CHERRY HILL
PUBLIC SCHOOLS

LOCAL GOVERNMENT ENERGY AUDIT PROGRAM: ENERGY AUDIT REPORT

PREPARED FOR:

CHERRY HILL PUBLIC SCHOOLS
MARLKRESS FACILITY
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CHERRY HILL, NJ 08003
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I. EXECUTIVE SUMMARY

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

Cherry Hill
Marlkress Facility
1155 Marlkress Road
Cherry Hill, NJ 08003

Municipal Contact Person: James Devereaux
Facility Contact Person: Kevin Larsen

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

The annual energy costs at this facility are as follows:

Electricity	$ 18,439
Fuel Oil #2	$ 10,226
Total	$ 28,665

The potential annual energy cost savings for each energy conservation measure (ECM) and renewable energy measure (REM) are shown below in Table 1. Be aware that the ECM's and REM's are not additive because of the interrelation of some of the measures. This audit is consistent with an ASHRAE level 2 audit. The cost and savings for each measure is ± 20%. The evaluations are based on engineering estimations and industry standard calculation methods. More detailed analyses would require engineering simulation models, hard equipment specifications, and contractor bid pricing.

Table 1
Financial Summary Table

ENERGY CONSERVATION MEASURES (ECM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST[A]**	**ANNUAL SAVINGS[B]**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
ECM #1	Computer Monitor Replacement	$1,500	$514	2.9	71.3%
ECM #2	Window AC Unit Replacement	$625	$94	6.6	50.4%
ECM #3	AC Unit Replacement	$12,470	$276	45.2	-55.7%
ECM #4	Lighting Upgrade	$15,648	$5,427	2.9	420.2%
ECM #5	Lighting Controls	$3,270	$1,514	2.2	594.5%
RENEWABLE ENERGY MEASURES (REM's)					
ECM NO.	**DESCRIPTION**	**NET INSTALLATION COST**	**ANNUAL SAVINGS**	**SIMPLE PAYBACK (Yrs)**	**SIMPLE LIFETIME ROI**
REM #1	Solor PV System	$125,120	$9,446	13.2	88.7%

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

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

Table 2
Estimated Energy Savings Summary Table

ENERGY CONSERVATION MEASURES (ECM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
ECM #1	Computer Monitor Replacement	0.8	3,276	0
ECM #2	Window AC Unit Replacement	0.4	522	0
ECM #3	AC Unit Replacement	1.9	1,536	0
ECM #4	Lighting Upgrade	7.3	30,999	0
ECM #5	Lighting Controls	0.0	9,175	0
RENEWABLE ENERGY MEASURES (REM's)				
ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECTRIC DEMAND (KW)	ELECTRIC CONSUMPTION (KWH)	NATURAL GAS (THERMS)
REM #1	Solor PV System	12.7	18,637	0
Notes:	A. Demand Savings for Renewable Energy Measures fluctuate with the seasons and are estimated based on the demand the Photovoltaic System will produce.			

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

- **ECM #1:** Computer Monitor Replacement
- **ECM #2:** Window AC Unit Replacement
- **ECM #4:** Lighting Upgrade
- **ECM #5:** Lighting Controls

The ECMs above represent investments that can be fully funded simply by the energy savings. These ECMs provide instantaneous value for the facility by reducing the operating costs and improving overall function of the building operations. The CRT to LCD monitor replacement provides approximately three to four times less energy consumption while at the same time providing other benefits such as better picture quality, desk space, and overall functionality. Upgrades such as the lighting upgrades not only save energy, but also provide better quality light and help to standardize the district's replacement bulbs and ballasts to simplify replacement orders and maintenance. Lighting Controls provide very fast paybacks when considering many of the spaces are often lit for far more hours than the spaces are occupied. New window AC units that replace older units throughout the transportation administration office provide energy savings as well as improved noise levels within the office space.

In addition to the fast payback ECMs, CEG recommends implementing ECMs with longer paybacks where the equipment is at the end of its rated life and the district is already considering replacement of that equipment. The longer payback ECMs such as the AC unit replacements is sometimes difficult to justify the up-front cost based on the energy savings alone. Installed costs are much easier to justify when looking at the net increase in installed cost for high efficiency equipment versus standard efficiency. It is important to note that the calculations for the equipment replacements is an estimate for the total installed cost without any "avoided costs" included. When equipment is replaced due to end of life cycle, the savings from the purchase of high efficiency equipment over standard efficiency equipment become justified much more easily. It is highly recommended to utilize high efficiency units for all future equipment replacement at the Marlkress facilities.

A solar photovoltaic (PV) system installation was evaluated for this site. Based on the optimal position of the building and direction of the roofs, it was determined that the garage showed the best potential for a solar PV system installation. A solar PV system could provide a 6.2% internal rate of return for a $125,000 project. REMs such as this should be considered as investments of capital for the school district. Inherently solar PV systems do not provide additional savings through "avoided cost," however the investment in renewable can be very financially beneficial none the less. The solar PV system calculation is based on a 100% owner purchased system. If grants become available as well as additional funding, a solar PV system could prove to become an even greater investment for the BOE.

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

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

2. Maintain all weather stripping on windows and doors.

3. Clean all light fixtures to maximize light output and limit the use of task lighting.

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

5. Turn off computer monitors and set computers to sleep when not being used. Computer monitors and computers are becoming one of the largest energy consumers in buildings today. Set computers to sleep when not being used and automatically turn off the computer monitors. Do not set computer monitors to "screen saver" mode which saves the screen life, not energy.

6. Repair back draft damper on boiler flue duct to limit excess air pulled from boiler room, and to prevent flue gases being introduced into mechanical room on boiler startup.

7. Implement a boiler shut down as part of regular maintenance in the late spring / early summer. It was noted that the boiler for the garage building was maintaining temperature at the time of the survey in late June. Boiler operation in the summer months allows for heat loss that provides no benefit to the facility.

8. Allow the data center temperature in the IT office to be as high as acceptable for the equipment being cooled. Colder room temperatures require more energy from the AC system compressor to provide the same capacity of cooling. In addition energy is wasted on over dehumidification when room temperatures are lower. Higher room temps such as 75°F – 80°F minimize these affects and causes less wear on the AC system improving reliability.

Overall, the Marlkress facilities as a whole is estimated to be average with respect to its energy efficiency compared to other similar facilities in the region. The energy star rating for this facility is not applicable since there is missing utility information for these buildings. Despite the energy score for the facility Cherry Hill BOE will realize further energy savings and improve its overall performance with the implementation of the ECMs shown above. If all ECMs under 10 years are implemented (assuming 3 window AC units replaced), the total project would be approximately $22,000 installed with a simple payback of 2.9 years. This project represents a 38% reduction in electric utility costs, as well as 35.6 Ton reduction of CO2 pollution annually. It is highly recommended to proceed with the implementation of all ECMs that are financially feasible for the BOE.

II. INTRODUCTION

The comprehensive energy audit covers the 28,000 square foot Marlkress facilities, which includes the following spaces: Garage, Warehouse, and Transportation Office.

Electrical and fuel oil #2 utility information is collected and analyzed for one full year's energy use of the building. The utility information allows for analysis of the building's operational characteristics; calculate energy benchmarks for comparison to industry averages, estimated savings potential, and baseline usage/cost to monitor the effectiveness of implemented measures. A computer spreadsheet is used to calculate benchmarks and to graph utility information (see the utility profiles below).

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

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

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

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Facility-specific equipment

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

III. METHOD OF ANALYSIS

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

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

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

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

ECM Calculation Equations:

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

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

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

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

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

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

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

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

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

The electric usage profile represents the actual electrical usage for the facility. Public Service Electric and Gas (PSE&G) provides electricity to the facility under their General Lighting and Power Service rate structure. The electric utility measures consumption in kilowatt-hours (KWH) and maximum demand in kilowatts (KW). One KWH usage is equivalent to 1000 watts running for one hour. One KW of electric demand is equivalent to 1000 watts running at any given time. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the historical data received for the facility.

The oil usage profile shows the actual oil consumption for the facility. Oil is provided by Major Petroleum Industries to the facility. The oil provider measures consumption in gallons. One Gallon of #2 oil is equivalent to 140,000 BTUs of energy.

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

Description	Average
Electricity	15.7¢ / kWh
Fuel Oil #2	$1.97 / Gallon

Table 3

Electricity Billing Data

ELECTRIC USAGE SUMMARY			
Utility Provider:	PSE&G		
Rate:	GLP		
Meter No:	726007561, 278005899		
Account No:	Meter 1: 6183606634 (Jan.-March), 6696971807 (April-Dec.) / Meter 2: 6183633305 (Feb., March), 6529887407 (April-Dec.)		
Third Party Utility Provider:	South Jersey Energy Company (May through Dec)		
TPS Meter / Acct No:			
MONTH OF USE	**CONSUMPTION KWH**	**DEMAND**	**TOTAL BILL**
Jan-09	3,978	12.8	$562
Feb-09	11,131	28.8	$1,647
Mar-09	10,857	28.9	$1,610
Apr-09	12,447	30.5	$1,777
May-09	10,802	31.7	$1,578
Jun-09	7,854	29.8	$1,440
Jul-09	9,606	30.4	$1,693
Aug-09	10,121	35.7	$1,830
Sep-09	9,630	33.3	$1,735
Oct-09	9,335	32.2	$1,391
Nov-09	9,323	28.9	$1,376
Dec-09	12,490	28.2	$1,799
Totals	**117,574**	**35.7 Max**	**$18,439**
	AVERAGE DEMAND	**29.3 KW average**	
	AVERAGE RATE	**$0.157 $/kWh**	

Figure 1
Electricity Usage Profile

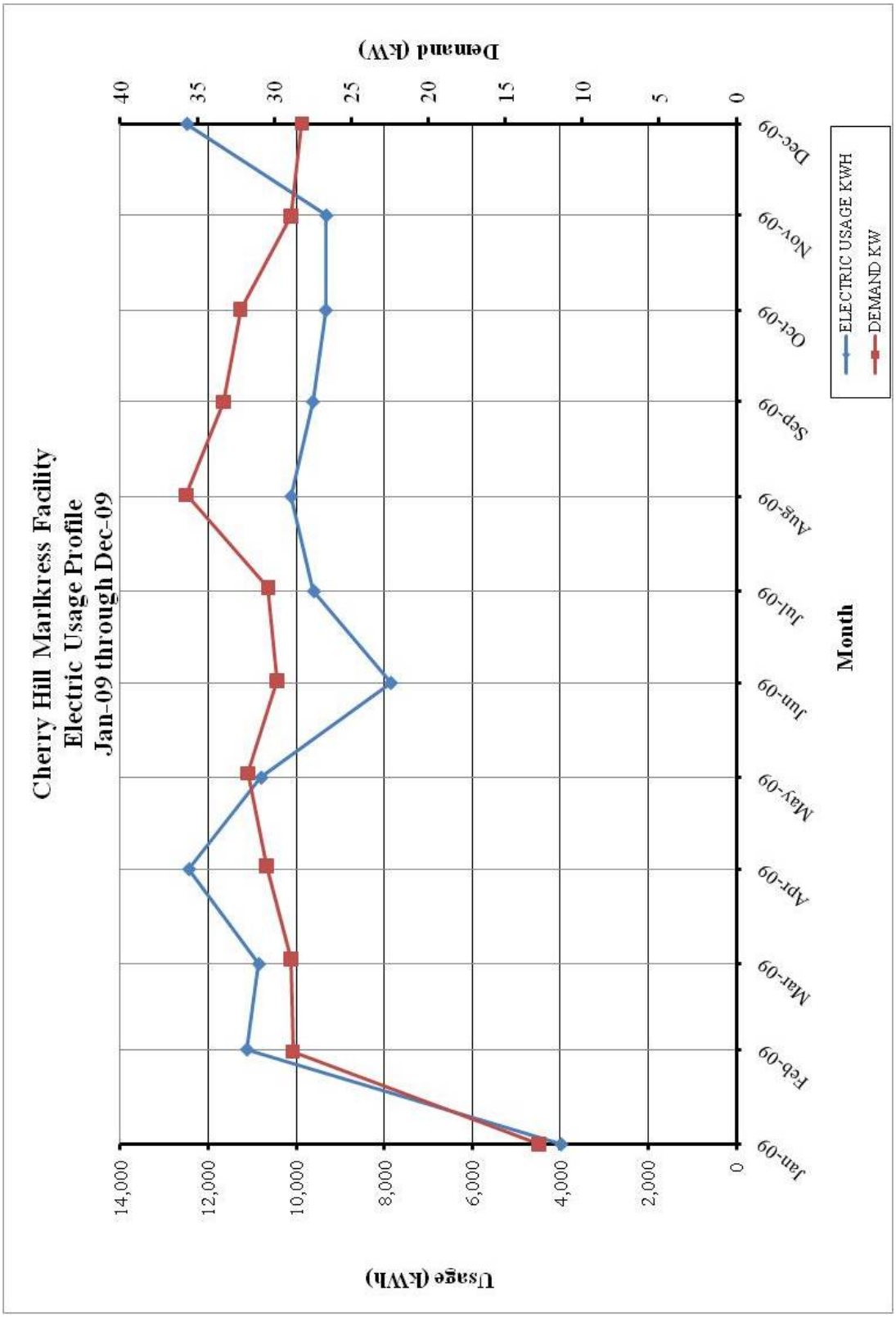
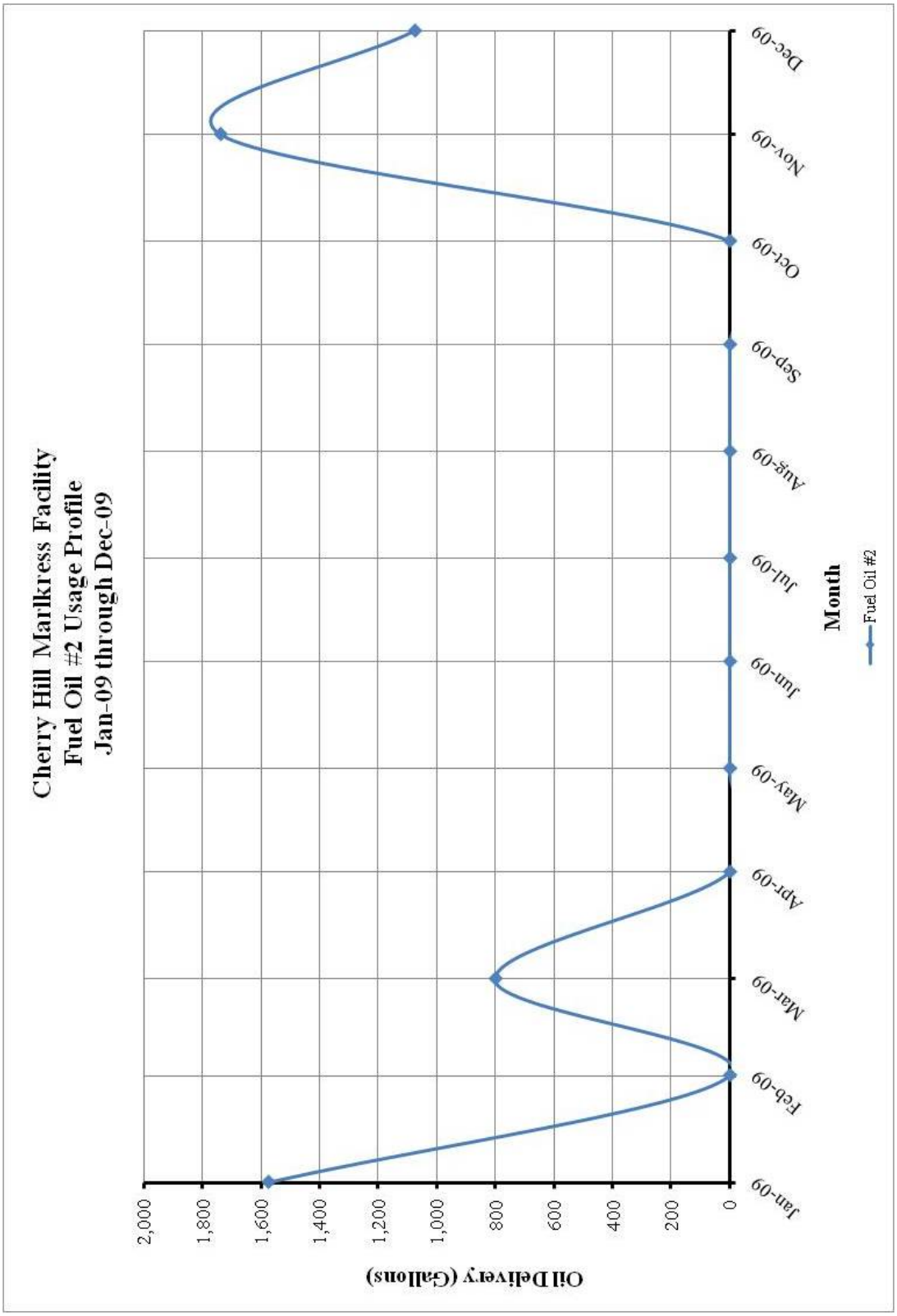


Table 4
Fuel Oil #2 Billing Data

FUEL OIL #2 USAGE SUMMARY		
Utility Provider:	Major Petroleum Industries	
Rate:		
Meter No:		
Account No:	0000001032	
Third Party Utility Provider:		
TPS Meter No:		
MONTH	**DELIVERY (GALLONS)**	**TOTAL BILL**
Jan-09	1,575.40	$2,678.18
Feb-09	0.00	$0.00
Mar-09	800.20	$1,302.73
Apr-09	0.00	$0.00
May-09	0.00	$0.00
Jun-09	0.00	$0.00
Jul-09	0.00	$0.00
Aug-09	0.00	$0.00
Sep-09	0.00	$0.00
Oct-09	0.00	$0.00
Nov-09	1,738.90	$3,881.22
Dec-09	1,075.00	$2,364.46
TOTALS	**5,189.50**	**$10,226.59**
AVERAGE RATE:	**$1.97**	**$/GALLON**

Figure 2
Fuel Oil #2 Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.

The site and source EUI for this facility is calculated as follows:

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

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

Table 5
Facility Energy Use Index (EUI) Calculation

ENERGY USE INTENSITY CALCULATION						
ENERGY TYPE	**BUILDING USE**			**SITE ENERGY**	**SITE-SOURCE RATIO**	**SOURCE ENERGY**
	kWh	**Therms**	**Gallons**	**kBtu**		**kBtu**
ELECTRIC	117574.0			401,398	3.340	1,340,668
NATURAL GAS		0.0		0	1.047	0
FUEL OIL			5189.5	721,341	1.010	728,554
PROPANE			0.0	0	1.010	0
TOTAL				1,122,738		2,069,222
*Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued Dec 2007.						
BUILDING AREA		28,000	SQUARE FEET			
BUILDING SITE EUI		*40.10*	kBtu/SF/YR			
BUILDING SOURCE EUI		*73.90*	kBtu/SF/YR			

As a comparison, data has been gathered by the US Department of Energy (DOE) for various facilities cataloguing the standard site and source energy utilization. This data has been published in the 2003 Commercial Building Energy Consumption Survey and is noted as follows for facilities of this type:

- Service (Vehicle Repair):
  77 kBtu/SF Site Energy, 150 kBtu/SF Source Energy.

Based on the information compiled for the studied facility, as compared to the national average the energy usage is approximately 50.7% lower than the baseline data.

Note that the gas usage was not available and therefore not included in the overall performance ratings or utility data shown below. The lack of gas utility data corresponds to a rating that shows higher than actual energy efficiency. The EUI rating show is lower than the building's actual rating which is unknown. This is similar to the Energy Star rating shown in the section below. The Energy Star rating is higher than the building's actual rating which is unknown.

C. EPA Energy Benchmarking System

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

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

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

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

User Name: cherryhillpublicschools
Password: lgeaceg2009

Security Question: "What is your birth city?"
Security Answer: "Cherry Hill"

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

Table 6
ENERGY STAR Performance Rating

ENERGY STAR PERFORMANCE RATING		
FACILITY DESCRIPTION	**ENERGY PERFORMANCE RATING**	**NATIONAL AVERAGE**
Marlkress Facility	81*	50

*Although the **Statement of Energy Performance Appendix** shows a rating for the Marlkress Facilities, this rating is not applicable for comparison purposes due to the lack of utility data provided.

V. FACILITY DESCRIPTION

The Marlkress Facility is comprised of three buildings; the Transportation Office, Garage, and Warehouse. These facilities are used for the buildings and grounds maintenance staff and equipment as well as the transportation office administration. These facilities total 28,000 SF of mixed use space including office areas, service garage, warehouse storage and central IT department office and data center. The typical operational hours of these facilities is 7:00AM to 3:30 PM. The IT department office typically remains open unit 5:00 PM. The Transportation Office building is not completely vacant until approximately 11:30 PM after custodial crews have cleaned all of the schools.

A. Transportation Office

The Transportation office is a two story facility built in 1929. The facility is comprised of a basement primarily for storage and the 1st floor which consists of administration offices. This envelope is constructed of brick exterior walls with plaster coating on the interior. There is no insulation within the envelope construction. The windows consist of large operable single pane windows with wood frames. The windows are in poor condition; however the operations personnel continue to provide weather stripping and seals to minimize leakage. Some windows have been completely boarded up to limit infiltration of outside air and moisture. The roof consists of a slopped roof with shingles. The roof appears to be in good to fair condition. Insulation value below the roof could not be verified.

HVAC Systems

The heating system consists of a central oil fired cast iron boiler that provides steam to the facility. The boiler is an old, poorly insulated sectional boiler made by Burnham. The boiler is original to the building. The steam is used for old radiators and baseboards throughout the building. The boiler provides a constant supply of steam and the radiator output is adjusted by manual valves at each radiator. The system is shut down in the summer months.

Cooling is provided for the administration office by window air conditioners. The window air conditioners vary in capacity and age from ½ ton cooling to 2 ton cooling units. The window unit efficiencies range from approximately 8.0 EER to 10 EER. Although it was noted that some window units were installed tightly and sealed within the openings, other units were noted to be somewhat aged and allowing leakage of outdoor air into the building.

Exhaust is provided for the bathrooms throughout the building with box style exhaust fans controlled by wall switches.

Domestic Hot Water

Domestic hot water is provided at this building through a central tank type propane gas hot water heater made by Bradford. The hot water heater appears to be in fair condition. The hot water is used for bathroom lavatories.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts. It was noted however that approximately 50% of the fixtures have been retrofitted with new electronic ballasts, but maintain the T-12 bulbs. A small percentage of the spaces include T-8 fixtures with electronic ballasts. Some storage areas and exterior light fixtures utilize incandescent bulbs. All lighting is controlled through manual light switches. In some locations due to alterations to the office space layout, light switches are not located at entrances to rooms making it difficult to turn on and off lighting when needed. The building exterior is lit with a metal halide fixture as well as multiple flood lights.

Electrical System and Load Imbalance Testing

The electrical service for this facility is provided by an underground service. The service is secondary service at 208/120v, 3PH power. The main power feed is supplied to a main distribution panel (MDP) located in the building basement electrical room. The service ratings are unknown. The MDP supplies power throughout the facility to various sub-panels providing power to mechanical equipment, lighting, and receptacle loads. The building does not include transformers since the incoming power is already 208/120v. Transformers incur losses when converting differing voltages due to inefficiencies in the conversion process. No efficiency changes are anticipated by the replacement of electrical distribution equipment.

As required by the project scope of work, CEG has performed testing on the facility's existing main power distribution to document any load imbalances utilizing actual field measurements. Field data was recorded from 10:45 AM, June 16th, 2010 through 10:48 AM, June 17th, 2010. The electrical testing data is included in the **Load Imbalance Testing Appendix**. As a result of the testing, it was found that the Transportation Building has an overall load imbalance of 183%. Incoming utility service size was unavailable. See the attached appendix for the testing details.

B. Garage

The Garage is a single story service building built in 1960. The facility is comprised of multiple garage sections for servicing of the buildings and grounds lawn equipment and road vehicles. This envelope is constructed of block exterior walls without any interior covering. There is no insulation within the envelope construction. The roof consists of a wood trusses below a flat built up roof. The amount of insulation below the roof membrane is unknown. The roof appears to be in fair condition.

HVAC Systems

The heating system consists of a central oil fired cast iron boiler that provides hot water to the facility. The boiler is an old boiler made by Weil McLain. The boiler is original to the building. The hot water is used to supply heat for unit heaters throughout the garage with hot water coils. The unit heaters include an aqua-stat which controls the fan on/off operation. Hot water is circulated throughout the building by a small inline hot water pump made by Bell & Gossett. It was noted that the boiler was at full temperature in the cooling season. The operations personnel

commented that the boilers are typically shut down in the cooling season. The garage section that is used to service large vehicles is heated by two propane gas fired unit heaters made by Sterling. Only one of the unit heaters is operational. These units appear to be in fair condition

No cooling is provided for this building. Large prop fans are used to provide some added comfort in the cooling season. Exhaust is provided for the bathrooms throughout the building with box style exhaust fans controlled by wall switches. Each garage bay utilizes a roof exhaust fan for ventilation. All fans are manually controlled.

Domestic Hot Water

Domestic hot water is provided at this building through a central tank type electric hot water heater made by Bradford White. The hot water heater appears to be in good condition. This hot water is used for bathroom lavatories. The truck service garage utilizes a dedicated tank type electric hot water heater made by Rheem. This hot water heater is used for hand washing as well as spraying down the service vehicles in the winter to wash off snow and salt.

Lighting

Typical lighting throughout building is fluorescent tube lay-in fixtures with T-12 lamps and magnetic ballasts. The service garage includes large metal halide light fixtures for added light during night / winter service work. All lighting is controlled through manual light switches. The building exterior is lit with metal halide fixture as well as multiple flood lights.

Electrical System and Load Imbalance Testing

The electrical service for this facility is provided by a utility pole style service drop. The service is secondary service at 208/120v, 3PH power. The main power feed is supplied to a main distribution panel (MDP) located in the building electrical room. The service size & ratings are unknown. The MDP supplies power throughout the facility to various sub-panels providing power to mechanical equipment, lighting, and receptacle loads. The building does not include transformers since the incoming power is already 208/120v. Transformers incur losses when converting differing voltages due to inefficiencies in the conversion process. No efficiency changes are anticipated by the replacement of electrical distribution equipment.

As required by the project scope of work, CEG has performed testing on the facility's existing main power distribution to document any load imbalances utilizing actual field measurements. Field data was recorded from 1:24 PM, June 16th, 2010 through 1:45 PM, June 17th, 2010. The electrical testing data is included in the **Load Imbalance Testing Appendix**. As a result of the testing, it was found that the Service Garage has an overall load imbalance of 144%. Incoming utility service size was unavailable. See the attached appendix for the testing details.

C. Warehouse

The Warehouse is a single story storage building / IT office built in 1999. The facility is comprised of a large warehouse section for storage and an IT office which houses the IT

department and the school district servers. The envelope is constructed of insulated metal exterior walls. The warehouse includes multiple skylights for day lighting. There is fiberglass batt insulation wrapped in plastic coating on the interior walls and roof. The roof consists of a standing metal seam roof. The building construction appears to be in good condition.

HVAC Systems

The heating system consists of a multiple gas fired unit heaters located within the warehouse and split system furnaces for the IT office. Cooling is only provided for the IT office which is made up of two individual split system AC units. One of the split systems is a 5 ton split system made by Rheem which is dedicated to the IT open office area. The second system is a 5 ton split system made by American Standard which is dedicated for the server room. The server room unit appears to be in good condition, while the IT office unit appears to be older and in fair condition.

Domestic Hot Water

Domestic hot water is provided for the IT department bathroom and sink by a 30 gallon tank type electric hot water heater made by AO Smith. The hot water heater appears to be in good condition.

Lighting

Typical lighting throughout IT department is fluorescent tube lay-in fixtures with T-8 lamps and electronic ballasts. The warehouse utilizes large metal halide light fixtures, which are only used when there is insufficient light provided by the skylights. The warehouse also has task lighting provided over work surfaces for bench work. All lighting is controlled through manual light switches. The building exterior is lit with metal halide fixture as well as multiple flood lights, and one large cobra style street light which appears to be inoperable.

Electrical System and Load Imbalance Testing

The electrical service for this facility is provided by a utility pole style service drop. The service is secondary service at 208/120v, 3PH power. The main power feed is supplied to a main distribution panel (MDP) located in the building electrical room within the IT office area of the building. The MDP supplies power throughout the facility to various sub-panels providing power to mechanical equipment, lighting, and receptacle loads. Power is also supplied to a UPS which is dedicated for the IT department data center which supplies 24/7 uninterruptable power to the computer equipment. The building does not include transformers since the incoming power is already 208/120v. Transformers incur losses when converting differing voltages due to inefficiencies in the conversion process. No efficiency changes are anticipated by the replacement of electrical distribution equipment.

As required by the project scope of work, CEG has performed testing on the facility's existing main power distribution to document any load imbalances utilizing actual field measurements. Field data was recorded from 12:10 PM, June 16th, 2010 through 1:07 PM, June 17th, 2010. The electrical testing data is included in the **Load Imbalance Testing Appendix**. As a result of the

testing, it was found that the Warehouse has an overall load imbalance of 10%. Incoming utility service size was unavailable. See the attached appendix for the testing details.

VI. MAJOR EQUIPMENT LIST

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

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

VII. ENERGY CONSERVATION MEASURES

ECM #1: Computer Monitor Replacement

Description:

The computers throughout the facility utilize a mixture of CRT computer monitors and LCD computer monitors. Computers are located in the offices within the transportation building, and IT office within the warehouse building. Two additional computers are utilized in the service Garage. The CRT computer monitors are outdated and have several disadvantages such as; significantly increased higher energy consumption, uses large amount of desk space, poor picture quality, distortions and flickering image, secular glare problems, and high weight, and electromagnetic emissions. Many of these drawbacks are difficult to quantify except for the energy use. CRT monitors use considerably more energy than an alternative flat panel LCD monitor. Replacement of the existing CRT monitors with LCD monitors saves considerable energy as well as provides other ergonomic benefits.

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

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

Energy Savings Calculations:

No. of CRT Monitors	
(Transportation Bldg):	8
(Garage):	2
(Warehouse):	5
Weeks per Yr:	52
Hrs per Week:	84 (12 hrs per day cumulative average)

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

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

COMPUTER MONITOR CALCULATIONS			
ECM INPUTS	**EXISTING**	**PROPOSED**	**SAVINGS**
ECM INPUTS	CRT Monitors	LCD Monitor	
# of Computers	15	15	
Monitor Power Cons. (W)	75	25	
Operating Hrs per Week	84	84	
Operating Weeks per Yr	52	52	
Elec Cost ($/kWh)	0.157	0.157	
ENERGY SAVINGS CALCULATIONS			
ECM RESULTS	**EXISTING**	**PROPOSED**	**SAVINGS**
Electric Usage (kWh)	4,914	1,638	3,276
Energy Cost ($)	$771	$257	$514
COMMENTS:	CRT Monitor consumption based on Dell CRT monitor M/N: CRT-E771MM. Operating hours based on estimated average.		

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

Installation Costs: # Monitors X Cost per Monitor
15 Monitors X $100 per Monitor
$1500

Energy Savings Summary:

ECM #1 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$1,500
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$1,500
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$514
Total Yearly Savings ($/Yr):	$514
Estimated ECM Lifetime (Yr):	5
Simple Payback	2.9
Simple Lifetime ROI	71.3%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$2,570
Internal Rate of Return (IRR)	21%
Net Present Value (NPV)	$853.97

ECM #2: Window AC Unit Replacement

Description:

The warehouse, and service garage do not include cooling, however the Transportation building utilizes window air conditioners. These units vary in size, capacity and efficiency. The units have been replaced on an "as needed" basis throughout the school district. Some window AC units are old and inefficient. Approximately 30% of the window AC units are estimated to be 10 years old or older.

While some of the units are new, many of the units are significantly older and inefficient. It is recommended to utilize the energy star ratings as a minimum standard for replacing any window unit that is in need of replacement. Existing units that are old, however still working should be considered for replacement if the efficiency is below 8.0 to 8.5 EER. Window AC units that are over 10 years old are very likely to fall in this efficiency range.

This ECM shows the savings and payback for inefficient window air conditioners with new, Energy Star rated units. Qualifying product list can be found at Energy Star website at: www.energystar.gov/products. Although energy star rated products provide a valuable benchmark, it is recommended to consider even higher EER ratings for potential AC unit replacements where available.

Energy Savings Calculations:

Average Summer Electric Cost: $0.180/kWh (June through September)
Typical AC Unit Size: 18,000 BTU/HR

Estimated Full Load Hours of Unit: 1200/Year*

*The estimated full load hours are higher for the transportation building when compared to the average schools, due to the occupancy profile and continuous operation of this facility throughout the summer months.

$$EnergySavings = \frac{Cooling(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}}\right) \times Full\ Load\ Hrs.$$

$$Demand\ Savings = \frac{Energy\ Savings\ (kWh)}{Hrs\ of\ Cooling}$$

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

The typical unit size at this facility is 18,000 BTU/HR. The estimated installation cost is estimated to be $625 per window AC unit ($475 Materials). This is based on installation of the window AC units by Cherry Hill staff at a cost of $100 per unit for small AC units (12,000 BTU/HR and below), and $150 per units for larger AC units (18,000 BTU/HR and above).

WINDOW AC UNIT CALCULATIONS								
Capacity BTU/H	**Full Load Hrs**	**Typical Eff. (10 Yrs & Older) EER**	**New Eff. EER**	**Energy Savings kWh**	**Demand Savings kW**	**Cooling Cost Savings**	**Net Installed Cost**	**Simple Payback**
6,000	1,200	8.5	10.7	174	0.15	$31	$300	9.6
8,000	1,200	8.5	10.8	241	0.20	$43	$350	8.1
12,000	1,200	8.5	10.8	361	0.30	$65	$400	6.2
18,000	**1,200**	**8.5**	**10.7**	**522**	**0.44**	**$94**	**$625**	**6.6**
24,000	1,200	8	9.4	536	0.45	$97	$725	7.5

Energy Savings Summary:

ECM #2 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$625
NJ Smart Start Equipment Incentive ($):	$0
Net Installation Cost ($):	$625
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$94
Total Yearly Savings ($/Yr):	$94
Estimated ECM Lifetime (Yr):	10
Simple Payback	6.6
Simple Lifetime ROI	50.4%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$940
Internal Rate of Return (IRR)	8%
Net Present Value (NPV)	$176.84

ECM #3: AC Units Replacement

Description:

Portions of the facility are cooled by direct expansion outdoor air cooled condensing systems. Split systems were discovered and analyzed. The estimated service life for a condensing unit is twenty (20) years. The systems are within the useful life but are not as efficient as the latest technology available. Usually, energy savings derived from replacing condensing units does not justify a reasonable payback term. Nevertheless, as the equipment ages, it loses efficiency due to clogged condensers, internal parts wear and deposits of oil and other contaminants on the heat exchangers. Replacing an older condensing unit avoids these issues along with some energy savings.

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

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

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

AC UNITS			
Tag	**Cooling Capacity (Tons)**	**Existing EER/SEER**	**Proposed EER/SEER**
AC-1	5	10	13.8
AC-2	5	13	13.8

Energy Savings Calculations:

Full Load Cooling Hrs. = 800 hrs/yr.
Average Cost of Electricity = $0.180/kWh (June through September)

$$EnergySavings = \frac{Cooling(Tons) \times 12{,}000\left(\frac{Btu}{Ton\ hr}\right)}{1000\left(\frac{Wh}{kWh}\right)} \times \left(\frac{1}{EER_{OLD}} - \frac{1}{EER_{NEW}}\right) \times Full\ Load\ Hrs.$$

$$Demand\ Savings = \frac{Energy\ Savings\ (kWh)}{Hrs\ of\ Cooling}$$

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

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

AC UNIT CALCULATIONS								
Tag	**Total Cooling Capacity (Tons)**	**Energy Savings kWh**	**Demand Savings kW**	**Cooling Cost Savings**	**Total Installed Cost**	**Incentive**	**Net Cost**	**Simple Payback**
AC-1	5	1322	1.7	$238	$6,695	$460	$6,235	26
AC-2	5	214	0.3	$39	$6,695	$460	$6,235	162
Total	**10**	**1536**	**1.9**	**$276**	**$13,390**	**$920**	**$12,470**	**45**

From the NJ Smart Start® Program appendix, the packaged unit replacement falls under the category "Electric Unitary HVAC" and warrants an incentive based on efficiency (EER). The program incentives are calculated as follows:

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

AC unit Smart Start Incentives were calculated in the table above for each AC unit.

Energy Savings Summary:

ECM #3 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$13,390
NJ Smart Start Equipment Incentive ($):	$920
Net Installation Cost ($):	$12,470
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$276
Total Yearly Savings ($/Yr):	$276
Estimated ECM Lifetime (Yr):	20
Simple Payback	45.2
Simple Lifetime ROI	-55.7%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$5,520
Internal Rate of Return (IRR)	-7%
Net Present Value (NPV)	($8,363.82)

ECM #4: Lighting Upgrade

Description:

The majority of the lighting at this facility is T-8 bulbs with electronic ballasts. The light fixtures installed in the building is the result of a district wide lighting upgrade to replace existing T-12 fixtures with magnetic ballast approximately 10 years ago. It was discovered that not all fixtures included T-8 bulbs and electronic ballasts. Approximately 10% of the existing fixtures still utilized magnetic ballasts with T-12 bulbs. It was also discovered that in some locations, T-12 bulbs were utilized in conjunction with electronic ballasts. In many cases a mixture of ballasts and bulbs were found within a single room. It is unclear whether the lighting retrofit was incomplete in providing a uniform lighting installation, or whether the mixture of fixture components are a result of the replacement of bulbs and ballasts over the years.

This ECM includes replacement or retrofit of all fixtures with magnetic ballasts in the facility with electronic ballasts and T-8 bulbs. T8 fixtures will provide adequate lighting and will save the owner on electrical costs due to the better performance of the lamp and ballasts. This ECM will also provide maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a T8 lamp is approximately 30,000 burn-hours, in comparison to the existing T12 lamps which is approximately 20,000 burn-hours. The facility will need 33% less lamps replaced per year.

This ECM also includes replacement of any incandescent lamps with compact fluorescent lamps. The energy usage of an incandescent compared to a compact fluorescent is approximately 3 to 4 times greater. In addition to the energy savings, compact fluorescent fixtures burn-hours are 8 to 15 times longer than incandescent fixtures ranging from 6,000 to 15,000 burn-hours compared to incandescent fixtures ranging from 750 to 1000 burn-hours.

It is important to note that the retrofit does not include the cost to replace the existing T-12 fixtures currently powered by electronic ballasts. There is very minimal energy savings from the retrofit of a T-12 to T-8 fixture where the existing T-12 fixture is powered by an electronic ballast. For the purpose standardizing the district's bulb and ballast maintenance requirements, it is highly recommended to retrofit all light fixtures to T-8 bulbs and corresponding ballasts. This retrofit provides standardization throughout the district, not energy savings.

Energy Savings Calculations:

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

From the **NJ Smart Start Incentive Appendix**, the replacement of a T-12 fixture to a T-5 or T-8 fixture warrants the following incentive: T-5 or T-8 (1-4 lamps) = $10 per fixture

$$\text{Smart Start®}\ Incentive = (\#\ of\ 1-4\ lamp\ \ fixtures \times\ \$10)$$

$$\text{Smart Start®}\ Incentive = (144\ \ fixtures \times\ \$10) = \$1440$$

Replacement and Maintenance Savings are calculated as follows:

$$Savings = (reduction\ in\ lamps\ replaced\ \ per\ \ year) \times (repacment\ \$\ per\ lamp + Labor\ \$\ per\ lamp)$$
$$Savings = (39\ lamps\ \ per\ \ year) \times (\$2.00 + \$5.00) = \$312$$

Energy Savings Summary:

ECM #4 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$17,088
NJ Smart Start Equipment Incentive ($):	$1,440
Net Installation Cost ($):	$15,648
Maintenance Savings ($/Yr):	$312
Energy Savings ($/Yr):	$5,115
Total Yearly Savings ($/Yr):	$5,427
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.9
Simple Lifetime ROI	420.2%
Simple Lifetime Maintenance Savings	$4,680
Simple Lifetime Savings	$81,405
Internal Rate of Return (IRR)	34%
Net Present Value (NPV)	$49,139.17

ECM #5: Lighting Controls

Description:

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

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

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

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

Savings resulting from the implementation of this ECM for energy management controls are estimated to be 10% of the total light energy controlled by occupancy sensors. The estimated savings is less than the savings listed above due to the continuous occupied nature of a classroom setting. Savings vary depending on space type and conditions surveyed in the field. The majority of the savings is expected to be after school hours when rooms are left with lights on.

This ECM includes replacement of standard wall switches with sensors wall switches for all individual offices, storage areas, or mechanical areas. Sensors shall be manufactured by Sensorswitch, Watt Stopper or equivalent.

The **Investment Grade Lighting Audit Appendix** of this report includes the summary of lighting controls implemented in this ECM and outlines the proposed controls, costs, savings, and payback periods. The calculations adjust the lighting power usage by the applicable percent savings for each area that includes lighting controls.

Energy Savings Calculations:

$$Energy\ Savings = (\%\ Savings \times Occuapancy\ Sensored\ Light\ Energy\ (kWh/Yr))$$

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

Installation cost per dual-technology sensors (Basis: Sensor switch or equivalent) as well as other details are shown in the **Investment Grade Lighting Audit Appendix**.

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

Occupancy Sensor Wall Mounted (existing facility only) = $20 per sensor.
Occupancy Sensor Remote Mounted (existing facility only) = $35 per sensor

$$\text{Smart Start®}\ Incentive = (\#\ of\ \ wall\ mount \times\ \$\ 20) + (\#\ of\ ceiling\ mount \times 35)$$
$$= (0 \times \$20) + (22 \times \$35) = \$770$$

Energy Savings Summary:

ECM #5 - ENERGY SAVINGS SUMMARY	
Installation Cost ($):	$4,040
NJ Smart Start Equipment Incentive ($):	$770
Net Installation Cost ($):	$3,270
Maintenance Savings ($/Yr):	$0
Energy Savings ($/Yr):	$1,514
Total Yearly Savings ($/Yr):	$1,514
Estimated ECM Lifetime (Yr):	15
Simple Payback	2.2
Simple Lifetime ROI	594.5%
Simple Lifetime Maintenance Savings	$0
Simple Lifetime Savings	$22,710
Internal Rate of Return (IRR)	46%
Net Present Value (NPV)	$14,804.03

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy measures (REM) for the municipality utilizing renewable technologies and concluded that there is potential for solar energy generation. The solar photovoltaic system calculation summary will be concluded as **REM#1** within this report.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 1100 S.F. can be utilized for a PV system. A depiction of the area utilized is shown in **Renewable / Distributed Energy Measures Calculation Appendix**. Using this square footage it was determined that a system size of 15.64 kilowatts could be installed. A system of this size has an estimated kilowatt hour production of 18,637 KWh annually, reducing the overall utility bill by approximately 16% percent. A detailed financial analysis can be found in the **Renewable / Distributed Energy Measures Calculation Appendix**. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

The proposed photovoltaic array layout is designed based on the specifications for the Sun Power SPR-230 panel. This panel has a "DC" rated full load output of 230 watts, and has a total panel conversion efficiency of 18%. Although panels rated at higher wattages are available through Sun Power and other various manufacturers, in general most manufacturers who produce commercially available solar panels produce a similar panel in the 200 to 250 watt range. This provides more manufacturer options to the public entity if they wish to pursue the proposed solar recommendation without losing significant system capacity.

The array system capacity was sized on available roof space on the existing facility. Estimated solar array generation was then calculated based on the National Renewable Energy Laboratory

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

The proposed solar array is qualified by the New Jersey Board of Public Utilities Net Metering Guidelines as a Class I Renewable Energy Source. These guidelines allow onsite customer generation using renewable energy sources such as solar and wind with a capacity of 2 megawatts (MW) or less. This limits a customer system design capacity to being a net user and not a net generator of electricity on an annual basis. Although these guidelines state that if a customer does net generate (produce more electricity than they use), the customer will be credited those kilowatt-hours generated to be carried over for future usage on a month to month basis. Then, on an annual basis if the customer is a net generator the customer will then be compensated by the utility the average annual PJM Grid LMP price per kilowatt-hour for the over generation. Due to the aforementioned legislation, the customer is at limited risk if they generate more than they use at times throughout the year. With the inefficiency of today's energy storage systems, such as batteries, the added cost of storage systems is not warranted and was not considered in the proposed design.

Direct purchase involves the BOE paying for 100% of the total project cost upfront via one of the methods noted in the Installation Funding Options section below. Calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following is the payback period:

Table 7
Financial Summary – Photovoltaic System

FINANCIAL SUMMARY - PHOTOVOLTAIC SYSTEM		
PAYMENT TYPE	**SIMPLE PAYBACK**	**INTERNAL RATE OF RETURN**
Direct Purchase	13.25 Years	6.2%

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

The solar PV system analysis shows that based on the combination of solar renewable energy credits and the savings in electric costs as a result of the system's production, this measure will provide a 6.2% rate of return on the BOE's initial investment. It is recommended to implement the installation of a solar PV system if funding is available and otherwise would be invested at a

rate of return less than this measure. Another option to consider is a Power Purchase Agreement (PPA). A PPA is a source of funding available to entities that have the potential for a solar PV system installation, however lacks the funding to implement. It could be advantageous for the BOE to solicit Power Purchase Agreement (PPA) with a third party who will own, operate, and maintain the system for a contracted period (typically 15 years). During this time the PPA Provider would sell all of the electric generated by Solar Arrays to the BOE at a reduced rate compared to their existing electric rate. This type of agreement allows the BOE to take advantage of renewable energy without the upfront costs of installation. The BOE should consider both options as a viable route for investing in renewable energy technologies.

In addition to the Solar Analysis, CEG also conducted a review of the applicability of wind energy for the facility. Wind energy production is another option available through the Renewable Energy Incentive Program. Wind turbines of various types can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. Based on CEG's review of the applicability of wind energy for the facility, it was determined that the average wind speed is not adequate, and the kilowatt demand for the building is below the threshold (200 kW) for purchase of a commercial wind turbine. Therefore, wind energy is not a viable option to implement.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

A load profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. For this report, the facility's energy consumption data was gathered from the school district and presented in table format and plotted in graph form to create the load profile. Refer to the Electric and Natural Gas Usage Profiles included within this report to reference the respective electricity and natural gas usage load profiles.

Electricity Overview:

The electricity usage profile demonstrates a typical cooling load profile for these types of facilities that are still occupied, but overall has some reduction in hours of occupancy during the summer months. Historical usage is relatively steady throughout the year with an average monthly usage of 9,798 kWh and an average monthly demand of 15kW. Consumption months greater than the average were February-May, August and December.

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

Fuel Oil Overview:

The Fuel Oil delivery profile is a typical (heat load) profile. The average cost for fuel oil during the 2009 delivery period was $1.97. Total deliveries were 5,190 gallons. Total 2009 fuel oil costs $ 10,226.

Natural Gas equivalent usage is 7,213 therms. PSEG's BGSS natural gas supply cost for this time period is $0.758/therm. The total cost of natural gas to include delivery through the utility via rate schedule LVG, is projected at $1.05/therm. There would have been a projected savings of $2,500.00 annually if the facility had consumed the equivalent usage via natural gas.

Tariff Analysis:

Electricity:

This facility currently receives electric distribution service through PSE&G on rate schedule GLP (General Light and Power) and has contracted a Third Party Supplier (TPS) to provide electric commodity service as of May 2009. For electric supply (generation) service, the client has a choice to either use PSE&G's default service rate BGS-FP or contract with a Third Party Supplier (TPS) to supply electric.

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

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

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

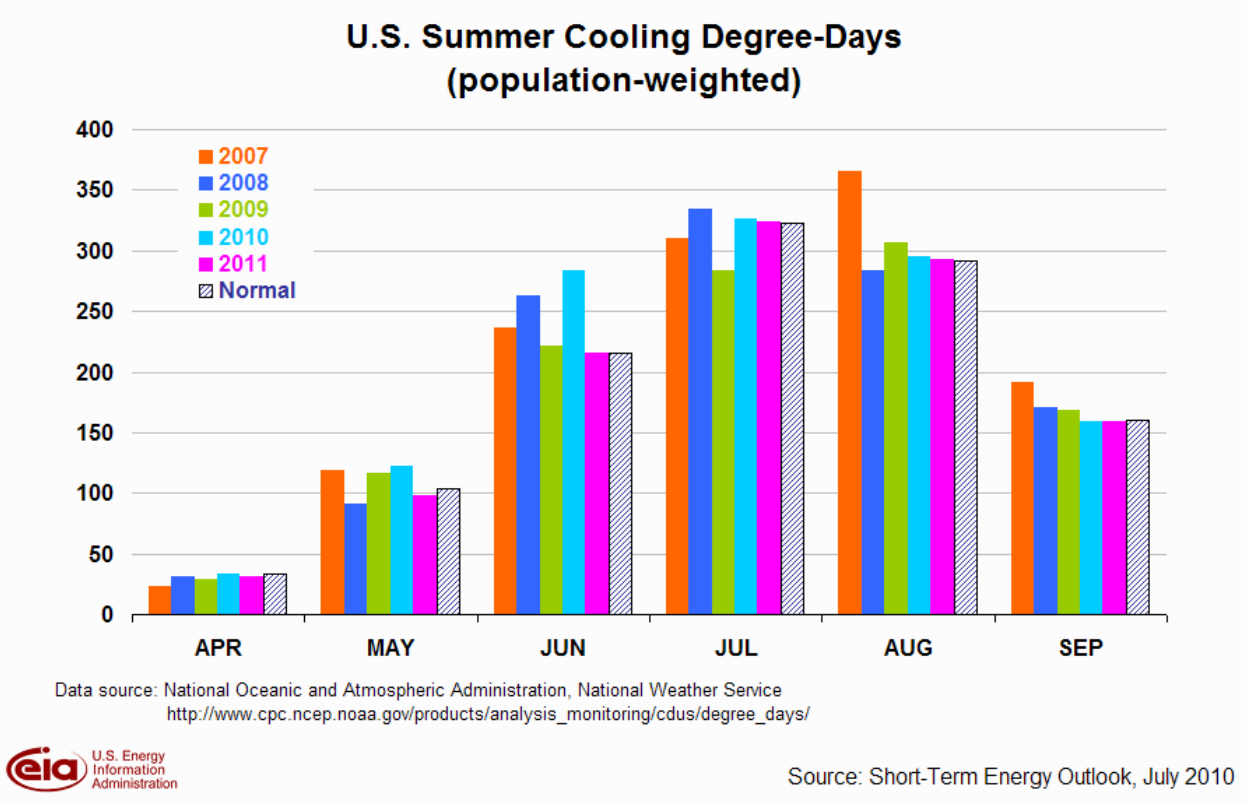
The facility's current BGS-FP average price to compare for PSE&G's GLP rate is $0.1130/kWh. Based upon the current third party supplier electric rate of $0.1075/kWh contracted with South Jersey Energy, this facility will yield a projected savings of $1,440.00 annually over the BGS-FP default rate with PSE&G.

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

Electric and Natural Gas Commodities Market Overview:

Current electricity and natural gas market pricing has remained relatively stable over the last year. Commodity pricing in 2008 marked historical highs in both natural gas and electricity commodity. Commodity pricing commencing spring of 2009 continuing through 2010, has decreased dramatically over 2008 historic highs and continues to be favorable for locking in long term (2-5 year) contracts with 3rd Party Supplier's for both natural gas and electricity supply requirements.

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



Short Term Energy Outlook - US Energy Information Administration (7/7/2010):

U.S. Electricity Retail Prices. *EIA estimates that residential retail electricity prices during the first half of 2010 were about the same as in the first half of 2009. However, rising fuel costs for natural gas and coal generation are likely to push up retail prices later this year, causing prices over the entire year to grow by about 0.8 percent. Increased fuel costs should push residential prices higher by about 2.7 percent during 2011.*

Crude Oil Prices. *WTI crude oil spot prices averaged $75.34 per barrel in June 2010 ($1.60 per barrel above the prior month's average), close to the $76 per barrel projected in the forecast in last month's Outlook. EIA projects WTI prices will average about $79 per barrel over the second half of this year and rise to $84 by the end of next year (West Texas Intermediate Crude Oil Price Chart).*

Energy price forecasts are highly uncertain, as history has shown (Energy Price Volatility and Forecast Uncertainty). WTI futures for September 2010 delivery for the 5-day period ending July 1 averaged $77 per barrel, and implied volatility averaged 35 percent. This made the lower and upper limits of the 95-percent confidence interval $60 and $98 per barrel, respectively.

Last year at this time, WTI for September 2009 delivery averaged $70 per barrel, and implied volatility averaged 44 percent, rendering the limits of the 95-percent confidence interval $52 and $95 per barrel.

U.S. Natural Gas Prices. *The Henry Hub spot price averaged $4.80 per MMBtu in June, $0.66 per MMBtu higher than the average spot price in May (Henry Hub Natural Gas Price Chart).*

The forecast price for the second half of 2010 averages $4.68 per MM Btu, $0.32 per MMBtu higher than last month's Outlook. The risk of hurricane outages and the projected reduction in drilling activity combine to strengthen prices through the year. A small decline in U.S. production alongside increased consumption leads to higher prices in 2011; the projected Henry Hub spot price averages $5.17 per MMBtu.

Uncertainty over future natural gas prices is lower this year compared with last year at this time. Natural gas futures for September 2010 delivery for the 5-day period ending July 1 averaged $4.77 per MMBtu, and the average implied volatility over the same period was 53 percent. This produced lower and upper bounds for the 95-percent confidence interval of $3.16 and $7.18 per MMBtu, respectively. At this time last year the natural gas September 2009 futures contract averaged $4.00 per MMBtu and implied volatility averaged almost 76 percent. This rendered the lower and upper limits of the 95-percent confidence interval at $2.25 and $7.14 per MMBtu.

Recommendations:

CEG recommends continuing an aggregated approach for 3rd party commodity supply procurement strategies.

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

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

X. INSTALLATION FUNDING OPTIONS

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

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

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

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

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

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

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

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

3. Measurement and Verification – Upon verification 12 months after implementation of all recommended measures, that actual savings have been achieved, based on a completed verification report, the incentive will grant additional savings per kWh or Therm based on the program's rates. Minimum savings must be 15%. (Example $0.07 / kWh for 15% savings, $0.08/ kWh for 17% savings, … and $0.70 / Therm for 15% savings, $0.80 / Therm for 17% saving, …) Increased incentives result from verified savings above 15%.

v. *Direct Install Program* – The New Jersey Clean Energy's Direct Install Program is a state funded program that targets small commercial and industrial facilities with peak demand of less than 200 kW. This turnkey program is aimed at providing owners a seamless, comprehensive process for analysis, equipment replacement and financial incentives to reduce consumption, lower utility costs and improve profitability. The program covers up to 60% of the cost for eligible upgrades including lighting, lighting controls, refrigeration, HVAC, motors, variable speed drives, natural gas and food service. Participating contractors (refer to www.njcleanenergy.com) conduct energy assessments in addition to your standard local government energy audit and install the cost-effective measures.

vi. *Energy Efficiency and Conservation Block Grants* – The EECGB rebate provides supplemental funding up to $20,000 for counties and local government entities to implement energy conservation measures. The EECGB funding is provided through the American Recovery and Reinvestment Act (ARRA). The local

government must be among the eligible local government entities listed on the NJ Clean Energy website as follows - http://njcleanenergy.com/commercial-industrial/programs/eecbg-eligible-entities. This program is limited to municipalities and counties that have not already received grants directly through the US department of Energy.

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

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

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

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

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

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

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

XI. ADDITIONAL RECOMMENDATIONS

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

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

B. Maintain all weather stripping on windows and doors.

C. Clean all light fixtures to maximize light output and limit the use of task lighting.

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

E. Turn off computer monitors and set computers to sleep when not being used. Computer monitors and computers are becoming one of the largest energy consumers in buildings today. Set computers to sleep when not being used and automatically turn off the computer monitors. Do not set computer monitors to “screen saver” mode which saves the screen life, not energy.

F. Repair back draft damper on boiler flue duct to limit excess air pulled from boiler room, and to prevent flue gases being introduced into mechanical room on boiler startup.

G. Implement a boiler shut down as part of regular maintenance in the late spring / early summer. It was noted that the boiler for the garage building was maintaining temperature at the time of the survey in late June. Boiler operation in the summer months allows for heat loss that provides no benefit to the facility.

H. Allow the data center temperature in the IT office to be as high as acceptable for the equipment being cooled. Colder room temperatures require more energy from the AC system compressor to provide the same capacity of cooling. In addition energy is wasted on over dehumidification when room temperatures are lower. Higher room temps such as 75°F – 80°F minimize these affects and causes less wear on the AC system improving reliability.

XII. ENERGY AUDIT ASSUMPTIONS

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

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

ECM COST & SAVINGS BREAKDOWN

CONCORD ENGINEERING GROUP

Cherry Hill Marlkress Facilities

ECM NO.	DESCRIPTION	INSTALLATION COST				YEARLY SAVINGS			ECM LIFETIME	LIFETIME ENERGY SAVINGS	LIFETIME MAINTENANCE SAVINGS	LIFETIME ROI	SIMPLE PAYBACK	INTERNAL RATE OF RETURN (IRR)	NET PRESENT VALUE (NPV)
		MATERIAL	LABOR	REBATES, INCENTIVES	NET INSTALLATION COST	ENERGY	MAINT. / SREC	TOTAL		(Yearly Saving * ECM Lifetime)	(Yearly Maint Svaing * ECM Lifetime)	(Lifetime Savings - Net Cost) / (Net Cost)	(Net cost / Yearly Savings)	$\sum_{n=0}^{N} \frac{C_n}{(1+IRR)^n}$	$\sum_{n=0}^{N} \frac{C_n}{(1+DR)^n}$
		($)	($)	($)	($)	($/Yr)	($/Yr)	($/Yr)	(Yr)	($)	($)	(%)	(Yr)	($)	($)
ECM ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
ECM #1	Computer Monitor Replacement	$1,500	$0	$0	$1,500	$514	$0	$514	5	$2,570	$0	71.3%	2.9	21.12%	$853.97
ECM #2	Window AC Unit Replacement	$475	$150	$0	$625	$94	$0	$94	10	$940	$0	50.4%	6.6	8.20%	$176.84
ECM #3	AC Unit Replacement	$7,200	$6,190	$920	$12,470	$276	$0	$276	20	$5,520	$0	-55.7%	45.2	-6.76%	($8,363.82)
ECM #4	Lighting Upgrade	$8,544	$8,544	$1,440	$15,648	$5,115	$312	$5,427	15	$81,405	$4,680	420.2%	2.9	34.26%	$49,139.17
ECM #5	Lighting Controls	$2,020	$2,020	$770	$3,270	$1,514	$0	$1,514	15	$22,710	$0	594.5%	2.2	46.14%	$14,804.03
REM RENEWABLE ENERGY AND FINANCIAL COSTS AND SAVINGS SUMMARY															
REM #1	Solor PV System	$125,120	$0	$0	$125,120	$2,923	$6,523	$9,446	25	$236,150	$163,075	88.7%	13.2	5.63%	$39,364.59

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

Concord Engineering Group, Inc.

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

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of February, 2010:

Electric Chillers

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Cooling

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

Desiccant Systems

$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250
Occupancy Controlled Thermostat (Hospitality & Institutional Facility)	$75 per thermostat

Energy Efficiency must comply with ASHRAE 90.1-2004

Ground Source Heat Pumps

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

Energy Efficiency must comply with ASHRAE 90.1-2004

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$50 per unit
Gas-Fired Water Heaters > 50 gallons	$1.00 - $2.00 per MBH
Gas-Fired Booster Water Heaters	$17 - $35 per MBH
Gas Fired Tankless Water Heaters	$300 per unit

Premium Motors

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

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$15 per fixture (1-4 lamps)
T-8 reduced Wattage (28w/25w 4', 1-4 lamps) Lamp & ballast replacement	$10 per fixture
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture
HID ≥ 100w Retrofit with induction lamp, power coupler and generator (must be 30% less watts/fixture than HID system)	$50 per fixture
HID ≥ 100w Replacement with new HID ≥ 100w	$70 per fixture
LED Refrigerator/Freezer case lighting replacement of fluorescent in medium and low temperature display case	$42 per 5 foot $65 per 6 foot

Lighting Controls – Occupancy Sensors

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

Lighting Controls – HID or Fluorescent Hi-Bay Controls

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

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive
Custom Measures	$0.16 KWh and $1.60/Therm of 1st year savings, or a buy down to a 1 year payback on estimated savings. Minimum required savings of 75,000 KWh or 1,500 Therms and a IRR of at least 10%.
Multi Measures Bonus	15%

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Cherry Hill Marlkress Facility

Building ID: 2348651
For 12-month Period Ending: December 31, 2009[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: August 10, 2010

Facility
Cherry Hill Marlkress Facility
1155 Marlkress Road
Cherry Hill, NJ 08003

Facility Owner
Cherry Hill Public Schools
45 Ranoldo Terrace P.O. Box 5015
Cherry Hill, NJ 08034

Primary Contact for this Facility
James Devereaux
45 Ranoldo Terrace P.O. Box 5015
Cherry Hill, NJ 08034

Year Built: 1929
Gross Floor Area (ft²): 28,000

Energy Performance Rating[2] (1-100) 81

Site Energy Use Summary[3]

Electricity - Grid Purchase(kBtu)	401,162
Fuel Oil (No. 2) (kBtu)	719,707
Natural Gas - (kBtu)[4]	0
Total Energy (kBtu)	1,120,869

Energy Intensity[5]

Site (kBtu/ft²/yr)	40
Source (kBtu/ft²/yr)	74

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	114

Electric Distribution Utility
Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	65
National Average Source EUI	120
% Difference from National Average Source EUI	-39%
Building Type	Warehouse (Unrefrigerated)

Stamp of Certifying Professional

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

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

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

Certifying Professional
Michael Fischette
520 South Burnt Mill Road
Voorhees, NJ 08043

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

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

ENERGY STAR® Data Checklist for Commercial Buildings

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

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

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Cherry Hill Marlkress Facility	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Warehouse (Unrefrigerated)	Is this an accurate description of the space in question?		☐
Location	1155 Marlkress Road, Cherry Hill, NJ 08003	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Admin Office (Office)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	11,224 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	40 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	15	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	29	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Warehouse & Garage (Warehouse (Unrefrigerated))				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑

Gross Floor Area	16,776 Sq. Ft.	Is this the total gross floor area as measured between the principal exterior surfaces of the enclosing fixed walls and including all supporting functions? The total gross floor area should include offices, lobbies, rest rooms, equipment storage areas, mechanical rooms, employee break rooms, cafeterias, elevators, stairwells, all space occupied by refrigeration/freezer units, and all areas that are entirely refrigerated. Existing atriums or areas with high ceilings should only include the base floor area that they occupy. The total gross floor area should not include outside loading bays or docks.		
Workers on Main Shift	10	Does this number represent the average number of workers that are present during the primary shift (that is, the shift with the most workers)? Note: this is not the total number of staff employed at the property. For example, if there are three daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		
Weekly operating hours	40 Hours	Is this the total number of hours per week that this warehouse space is in operation, excluding hours when the facility is occupied by maintenance, security, or other support personnel? Note: the average warehouse space operates 60 hours per week.		
Percent Cooled	30 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		
Number of walk-in refrigeration/freezer units	1	Does this count include all large walk-in refrigeration or freezer units at the warehouse?		
Distribution Center	No(Optional)	Is this building considered a distribution center?		

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Public Service Elec & Gas Co

Fuel Type: Electricity

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

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
12/01/2009	12/31/2009	12,490.00
11/01/2009	11/30/2009	9,323.00
10/01/2009	10/31/2009	9,335.00
09/01/2009	09/30/2009	9,630.00
08/01/2009	08/31/2009	10,121.00
07/01/2009	07/31/2009	9,606.00
06/01/2009	06/30/2009	7,854.00
05/01/2009	05/31/2009	10,802.00
04/01/2009	04/30/2009	12,447.00
03/01/2009	03/31/2009	10,857.00
02/01/2009	02/28/2009	11,131.00
01/01/2009	01/31/2009	3,978.00
Electric Consumption (kWh (thousand Watt-hours))		**117,574.00**
Electric Consumption (kBtu (thousand Btu))		**401,162.49**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**401,162.49**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Fuel Oil (No. 2)

Meter: Fuel Oil #2 (Gallons)
Space(s): Entire Facility

Start Date	End Date	Energy Use (Gallons)
12/01/2009	12/31/2009	1,075.00
11/01/2009	11/30/2009	1,738.90
10/01/2009	10/31/2009	100.00
09/01/2009	09/30/2009	100.00
08/01/2009	08/31/2009	100.00
07/01/2009	07/31/2009	100.00
06/01/2009	06/30/2009	100.00
05/01/2009	05/31/2009	100.00
04/01/2009	04/30/2009	100.00
03/01/2009	03/31/2009	100.00

02/01/2009	02/28/2009	787.70
01/01/2009	01/31/2009	787.70
Fuel Oil #2 Consumption (Gallons)		**5,189.30**
Fuel Oil #2 Consumption (kBtu (thousand Btu))		**719,706.61**
Total Fuel Oil (No. 2) Consumption (kBtu (thousand Btu))		**719,706.61**
Is this the total Fuel Oil (No. 2) consumption at this building including all Fuel Oil (No. 2) meters?		☐

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

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

Certifying Professional

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

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

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

Facility
Cherry Hill Marlkress Facility
1155 Marlkress Road
Cherry Hill, NJ 08003

Facility Owner
Cherry Hill Public Schools
45 Ranoldo Terrace P.O. Box 5015
Cherry Hill, NJ 08034

Primary Contact for this Facility
James Devereaux
45 Ranoldo Terrace P.O. Box 5015
Cherry Hill, NJ 08034

General Information

Cherry Hill Marlkress Facility	
Gross Floor Area Excluding Parking: (ft^2)	28,000
Year Built	1929
For 12-month Evaluation Period Ending Date:	December 31, 2009

Facility Space Use Summary

Admin Office	
Space Type	Office
Gross Floor Area(ft^2)	11,224
Weekly operating hours	40
Workers on Main Shift	15
Number of PCs	29
Percent Cooled	50% or more
Percent Heated	50% or more

Warehouse & Garage	
Space Type	Warehouse (Unrefrigerated)
Gross Floor Area(ft^2)	16,776
Workers on Main Shift	10
Weekly operating hours	40
Percent Cooled	30
Percent Heated	100
Number of walk-in refrigeration/freezer units	1
Distribution Center[o]	N

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2009)	**Baseline** (Ending Date 12/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	81	81	75	N/A	50
Energy Intensity					
Site (kBtu/ft²)	40	40	46	N/A	65
Source (kBtu/ft²)	74	74	84	N/A	120
Energy Cost					
$/year	N/A	N/A	N/A	N/A	N/A
$/ft²/year	N/A	N/A	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	114	114	130	N/A	186
$kgCO_2e/ft^2$/year	4	4	5	N/A	7

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

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

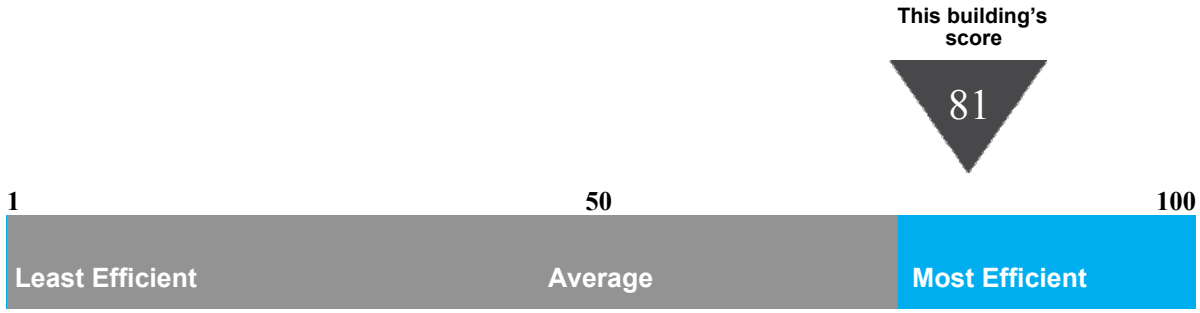
Statement of Energy Performance

2009

Cherry Hill Marlkress Facility
1155 Marlkress Road
Cherry Hill, NJ 08003

Portfolio Manager Building ID: 2348651

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



This building uses 74 kBtu per square foot per year.*

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

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

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

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 08/10/2010

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill - Marlkress Facilities

Boilers

Tag	Boiler	Boiler	
Unit Type	Cast Iron Steam Boiler	Cast Iron HW Boiler	
Qty	1	1	
Location	Transportation Building Bsmt	Service Garage Mech Room	
Area Served	Transportation Building Steam Radiators	Service Garage HW unit heaters	
Manufacturer	Burnham	Weil McLain	
Model #	S-50-6	N/A	
Serial #	N/A	N/A	
Input Capacity (MBH)	N/A	650 MBH	
Rated Output Capacity (MBH)	N/A	530 MBH	
Approx. Efficiency %	65% (Est)	81%	
Fuel	#2 Oil	#2 Oil	
Year	1928	1960	
Ashrae Service Life	30	35	
Remaining Life	(52)	(15)	
Comments	Oil Fired Boiler. Burner: - ABC Sunray Corp, 1/3 HP, Model # 95A-1	Boiler was running during survey in the cooling season. Gravity damper missing on flue.	

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill - Marlkress Facilities

Pumps

Tag	Pump		
Unit Type	Inline Pump		
Qty	1		
Location	Service Garage Boiler Room		
Area Served	Service Garage HW Piping		
Manufacturer	Bell & Gossett		
Model #	189105		
Serial #	N/A		
Horse Power	1/4 HP (Est)		
Flow	N/A		
Motor Info	N/A		
Electrical Power	115V, 1PH		
RPM	N/A		
Motor Efficiency %	N/A		
Year	N/A		
Ashrae Service Life	10		
Remaining Life	N/A		
Comments	Fair Condition		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill - Marlkress Facilities

Domestic Hot Water Heaters

Tag	HWH	HWH	HWH
Unit Type	Tank Type HWH	Tank Type HWH	Tank Type HWH
Qty	1	1	1
Location	Transportation building Bsmt	Service Garage	Service Garage
Area Served	Transportation building	Service Garage Bathrooms	Service Garage Utility Sink
Manufacturer	Bradford White	Bradford White	Rheem
Model #	MI403S6CX12	MI4085D5-12	82MV52-2
Serial #	ZA2616138	GH8950333	RH0208207336
Size (Gallons)	40	40	50
Input Capacity (MBH/KW)	40 MBH	4.5 KW	4.5 KW
Recovery (Gal/Hr)	N/A	N/A	N/A
Efficiency %	79%	N/A	N/A
Fuel	Propane	Electric	Electric
Year	N/A	N/A	N/A
Ashrae Service Life	12	12	12
Remaining Life	N/A	N/A	N/A
Comments	Fair Condition	Fair Condition	Good Condition

Domestic Hot Water Heaters

Tag	HWH		
Unit Type	Tank Type HWH		
Qty	1		
Location	Warehouse IT Office Mech Room		
Area Served	IT Office Bathroom / sink		
Manufacturer	AO Smith		
Model #	N/A		
Serial #	N/A		
Size (Gallons)	30 Gallon (Est)		
Input Capacity (MBH/KW)	4.5 KW (Est)		
Recovery (Gal/Hr)	N/A		
Efficiency %	N/A		
Fuel	Electric		
Year	N/A		
Ashrae Service Life	12		
Remaining Life	N/A		
Comments	Fair Condition		

MAJOR EQUIPMENT LIST

Concord Engineering Group

Cherry Hill - Marlkress Facilities

HVAC Units

Tag	Win AC	AC	AC
Unit Type	Window AC Unit	Split System AC	Split System AC
Qty	Typically one per office / room	1	1
Location	Transportation Building Offices / conf. rooms	Warehouse IT Office	Warehouse IT server room
Area Served	Transportation Building Offices / conf. rooms	Warehouse IT Office	Warehouse IT server room
Manufacturer	Various	Rheem	American Standard
Model #	N/A	Out: RAKA-060JAZ Indoor: Classic 90 Plus	Out: 2A7C0060A3000AA Indoor: N/A
Serial #	N/A	Out: 5721 M2999 Indoor: N/A	Out: 5032Y483F Indoor: N/A
Cooling Type	DX	DX Split	DX Split
Cooling Capacity (Tons)	1.0 - 2.0 tons	5 tons	5 tons
Cooling Efficiency (SEER/EER)	7.0 - 10.7 EER	10 SEER	13 SEER (Est)
Heating Type	None	Nat Gas Condensing Furnace	None
Heating Input (MBH)	N/A	60 MBH (Est)	N/A
Efficiency	N/A	92%	N/A
Fuel	N/A	Nat Gas	N/A
Year	Various	1999	2005
Ashrae Service Life	10	15	15
Remaining Life	N/A	4	10
Comments	Units range in capacity and condition	Good / Fair Condition	Good Condition

HVAC Units

Tag	UH		
Unit Type	Gas Fired Unit Heaters		
Qty	8		
Location	Warehouse - Storage		
Area Served	Warehouse - Storage		
Manufacturer	Modine		
Model #	BV75SEM1560		
Serial #	1201033099		
Cooling Type	None		
Cooling Capacity (Tons)	N/A		
Cooling Efficiency (SEER/EER)	N/A		
Heating Type	Gas Fired Heat Exchanger		
Heating Input (MBH)	75 MBH		
Efficiency	80%		
Fuel	Nat Gas		
Year	1999		
Ashrae Service Life	13		
Remaining Life	2		
Comments	Minimum fire - 37.5MBH,		

Investment Grade Lighting Audit

CEG Job #: 9C09182
Project: Old Sharp Transportation — Marlkress
1155 Marlkress Road
Cherry Hill, NJ
Sq. Ft. 30,000
KWH COST: $0.165

ECM #4: Lighting Upgrade - General

EXISTING LIGHTING										PROPOSED LIGHTING										SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Lamps	Retro-Unit Description	Watts Used	Total kW	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
TRANSPORTATION BUILDING																							
142.342	Boiler Room	1050	2	4	2x4, 4 Lamp, 34w T12, Elec. Ballast, Pendant Mnt., No Lens	119	0.24	249.9	$41.23	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	180.6	$29.80	$100.00	$200.00	0.07	69.3	$11.43	17.49
564		8760	1	1	Surface Mount Fixture w/ 13w CFL Lamp	13	0.01	113.9	$18.79	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
128.34	Storage	1050	2	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.28	298.2	$49.20	2	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.21	218.4	$36.04	$100.00	$200.00	0.08	79.8	$13.17	15.19
142.31	Basement Hallway	8760	8	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	1.25	10,932.5	$1,803.86	8	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.69	6026.88	$994.44	$100.00	$800.00	0.56	4905.6	$809.42	0.99
142.31	Basement Managers Office (3)	4200	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.94	3,931.2	$648.65	6	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.52	2167.2	$357.59	$100.00	$600.00	0.42	1764	$291.06	2.06
142.31	Basement Men's Room	4200	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.16	655.2	$108.11	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	361.2	$59.60	$100.00	$100.00	0.07	294	$48.51	2.06
564		4200	1	1	Surface Mount Fixture w/ 13w CFL Lamp	13	0.01	54.6	$9.01	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
128.34		4200	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	596.4	$98.41	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	436.8	$72.07	$100.00	$100.00	0.04	159.6	$26.33	3.80
142.31	Baesment Offices/Storage	8760	9	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	1.40	12,299.0	$2,029.34	9	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.77	6780.24	$1,118.74	$100.00	$900.00	0.63	5518.8	$910.60	0.99
142.31	Basement File Storage	8760	5	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.78	6,832.8	$1,127.41	5	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.43	3766.8	$621.52	$100.00	$500.00	0.35	3066	$505.89	0.99
121.31	Basement Cust. Closet	1050	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	78	0.08	81.9	$13.51	1	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.06	60.9	$10.05	$100.00	$100.00	0.02	21	$3.47	28.86
600	Basement Exit Sign	8760	2	1	LED Exit Sign	5	0.01	87.6	$14.45	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
565	Basement Outdoor Entrance	8760	2	2	Surface Mount Box style Fixture w/ 60w Incandescent Lamp	120	0.24	2,102.4	$346.90	2	2	13w CFL Lamp	26	0.05	455.52	$75.16	$7.00	$14.00	0.19	1646.88	$271.74	0.05
142.342	1st Floor Hallway	4200	7	4	2x4, 4 Lamp, 34w T12, Elec. Ballast, Pendant Mnt., No Lens	119	0.83	3,498.6	$577.27	7	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.60	2528.4	$417.19	$100.00	$700.00	0.23	970.2	$160.08	4.37
142.342	1st Floor Stairs	4200	2	4	2x4, 4 Lamp, 34w T12, Elec. Ballast, Pendant Mnt., No Lens	119	0.24	999.6	$164.93	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	722.4	$119.20	$100.00	$200.00	0.07	277.2	$45.74	4.37
222.21	Secretary Offices	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	301.6	$49.76	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	452.4	$74.65	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
142.11		2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	156	0.16	405.6	$66.92	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	223.6	$36.89	$100.00	$100.00	0.07	182	$30.03	3.33

Investment Grade Lighting Audit

128.34		2600	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	369.2	$60.92	1	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.10	270.4	$44.62	$100.00	$100.00	0.04	98.8	$16.30	6.13
121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	$33.46	1	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.06	150.8	$24.88	$100.00	$100.00	0.02	52	$8.58	11.66
222.31	Kevin Larson Office	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	301.6	$49.76	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.31		2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	301.6	$49.76	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
142.312	Office/Drawing Room	2600	7	4	2x4, 4 Lamp, 34w T12, Elect. Ballast, Pendant Mnt., Prismatic Lens	119	0.83	2,165.8	$357.36	7	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.60	1565.2	$258.26	$100.00	$700.00	0.23	600.6	$99.10	7.06
142.31	Admin Office Conf. Room	1050	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.31	327.6	$54.05	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	180.6	$29.80	$100.00	$200.00	0.14	147	$24.26	8.25
142.31	1st Floor Men's Restroom	1050	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.16	163.8	$27.03	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	90.3	$14.90	$100.00	$100.00	0.07	73.5	$12.13	8.25
142.31	1st Floor Women's Restroom	1050	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.16	163.8	$27.03	1	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.09	90.3	$14.90	$100.00	$100.00	0.07	73.5	$12.13	8.25
142.31	Transportation Office	2600	5	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.78	2,028.0	$334.62	5	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.43	1118	$184.47	$100.00	$500.00	0.35	910	$150.15	3.33
566		2600	1	1	Surface Mount Fixture w/ 23w CFL Lamp	23	0.02	59.8	$9.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
142.31	Trans. Private Office	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.62	1,622.4	$267.70	4	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.34	894.4	$147.58	$100.00	$400.00	0.28	728	$120.12	3.33
142.11	Offices/Storage 102	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	156	0.62	1,622.4	$267.70	4	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.34	894.4	$147.58	$100.00	$400.00	0.28	728	$120.12	3.33
142.11	Offices/Storage	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	156	0.62	1,622.4	$267.70	4	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.34	894.4	$147.58	$100.00	$400.00	0.28	728	$120.12	3.33
142.31	Private Office	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.31	811.2	$133.85	2	3	3 Lamp , 32w T8, Elect. Ballast, Specular Reflector; retrofit	86	0.17	447.2	$73.79	$100.00	$200.00	0.14	364	$60.06	3.33
747	Ext. Wall	3650	1	1	250w MH Wall Mnt w/ Round Lens	295	0.30	1,076.8	$177.66	1	1	Retrofit; 200w MH Pulse Start Lamp and Ballast; Venture Lighting	234	0.23	854.1	$140.93	$215.00	$215.00	0.06	222.65	$36.74	5.85
567	Ext. Flood	3650	4	1	Outdoor Flood Light, 90w Lamp	90	0.36	1,314.0	$216.81	4	1	26w CFL Lamp	26	0.10	379.6	$62.63	$20.00	$80.00	0.26	934.4	$154.18	0.52
566	Front Entrance	8760	2	1	Surface Mount Fixture w/ 23w CFL Lamp	23	0.05	403.0	$66.49	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
MAINTENANCE GARAGE																					
121.14	Lawn Equip. Garage	2600	10	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.78	2,028.0	$334.62	10	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.58	1508	$248.82	$100.00	$1,000.00	0.20	520	$85.80	11.66
121.14	Storage/Work Garage	2600	19	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	1.48	3,853.2	$635.78	19	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	1.10	2865.2	$472.76	$100.00	$1,900.00	0.38	988	$163.02	11.66
566		2600	1	1	Surface Mount Fixture w/ 23w CFL Lamp	23	0.02	59.8	$9.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
141.14	Bathroom	2600	1	3	2x4, 3-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Parabolic Lens	127	0.13	330.2	$54.48	1	2	2 Lamp, 32w T8, Elect. Ballast, Specular Reflector; retrofit	58	0.06	150.8	$24.88	$100.00	$100.00	0.07	179.4	$29.60	3.38
121.14		2600	14	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	1.09	2,839.2	$468.47	14	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.81	2111.2	$348.35	$100.00	$1,400.00	0.28	728	$120.12	11.66

Investment Grade Lighting Audit

128.12	Workshop Garage	2600	2	2	8' Channel, 2 Lamp, 60w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.28	738.4	$121.84	2	4	(2) 8' Lamps to (4) 4' Lamps - 32w T8, Elect Ballast; retrofit	104	0.21	540.8	$89.23	$100.00	$200.00	0.08	197.6	$32.60	6.13
122.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Clear Acrylic Lens	78	0.08	202.8	$33.46	1	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	0.06	150.8	$24.88	$100.00	$100.00	0.02	52	$8.58	11.66
121.14	Truck Service Garage	2600	20	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	1.56	4,056.0	$669.24	20	2	2 Lamp, 32w T8, Elect. Ballast; retrofit	58	1.16	3016	$497.64	$100.00	$2,000.00	0.40	1040	$171.60	11.66
737		1300	8	1	175w MH Down Light, Surface Mnt., Polycarb Lens	210	1.68	2,184.0	$360.36	8	1	Retrofit; 150w MH Pulse Start Lamp and Ballast; Venture Lighting	170	1.36	1768	$291.72	$200.00	$1,600.00	0.32	416	$68.64	23.31
739	Ext. Outside Workshop	8760	1	1	175w MH Wall Mnt w/ Round Lens	189	0.19	1,655.6	$273.18	1	1	Retrofit; 150w MH Pulse Start Lamp and Ballast; Venture Lighting	170	0.17	1489.2	$245.72	$215.00	$215.00	0.02	166.44	$27.46	7.83
625	Ext. Outside Work Garage	8760	1	1	Wall Sconce, (1) 60w A19 Lamp	60	0.06	525.6	$86.72	1	1	13w CFL Lamp	13	0.01	113.88	$18.79	$7.00	$7.00	0.05	411.72	$67.93	0.10
568	Boiler Room	1050	1	1	Surface Mount Fixture w/ 60w Incandescent Lamp	60	0.06	63.0	$10.40	1	1	13w CFL Lamp	13	0.01	13.65	$2.25	$7.00	$7.00	0.05	49.35	$8.14	0.86
600	Exit Sign	8760	1	1	LED Exit Sign	5	0.01	43.8	$7.23	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
739	Ext. Outside Lawn Garage	2600	2	1	175w MH Wall Mnt w/ Round Lens	189	0.38	982.8	$162.16	2	1	Retrofit; 150w MH Pulse Start Lamp and Ballast; Venture Lighting	170	0.34	884	$145.86	$215.00	$430.00	0.04	98.8	$16.30	26.38
741	Ext. Side of Service Garage	2600	2	1	175w MH, Pulse Start Wall Pack w/ Prismatic Lens	210	0.42	1,092.0	$180.18	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
WAREHOUSE																					
221.14	Warehouse - Workbench	800	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.81	649.6	$107.18	14	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.14		1200	3	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.09	108.0	$17.82	3	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Warehouse - Storage Area	2400	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.70	1,670.4	$275.62	12	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
771	Warehouse	2600	28	1	320w MH LoBay, Clear Lens	349	9.77	25,407.2	$4,192.19	28	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Warehouse - Corner Room	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$36.89	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2,012.4	$332.05	9	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Private Office	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$73.79	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Server Room	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$36.89	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
211.11	Bathroom	2600	1	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.03	78.0	$12.87	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
915		2600	1	1	Fan/Light Combo, (1) 100w A19 Lamp	100	0.10	260.0	$42.90	1	1	26w CFL Lamp	26	0.03	67.6	$11.15	$20.00	$20.00	0.07	192.4	$31.75	0.63
232.21	Hallway	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$73.79	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Mech. Room	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	301.6	$49.76	2	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
725	Outside	4200	4	1	150w HPS Wallpack	188	0.75	3,158.4	$521.14	4	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00
567		4200	5	1	Outdoor Flood Light, 90w Lamp	90	0.45	1,890.0	$311.85	5	1	26w CFL Lamp	26	0.13	546	$90.09	$20.00	$100.00	0.32	1344	$221.76	0.45
760		4200	1	1	400w HPS "Cobra Head" Area Light	465	0.47	1,953.0	$322.25	1	0	No Change	0	0.00	0	$0.00	$0.00	$0.00	0.00	0	$0.00	0.00

Investment Grade Lighting Audit

	Totals					35.45	117,934	$19,459	270	97		13.1	46,984	$7,752		$17,088	7.3	30,999	$5,115	3.34

CEG Job #: 9C09182
Project: Old Sharp Transportation
Address: 1155 Marlkress Road
Cherry Hill, NJ
Building SF: 97,903

Marlkress

KWH COST: $0.165

ECM #5: Lighting Controls

EXISTING LIGHTING										PROPOSED LIGHTING CONTROLS											SAVINGS			
CEG Type	Fixture Location	Yearly Usage	No. Fixts	No. Lamps	Fixture Type	Fixt Watts	Total kW	kWh/Yr Fixtures	Yearly $ Cost	No. Fixts	No. Cont.	Controls Description	Watts Used	Total kW	Reduction (%)	kWh/Yr Fixtures	Yearly $ Cost	Unit Cost (INSTALLED)	Total Cost	kW Savings	kWh/Yr Savings	Yearly $ Savings	Yearly Simple Payback
TRANSPORTATION BUILDING																							
142.342	Boiler Room	1050	2	4	2x4, 4 Lamp, 34w T12, Elec. Ballast, Pendant Mnt., No Lens	119	0.24	249.9	$41.23	2	0	No Change	119	0.05	0%	249.9	$41.23	$0.00	$0.00	0.00	0	$0.00	0.00
564		8760	1	1	Surface Mount Fixture w/ 13w CFL Lamp	13	0.01	113.88	$18.79	1	0	No Change	13	0.00	0%	113.88	$18.79	$0.00	$0.00	0.00	0	$0.00	0.00
128.34	Storage	1050	2	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.28	298.2	$49.20	2	0	No Change	142	0.06	0%	298.2	$49.20	$0.00	$0.00	0.00	0	$0.00	0.00
142.31	Basement Hallway	8760	8	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	1.25	10932.48	$1,803.86	8	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.25	10%	9839.232	$1,623.47	$160.00	$160.00	1.00	1093.248	$180.39	0.89
142.31	Basement Managers Office (3)	4200	6	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.94	3931.2	$648.65	6	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.19	10%	3538.08	$583.78	$160.00	$160.00	0.75	393.12	$64.86	2.47
142.31	Basement Men's Room	4200	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.16	655.2	$108.11	1	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.03	10%	589.68	$97.30	$160.00	$160.00	0.12	65.52	$10.81	7.42
564		4200	1	1	Surface Mount Fixture w/ 13w CFL Lamp	13	0.01	54.6	$9.01	1	0	No Change	13	0.00	10%	49.14	$8.11	$0.00	$0.00	0.00	5.46	$0.90	0.00
128.34		4200	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	596.4	$98.41	1	0	No Change	142	0.03	10%	536.76	$88.57	$0.00	$0.00	0.00	59.64	$9.84	0.00
142.31	Baesment Offices/Storage	8760	9	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	1.40	12299.04	$2,029.34	9	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.28	10%	11069.136	$1,826.41	$160.00	$160.00	1.12	1229.904	$202.93	0.79
142.31	Basement File Storage	8760	5	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.78	6832.8	$1,127.41	5	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.16	10%	6149.52	$1,014.67	$160.00	$160.00	0.62	683.28	$112.74	1.42
121.31	Basement Cust. Closet	1050	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	78	0.08	81.9	$13.51	1	0	No Change	78	0.02	0%	81.9	$13.51	$0.00	$0.00	0.00	0	$0.00	0.00
600	Basement Exit Sign	8760	2	1	LED Exit Sign	5	0.01	87.6	$14.45	2	0	No Change	5	0.00	0%	87.6	$14.45	$0.00	$0.00	0.00	0	$0.00	0.00
565	Basement Outdoor Entrance	8760	2	2	Surface Mount Box style Fixture w/ 60w Incandescent Lamp	120	0.24	2102.4	$346.90	2	0	No Change	120	0.05	0%	2102.4	$346.90	$0.00	$0.00	0.00	0	$0.00	0.00
142.342	1st Floor Hallway	4200	7	4	2x4, 4 Lamp, 34w T12, Elec. Ballast, Pendant Mnt., No Lens	119	0.83	3498.6	$577.27	7	0	No Change	119	0.17	0%	3498.6	$577.27	$0.00	$0.00	0.00	0	$0.00	0.00
142.342	1st Floor Stairs	4200	2	4	2x4, 4 Lamp, 34w T12, Elec. Ballast, Pendant Mnt., No Lens	119	0.24	999.6	$164.93	2	0	No Change	119	0.05	0%	999.6	$164.93	$0.00	$0.00	0.00	0	$0.00	0.00
222.21	Secretary Offices	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	58	0.12	301.6	$49.76	2	0	No Change	58	0.02	0%	301.6	$49.76	$0.00	$0.00	0.00	0	$0.00	0.00
221.11		2600	3	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	58	0.17	452.4	$74.65	3	0	No Change	58	0.03	0%	452.4	$74.65	$0.00	$0.00	0.00	0	$0.00	0.00
142.11		2600	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	156	0.16	405.6	$66.92	1	0	No Change	156	0.03	0%	405.6	$66.92	$0.00	$0.00	0.00	0	$0.00	0.00
128.34		2600	1	2	8' Channel, 2 Lamp, 75w T12, Mag. Ballast, Pendant Mnt., No Lens	142	0.14	369.2	$60.92	1	0	No Change	142	0.03	0%	369.2	$60.92	$0.00	$0.00	0.00	0	$0.00	0.00

121.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	78	0.08	202.8	$33.46	1	0	No Change	78	0.02	0%	202.8	$33.46	$0.00	$0.00	0.00	0	$0.00	0.00
222.31	Kevin Larson Office	2600	2	2	2x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	301.6	$49.76	2	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	58	0.02	10%	271.44	$44.79	$160.00	$160.00	0.09	30.16	$4.98	32.15
221.31		2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Pendant Mnt., Prismatic Lens	58	0.12	301.6	$49.76	2	0	No Change	58	0.02	0%	301.6	$49.76	$0.00	$0.00	0.00	0	$0.00	0.00
142.312	Office/Drawing Room	2600	7	4	2x4, 4 Lamp, 34w T12, Elect. Ballast, Pendant Mnt., Prismatic Lens	119	0.83	2165.8	$357.36	7	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	119	0.17	10%	1949.22	$321.62	$160.00	$160.00	0.67	216.58	$35.74	4.48
142.31	Admin Office Conf. Room	1050	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.31	327.6	$54.05	2	0	No Change	156	0.06	0%	327.6	$54.05	$0.00	$0.00	0.00	0	$0.00	0.00
142.31	1st Floor Men's Restroom	1050	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.16	163.8	$27.03	1	0	No Change	156	0.03	0%	163.8	$27.03	$0.00	$0.00	0.00	0	$0.00	0.00
142.31	1st Floor Women's Restroom	1050	1	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.16	163.8	$27.03	1	0	No Change	156	0.03	0%	163.8	$27.03	$0.00	$0.00	0.00	0	$0.00	0.00
142.31	Transportation Office	2600	5	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.78	2028	$334.62	5	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.16	10%	1825.2	$301.16	$160.00	$160.00	0.62	202.8	$33.46	4.78
566		2600	1	1	Surface Mount Fixture w/ 23w CFL Lamp	23	0.02	59.8	$9.87	1	0	No Change	23	0.00	0%	59.8	$9.87	$0.00	$0.00	0.00	0	$0.00	0.00
142.31	Trans. Private Office	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.62	1622.4	$267.70	4	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.12	10%	1460.16	$240.93	$160.00	$160.00	0.50	162.24	$26.77	5.98
142.11	Offices/Storage 102	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	156	0.62	1622.4	$267.70	4	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.12	10%	1460.16	$240.93	$160.00	$160.00	0.50	162.24	$26.77	5.98
142.11	Offices/Storage	2600	4	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Surface Mnt., Prismatic Lens	156	0.62	1622.4	$267.70	4	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.12	10%	1460.16	$240.93	$160.00	$160.00	0.50	162.24	$26.77	5.98
142.31	Private Office	2600	2	4	2x4, 4 Lamp, 34w T12, Mag. Ballast, Pendant Mnt., Prismatic Lens	156	0.31	811.2	$133.85	2	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	156	0.06	10%	730.08	$120.46	$160.00	$160.00	0.25	81.12	$13.38	11.95
747	Ext. Wall	3650	1	1	250w MH Wall Mnt w/ Round Lens	295	0.30	1076.75	$177.66	1	0	No Change	295	0.06	0%	1076.75	$177.66	$0.00	$0.00	0.00	0	$0.00	0.00
567	Ext. Flood	3650	4	1	Outdoor Flood Light, 90w Lamp	90	0.36	1314	$216.81	4	0	No Change	90	0.07	0%	1314	$216.81	$0.00	$0.00	0.00	0	$0.00	0.00
566	Front Entrance	8760	2	1	Surface Mount Fixture w/ 23w CFL Lamp	23	0.05	402.96	$66.49	2	0	No Change	23	0.01	0%	402.96	$66.49	$0.00	$0.00	0.00	0	$0.00	0.00
MAINTENANCE GARAGE																							
121.14	Lawn Equip. Garage	2600	10	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	0.78	2028	$334.62	10	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	78	0.16	10%	1825.2	$301.16	$225.00	$225.00	0.62	202.8	$33.46	6.72
121.14	Storage/Work Garage	2600	19	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	1.48	3853.2	$635.78	19	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	78	0.30	10%	3467.88	$572.20	$225.00	$225.00	1.19	385.32	$63.58	3.54
566		2600	1	1	Surface Mount Fixture w/ 23w CFL Lamp	23	0.02	59.8	$9.87	1	0	No Change	23	0.00	0%	59.8	$9.87	$0.00	$0.00	0.00	0	$0.00	0.00
141.14	Bathroom	2600	1	3	2x4, 3-Lamp, 34w T12, Mag. Ballast, Recessed Mnt., Parabolic Lens	127	0.13	330.2	$54.48	1	0	No Change	127	0.03	0%	330.2	$54.48	$0.00	$0.00	0.00	0	$0.00	0.00
121.14	Workshop Garage	2600	14	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	1.09	2839.2	$468.47	14	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	78	0.22	10%	2555.28	$421.62	$225.00	$225.00	0.87	283.92	$46.85	4.80
128.12		2600	2	2	8' Channel, 2 Lamp, 60w T12, Mag. Ballast, Surface Mnt., No Lens	142	0.28	738.4	$121.84	2	0	No Change	142	0.06	0%	738.4	$121.84	$0.00	$0.00	0.00	0	$0.00	0.00
122.11		2600	1	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Wall Mnt., Clear Acrylic Lens	78	0.08	202.8	$33.46	1	0	No Change	78	0.02	0%	202.8	$33.46	$0.00	$0.00	0.00	0	$0.00	0.00

121.14	Truck Service Garage	2600	20	2	1x4, 2-Lamp, 34w T12, Mag. Ballast, Surface Mnt., No Lens	78	1.56	4056	$669.24	20	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	78	0.31	10%	3650.4	$602.32	$225.00	$225.00	1.25	405.6	$66.92	3.36
737		1300	8	1	175w MH Down Light, Surface Mnt., Polycarb Lens	210	1.68	2184	$360.36	8	0	No Change	210	0.34	0%	2184	$360.36	$0.00	$0.00	0.00	0	$0.00	0.00
739	Ext. Outside Workshop	8760	1	1	175w MH Wall Mnt w/ Round Lens	189	0.19	1655.64	$273.18	1	1	Daylight Sensor (Sensorswitch PP-20 & CM-PC or equal)	189	0.04	20%	1324.512	$218.54	$160.00	$160.00	0.15	331.128	$54.64	2.93
625	Ext. Outside Work Garage	8760	1	1	Wall Sconce, (1) 60w A19 Lamp	60	0.06	525.6	$86.72	1	0	No Change	60	0.01	0%	525.6	$86.72	$0.00	$0.00	0.00	0	$0.00	0.00
568	Boiler Room	1050	1	1	Surface Mount Fixture w/ 60w Incandescent Lamp	60	0.06	63	$10.40	1	0	No Change	60	0.01	0%	63	$10.40	$0.00	$0.00	0.00	0	$0.00	0.00
600	Exit Sign	8760	1	1	LED Exit Sign	5	0.01	43.8	$7.23	1	0	No Change	5	0.00	0%	43.8	$7.23	$0.00	$0.00	0.00	0	$0.00	0.00
739	Ext. Outside Lawn Garage	2600	2	1	175w MH Wall Mnt w/ Round Lens	189	0.38	982.8	$162.16	2	0	No Change	189	0.08	0%	982.8	$162.16	$0.00	$0.00	0.00	0	$0.00	0.00
741	Ext. Side of Service Garage	2600	2	1	175w MH, Pulse Start Wall Pack w/ Prismatic Lens	210	0.42	1092	$180.18	2	0	No Change	210	0.08	0%	1092	$180.18	$0.00	$0.00	0.00	0	$0.00	0.00
WAREHOUSE																							
221.14	Warehouse - Workbench	800	14	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.81	649.6	$107.18	14	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	58	0.16	10%	584.64	$96.47	$225.00	$225.00	0.65	64.96	$10.72	20.99
211.14		1200	3	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.09	108	$17.82	3	0	No Change	30	0.02	0%	108	$17.82	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Warehouse - Storage Area	2400	12	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.70	1670.4	$275.62	12	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	58	0.14	10%	1503.36	$248.05	$160.00	$160.00	0.56	167.04	$27.56	5.81
771	Warehouse	2600	28	1	320w MH LoBay, Clear Lens	349	9.77	25407.2	$4,192.19	28	1	2 Pole Power Pack w/Dual Tech. Occupancy Sensor (Sensorswitch or equal)	349	1.95	10%	22866.48	$3,772.97	$225.00	$225.00	7.82	2540.72	$419.22	0.54
232.22	Warehouse - Corner Room	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$36.89	1	0	No Change	86	0.02	0%	223.6	$36.89	$0.00	$0.00	0.00	0	$0.00	0.00
232.22	Office	2600	9	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.77	2012.4	$332.05	9	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	86	0.15	10%	1811.16	$298.84	$225.00	$225.00	0.62	201.24	$33.20	6.78
232.22	Private Office	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.17	447.2	$73.79	2	1	Dual Technology Occupancy Sensor (Sensorswitch or equal)	86	0.03	10%	402.48	$66.41	$225.00	$225.00	0.14	44.72	$7.38	30.49
232.22	Server Room	2600	1	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Parabolic Lens	86	0.09	223.6	$36.89	1	0	No Change	86	0.02	0%	223.6	$36.89	$0.00	$0.00	0.00	0	$0.00	0.00
211.11	Bathroom	2600	1	1	1x4, 1 Lamp, 32w T8, Elect. Ballast, Surface Mnt., Prismatic Lens	30	0.03	78	$12.87	1	0	No Change	30	0.01	0%	78	$12.87	$0.00	$0.00	0.00	0	$0.00	0.00
915		2600	1	1	Fan/Light Combo, (1) 100w A19 Lamp	100	0.10	260	$42.90	1	0	No Change	100	0.02	0%	260	$42.90	$0.00	$0.00	0.00	0	$0.00	0.00
232.21	Hallway	2600	2	3	2x4, 3 Lamp, 32w T8, Elect. Ballast, Recessed Mnt., Prismatic Lens	86	0.17	447.2	$73.79	2	0	No Change	86	0.03	0%	447.2	$73.79	$0.00	$0.00	0.00	0	$0.00	0.00
221.14	Mech. Room	2600	2	2	1x4, 2 Lamp, 32w T8, Elect. Ballast, Surface Mnt., No Lens	58	0.12	301.6	$49.76	2	0	No Change	58	0.02	0%	301.6	$49.76	$0.00	$0.00	0.00	0	$0.00	0.00
725	Outside	4200	4	1	150w HPS Wallpack	188	0.75	3158.4	$521.14	4	0	No Change	188	0.15	0%	3158.4	$521.14	$0.00	$0.00	0.00	0	$0.00	0.00
567		4200	5	1	Outdoor Flood Light, 90w Lamp	90	0.45	1890	$311.85	5	0	No Change	90	0.09	0%	1890	$311.85	$0.00	$0.00	0.00	0	$0.00	0.00
760		4200	1	1	400w HPS "Cobra Head" Area Light	465	0.47	1953	$322.25	1	0	No Change	465	0.09	0%	1953	$322.25	$0.00	$0.00	0.00	0	$0.00	0.00
0	Totals					7517	35.4	117,934.2	$19,459	270	22			7.1		108,759.2	$17,945.26		$4,040	20.61	9,175	$1,514	2.67

Project Name: LGEA Solar PV Project - Marlkress Facility
Location: Cherry Hill, NJ
Description: Photovoltaic System - Direct Purchase

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$125,120
Annual kWh Production	18,637
Annual Energy Cost Reduction	$2,923
Annual SREC Revenue	$6,523
First Cost Premium	**$125,120**
Simple Payback:	**13.25** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.157**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$125,120	0	0	0	$0	(125,120)	0
1	$0	18,637	$2,923	$0	$6,523	$9,446	($115,674)
2	$0	18,544	$3,011	$0	$6,490	$9,501	($106,173)
3	$0	18,451	$3,101	$0	$6,458	$9,559	($96,615)
4	$0	18,359	$3,194	$0	$6,426	$9,619	($86,995)
5	$0	18,267	$3,290	$188	$6,393	$9,495	($77,500)
6	$0	18,176	$3,388	$187	$6,361	$9,563	($67,937)
7	$0	18,085	$3,490	$186	$6,330	$9,633	($58,304)
8	$0	17,994	$3,595	$185	$6,298	$9,707	($48,596)
9	$0	17,904	$3,703	$184	$6,267	$9,785	($38,812)
10	$0	17,815	$3,814	$183	$6,235	$9,865	($28,946)
11	$0	17,726	$3,928	$183	$6,204	$9,950	($18,997)
12	$0	17,637	$4,046	$182	$6,173	$10,037	($8,959)
13	$0	17,549	$4,167	$181	$6,142	$10,129	$1,169
14	$0	17,461	$4,292	$180	$6,111	$10,224	$11,393
15	$0	17,374	$4,421	$179	$6,081	$10,323	$21,716
16	$0	17,287	$4,554	$178	$6,050	$10,426	$32,143
17	$0	17,201	$4,690	$177	$6,020	$10,533	$42,676
18	$0	17,115	$4,831	$176	$5,990	$10,645	$53,321
19	$0	17,029	$4,976	$175	$5,960	$10,761	$64,082
20	$0	16,944	$5,125	$175	$5,930	$10,881	$74,963
21	$1	16,859	$5,279	$174	$5,901	$11,006	$85,969
22	$2	16,775	$5,437	$173	$5,871	$11,136	$97,105
23	$3	16,691	$5,601	$172	$5,842	$11,270	$108,375
24	$4	16,608	$5,769	$171	$5,813	$11,410	$119,785
25	$5	16,525	$5,942	$170	$5,784	$11,555	$131,340
	Totals:	439,012	$106,566	$3,760	$153,654	$256,460	$90,530
				Net Present Value (NPV)		**$131,365**	
				Internal Rate of Return (IRR)		**6.2%**	

Building	Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW_{DC}	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Marlkress Facility	1,100	Sunpower SPR230	68	14.7	1,000	15.64	18,637	2,244	15.64

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

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

Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	15.6 kW
DC to AC Derate Factor:	0.810
AC Rating:	12.7 kW
Array Type:	Fixed Tilt
Array Tilt:	10.0°
Array Azimuth:	135.0°
Energy Specifications	
Cost of Electricity:	15.7 ¢/kWh

Results			
Month	Solar Radiation (kWh/m^2/day)	AC Energy (kWh)	Energy Value ($)
1	2.44	953	149.62
2	3.19	1140	178.98
3	4.20	1635	256.69
4	5.11	1878	294.85
5	5.79	2144	336.61
6	6.11	2116	332.21
7	6.01	2125	333.62
8	5.47	1945	305.37
9	4.74	1661	260.78
10	3.64	1335	209.59
11	2.54	919	144.28
12	2.11	786	123.40
Year	4.29	18637	2926.01

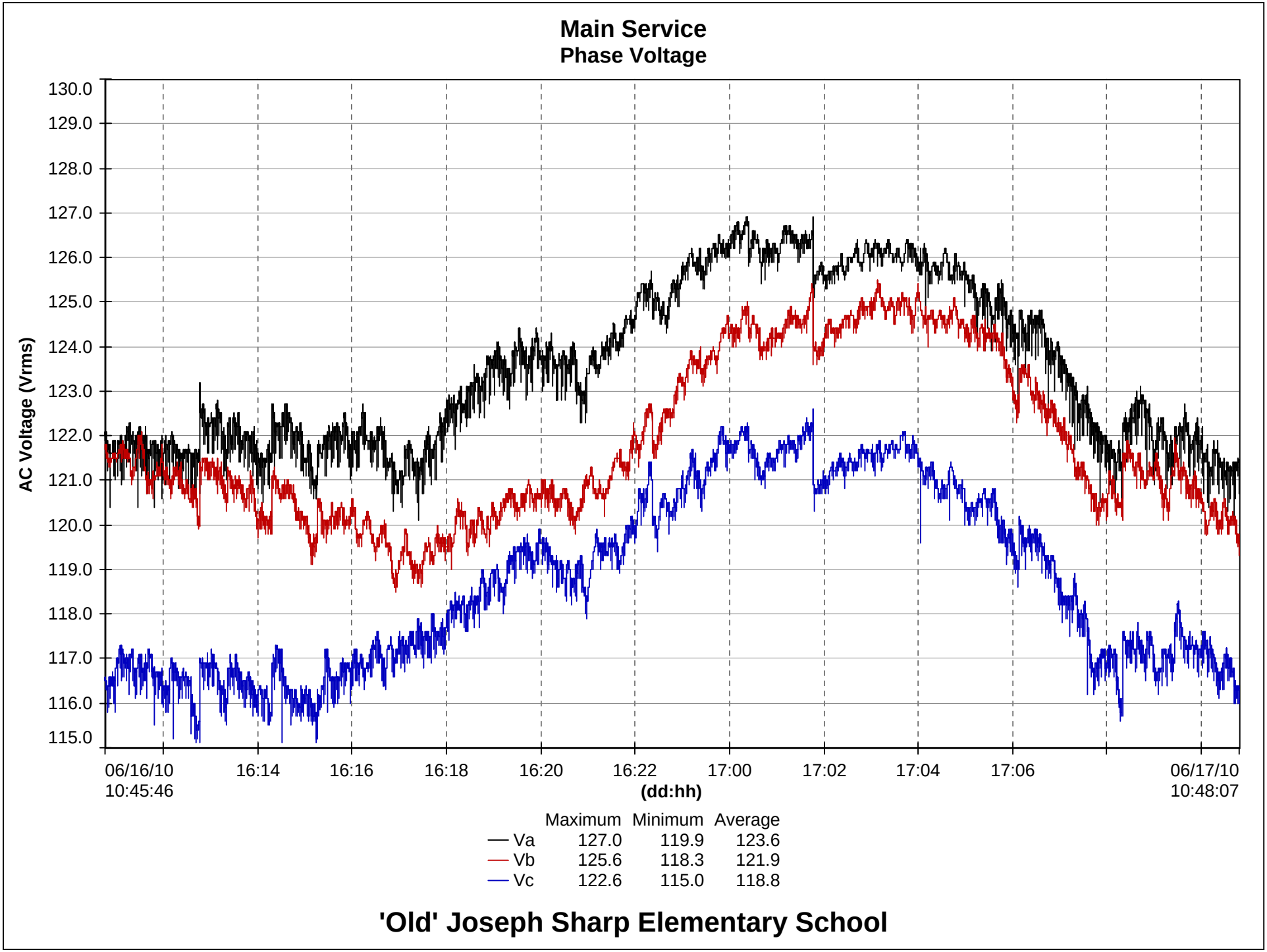
.= Proposed PV Layout

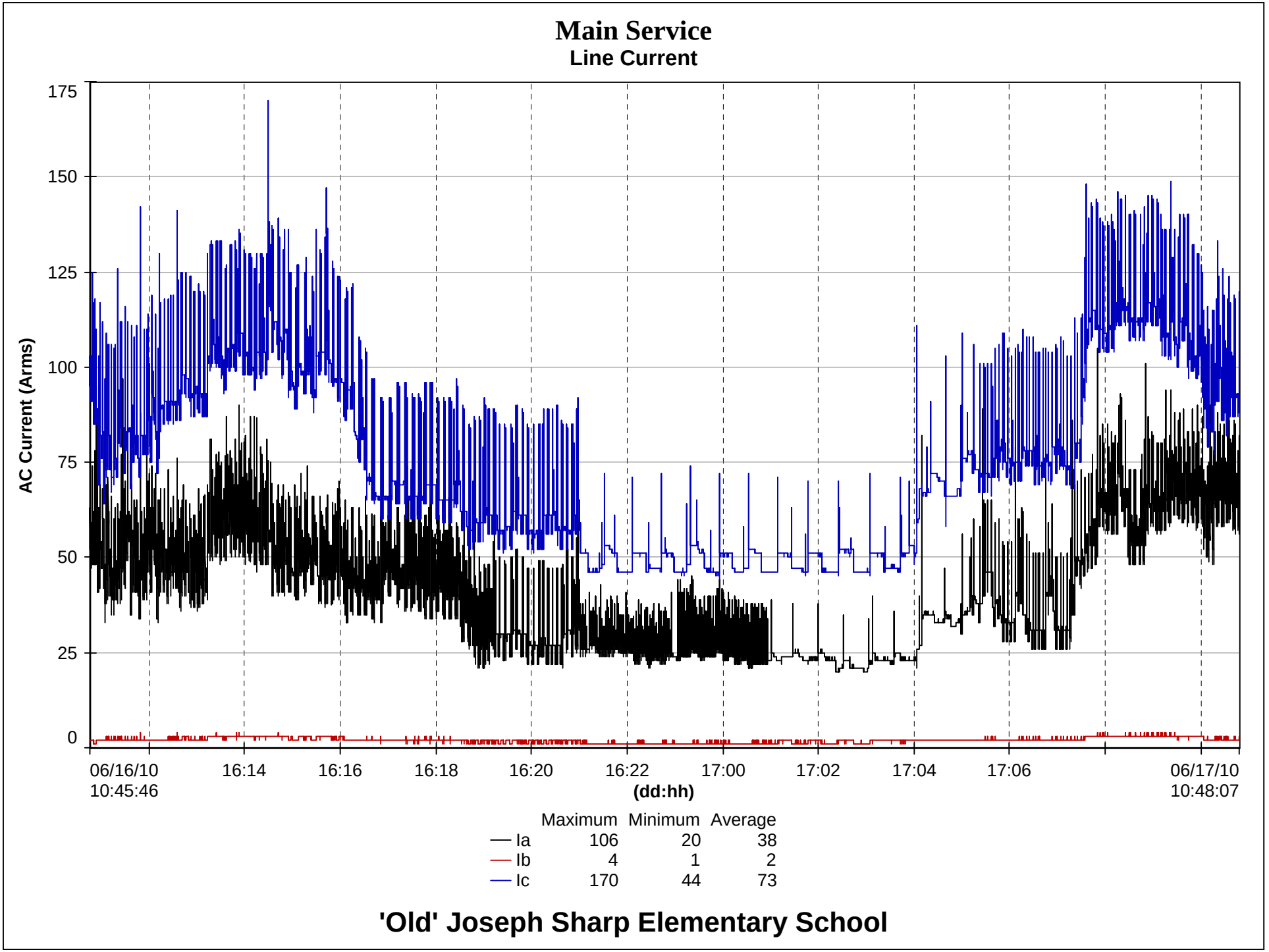
Note: Estimated kWH based on the National Renewable Energy Laboratory PVWatts Version 1 Calculator Program.

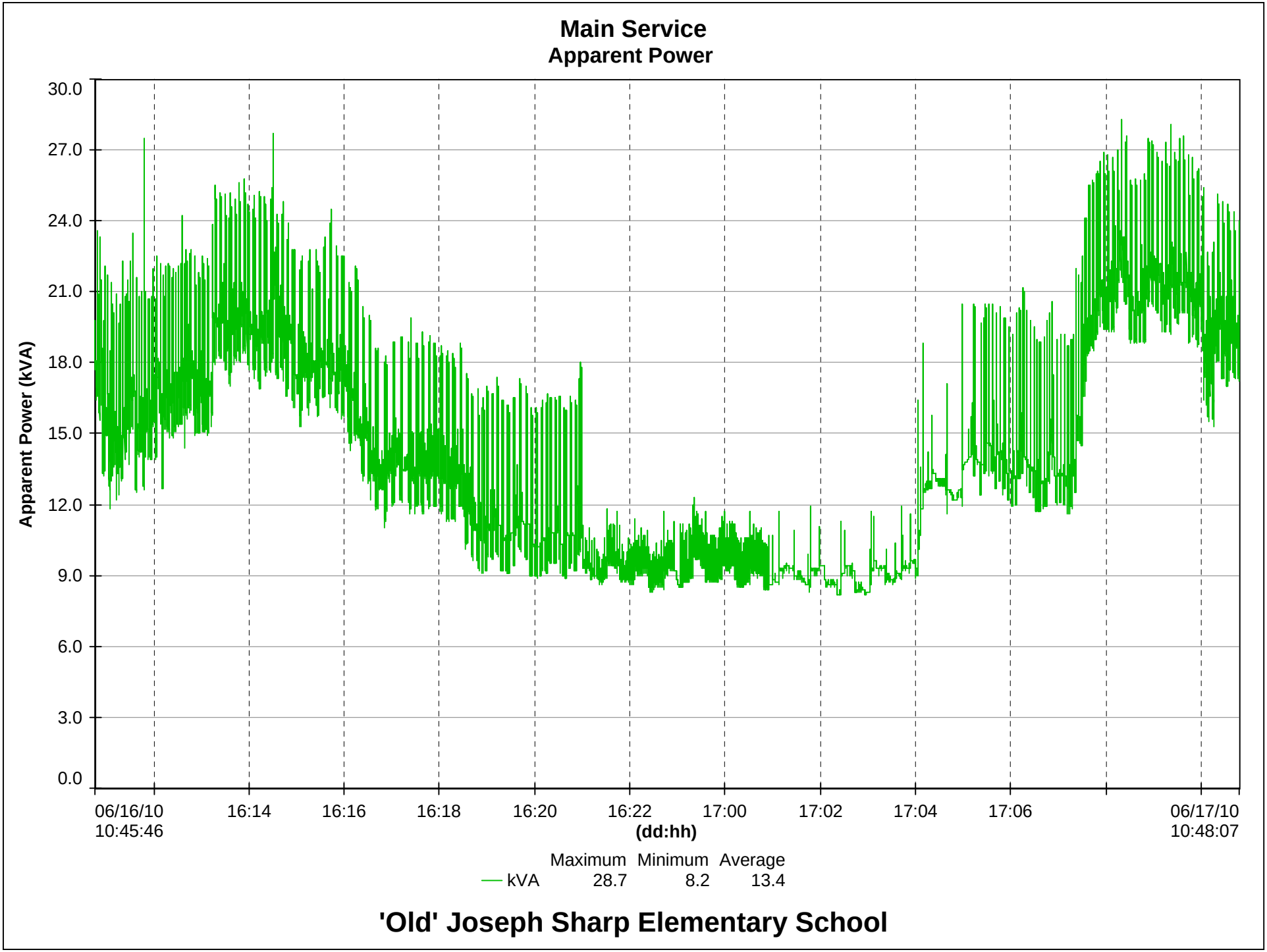
‘Old’ Joseph Sharp Elementary School

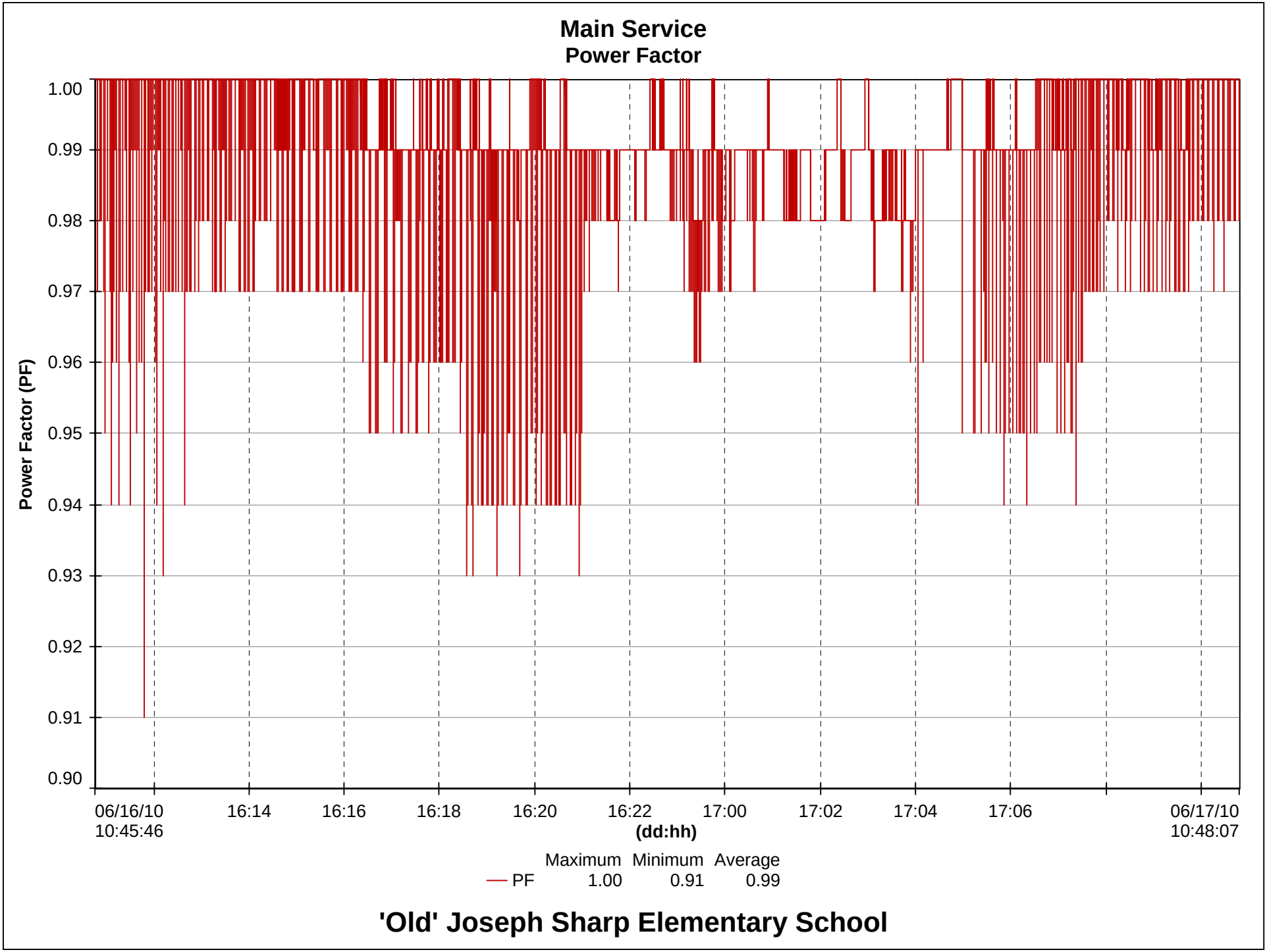
Electrical Load Study
June 16 – 17, 2010

Cherry Hill School District


Main Service
Phase Voltage
AC Voltage (Vrms)
130.0
129.0
128.0
127.0
126.0
125.0
124.0
123.0
122.0
121.0
120.0
119.0
118.0
117.0
116.0
115.0
06/16/10
10:45:46
16:14
16:16
16:18
16:20
16:22
17:00
17:02
17:04
17:06
06/17/10
10:48:07
(dd:hh)
Maximum Minimum Average
Va 127.0 119.9 123.6
Vb 125.6 118.3 121.9
Vc 122.6 115.0 118.8
'Old' Joseph Sharp Elementary School


Main Service
Line Current
AC Current (Arms)
175
150
125
100
75
50
25
0
06/16/10
10:45:46
16:14
16:16
16:18
16:20
16:22
17:00
17:02
17:04
17:06
06/17/10
10:48:07
(dd:hh)
Maximum Minimum Average
Ia 106 20 38
Ib 4 1 2
Ic 170 44 73
'Old' Joseph Sharp Elementary School


Main Service
Apparent Power
30.0
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
Apparent Power (kVA)
06/16/10
10:45:46
16:14
16:16
16:18
16:20
16:22
17:00
17:02
17:04
17:06
06/17/10
10:48:07
(dd:hh)
Maximum Minimum Average
kVA 28.7 8.2 13.4
'Old' Joseph Sharp Elementary School


Main Service
Power Factor
Power Factor (PF)
1.00
0.99
0.98
0.97
0.96
0.95
0.94
0.93
0.92
0.91
0.90
06/16/10
10:45:46
16:14
16:16
16:18
16:20
16:22
17:00
17:02
17:04
17:06
06/17/10
10:48:07
(dd:hh)
Maximum
Minimum
Average
PF
1.00
0.91
0.99
'Old' Joseph Sharp Elementary School

Cherry Hill School District | 'Old' Joseph Sharp Elementary School | June 16 - 17, 2010

Load Study

15-Minute Data Averages

Date / Time	Va	Vb	Vc	Ia	Ib	Ic	PF	kVA
6/16/10 11:00	121.7	121.5	116.5	53	2	87	1.00	16.7
6/16/10 11:15	121.8	121.6	117.0	44	2	74	1.00	14.3
6/16/10 11:30	122.0	121.5	116.9	44	2	78	1.00	14.6
6/16/10 11:45	121.8	121.3	116.9	48	2	78	1.00	15.2
6/16/10 12:00	121.7	121.2	116.6	43	2	80	1.00	14.8
6/16/10 12:15	121.8	121.1	116.6	47	2	84	1.00	15.7
6/16/10 12:30	121.6	121.0	116.6	45	2	89	1.00	16.0
6/16/10 12:45	121.5	120.6	116.0	44	2	92	1.00	16.3
6/16/10 13:00	122.3	121.3	116.8	43	2	93	1.00	16.4
6/16/10 13:15	122.4	121.2	116.7	43	2	92	1.00	16.3
6/16/10 13:30	122.0	120.9	116.5	54	3	104	1.00	19.1
6/16/10 13:45	122.1	120.8	116.6	56	3	100	1.00	18.8
6/16/10 14:00	121.8	120.7	116.3	55	3	104	1.00	19.2
6/16/10 14:15	121.5	120.1	116.1	54	3	100	1.00	18.5
6/16/10 14:30	122.1	120.8	116.8	53	3	103	1.00	18.7
6/16/10 14:45	122.3	120.8	116.4	48	3	111	0.99	19.1
6/16/10 15:00	121.9	120.3	116.1	46	3	103	1.00	17.9
6/16/10 15:15	121.3	119.7	116.0	45	2	96	1.00	16.9
6/16/10 15:30	121.7	120.2	116.5	47	2	96	1.00	17.2
6/16/10 15:45	122.0	120.2	116.6	43	3	103	1.00	17.6
6/16/10 16:00	122.0	120.2	116.8	43	3	97	1.00	16.9
6/16/10 16:15	122.1	119.9	116.9	41	2	93	1.00	16.1
6/16/10 16:30	121.9	119.9	117.0	40	2	82	1.00	14.7
6/16/10 16:45	121.9	119.7	117.1	38	2	70	0.99	13.0
6/16/10 17:00	121.2	119.1	117.1	41	2	65	0.99	12.8
6/16/10 17:15	121.4	119.5	117.3	43	2	66	0.99	13.2
6/16/10 17:30	121.3	119.0	117.5	42	2	66	0.99	13.0
6/16/10 17:45	121.7	119.4	117.6	42	2	64	0.99	12.8
6/16/10 18:00	122.2	119.6	117.6	39	2	68	0.99	12.9
6/16/10 18:15	122.7	119.8	118.1	39	2	64	0.99	12.5
6/16/10 18:30	122.8	120.0	118.2	38	2	65	0.99	12.6
6/16/10 18:45	123.2	120.0	118.4	32	2	59	0.99	11.1
6/16/10 19:00	123.5	120.0	118.7	27	2	57	0.99	10.2
6/16/10 19:15	123.7	120.3	118.7	27	2	60	0.99	10.6
6/16/10 19:30	123.6	120.6	119.2	28	2	56	0.99	10.2
6/16/10 19:45	123.9	120.6	119.5	29	2	58	0.99	10.7
6/16/10 20:00	124.0	120.7	119.4	27	2	58	0.99	10.5
6/16/10 20:15	123.9	120.8	119.5	26	1	55	1.00	9.9
6/16/10 20:30	123.6	120.6	119.1	26	2	60	0.99	10.5
6/16/10 20:45	123.7	120.4	118.8	26	2	56	0.99	10.0
6/16/10 21:00	123.1	120.6	118.8	30	2	57	0.99	10.6
6/16/10 21:15	123.7	120.9	119.3	26	1	50	0.99	9.3
6/16/10 21:30	124.0	120.8	119.5	26	1	46	0.99	8.9
6/16/10 21:45	124.2	121.4	119.4	26	1	52	0.98	9.5
6/16/10 22:00	124.6	121.6	119.9	26	1	47	0.99	8.9
6/16/10 22:15	125.2	122.0	120.5	25	1	49	0.99	9.0
6/16/10 22:30	125.2	122.2	120.5	24	1	49	0.99	8.9
6/16/10 22:45	124.8	122.4	120.4	23	1	47	0.99	8.7
6/16/10 23:00	125.4	123.0	120.6	24	1	51	0.99	9.2
6/16/10 23:15	125.9	123.5	121.2	24	1	46	0.99	8.7

Cherry Hill School District

'Old' Joseph Sharp Elementary School
Load Study
15-Minute Data Averages

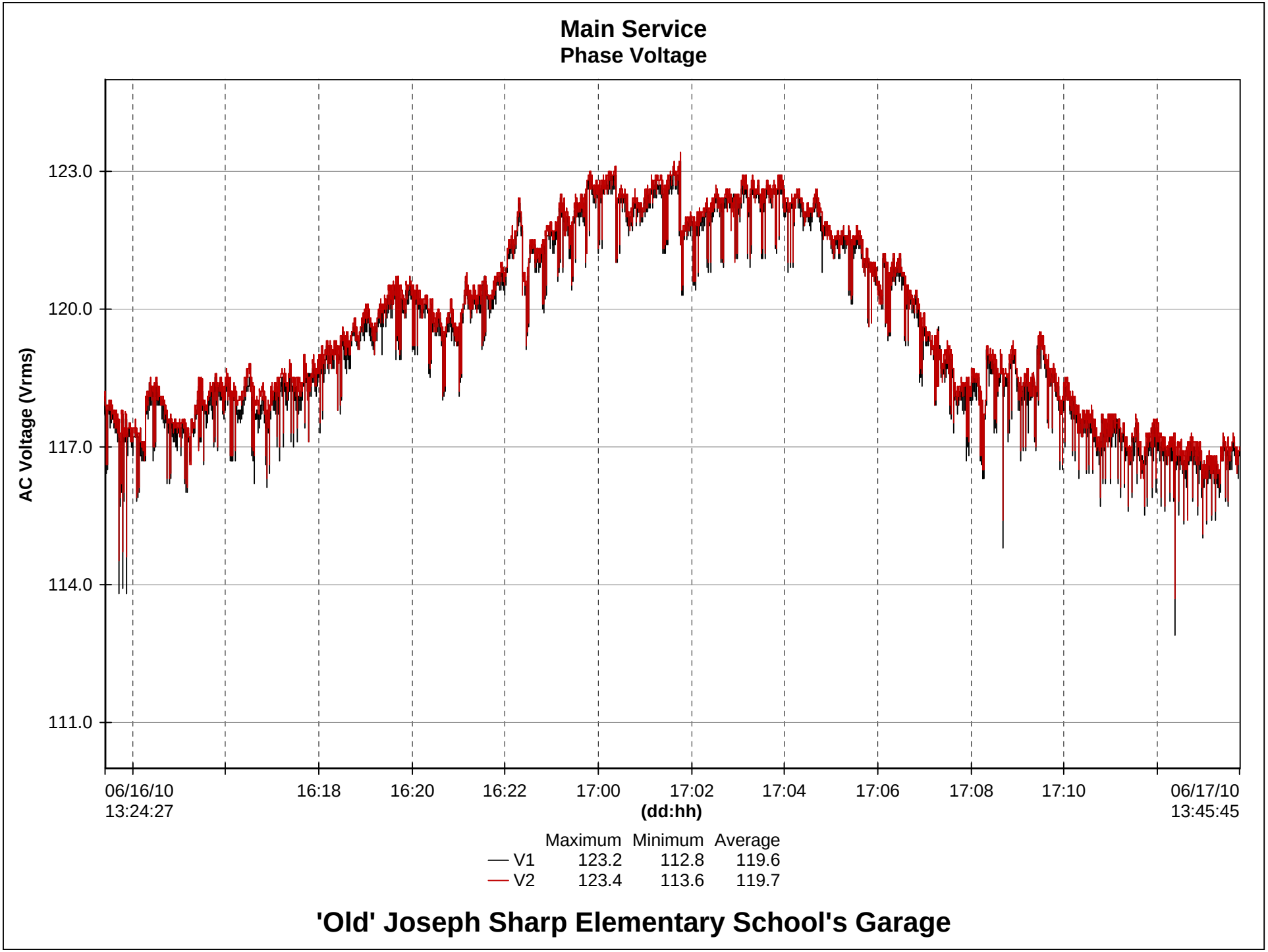
June 16 - 17, 2010

Date / Time	Va	Vb	Vc	Ia	Ib	Ic	PF	kVA
6/16/10 23:30	125.8	123.6	121.0	25	1	52	0.98	9.5
6/16/10 23:45	126.1	123.8	121.4	24	1	49	0.99	9.0
6/17/10 0:00	126.2	124.3	121.9	25	1	47	0.99	9.0
6/17/10 0:15	126.5	124.3	121.8	24	1	50	0.99	9.2
6/17/10 0:30	126.5	124.6	122.0	23	1	46	0.99	8.6
6/17/10 0:45	126.2	124.2	121.3	22	1	51	0.99	9.1
6/17/10 1:00	126.2	124.1	121.5	22	1	47	0.99	8.6
6/17/10 1:15	126.4	124.4	121.8	24	1	48	0.99	9.0
6/17/10 1:30	126.4	124.7	121.8	24	2	50	0.98	9.3
6/17/10 1:45	126.4	124.8	122.1	24	1	47	0.99	8.8
6/17/10 2:00	125.8	124.1	121.0	23	2	50	0.98	9.2
6/17/10 2:15	125.6	124.4	121.2	24	1	48	0.99	8.9
6/17/10 2:30	125.8	124.5	121.4	22	1	48	0.99	8.6
6/17/10 2:45	126.1	124.7	121.4	22	2	51	0.98	9.2
6/17/10 3:00	126.1	124.9	121.6	21	1	46	0.99	8.3
6/17/10 3:15	126.2	125.1	121.6	23	2	49	0.98	9.1
6/17/10 3:30	126.1	124.9	121.7	23	2	49	0.99	9.0
6/17/10 3:45	126.0	125.0	121.8	24	2	47	0.98	9.0
6/17/10 4:00	126.2	124.9	121.7	23	2	52	0.98	9.4
6/17/10 4:15	125.9	124.7	121.2	29	2	62	0.99	11.3
6/17/10 4:30	125.7	124.7	121.0	34	2	70	0.99	13.0
6/17/10 4:45	125.9	124.7	121.0	34	2	68	0.99	12.7
6/17/10 5:00	125.8	124.6	120.8	33	2	66	1.00	12.3
6/17/10 5:15	125.4	124.4	120.4	36	2	76	0.99	13.9
6/17/10 5:30	125.2	124.3	120.6	39	2	72	0.99	13.8
6/17/10 5:45	125.0	124.2	120.4	41	2	72	0.99	14.0
6/17/10 6:00	124.8	123.6	119.8	33	2	76	0.99	13.5
6/17/10 6:15	124.5	123.1	119.6	36	2	73	0.99	13.4
6/17/10 6:30	124.5	123.2	119.7	33	2	77	0.99	13.5
6/17/10 6:45	124.4	122.8	119.5	29	2	74	1.00	12.7
6/17/10 7:00	123.9	122.5	119.0	37	2	75	1.00	13.7
6/17/10 7:15	123.5	122.0	118.4	30	2	75	0.99	12.8
6/17/10 7:30	122.8	121.3	118.2	42	2	75	1.00	14.2
6/17/10 7:45	122.5	120.9	117.4	50	3	104	1.00	18.6
6/17/10 8:00	122.0	120.4	116.9	58	3	110	1.00	20.3
6/17/10 8:15	121.6	120.7	117.0	61	3	109	1.00	20.5
6/17/10 8:30	121.9	121.2	116.9	66	3	115	0.99	21.8
6/17/10 8:45	122.6	121.3	117.3	52	3	111	1.00	19.8
6/17/10 9:00	122.4	121.1	117.3	58	3	113	1.00	20.7
6/17/10 9:15	122.0	121.0	116.8	62	3	112	0.99	20.9
6/17/10 9:30	121.7	121.0	117.3	65	3	108	1.00	20.9
6/17/10 9:45	122.2	121.1	117.5	64	3	109	0.99	20.9
6/17/10 10:00	121.9	120.8	117.2	65	3	102	1.00	20.2
6/17/10 10:15	121.5	120.2	117.3	59	2	90	1.00	17.8
6/17/10 10:30	121.5	120.3	116.7	62	2	93	1.00	18.6
6/17/10 10:45	121.2	120.1	116.8	63	2	90	1.00	18.4
6/17/10 10:48	121.3	119.7	116.3	62	2	91	1.00	18.3

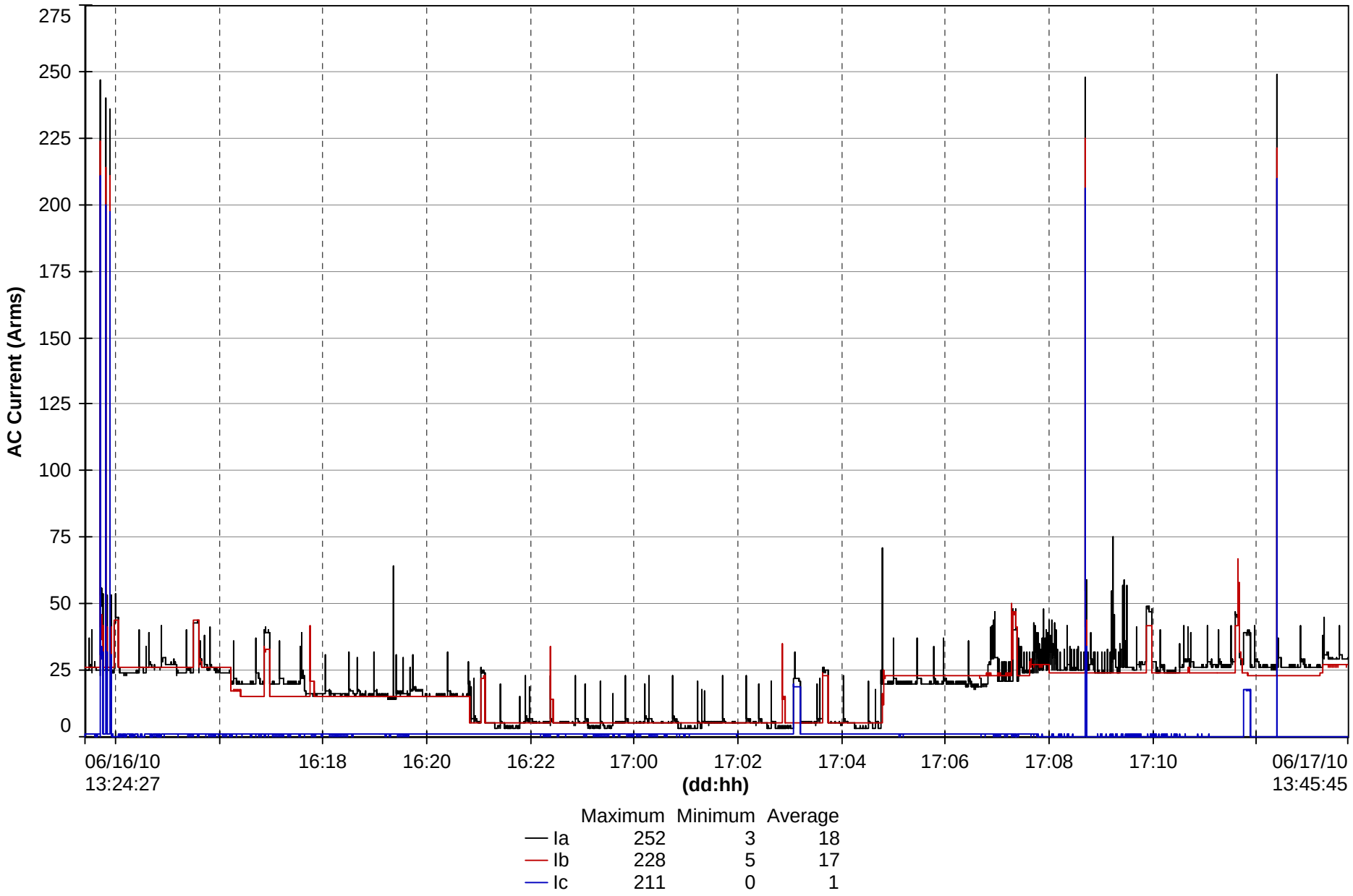
‘Old’ Joseph Sharp Elementary School’s Garage

Electrical Load Study
June 16 – 17, 2010

Cherry Hill School District

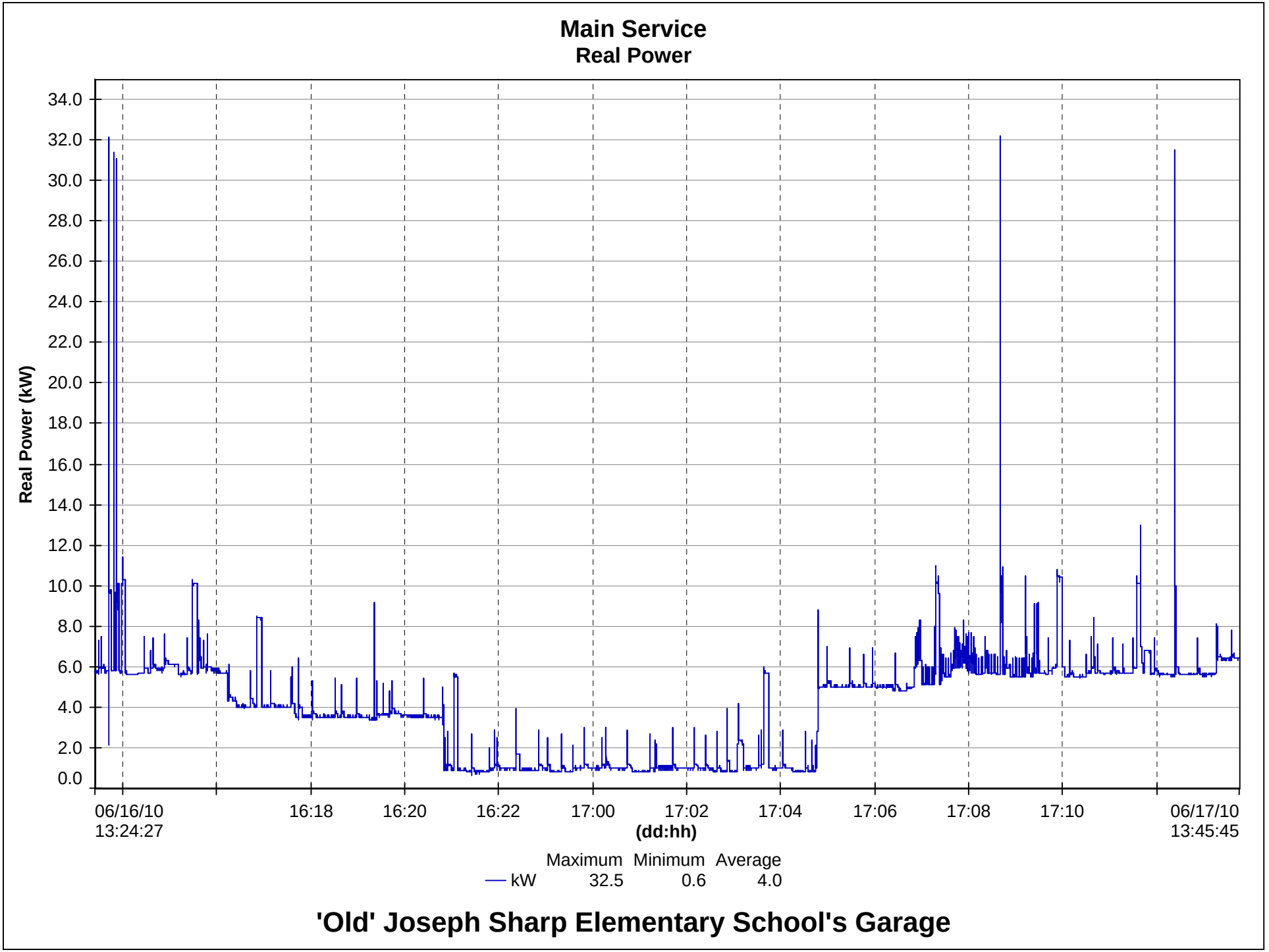

Main Service
Phase Voltage
AC Voltage (Vrms)
123.0
120.0
117.0
114.0
111.0
06/16/10
13:24:27
16:18
16:20
16:22
17:00
17:02
17:04
17:06
17:08
17:10
06/17/10
13:45:45
(dd:hh)
Maximum Minimum Average
V1 123.2 112.8 119.6
V2 123.4 113.6 119.7
'Old' Joseph Sharp Elementary School's Garage

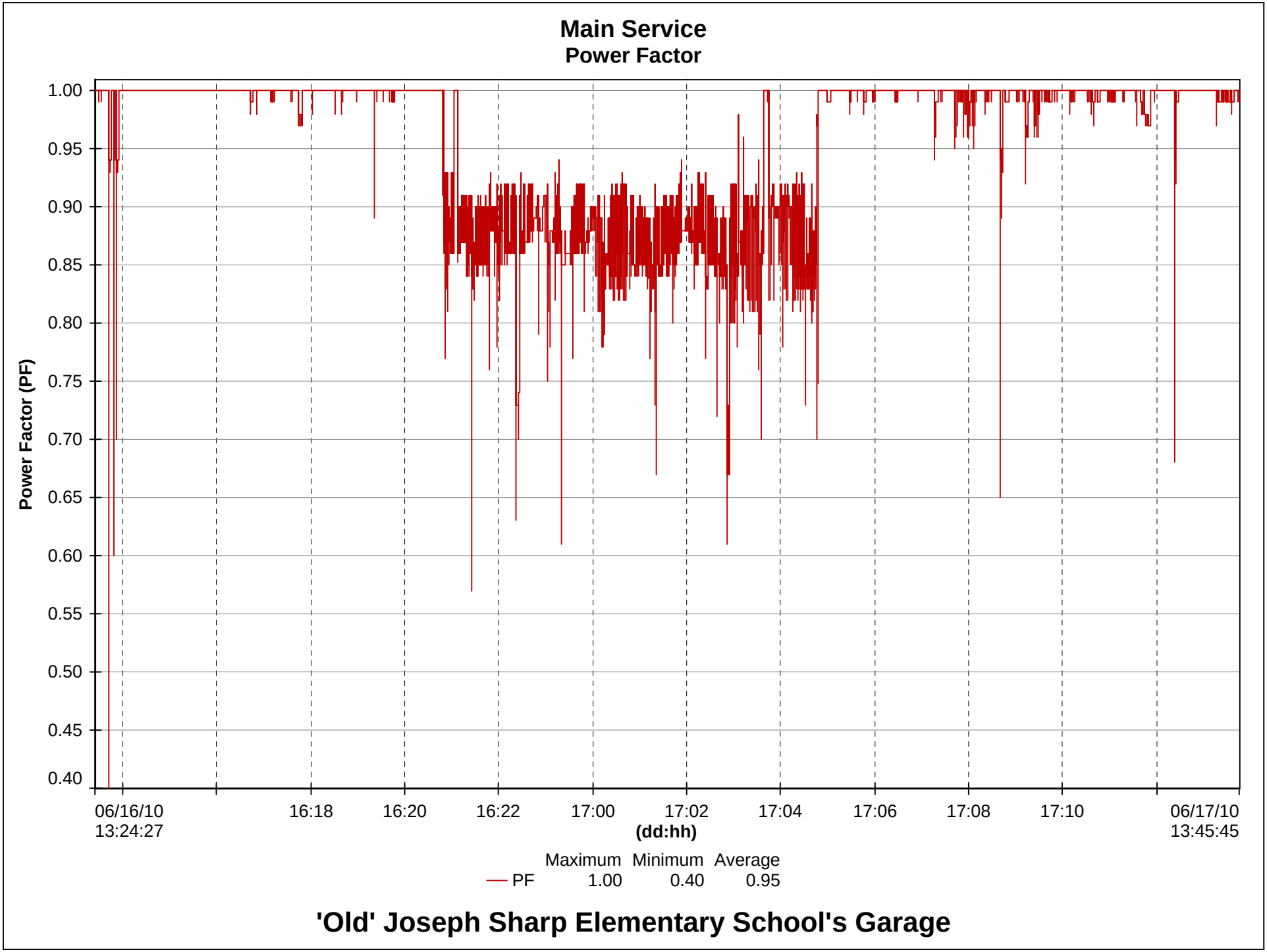
Main Service
Line Current



	Maximum	Minimum	Average
Ia	252	3	18
Ib	228	5	17
Ic	211	0	1

'Old' Joseph Sharp Elementary School's Garage


Main Service
Real Power
Real Power (kW)
34.0
32.0
30.0
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
06/16/10
13:24:27
16:18
16:20
16:22
17:00
17:02
17:04
17:06
17:08
17:10
06/17/10
13:45:45
(dd:hh)
Maximum Minimum Average
kW 32.5 0.6 4.0
'Old' Joseph Sharp Elementary School's Garage


Main Service
Power Factor
Power Factor (PF)
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
06/16/10
13:24:27
16:18
16:20
16:22
17:00
17:02
17:04
17:06
17:08
17:10
06/17/10
13:45:45
(dd:hh)
Maximum
Minimum
Average
PF
1.00
0.40
0.95
'Old' Joseph Sharp Elementary School's Garage

Cheery Hill School District 'Old' Joseph Sharp Elementary School Garage June 16 - 17, 2010

Load Study

15-Minute Data Averages

Date / Time	V1	V2	Ia	Ib	Ic	kW	PF
6/16/10 13:39	117.7	117.8	25	26	1	5.8	1.00
6/16/10 13:54	117.3	117.5	37	32	14	7.5	0.97
6/16/10 14:09	117.2	117.3	33	33	1	7.5	1.00
6/16/10 14:24	117.5	117.6	24	26	1	5.6	1.00
6/16/10 14:39	118.1	118.2	25	26	0	5.8	1.00
6/16/10 14:54	117.5	117.6	26	26	1	5.9	1.00
6/16/10 15:09	117.3	117.5	28	26	1	6.1	1.00
6/16/10 15:24	117.4	117.5	25	26	1	5.7	1.00
6/16/10 15:39	118.0	118.1	32	33	1	7.6	1.00
6/16/10 15:54	118.2	118.3	26	26	1	6.0	1.00
6/16/10 16:09	118.2	118.3	24	26	1	5.8	1.00
6/16/10 16:24	117.9	118.1	22	20	1	4.8	1.00
6/16/10 16:39	118.1	118.4	20	15	1	4.0	1.00
6/16/10 16:54	117.7	118.0	24	18	1	4.8	1.00
6/16/10 17:09	117.9	118.1	25	20	1	5.2	1.00
6/16/10 17:24	118.3	118.5	21	15	1	4.1	1.00
6/16/10 17:39	118.1	118.4	21	15	1	4.1	1.00
6/16/10 17:54	118.5	118.6	16	17	1	3.7	0.99
6/16/10 18:09	118.7	118.9	16	15	1	3.6	1.00
6/16/10 18:24	119.0	119.1	16	15	1	3.5	1.00
6/16/10 18:39	119.1	119.3	16	15	1	3.6	1.00
6/16/10 18:54	119.3	119.5	16	15	1	3.5	1.00
6/16/10 19:09	119.7	119.8	16	15	1	3.6	1.00
6/16/10 19:24	119.7	119.8	15	15	1	3.4	1.00
6/16/10 19:39	120.2	120.3	16	15	1	3.6	1.00
6/16/10 19:54	120.1	120.3	17	15	1	3.7	1.00
6/16/10 20:09	120.3	120.4	15	15	1	3.6	1.00
6/16/10 20:24	120.0	120.1	15	15	1	3.5	1.00
6/16/10 20:39	119.7	119.8	16	15	1	3.6	1.00
6/16/10 20:54	119.6	119.7	14	12	1	3.0	0.96
6/16/10 21:09	119.6	119.8	13	11	1	2.7	0.91
6/16/10 21:24	120.2	120.3	4	5	1	0.9	0.86
6/16/10 21:39	120.3	120.4	4	5	1	0.9	0.85
6/16/10 21:54	120.4	120.5	4	5	1	0.9	0.86
6/16/10 22:09	121.0	121.1	6	5	1	1.1	0.87
6/16/10 22:24	121.6	121.7	5	6	1	1.1	0.85
6/16/10 22:39	121.0	121.1	5	7	1	1.1	0.84
6/16/10 22:54	121.2	121.4	5	5	1	0.9	0.89
6/16/10 23:09	121.6	121.8	5	5	1	1.0	0.89
6/16/10 23:24	122.0	122.1	4	5	1	0.9	0.87
6/16/10 23:39	122.1	122.2	4	5	1	0.9	0.86
6/16/10 23:54	122.5	122.6	6	5	1	1.1	0.87
6/17/10 0:09	122.6	122.7	5	5	1	1.0	0.88
6/17/10 0:24	122.7	122.9	6	5	1	1.1	0.85
6/17/10 0:39	122.3	122.4	5	5	1	1.0	0.85
6/17/10 0:54	122.1	122.2	5	5	1	1.0	0.86
6/17/10 1:09	122.4	122.4	3	5	1	0.8	0.85
6/17/10 1:24	122.6	122.8	5	5	1	0.9	0.84
6/17/10 1:39	122.7	122.9	5	5	1	1.0	0.85
6/17/10 1:54	122.1	122.3	5	5	1	1.1	0.86

Cheery Hill School District 'Old' Joseph Sharp Elementary School Garage June 16 - 17, 2010

Load Study

15-Minute Data Averages

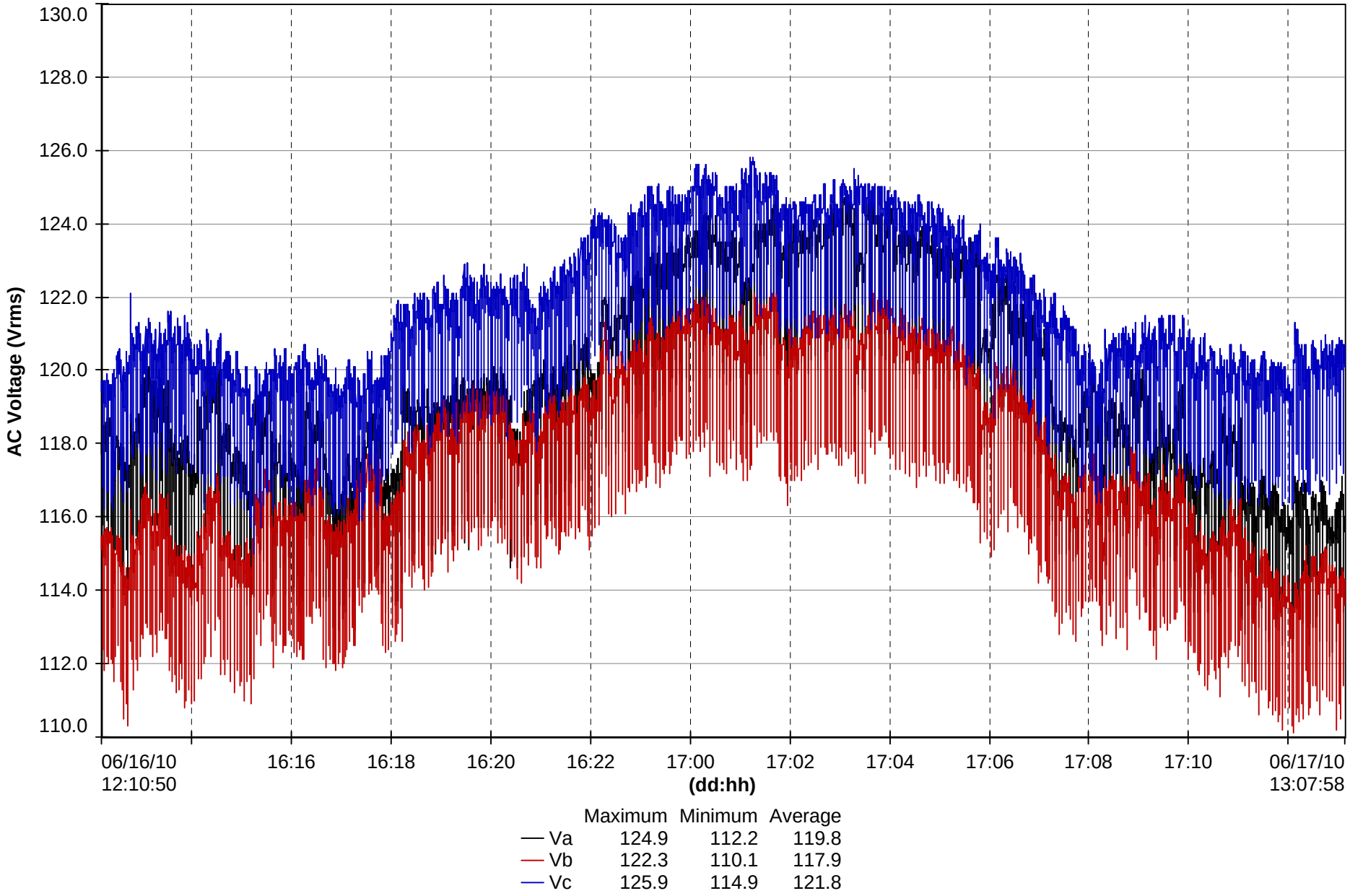
Date / Time	V1	V2	Ia	Ib	Ic	kW	PF
6/17/10 2:09	121.8	121.9	5	5	1	1.0	0.88
6/17/10 2:24	122.0	122.1	5	5	1	1.0	0.86
6/17/10 2:39	122.3	122.4	5	5	1	1.0	0.85
6/17/10 2:54	122.3	122.4	4	7	1	1.0	0.81
6/17/10 3:09	122.4	122.5	9	6	7	1.3	0.83
6/17/10 3:24	122.5	122.6	8	5	5	1.3	0.88
6/17/10 3:39	122.5	122.6	6	5	1	1.1	0.88
6/17/10 3:54	122.6	122.7	12	12	1	2.8	0.94
6/17/10 4:09	122.3	122.5	5	5	1	1.0	0.89
6/17/10 4:24	122.3	122.4	4	5	1	0.9	0.87
6/17/10 4:39	122.1	122.2	4	5	1	0.9	0.84
6/17/10 4:54	122.0	122.1	13	12	1	2.8	0.91
6/17/10 5:09	121.6	121.6	21	23	1	5.1	1.00
6/17/10 5:24	121.5	121.6	20	23	1	5.0	1.00
6/17/10 5:39	121.5	121.6	21	23	1	5.1	1.00
6/17/10 5:54	121.0	121.1	20	23	1	5.0	1.00
6/17/10 6:09	120.6	120.7	21	23	1	5.1	1.00
6/17/10 6:24	120.8	120.9	20	23	1	5.0	1.00
6/17/10 6:39	120.7	120.8	19	23	1	4.9	1.00
6/17/10 6:54	120.2	120.2	22	23	1	5.2	1.00
6/17/10 7:09	119.4	119.6	26	23	1	5.8	1.00
6/17/10 7:24	119.1	119.1	29	32	1	7.1	1.00
6/17/10 7:39	118.7	118.9	25	23	1	5.6	1.00
6/17/10 7:54	118.1	118.3	28	27	0	6.2	1.00
6/17/10 8:09	118.2	118.4	29	25	0	6.2	1.00
6/17/10 8:24	118.2	118.3	26	24	0	5.8	1.00
6/17/10 8:39	118.7	118.8	26	24	0	5.8	1.00
6/17/10 8:54	118.5	118.7	31	26	5	6.4	0.99
6/17/10 9:09	118.4	118.5	25	24	0	5.6	1.00
6/17/10 9:24	118.3	118.4	27	24	0	5.7	0.99
6/17/10 9:39	119.0	119.1	27	24	0	5.8	1.00
6/17/10 9:54	118.4	118.5	28	25	0	6.1	1.00
6/17/10 10:09	118.0	118.1	34	30	0	7.4	1.00
6/17/10 10:24	117.7	117.8	25	24	0	5.6	1.00
6/17/10 10:39	117.5	117.6	25	24	0	5.7	1.00
6/17/10 10:54	117.2	117.3	27	24	0	5.8	1.00
6/17/10 11:09	117.4	117.5	27	24	0	5.8	1.00
6/17/10 11:24	117.1	117.2	27	24	0	5.7	1.00
6/17/10 11:39	117.0	117.2	32	29	0	6.9	1.00
6/17/10 11:54	116.9	117.0	35	27	9	6.9	0.98
6/17/10 12:09	117.1	117.3	27	23	0	5.7	1.00
6/17/10 12:24	116.9	117.0	28	24	2	5.9	1.00
6/17/10 12:39	116.7	116.9	28	23	1	5.8	1.00
6/17/10 12:54	116.8	117.0	26	23	0	5.6	1.00
6/17/10 13:09	116.5	116.6	26	23	0	5.6	1.00
6/17/10 13:24	116.5	116.6	28	25	0	6.0	1.00
6/17/10 13:39	116.9	117.0	29	27	0	6.4	0.99
6/17/10 13:45	116.8	116.9	29	27	0	6.4	1.00

‘Old’ Joseph Sharp Elementary School’s Warehouse

Electrical Load Study
June 16 – 17, 2010

Cherry Hill School District

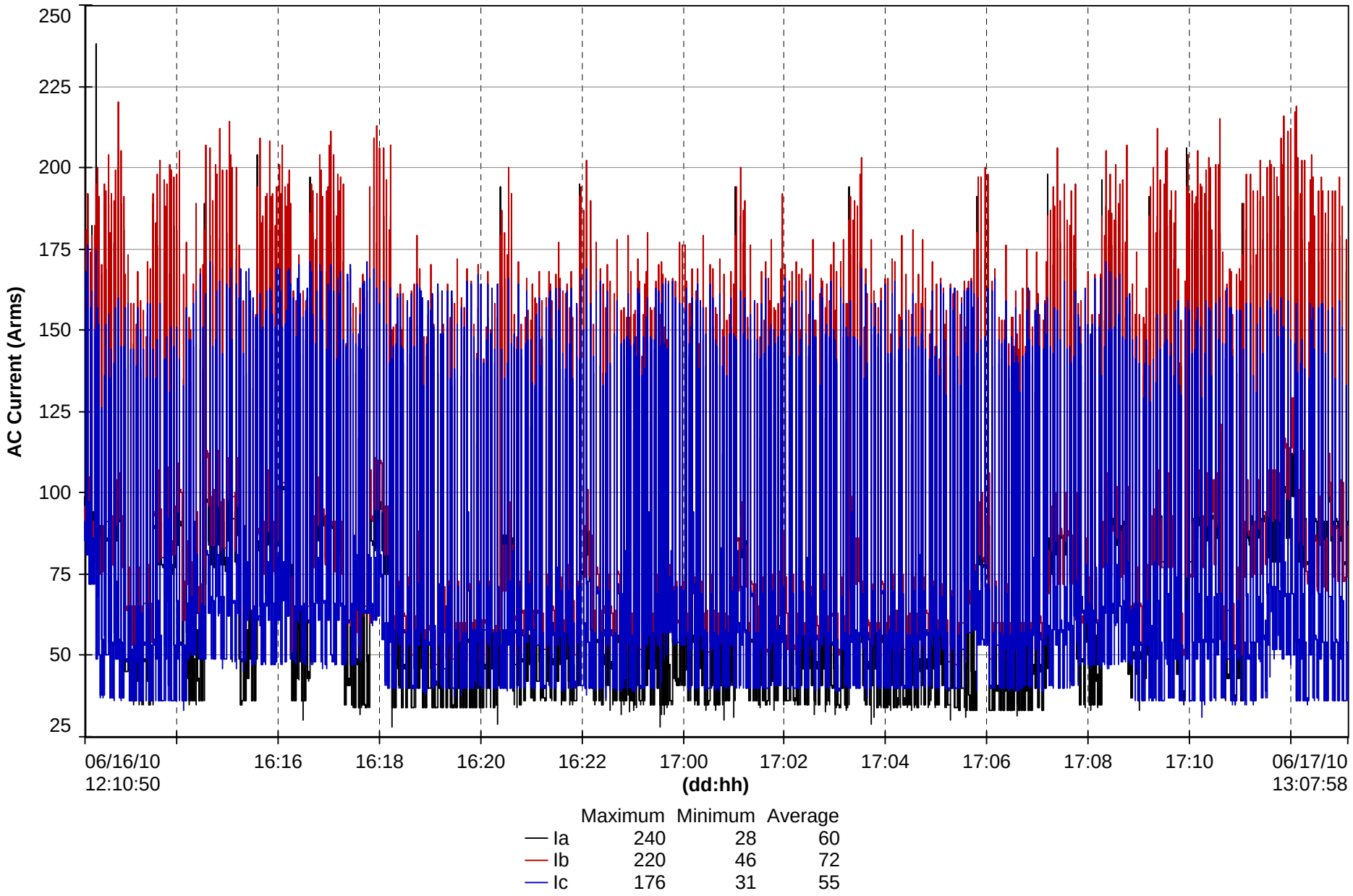
Main Service
Phase Voltage



	Maximum	Minimum	Average
Va	124.9	112.2	119.8
Vb	122.3	110.1	117.9
Vc	125.9	114.9	121.8

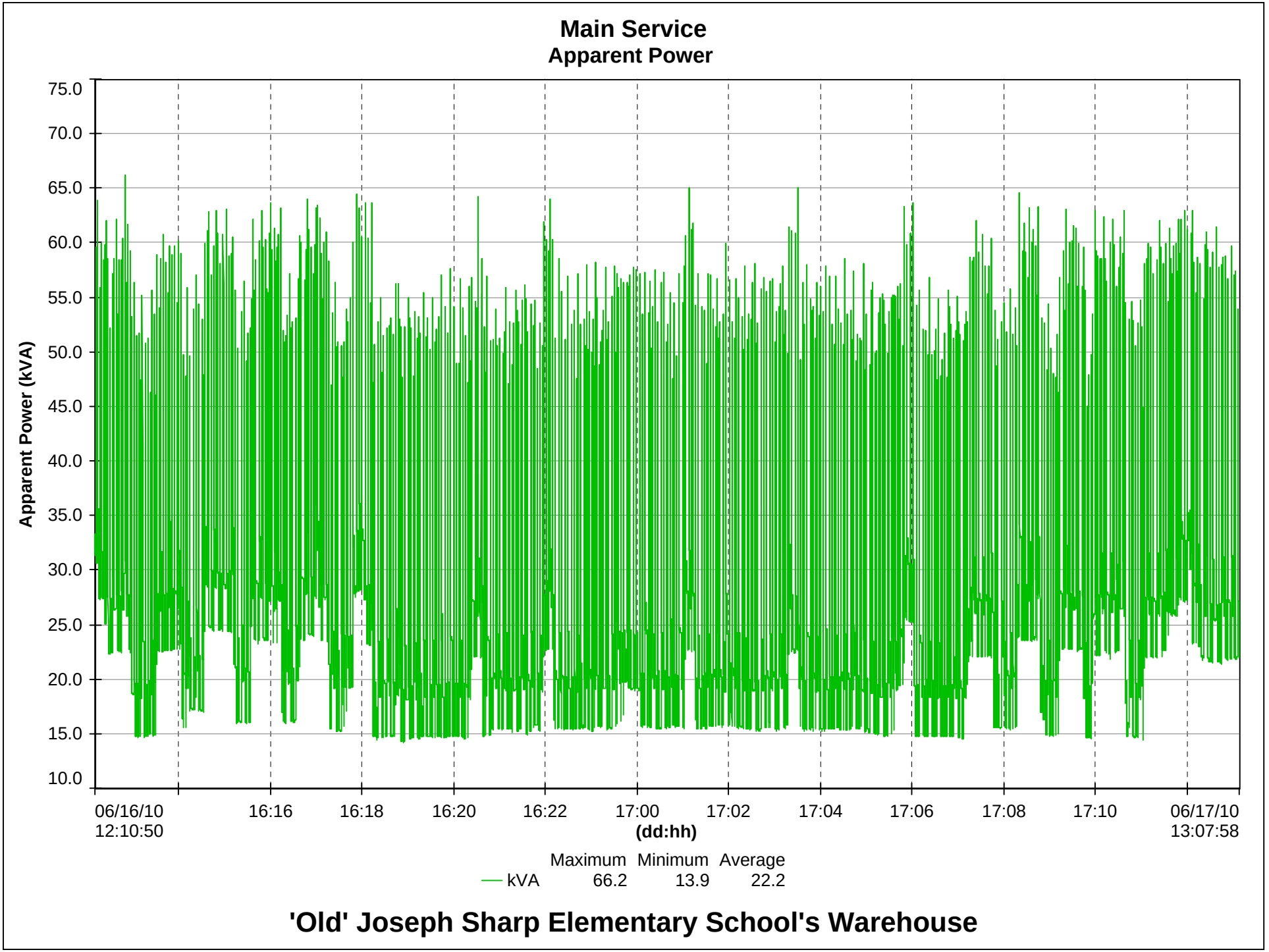
'Old' Joseph Sharp Elementary School's Warehouse

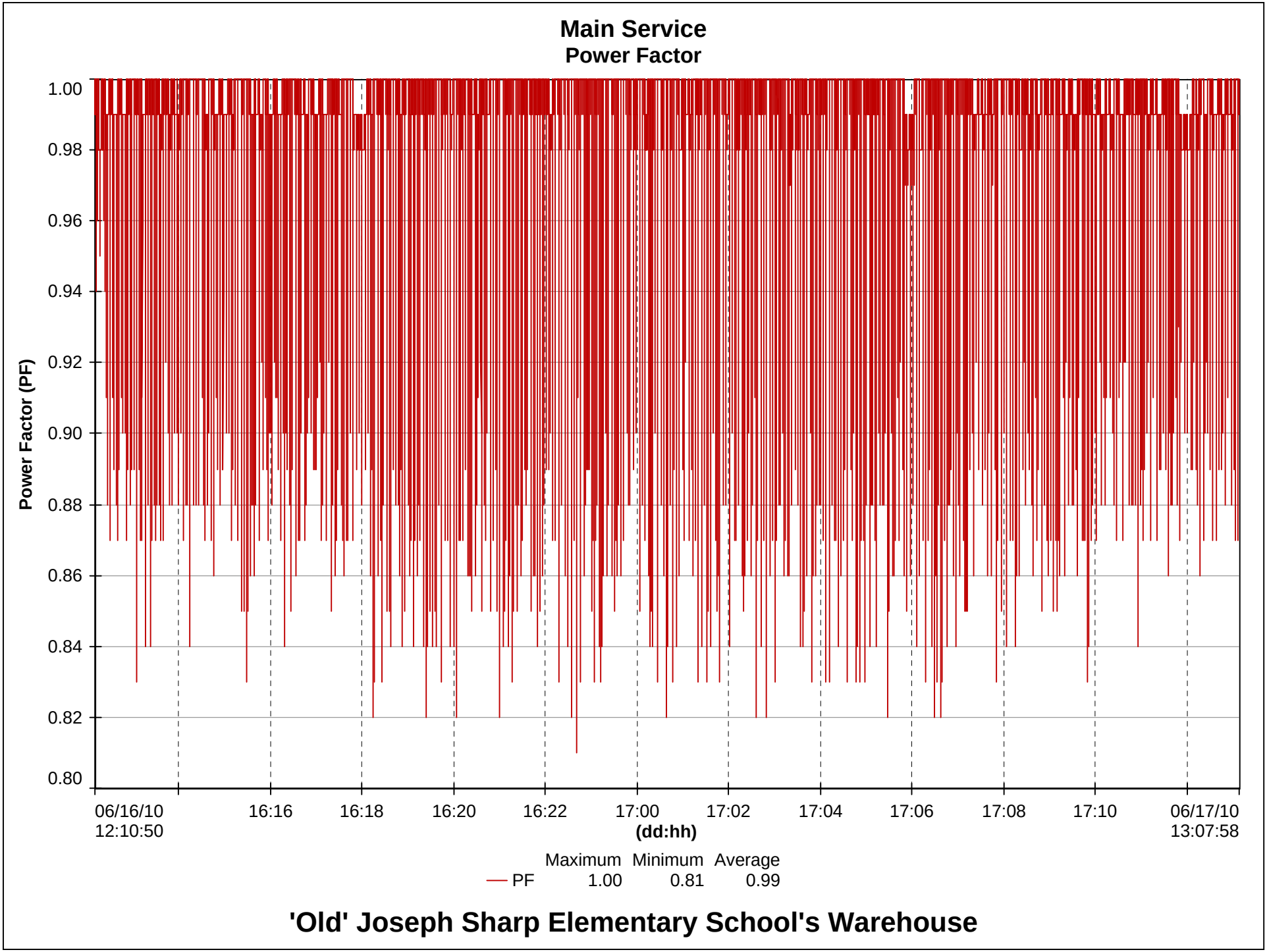
Main Service
Line Current



	Maximum	Minimum	Average
Ia	240	28	60
Ib	220	46	72
Ic	176	31	55

'Old' Joseph Sharp Elementary School's Warehouse


Main Service
Apparent Power
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
Apparent Power (kVA)
06/16/10
12:10:50
16:16
16:18
16:20
16:22
17:00
17:02
17:04
17:06
17:08
17:10
06/17/10
13:07:58
(dd:hh)
Maximum Minimum Average
kVA 66.2 13.9 22.2
'Old' Joseph Sharp Elementary School's Warehouse


Main Service
Power Factor
Power Factor (PF)
1.00
0.98
0.96
0.94
0.92
0.90
0.88
0.86
0.84
0.82
0.80
06/16/10
12:10:50
16:16
16:18
16:20
16:22
17:00
17:02
17:04
17:06
17:08
17:10
06/17/10
13:07:58
(dd:hh)
Maximum
Minimum
Average
PF
1.00
0.81
0.99
'Old' Joseph Sharp Elementary School's Warehouse

Cherry Hill School District 'Old' Joseph Sharp Elementary School's Warehouse June 16 - 17, 2010

Load Study

15-Minute Data Averages

Date / Time	Va	Vb	Vc	Ia	Ib	Ic	kVA	PF
6/16/10 12:25	118.2	115.3	119.4	91	90	82	30.9	0.99
6/16/10 12:40	117.5	114.8	119.8	88	89	51	26.7	0.99
6/16/10 12:55	117.9	114.8	120.5	90	93	49	27.2	0.99
6/16/10 13:10	119.2	116.1	120.6	54	67	47	19.9	1.00
6/16/10 13:25	119.2	115.8	120.5	45	63	49	18.5	1.00
6/16/10 13:40	118.3	115.4	120.7	69	80	49	23.2	0.99
6/16/10 13:55	117.6	114.7	120.7	85	92	49	26.4	0.99
6/16/10 14:10	117.6	114.6	120.2	73	86	48	24.2	0.99
6/16/10 14:25	119.1	115.6	120.1	46	72	60	21.0	1.00
6/16/10 14:40	118.7	115.9	120.1	64	82	62	24.5	1.00
6/16/10 14:55	117.7	115.0	119.9	85	93	61	28.1	0.99
6/16/10 15:10	117.1	114.7	119.5	86	94	61	28.0	0.99
6/16/10 15:25	118.1	115.7	119.1	56	71	64	22.3	1.00
6/16/10 15:40	118.2	116.3	119.6	58	70	62	22.4	1.00
6/16/10 15:55	117.4	115.9	119.9	86	86	60	27.2	0.99
6/16/10 16:10	117.2	115.8	119.7	89	88	60	27.8	0.99
6/16/10 16:25	118.0	116.3	119.8	62	71	62	23.0	0.99
6/16/10 16:40	118.2	116.6	119.8	50	66	61	20.8	1.00
6/16/10 16:55	116.5	115.4	119.4	88	89	61	27.8	0.99
6/16/10 17:10	116.6	115.6	119.4	89	91	60	28.0	0.99
6/16/10 17:25	117.0	116.4	119.3	66	75	62	23.9	0.99
6/16/10 17:40	118.1	117.1	119.6	41	62	64	19.7	1.00
6/16/10 17:55	117.6	116.5	119.5	63	84	72	25.7	0.99
6/16/10 18:10	117.0	116.1	120.9	86	97	63	29.0	0.99
6/16/10 18:25	118.7	117.4	121.2	52	68	55	20.7	1.00
6/16/10 18:40	118.7	117.8	121.6	42	61	53	18.6	1.00
6/16/10 18:55	118.6	117.9	121.5	45	62	52	19.0	1.00
6/16/10 19:10	118.8	118.6	121.8	43	57	54	18.2	0.99
6/16/10 19:25	119.2	118.5	121.6	42	58	54	18.4	1.00
6/16/10 19:40	119.2	118.9	122.2	42	57	52	18.1	1.00
6/16/10 19:55	119.3	118.9	122.0	42	58	53	18.2	1.00
6/16/10 20:10	119.4	119.0	121.9	43	59	55	18.9	1.00
6/16/10 20:25	119.0	118.7	121.8	48	59	52	19.1	1.00
6/16/10 20:40	118.0	117.8	122.0	79	78	52	24.8	0.99
6/16/10 20:55	119.1	118.3	121.6	44	60	53	18.7	1.00
6/16/10 21:10	119.6	118.3	121.7	45	63	55	19.5	1.00
6/16/10 21:25	119.5	118.8	122.2	43	60	51	18.5	1.00
6/16/10 21:40	120.0	119.0	122.5	44	60	52	18.8	1.00
6/16/10 21:55	120.2	119.1	122.9	44	62	53	19.3	0.99
6/16/10 22:10	119.8	119.1	123.6	79	82	54	25.9	0.99
6/16/10 22:25	121.2	120.2	123.7	49	64	52	19.9	1.00
6/16/10 22:40	121.3	119.8	123.3	43	61	52	18.9	1.00
6/16/10 22:55	121.8	120.1	123.7	43	61	53	19.1	1.00
6/16/10 23:10	122.4	120.4	124.2	43	61	52	19.1	1.00
6/16/10 23:25	122.8	120.8	124.5	43	60	52	19.0	1.00
6/16/10 23:40	122.8	120.8	124.2	42	68	59	20.7	1.00
6/16/10 23:55	123.1	121.3	124.4	44	69	63	21.6	1.00
6/17/10 0:10	123.3	121.4	124.8	46	63	57	20.3	1.00
6/17/10 0:25	123.7	121.5	124.9	44	63	54	19.9	1.00
6/17/10 0:40	123.5	121.1	124.8	42	59	51	18.6	1.00

Cherry Hill School District 'Old' Joseph Sharp Elementary School's Warehouse June 16 - 17, 2010

Load Study

15-Minute Data Averages

Date / Time	Va	Vb	Vc	Ia	Ib	Ic	kVA	PF
6/17/10 0:55	123.2	121.0	124.6	43	60	52	19.0	1.00
6/17/10 1:10	122.6	120.8	124.7	64	72	55	23.3	0.99
6/17/10 1:25	123.2	121.3	125.1	59	68	52	21.9	0.99
6/17/10 1:40	123.7	121.6	124.9	43	60	51	18.9	1.00
6/17/10 1:55	123.5	120.9	124.4	44	61	53	19.4	1.00
6/17/10 2:10	123.4	120.5	124.2	47	66	53	20.3	1.00
6/17/10 2:25	123.5	120.9	124.3	43	60	52	18.9	1.00
6/17/10 2:40	123.7	121.2	124.4	43	58	51	18.7	1.00
6/17/10 2:55	124.0	121.3	124.5	42	59	51	18.6	1.00
6/17/10 3:10	124.2	121.2	124.6	43	61	53	19.3	1.00
6/17/10 3:25	123.4	120.8	124.7	63	72	53	23.0	0.99
6/17/10 3:40	123.6	121.1	124.6	58	68	51	21.7	0.99
6/17/10 3:55	123.9	121.7	124.7	42	57	51	18.5	1.00
6/17/10 4:10	123.8	121.2	124.4	44	61	54	19.5	0.99
6/17/10 4:25	123.4	120.9	124.1	42	60	51	18.7	1.00
6/17/10 4:40	123.4	120.8	124.2	42	59	50	18.4	1.00
6/17/10 4:55	123.4	120.8	124.0	43	61	53	19.1	1.00
6/17/10 5:10	123.0	120.5	123.9	44	59	53	19.1	1.00
6/17/10 5:25	123.1	120.6	123.7	41	55	50	17.8	0.99
6/17/10 5:40	123.0	120.2	123.2	41	65	59	20.1	1.00
6/17/10 5:55	121.9	119.2	123.0	61	81	65	24.9	0.99
6/17/10 6:10	121.1	119.0	122.7	61	70	55	22.5	0.99
6/17/10 6:25	121.9	119.4	122.6	43	60	55	19.0	0.99
6/17/10 6:40	121.5	119.3	122.6	41	58	51	18.1	1.00
6/17/10 6:55	121.2	118.9	122.1	40	56	51	17.7	1.00
6/17/10 7:10	120.6	118.1	121.6	42	59	52	18.3	1.00
6/17/10 7:25	119.0	117.0	121.2	75	80	54	24.8	0.99
6/17/10 7:40	118.3	116.6	121.0	82	82	51	25.4	0.99
6/17/10 7:55	118.2	116.5	120.3	64	71	57	22.6	1.00
6/17/10 8:10	119.1	116.9	119.7	48	63	60	20.2	1.00
6/17/10 8:25	118.4	116.3	119.7	67	75	59	23.8	0.99
6/17/10 8:40	118.5	116.6	120.4	86	85	60	27.2	0.99
6/17/10 8:55	118.7	116.8	120.5	69	75	59	24.0	0.99
6/17/10 9:10	119.3	116.7	120.5	45	63	49	18.6	1.00
6/17/10 9:25	117.8	115.9	120.5	83	86	50	25.8	0.99
6/17/10 9:40	118.1	116.5	120.9	87	89	50	26.6	0.99
6/17/10 9:55	118.6	116.7	120.7	56	66	47	20.0	1.00
6/17/10 10:10	117.1	115.6	120.3	86	86	51	26.0	0.99
6/17/10 10:25	117.0	115.0	120.2	88	90	50	26.6	0.99
6/17/10 10:40	117.1	115.0	120.1	87	90	49	26.3	0.99
6/17/10 10:55	118.1	115.6	119.8	45	61	49	18.3	1.00
6/17/10 11:10	117.1	115.4	119.8	67	75	51	22.5	0.99
6/17/10 11:25	116.3	114.5	119.7	88	87	50	26.0	0.99
6/17/10 11:40	116.3	114.5	119.7	86	92	54	27.0	0.99
6/17/10 11:55	116.1	113.8	119.7	89	104	62	29.5	0.99
6/17/10 12:10	115.8	113.8	119.6	95	106	55	29.6	0.99
6/17/10 12:25	116.3	114.1	120.1	88	92	51	26.7	0.99
6/17/10 12:40	116.0	114.4	120.0	88	84	51	25.9	0.99
6/17/10 12:55	115.8	114.4	120.1	87	83	48	25.3	0.99
6/17/10 13:07	116.0	113.9	120.2	88	86	49	25.9	0.99