



Borton  
Lawson

ENGINEERING  
ARCHITECTURE

Warwick Maintenance and Police Department  
*Lititz, PA*



Submitted to:



June 18, 2009



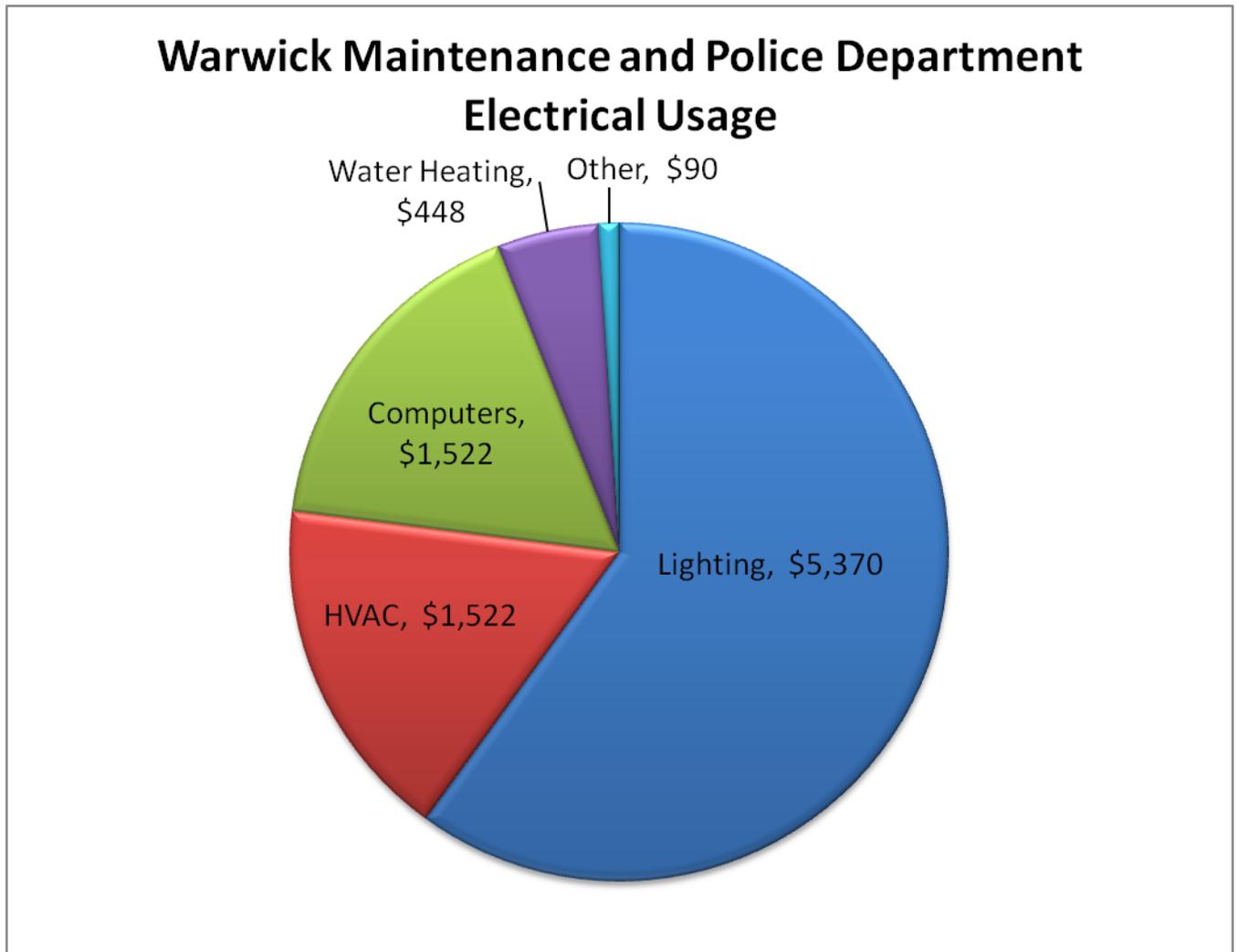
## I. Executive Summary

Attached is a summary of Borton-Lawson's findings from a Tier 1 Energy Audit performed on June 2, 2009. The audit team consisted of Bill McFarland P.E. who performed the site visit and Pat Walko, P.E. who assisted in evaluating the mechanical systems.

Overall, the Warwick Administrative Offices are in excellent condition and care has been taken with the maintenance of equipment.

Upon reviewing the utility billing, the site currently pays \$0.09 per kWhr. Expect an increase of up to approximately 55% when PPL eliminates their rate cap structure at the end of 2009.

Below is a breakdown of the current electrical usage at the site.



The items discussed below focus on reducing overall energy costs as well as maintenance and design enhancements. The items are not in any particular order but are designed to follow the Detailed Review.

Items are broken down into three categories 1) 'immediate' - for action as soon as economically possible 2) 'current' - for action to be taken within the current or next two budget years and 3) 'long term' - for action to be taken three years and beyond.

Items marked with an '\*\*' may require engineering assistance typical of the type performed by Borton-Lawson. Please let us know if you would like to see a proposal for any of these services. Please be aware that grant and loans are available for most if not all of these items. Borton-Lawson will assist with any applications required for these funding sources.

The following items should be considered for immediate action:

- In both buildings, replace T12 and metal halide fixtures with energy efficient units, saving approximately \$1,320 annually.
- Install occupancy sensors in any areas intermittently occupied.
- Replace hot water heater with energy efficient unit.
- Install a timer on the hot water heater.
- Tie in the garage door openers to the unit heaters
- Change analogue thermostat in police station to digital unit.

Consider the following for current action:

- "Smart Strip" makes a power strip that can sense when a computer shuts down and in turn shuts down other peripheral devices such as monitors, printers and scanners.
- Consider changing the fixtures to low flow motion detection in order to best conserve water.

Consider the following for your long-term strategic plan:

- Verify that the site meets current OSHA, NFPA 70E or NEC code for arc flash protection. \*
- The site appears to be conducive to having photovoltaic system installed on the roof. This could be augmented with a solar hot water heating application.\*

The most cost effective and significant savings can be obtained with lighting upgrades, occupancy sensors, and hot water heating upgrades.

If you have any questions or comments on the study or would like clarification of these issues please do not hesitate to contact the Director of Electrical Engineering Services, William J. McFarland P.E., LEED AP, at 570-821-1994 x344.



## II. Detailed Report

## **General Information**

1. The facility is composed of two buildings, maintenance constructed in 1995 and the police department which was constructed in phases. Both facilities are in good condition.

## **Envelope**

1. Ceiling/Roof:
  - a. The roofs of both facilities appear in good condition from the ground.
2. Walls/Floors:
  - a. Walls and floors are generally in good condition.
  - b. Caulking is used where appropriate.
  - c. The exterior walls are lightly insulated but suitable for the application.
3. Windows/Doors:
  - a. The facilities have few windows and those that exist are energy efficient.
4. Reduce Infiltration:
  - a. Overall there is excessive loss of comfort air due to the garage doors and limited barriers.
5. Entrance:
  - a. Minor type vestibules systems exist.

## **Lighting**

1. Lighting Levels:
  - a. Lighting levels appear adequate. Please note that no light readings were taken.
2. Task Lighting:
  - a. Task lighting is used where necessary.
3. Light Colored Interior Wall Finishes:
  - a. The current finishes meet the needs of the facility.

4. Interior Energy Efficient Lighting Systems:

- a. The Maintenance Building has T12 fixtures in the office and metal halide fixtures in the garage. These fixtures should be changed to T8 and T5 fixtures respectively. This facility can save \$750 annually.
- b. The Police Department has T12 fixtures in the oil storage and metal halide fixtures in the garage. These fixtures should be changed to T8 and T5 fixtures respectively. This facility can save \$570 annually.
- c. Occupancy sensors should be considered along unoccupied areas including restrooms and conference rooms.
- d. Exit signs appear to be energy efficient.



5. Exterior Energy Efficient Fixtures:

- a. There are exterior metal halide parking lot fixtures that can be changed to more efficient fixtures. The cost benefit of induction lighting should be reviewed. Typically these lamps cost more but the energy use and the life span of the fixture creates a lower cost of ownership.

6. Use Day Lighting

- a. The limited use of windows does not allow for day-lighting.

## HVAC Systems

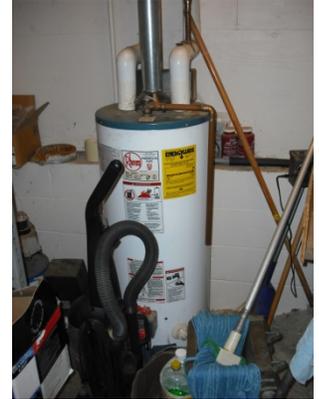
1. General Systems

- a. The heat pumps all have an SEER of around 10. These units are efficient to today's standards and there is no financial justification to change these units.
- b. The Police Department needs its analogue thermostat changed to a digital unit.
- c. Consider tying in the garage door openers to the unit heaters in such a way as the unit heaters turn off when the doors are open. This will prevent the creation of heat to be lost to the outside.



## Water Heating

1. Fixtures/Faucets
  - a. Consider changing the fixtures to low flow motion detection in order to best conserve water in both facilities.
2. Efficiency of the System
  - a. In the Maintenance Building, the Rheem gas fired unit is one of the most inefficient for units for its age and should be changed when funds are available.
  - b. Consider putting the hot water heater on a timer so that the unit does not expend energy off hours.



## Power Systems

1. Billing Structure
  - a. The site is on general service rate, the proper rate for this facility from a tariff perspective.
2. Alternate Sources of Energy
  - a. The site due to its location is not appropriate for wind generation at the current cost per kW per installation.
  - b. The site appears to be conducive to having photovoltaic system installed on the roof. This could be augmented with a solar hot water heating application.
3. Arc Flash Compliance
  - a. It was unclear if the electrical system meets current OSHA, NFPA 70E or NEC code for arc flash protection.
4. Energy Efficient Motors
  - a. There are few motors at the site. Any new motor installations should be rated NEMA Premium.
5. Computer Energy Conservation
  - a. "Smart Strip" makes a power strip that can sense when a computer shuts down and in turn shuts down other peripheral devices such as monitors, printers and scanners.

