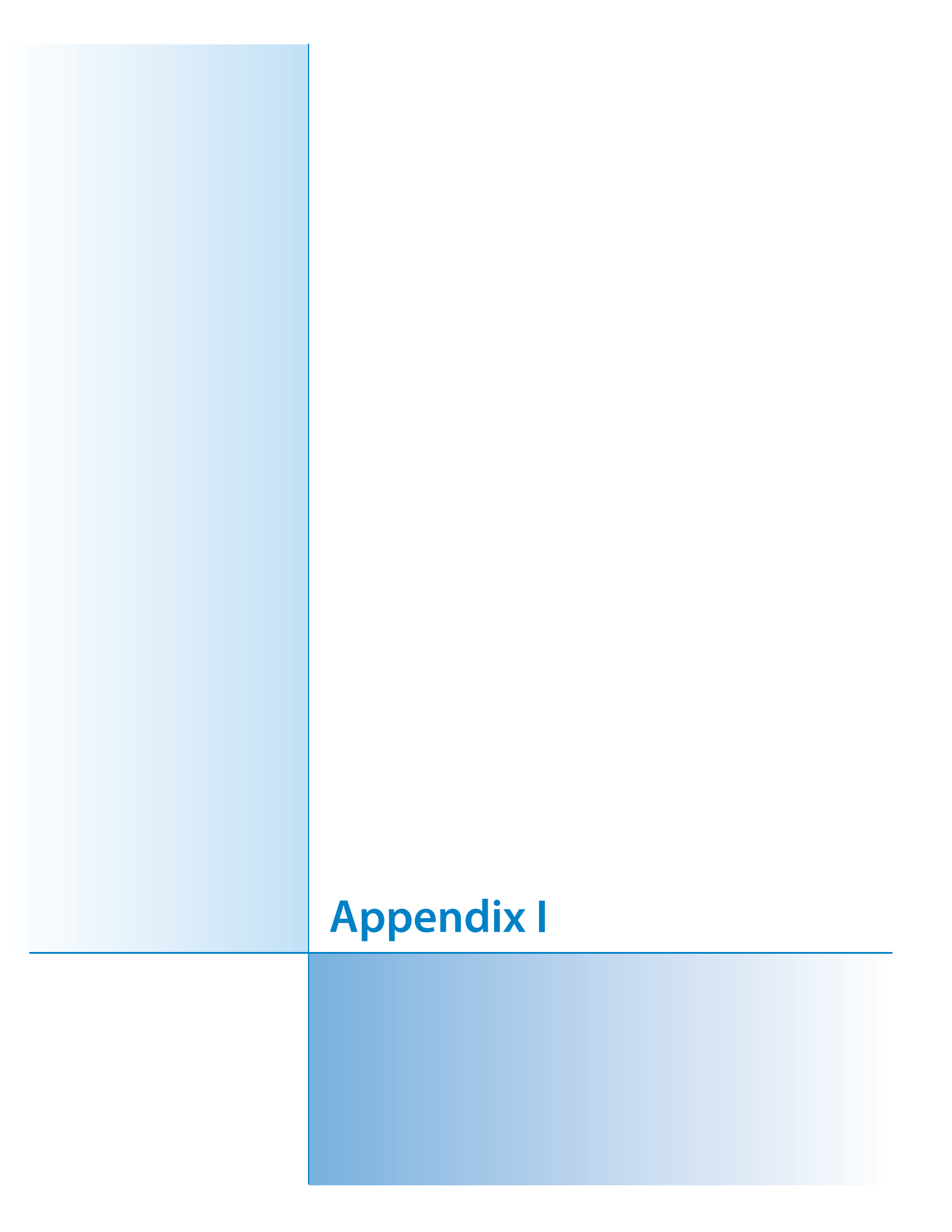
ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
1	PS 21: Windows Upgrade									
	Removal of Windows	5,180	S.F.		\$ -	5,180	S.F.	\$ 3.00	\$ 15,540.00	15,540.00
2	New Windows	5,180	S.F.	76.00	\$ 393,680.00	5,180	S.F.	\$ 11.00	\$ 56,980.00	450,660.00
	Subtotal				0.00				15,540.00	

Cost data obtained from RSMeans CostWorks 2015

SUBTOTAL =	\$	466,200.00
MARKUP % =	\$	0.15
MARKUP =	\$	69,930.00
SUB-TOTAL w/ OH & P =	\$	536,130.00
CONTINGENCY % =		0.25
CONTINGENCY =	\$	134,032.50
BUDGET COST ESTIMATE =	\$	670,162.50

Notes:

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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 extends from the vertical line across the page, intersecting a darker blue rectangle at the bottom right. The text "Appendix I" is positioned at the intersection of these lines.

Appendix I

ECM	School 1 & 26 DDC Upgrade	School 2 DDC Upgrade	School 3 DDC Upgrade	School 4 DDC Upgrade	School 5 DDC Upgrade	School 8 DDC Upgrade
Assumed Inflation (Gas, Oil)	2%	2%	2%	2%	2%	2%
Initial Yearly Savings (Gas, Oil)	\$1,464.62	\$2,594.42	\$1,055.09	\$2,463.72	\$1,982.31	\$1,632.92
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$2,201.70	\$934.56	\$1,008.90	\$2,386.49	\$2,630.90	\$1,156.47
Assumed Average Useful Life (Years)	20	20	20	20	20	20
Lifetime Savings	\$94,746.80	\$62,248.08	\$52,745.33	\$123,987.77	\$118,858.27	\$49,747.85
<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>
1	\$3,666.32	\$3,528.97	\$2,063.99	\$4,850.21	\$4,613.21	\$2,789.39
2	\$3,761.66	\$3,608.90	\$2,115.35	\$4,971.08	\$4,731.79	\$2,856.74
3	\$3,859.57	\$3,690.70	\$2,168.05	\$5,095.08	\$4,853.52	\$2,925.79
4	\$3,960.12	\$3,774.43	\$2,222.12	\$5,222.30	\$4,978.50	\$2,996.57
5	\$4,063.38	\$3,860.13	\$2,277.58	\$5,352.82	\$5,106.82	\$3,069.14
6	\$4,169.43	\$3,947.85	\$2,334.49	\$5,486.74	\$5,238.57	\$3,143.54
7	\$4,278.34	\$4,037.64	\$2,392.88	\$5,624.14	\$5,373.84	\$3,219.82
8	\$4,390.20	\$4,129.56	\$2,452.78	\$5,765.12	\$5,512.73	\$3,298.02
9	\$4,505.08	\$4,223.64	\$2,514.25	\$5,909.77	\$5,655.34	\$3,378.21
10	\$4,623.07	\$4,319.95	\$2,577.31	\$6,058.20	\$5,801.78	\$3,460.42
11	\$4,744.26	\$4,418.55	\$2,642.02	\$6,210.50	\$5,952.14	\$3,544.72
12	\$4,868.73	\$4,519.48	\$2,708.42	\$6,366.79	\$6,106.54	\$3,631.16
13	\$4,996.58	\$4,622.80	\$2,776.55	\$6,527.16	\$6,265.09	\$3,719.79
14	\$5,127.91	\$4,728.58	\$2,846.47	\$6,691.72	\$6,427.90	\$3,810.67
15	\$5,262.80	\$4,836.88	\$2,918.21	\$6,860.61	\$6,595.09	\$3,903.87
16	\$5,401.36	\$4,947.75	\$2,991.84	\$7,033.91	\$6,766.79	\$3,999.44
17	\$5,543.68	\$5,061.27	\$3,067.39	\$7,211.77	\$6,943.11	\$4,097.44
18	\$5,689.89	\$5,177.49	\$3,144.93	\$7,394.31	\$7,124.19	\$4,197.95
19	\$5,840.08	\$5,296.49	\$3,224.51	\$7,581.64	\$7,310.16	\$4,301.02
20	\$5,994.36	\$5,418.33	\$3,306.17	\$7,773.90	\$7,501.16	\$4,406.73
21						
22						
23						
24						

ECM	School 9 DDC Upgrade	School 10 DDC Upgrade	School 11 DDC Upgrade	School 14 DDC Upgrade	School 15 DDC Upgrade	School 19 DDC Upgrade
Assumed Inflation (Gas, Oil)	2%	2%	2%	2%	2%	2%
Initial Yearly Savings (Gas, Oil)	\$331.54	\$1,439.21	\$646.58	\$420.75	\$2,992.94	\$944.52
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$4,410.45	\$1,113.71	\$557.16	\$258.30	\$1,714.76	\$656.14
Assumed Average Useful Life (Years)	20	20	20	20	20	20
Lifetime Savings	\$126,566.09	\$45,602.63	\$30,681.24	\$17,163.74	\$118,796.83	\$28,537.50
<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>
1	\$4,741.99	\$2,552.92	\$1,203.74	\$679.05	\$4,707.70	\$1,600.66
2	\$4,880.94	\$2,615.11	\$1,233.38	\$695.21	\$4,819.00	\$1,639.24
3	\$5,023.98	\$2,678.89	\$1,263.79	\$711.78	\$4,933.04	\$1,678.78
4	\$5,171.25	\$2,744.28	\$1,294.98	\$728.75	\$5,049.90	\$1,719.32
5	\$5,322.87	\$2,811.34	\$1,326.97	\$746.15	\$5,169.63	\$1,760.87
6	\$5,478.97	\$2,880.10	\$1,359.78	\$763.98	\$5,292.33	\$1,803.47
7	\$5,639.68	\$2,950.61	\$1,393.43	\$782.26	\$5,418.05	\$1,847.15
8	\$5,805.14	\$3,022.92	\$1,427.95	\$800.99	\$5,546.89	\$1,891.93
9	\$5,975.48	\$3,097.08	\$1,463.36	\$820.18	\$5,678.91	\$1,937.84
10	\$6,150.86	\$3,173.13	\$1,499.69	\$839.86	\$5,814.21	\$1,984.90
11	\$6,331.43	\$3,251.12	\$1,536.95	\$860.03	\$5,952.87	\$2,033.16
12	\$6,517.33	\$3,331.11	\$1,575.18	\$880.70	\$6,094.97	\$2,082.65
13	\$6,708.73	\$3,413.15	\$1,614.39	\$901.89	\$6,240.61	\$2,133.38
14	\$6,905.78	\$3,497.29	\$1,654.63	\$923.61	\$6,389.87	\$2,185.40
15	\$7,108.67	\$3,583.59	\$1,695.90	\$945.87	\$6,542.85	\$2,238.75
16	\$7,317.55	\$3,672.11	\$1,738.25	\$968.70	\$6,699.64	\$2,293.45
17	\$7,532.62	\$3,762.90	\$1,781.69	\$992.10	\$6,860.35	\$2,349.54
18	\$7,754.04	\$3,856.03	\$1,826.27	\$1,016.08	\$7,025.08	\$2,407.06
19	\$7,982.02	\$3,951.56	\$1,872.00	\$1,040.67	\$7,193.92	\$2,466.04
20	\$8,216.75	\$4,049.55	\$1,918.93	\$1,065.88	\$7,366.99	\$2,526.54
21						
22						
23						
24						

ECM	School 20 DDC Upgrade	School 21 DDC Upgrade	School 24 DDC Upgrade	School 25 DDC Upgrade	School 27 DDC Upgrade
Assumed Inflation (Gas, Oil)	2%	2%	2%	2%	2%
Initial Yearly Savings (Gas, Oil)	\$1,842.90	\$1,805.10	\$1,385.58	\$1,404.57	\$1,089.99
Assumed Inflation (Electricity)	3%	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$1,563.36	\$1,917.96	\$3,850.36	\$1,221.92	\$2,359.08
Assumed Average Useful Life (Years)	20	20	20	20	20
Lifetime Savings	\$60,946.77	\$66,888.39	\$95,573.93	\$47,016.28	\$62,725.90
<u>Year</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>
1	\$3,406.26	\$3,723.06	\$5,235.94	\$2,626.49	\$3,449.07
2	\$3,490.01	\$3,816.70	\$5,379.16	\$2,691.24	\$3,541.64
3	\$3,575.92	\$3,912.79	\$5,526.40	\$2,757.65	\$3,636.77
4	\$3,664.02	\$4,011.40	\$5,677.78	\$2,825.77	\$3,734.53
5	\$3,754.39	\$4,112.58	\$5,833.41	\$2,895.64	\$3,835.00
6	\$3,847.07	\$4,216.42	\$5,993.41	\$2,967.30	\$3,938.25
7	\$3,942.13	\$4,322.98	\$6,157.92	\$3,040.82	\$4,044.37
8	\$4,039.64	\$4,432.35	\$6,327.05	\$3,116.22	\$4,153.42
9	\$4,139.66	\$4,544.58	\$6,500.95	\$3,193.57	\$4,265.50
10	\$4,242.26	\$4,659.77	\$6,679.74	\$3,272.93	\$4,380.70
11	\$4,347.51	\$4,777.99	\$6,863.58	\$3,354.33	\$4,499.09
12	\$4,455.47	\$4,899.33	\$7,052.59	\$3,437.84	\$4,620.78
13	\$4,566.22	\$5,023.86	\$7,246.94	\$3,523.51	\$4,745.85
14	\$4,679.83	\$5,151.68	\$7,446.78	\$3,611.40	\$4,874.40
15	\$4,796.38	\$5,282.88	\$7,652.26	\$3,701.57	\$5,006.53
16	\$4,915.96	\$5,417.55	\$7,863.54	\$3,794.08	\$5,142.35
17	\$5,038.64	\$5,555.78	\$8,080.80	\$3,889.00	\$5,281.95
18	\$5,164.50	\$5,697.68	\$8,304.20	\$3,986.39	\$5,425.44
19	\$5,293.63	\$5,843.33	\$8,533.93	\$4,086.32	\$5,572.94
20	\$5,426.11	\$5,992.85	\$8,770.16	\$4,188.84	\$5,724.56
21					
22					
23					
24					

School 1 & 26 DDC Upgrade		School 2 DDC Upgrade		School 3 DDC Upgrade		School 4 DDC Upgrade		School 5 DDC Upgrade		School 8 DDC Upgrade	
Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow
0	\$ (116,676)	0	\$ (117,289)	0	\$ (48,480)	0	\$ (153,484)	0	\$ (136,201)	0	\$ (101,056)
1	\$3,666.32	1	\$2,063.99	1	\$2,063.99	1	\$4,850.21	1	\$4,613.21	1	\$2,789.39
2	\$3,761.66	2	\$2,115.35	2	\$2,115.35	2	\$4,971.08	2	\$4,731.79	2	\$2,856.74
3	\$3,859.57	3	\$2,168.05	3	\$2,168.05	3	\$5,095.08	3	\$4,853.52	3	\$2,925.79
4	\$3,960.12	4	\$2,222.12	4	\$2,222.12	4	\$5,222.30	4	\$4,978.50	4	\$2,996.57
5	\$4,063.38	5	\$2,277.58	5	\$2,277.58	5	\$5,352.82	5	\$5,106.82	5	\$3,069.14
6	\$4,169.43	6	\$2,334.49	6	\$2,334.49	6	\$5,486.74	6	\$5,238.57	6	\$3,143.54
7	\$4,278.34	7	\$2,392.88	7	\$2,392.88	7	\$5,624.14	7	\$5,373.84	7	\$3,219.82
8	\$4,390.20	8	\$2,452.78	8	\$2,452.78	8	\$5,765.12	8	\$5,512.73	8	\$3,298.02
9	\$4,505.08	9	\$2,514.25	9	\$2,514.25	9	\$5,909.77	9	\$5,655.34	9	\$3,378.21
10	\$4,623.07	10	\$2,577.31	10	\$2,577.31	10	\$6,058.20	10	\$5,801.78	10	\$3,460.42
11	\$4,744.26	11	\$2,642.02	11	\$2,642.02	11	\$6,210.50	11	\$5,952.14	11	\$3,544.72
12	\$4,868.73	12	\$2,708.42	12	\$2,708.42	12	\$6,366.79	12	\$6,106.54	12	\$3,631.16
13	\$4,996.58	13	\$2,776.55	13	\$2,776.55	13	\$6,527.16	13	\$6,265.09	13	\$3,719.79
14	\$5,127.91	14	\$2,846.47	14	\$2,846.47	14	\$6,691.72	14	\$6,427.90	14	\$3,810.67
15	\$5,262.80	15	\$2,918.21	15	\$2,918.21	15	\$6,860.61	15	\$6,595.09	15	\$3,903.87
16	\$5,401.36	16	\$2,991.84	16	\$2,991.84	16	\$7,033.91	16	\$6,766.79	16	\$3,999.44
17	\$5,543.68	17	\$3,067.39	17	\$3,067.39	17	\$7,211.77	17	\$6,943.11	17	\$4,097.44
18	\$5,689.89	18	\$3,144.93	18	\$3,144.93	18	\$7,394.31	18	\$7,124.19	18	\$4,197.95
19	\$5,840.08	19	\$3,224.51	19	\$3,224.51	19	\$7,581.64	19	\$7,310.16	19	\$4,301.02
20	\$5,994.36	20	\$3,306.17	20	\$3,306.17	20	\$7,773.90	20	\$7,501.16	20	\$4,406.73
21		21									
22		22									
23		23									
24		24									
IRR	-1.77%	IRR	-6.27%	IRR	0.76%	IRR	-1.82%	IRR	-1.17%	IRR	-2.98%
NPV	(\$47,962.03)	NPV	(\$78,995.96)	NPV	(\$10,186.22)	NPV	(\$63,470.75)	NPV	(\$49,975.31)	NPV	(\$49,654.25)
ARO	-3.52%	ARO	-4.91%	ARO	-2.41%	ARO	-3.51%	ARO	-3.28%	ARO	-3.91%

School 9 DDC Upgrade		School 10 DDC Upgrade		School 11 DDC Upgrade		School 14 DDC Upgrade		School 15 DDC Upgrade		School 19 DDC Upgrade	
Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow
0	\$ (150,219)	0	\$ (79,989)	0	\$ (48,406)	0	\$ (22,454)	0	\$ (150,361)	0	\$ (47,618)
1	\$4,741.99	1	\$2,552.92	1	\$1,203.74	1	\$679.05	1	\$4,707.70	1	\$1,600.66
2	\$4,880.94	2	\$2,615.11	2	\$1,233.38	2	\$695.21	2	\$4,819.00	2	\$1,639.24
3	\$5,023.98	3	\$2,678.89	3	\$1,263.79	3	\$711.78	3	\$4,933.04	3	\$1,678.78
4	\$5,171.25	4	\$2,744.28	4	\$1,294.98	4	\$728.75	4	\$5,049.90	4	\$1,719.32
5	\$5,322.87	5	\$2,811.34	5	\$1,326.97	5	\$746.15	5	\$5,169.63	5	\$1,760.87
6	\$5,478.97	6	\$2,880.10	6	\$1,359.78	6	\$763.98	6	\$5,292.33	6	\$1,803.47
7	\$5,639.68	7	\$2,950.61	7	\$1,393.43	7	\$782.26	7	\$5,418.05	7	\$1,847.15
8	\$5,805.14	8	\$3,022.92	8	\$1,427.95	8	\$800.99	8	\$5,546.89	8	\$1,891.93
9	\$5,975.48	9	\$3,097.08	9	\$1,463.36	9	\$820.18	9	\$5,678.91	9	\$1,937.84
10	\$6,150.86	10	\$3,173.13	10	\$1,499.69	10	\$839.86	10	\$5,814.21	10	\$1,984.90
11	\$6,331.43	11	\$3,251.12	11	\$1,536.95	11	\$860.03	11	\$5,952.87	11	\$2,033.16
12	\$6,517.33	12	\$3,331.11	12	\$1,575.18	12	\$880.70	12	\$6,094.97	12	\$2,082.65
13	\$6,708.73	13	\$3,413.15	13	\$1,614.39	13	\$901.89	13	\$6,240.61	13	\$2,133.38
14	\$6,905.78	14	\$3,497.29	14	\$1,654.63	14	\$923.61	14	\$6,389.87	14	\$2,185.40
15	\$7,108.67	15	\$3,583.59	15	\$1,695.90	15	\$945.87	15	\$6,542.85	15	\$2,238.75
16	\$7,317.55	16	\$3,672.11	16	\$1,738.25	16	\$968.70	16	\$6,699.64	16	\$2,293.45
17	\$7,532.62	17	\$3,762.90	17	\$1,781.69	17	\$992.10	17	\$6,860.35	17	\$2,349.54
18	\$7,754.04	18	\$3,856.03	18	\$1,826.27	18	\$1,016.08	18	\$7,025.08	18	\$2,407.06
19	\$7,982.02	19	\$3,951.56	19	\$1,872.00	19	\$1,040.67	19	\$7,193.92	19	\$2,466.04
20	\$8,216.75	20	\$4,049.55	20	\$1,918.93	20	\$1,065.88	20	\$7,366.99	20	\$2,526.54
IRR	-1.45%	IRR	-1.79%	IRR	-3.75%	IRR	-2.28%	IRR	-2.01%	IRR	-1.38%
NPV	(\$58,701.76)	NPV	(\$32,850.91)	NPV	(\$26,125.61)	NPV	(\$9,979.57)	NPV	(\$64,009.52)	NPV	(\$18,134.15)
ARO	-3.51%	ARO	-3.48%	ARO	-4.18%	ARO	-3.64%	ARO	-3.54%	ARO	-3.31%

School 20 DDC Upgrade		School 21 DDC Upgrade		School 24 DDC Upgrade		School 25 DDC Upgrade		School 27 DDC Upgrade	
Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow
0	\$ (113,434)	0	\$ (141,364)	0	\$ (137,655)	0	\$ (99,095)	0	\$ (141,924)
1	\$3,406.26	1	\$3,723.06	1	\$5,235.94	1	\$2,626.49	1	\$3,449.07
2	\$3,490.01	2	\$3,816.70	2	\$5,379.16	2	\$2,691.24	2	\$3,541.64
3	\$3,575.92	3	\$3,912.79	3	\$5,526.40	3	\$2,757.65	3	\$3,636.77
4	\$3,664.02	4	\$4,011.40	4	\$5,677.78	4	\$2,825.77	4	\$3,734.53
5	\$3,754.39	5	\$4,112.58	5	\$5,833.41	5	\$2,895.64	5	\$3,835.00
6	\$3,847.07	6	\$4,216.42	6	\$5,993.41	6	\$2,967.30	6	\$3,938.25
7	\$3,942.13	7	\$4,322.98	7	\$6,157.92	7	\$3,040.82	7	\$4,044.37
8	\$4,039.64	8	\$4,432.35	8	\$6,327.05	8	\$3,116.22	8	\$4,153.42
9	\$4,139.66	9	\$4,544.58	9	\$6,500.95	9	\$3,193.57	9	\$4,265.50
10	\$4,242.26	10	\$4,659.77	10	\$6,679.74	10	\$3,272.93	10	\$4,380.70
11	\$4,347.51	11	\$4,777.99	11	\$6,863.58	11	\$3,354.33	11	\$4,499.09
12	\$4,455.47	12	\$4,899.33	12	\$7,052.59	12	\$3,437.84	12	\$4,620.78
13	\$4,566.22	13	\$5,023.86	13	\$7,246.94	13	\$3,523.51	13	\$4,745.85
14	\$4,679.83	14	\$5,151.68	14	\$7,446.78	14	\$3,611.40	14	\$4,874.40
15	\$4,796.38	15	\$5,282.88	15	\$7,652.26	15	\$3,701.57	15	\$5,006.53
16	\$4,915.96	16	\$5,417.55	16	\$7,863.54	16	\$3,794.08	16	\$5,142.35
17	\$5,038.64	17	\$5,555.78	17	\$8,080.80	17	\$3,889.00	17	\$5,281.95
18	\$5,164.50	18	\$5,697.68	18	\$8,304.20	18	\$3,986.39	18	\$5,425.44
19	\$5,293.63	19	\$5,843.33	19	\$8,533.93	19	\$4,086.32	19	\$5,572.94
20	\$5,426.11	20	\$5,992.85	20	\$8,770.16	20	\$4,188.84	20	\$5,724.56
IRR	-2.27%	IRR	-3.26%	IRR	-0.03%	IRR	-3.25%	IRR	-3.74%
NPV	(\$50,409.32)	NPV	(\$72,123.57)	NPV	(\$38,328.97)	NPV	(\$50,470.14)	NPV	(\$76,794.72)
ARO	-3.66%	ARO	-4.03%	ARO	-2.86%	ARO	-4.02%	ARO	-4.24%

ECM	School 2 Condensing Boiler	School 10 Condensing Boiler
Assumed Inflation (Gas, Oil)	2%	2%
Initial Yearly Savings (Gas, Oil)	\$19,276.38	\$6,812.10
Assumed Inflation (Electricity)	3%	3%
Initial Yearly Savings (Electricity)	\$0.00	\$0.00
Annual Maintenance Cost Savings	\$3,000.00	\$3,000.00
Assumed Average Useful Life (Years)	24	24
Lifetime Savings	\$586,423.38	\$162,804.49
<u>Year</u>	<u>Annual Savings</u>	<u>Annual Savings</u>
1	\$19,276.38	\$9,812.10
2	\$19,661.91	\$9,948.34
3	\$20,055.15	\$10,087.31
4	\$20,456.25	\$10,229.06
5	\$20,865.37	\$10,373.64
6	\$21,282.68	\$10,521.11
7	\$21,708.33	\$10,671.53
8	\$22,142.50	\$10,824.96
9	\$22,585.35	\$10,981.46
10	\$23,037.06	\$11,141.09
11	\$23,497.80	\$11,303.91
12	\$23,967.76	\$11,469.99
13	\$24,447.11	\$11,639.39
14	\$24,936.05	\$11,812.18
15	\$25,434.77	\$11,988.42
16	\$25,943.47	\$12,168.19
17	\$26,462.34	\$12,351.55
18	\$26,991.59	\$12,538.58
19	\$27,531.42	\$12,729.36
20	\$28,082.05	\$12,923.94
21	\$28,643.69	\$13,122.42
22	\$29,216.56	\$13,324.87
23	\$29,800.89	\$13,531.37
24	\$30,396.91	\$13,742.00

IRR, NPV, AROI - HVAC EC

School 2 Condensing Boiler		School 10 Condensing Boiler	
Year	Cash Flow	Year	Cash Flow
0	(\$333,178.00)	0	(\$157,000.00)
1	\$19,276.38	1	\$9,812.10
2	\$19,661.91	2	\$9,948.34
3	\$20,055.15	3	\$10,087.31
4	\$20,456.25	4	\$10,229.06
5	\$20,865.37	5	\$10,373.64
6	\$21,282.68	6	\$10,521.11
7	\$21,708.33	7	\$10,671.53
8	\$22,142.50	8	\$10,824.96
9	\$22,585.35	9	\$10,981.46
10	\$23,037.06	10	\$11,141.09
11	\$23,497.80	11	\$11,303.91
12	\$23,967.76	12	\$11,469.99
13	\$24,447.11	13	\$11,639.39
14	\$24,936.05	14	\$11,812.18
15	\$25,434.77	15	\$11,988.42
16	\$25,943.47	16	\$12,168.19
17	\$26,462.34	17	\$12,351.55
18	\$26,991.59	18	\$12,538.58
19	\$27,531.42	19	\$12,729.36
20	\$28,082.05	20	\$12,923.94
21	\$28,643.69	21	\$13,122.42
22	\$29,216.56	22	\$13,324.87
23	\$29,800.89	23	\$13,531.37
24	\$30,396.91	24	\$13,742.00
IRR	0.01%	IRR	3.54%
NPV	(\$70,752.59)	NPV	\$8,388.45
AROI	-0.88%	AROI	1.25%

ECM	School 8 Steam Boiler	School 14 Steam Boiler	School 21 Steam Boiler	School 24 Steam Boiler
Assumed Inflation (Gas, Oil)	2%	2%	2%	2%
Initial Yearly Savings (Gas, Oil)	\$8,115.30	\$1,110.78	\$4,124.40	\$3,952.20
Assumed Inflation (Electricity)	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$0.00	\$0.00	\$0.00	\$0.00
Annual Maintenance Cost Savings	\$0.00	\$0.00	\$0.00	\$0.00
Assumed Average Useful Life (Years)	24	24	24	24
Lifetime Savings	\$246,882.54	\$33,792.00	\$125,471.93	\$120,233.28
<u>Year</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>
1	\$8,115.30	\$1,110.78	\$4,124.40	\$3,952.20
2	\$8,277.61	\$1,133.00	\$4,206.89	\$4,031.24
3	\$8,443.16	\$1,155.66	\$4,291.03	\$4,111.87
4	\$8,612.02	\$1,178.77	\$4,376.85	\$4,194.11
5	\$8,784.26	\$1,202.34	\$4,464.38	\$4,277.99
6	\$8,959.95	\$1,226.39	\$4,553.67	\$4,363.55
7	\$9,139.15	\$1,250.92	\$4,644.74	\$4,450.82
8	\$9,321.93	\$1,275.94	\$4,737.64	\$4,539.84
9	\$9,508.37	\$1,301.46	\$4,832.39	\$4,630.63
10	\$9,698.53	\$1,327.48	\$4,929.04	\$4,723.24
11	\$9,892.51	\$1,354.03	\$5,027.62	\$4,817.71
12	\$10,090.36	\$1,381.12	\$5,128.17	\$4,914.06
13	\$10,292.16	\$1,408.74	\$5,230.74	\$5,012.35
14	\$10,498.01	\$1,436.91	\$5,335.35	\$5,112.59
15	\$10,707.97	\$1,465.65	\$5,442.06	\$5,214.84
16	\$10,922.13	\$1,494.96	\$5,550.90	\$5,319.14
17	\$11,140.57	\$1,524.86	\$5,661.92	\$5,425.52
18	\$11,363.38	\$1,555.36	\$5,775.16	\$5,534.03
19	\$11,590.65	\$1,586.47	\$5,890.66	\$5,644.71
20	\$11,822.46	\$1,618.20	\$6,008.47	\$5,757.61
21	\$12,058.91	\$1,650.56	\$6,128.64	\$5,872.76
22	\$12,300.09	\$1,683.57	\$6,251.21	\$5,990.22
23	\$12,546.09	\$1,717.24	\$6,376.24	\$6,110.02
24	\$12,797.01	\$1,751.59	\$6,503.76	\$6,232.22

IRR, NPV, AROI - HVAC ECRMS

School 8 Steam Boiler		School 14 Steam Boiler		School 21 Steam Boiler		School 24 Steam Boiler	
Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow
0	(\$136,012.00)	0	(\$61,008.00)	0	(\$227,649.88)	0	(\$227,649.88)
1	\$8,115.30	1	\$1,110.78	1	\$4,124.40	1	\$3,952.20
2	\$8,277.61	2	\$1,133.00	2	\$4,206.89	2	\$4,031.24
3	\$8,443.16	3	\$1,155.66	3	\$4,291.03	3	\$4,111.87
4	\$8,612.02	4	\$1,178.77	4	\$4,376.85	4	\$4,194.11
5	\$8,784.26	5	\$1,202.34	5	\$4,464.38	5	\$4,277.99
6	\$8,959.95	6	\$1,226.39	6	\$4,553.67	6	\$4,363.55
7	\$9,139.15	7	\$1,250.92	7	\$4,644.74	7	\$4,450.82
8	\$9,321.93	8	\$1,275.94	8	\$4,737.64	8	\$4,539.84
9	\$9,508.37	9	\$1,301.46	9	\$4,832.39	9	\$4,630.63
10	\$9,698.53	10	\$1,327.48	10	\$4,929.04	10	\$4,723.24
11	\$9,892.51	11	\$1,354.03	11	\$5,027.62	11	\$4,817.71
12	\$10,090.36	12	\$1,381.12	12	\$5,128.17	12	\$4,914.06
13	\$10,292.16	13	\$1,408.74	13	\$5,230.74	13	\$5,012.35
14	\$10,498.01	14	\$1,436.91	14	\$5,335.35	14	\$5,112.59
15	\$10,707.97	15	\$1,465.65	15	\$5,442.06	15	\$5,214.84
16	\$10,922.13	16	\$1,494.96	16	\$5,550.90	16	\$5,319.14
17	\$11,140.57	17	\$1,524.86	17	\$5,661.92	17	\$5,425.52
18	\$11,363.38	18	\$1,555.36	18	\$5,775.16	18	\$5,534.03
19	\$11,590.65	19	\$1,586.47	19	\$5,890.66	19	\$5,644.71
20	\$11,822.46	20	\$1,618.20	20	\$6,008.47	20	\$5,757.61
21	\$12,058.91	21	\$1,650.56	21	\$6,128.64	21	\$5,872.76
22	\$12,300.09	22	\$1,683.57	22	\$6,251.21	22	\$5,990.22
23	\$12,546.09	23	\$1,717.24	23	\$6,376.24	23	\$6,110.02
24	\$12,797.01	24	\$1,751.59	24	\$6,503.76	24	\$6,232.22
IRR	4.97%	IRR	-6.45%	IRR	-6.49%	IRR	-6.79%
NPV	\$33,399.31	NPV	(\$41,317.54)	NPV	(\$154,537.90)	NPV	(\$157,590.43)
AROI	1.80%	AROI	-3.18%	AROI	-3.19%	AROI	-3.26%

ECM	School 11 Window Upgrade	School 14 Window Upgrade	School 19 Window Upgrade	School 21 Window Upgrade
Assumed Inflation (Gas, Oil)	2%	2%	2%	2%
Initial Yearly Savings (Gas, Oil)	\$2,913.60	\$3,045.74	\$4,363.03	\$2,777.37
Assumed Inflation (Electricity)	3%	3%	3%	3%
Initial Yearly Savings (Electricity)	\$0.00	\$0.00	\$0.00	\$0.00
Assumed Average Useful Life (Years)	20	20	20	20
Lifetime Savings	\$175,987.36	\$183,968.70	\$263,535.80	\$167,758.83
<u>Year</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>	<u>Annual Savings</u>
1	\$2,913.60	\$3,045.74	\$4,363.03	\$2,777.37
2	\$2,971.87	\$3,106.65	\$4,450.29	\$2,832.92
3	\$3,031.31	\$3,168.79	\$4,539.30	\$2,889.58
4	\$3,091.94	\$3,232.16	\$4,630.08	\$2,947.37
5	\$3,153.78	\$3,296.81	\$4,722.69	\$3,006.32
6	\$3,216.85	\$3,362.74	\$4,817.14	\$3,066.44
7	\$3,281.19	\$3,430.00	\$4,913.48	\$3,127.77
8	\$3,346.81	\$3,498.60	\$5,011.75	\$3,190.33
9	\$3,413.75	\$3,568.57	\$5,111.99	\$3,254.13
10	\$3,482.02	\$3,639.94	\$5,214.23	\$3,319.22
11	\$3,551.66	\$3,712.74	\$5,318.51	\$3,385.60
12	\$3,622.70	\$3,786.99	\$5,424.88	\$3,453.31
13	\$3,695.15	\$3,862.73	\$5,533.38	\$3,522.38
14	\$3,769.06	\$3,939.99	\$5,644.05	\$3,592.83
15	\$3,844.44	\$4,018.79	\$5,756.93	\$3,664.68
16	\$3,921.33	\$4,099.16	\$5,872.07	\$3,737.98
17	\$3,999.75	\$4,181.15	\$5,989.51	\$3,812.74
18	\$4,079.75	\$4,264.77	\$6,109.30	\$3,888.99
19	\$4,161.34	\$4,350.07	\$6,231.48	\$3,966.77
20	\$4,244.57	\$4,437.07	\$6,356.11	\$4,046.11
21	\$4,329.46	\$4,525.81	\$6,483.24	\$4,127.03
22	\$4,416.05	\$4,616.32	\$6,612.90	\$4,209.57
23	\$4,504.37	\$4,708.65	\$6,745.16	\$4,293.76
24	\$4,594.46	\$4,802.82	\$6,880.06	\$4,379.64
25	\$4,686.35	\$4,898.88	\$7,017.66	\$4,467.23
26	\$4,780.07	\$4,996.86	\$7,158.02	\$4,556.57
27	\$4,875.67	\$5,096.80	\$7,301.18	\$4,647.71
28	\$4,973.19	\$5,198.73	\$7,447.20	\$4,740.66
29	\$5,072.65	\$5,302.71	\$7,596.14	\$4,835.47
30	\$5,174.11	\$5,408.76	\$7,748.07	\$4,932.18
31	\$5,277.59	\$5,516.94	\$7,903.03	\$5,030.83
32	\$5,383.14	\$5,627.27	\$8,061.09	\$5,131.44
33	\$5,490.80	\$5,739.82	\$8,222.31	\$5,234.07
34	\$5,600.62	\$5,854.62	\$8,386.76	\$5,338.75
35	\$5,712.63	\$5,971.71	\$8,554.49	\$5,445.53
36	\$5,826.88	\$6,091.14	\$8,725.58	\$5,554.44
37	\$5,943.42	\$6,212.97	\$8,900.09	\$5,665.53
38	\$6,062.29	\$6,337.22	\$9,078.10	\$5,778.84
39	\$6,183.53	\$6,463.97	\$9,259.66	\$5,894.42
40	\$6,307.21	\$6,593.25	\$9,444.85	\$6,012.30

School 11 Window Upgrade		School 14 Window Upgrade		School 19 Window Upgrade		School 21 Window Upgrade	
Year	Cash Flow	Year	Cash Flow	Year	Cash Flow	Year	Cash Flow
0	\$ (408,308)	0	\$ (231,711)	0	\$ (288,377)	0	\$ (670,163)
1	\$2,913.60	1	\$3,045.74	1	\$4,363.03	1	\$2,777.37
2	\$2,971.87	2	\$3,106.65	2	\$4,450.29	2	\$2,832.92
3	\$3,031.31	3	\$3,168.79	3	\$4,539.30	3	\$2,889.58
4	\$3,091.94	4	\$3,232.16	4	\$4,630.08	4	\$2,947.37
5	\$3,153.78	5	\$3,296.81	5	\$4,722.69	5	\$3,006.32
6	\$3,216.85	6	\$3,362.74	6	\$4,817.14	6	\$3,066.44
7	\$3,281.19	7	\$3,430.00	7	\$4,913.48	7	\$3,127.77
8	\$3,346.81	8	\$3,498.60	8	\$5,011.75	8	\$3,190.33
9	\$3,413.75	9	\$3,568.57	9	\$5,111.99	9	\$3,254.13
10	\$3,482.02	10	\$3,639.94	10	\$5,214.23	10	\$3,319.22
11	\$3,551.66	11	\$3,712.74	11	\$5,318.51	11	\$3,385.60
12	\$3,622.70	12	\$3,786.99	12	\$5,424.88	12	\$3,453.31
13	\$3,695.15	13	\$3,862.73	13	\$5,533.38	13	\$3,522.38
14	\$3,769.06	14	\$3,939.99	14	\$5,644.05	14	\$3,592.83
15	\$3,844.44	15	\$4,018.79	15	\$5,756.93	15	\$3,664.68
16	\$3,921.33	16	\$4,099.16	16	\$5,872.07	16	\$3,737.98
17	\$3,999.75	17	\$4,181.15	17	\$5,989.51	17	\$3,812.74
18	\$4,079.75	18	\$4,264.77	18	\$6,109.30	18	\$3,888.99
19	\$4,161.34	19	\$4,350.07	19	\$6,231.48	19	\$3,966.77
20	\$4,244.57	20	\$4,437.07	20	\$6,356.11	20	\$4,046.11
IRR	-12.46%	IRR	-8.67%	IRR	-7.73%	IRR	-15.51%
NPV	(\$356,658.96)	NPV	(\$177,719.70)	NPV	(\$211,034.74)	NPV	(\$620,928.86)
ARO	-5.95%	ARO	-5.35%	ARO	-5.15%	ARO	-6.25%

Paterson Board of Ed
(Minimum Site Wind Speed @40m - 7.0 mph)

Annual kWh 55,334
Engineer's Opinion of Probable Cost \$151,000.00

Assumptions
Annual System Degredation 0.50%
Annual Utility Inflation 3.00%
Annual Maintenance Costs \$0.02/kWh Production
REC Factor 0
REIP Incentive 0
0

Year	Utility Price	Annual Wind kWh Production	Utility Savings	Renewable Energy Credits (RECs)	Renewable Energy Incentive Program (REIP)	Maintenance Costs	Annual Cash Flow	Cumulative Cash Flow
1	0.1500	55,334.0	\$8,300.1	\$0	\$0	(\$1,107)	\$7,193.4	\$7,193.4
2	0.1545	55,057.3	\$8,506.4	\$0	\$0	(\$1,101)	\$7,405.2	\$14,598.6
3	0.1591	54,782.0	\$8,717.7	\$0	\$0	(\$1,096)	\$7,622.1	\$22,220.7
4	0.1639	54,508.1	\$8,934.4	\$0	\$0	(\$1,090)	\$7,844.2	\$30,064.9
5	0.1688	54,235.6	\$9,156.4	\$0	\$0	(\$1,085)	\$8,071.7	\$38,136.6
6	0.1739	53,964.4	\$9,383.9	\$0	\$0	(\$1,079)	\$8,304.6	\$46,441.3
7	0.1791	53,694.6	\$9,617.1	\$0	\$0	(\$1,074)	\$8,543.2	\$54,984.5
8	0.1845	53,426.1	\$9,856.1	\$0	\$0	(\$1,069)	\$8,787.6	\$63,772.1
9	0.1900	53,159.0	\$10,101.0	\$0	\$0	(\$1,063)	\$9,037.9	\$72,809.9
10	0.1957	52,893.2	\$10,352.0	\$0	\$0	(\$1,058)	\$9,294.2	\$82,104.1
11	0.2016	52,628.7	\$10,609.3	\$0	\$0	(\$1,053)	\$9,556.7	\$91,660.8
12	0.2076	52,365.6	\$10,872.9	\$0	\$0	(\$1,047)	\$9,825.6	\$101,486.5
13	0.2139	52,103.8	\$11,143.1	\$0	\$0	(\$1,042)	\$10,101.0	\$111,587.5
14	0.2203	51,843.2	\$11,420.0	\$0	\$0	(\$1,037)	\$10,383.2	\$121,970.7
15	0.2269	51,584.0	\$11,703.8	\$0	\$0	(\$1,032)	\$10,672.1	\$132,642.8
16	0.2337	51,326.1	\$11,994.7	\$0	\$0	(\$1,027)	\$10,968.1	\$143,610.9
17	0.2407	51,069.5	\$12,292.7	\$0	\$0	(\$1,021)	\$11,271.3	\$154,882.3
18	0.2479	50,814.1	\$12,598.2	\$0	\$0	(\$1,016)	\$11,581.9	\$166,464.2
19	0.2554	50,560.1	\$12,911.3	\$0	\$0	(\$1,011)	\$11,900.1	\$178,364.3
20	0.2630	50,307.3	\$13,232.1	\$0	\$0	(\$1,006)	\$12,226.0	\$190,590.2
21	0.2709	50,055.7	\$13,560.9	\$0	\$0	(\$1,001)	\$12,559.8	\$203,150.0
22	0.2790	49,805.4	\$13,897.9	\$0	\$0	(\$996)	\$12,901.8	\$216,051.9
23	0.2874	49,556.4	\$14,243.3	\$0	\$0	(\$991)	\$13,252.2	\$229,304.0
24	0.2960	49,308.6	\$14,597.2	\$0	\$0	(\$986)	\$13,611.1	\$242,915.1
25	0.3049	49,062.1	\$14,960.0	\$0	\$0	(\$981)	\$13,978.7	\$256,893.8

ECM	Typical Wind Turbine
Assumed Inflation (Gas, Oil)	2%
Initial Yearly Savings (Gas, Oil)	\$0.00
Assumed Inflation (Electricity)	2%
Initial Yearly Savings (Electricity)	\$8,300.10
Annual Maintenance Cost Savings	-\$1,107.00
Assumed Average Useful Life (Years)	24
Lifetime Savings	\$232,191.38
<u>Year</u>	<u>Annual Savings</u>
1	\$7,193.10
2	\$7,375.70
3	\$7,562.32
4	\$7,753.05
5	\$7,947.97
6	\$8,147.18
7	\$8,350.77
8	\$8,558.84
9	\$8,771.49
10	\$8,988.82
11	\$9,210.92
12	\$9,437.92
13	\$9,669.91
14	\$9,907.00
15	\$10,149.31
16	\$10,396.94
17	\$10,650.03
18	\$10,908.69
19	\$11,173.03
20	\$11,443.19
21	\$11,719.30
22	\$12,001.47
23	\$12,289.86
24	\$12,584.59

IRR, NPV, AROI - HVAC ECRMS

Typical Wind Turbine	
Year	Cash Flow
0	(\$151,000.00)
1	\$7,193.10
2	\$7,375.70
3	\$7,562.32
4	\$7,753.05
5	\$7,947.97
6	\$8,147.18
7	\$8,350.77
8	\$8,558.84
9	\$8,771.49
10	\$8,988.82
11	\$9,210.92
12	\$9,437.92
13	\$9,669.91
14	\$9,907.00
15	\$10,149.31
16	\$10,396.94
17	\$10,650.03
18	\$10,908.69
19	\$11,173.03
20	\$11,443.19
21	\$11,719.30
22	\$12,001.47
23	\$12,289.86
24	\$12,584.59
IRR	3.40%
NPV	\$7,323.17
AROI	0.60%