9/29/2023

Winter Park
Ward Park
Maintenance Building

ASHRAE Level II Energy Audit

15 lightyears
Energy Testing | Solar Power | Green Certification

TLC ENGINEERING SOLUTIONS

Table of Contents

Executive Summary

TLC Engineering Solutions (TLC) and 15 Lightyears performed an ASHRAE Level 2 facility energy audit of the Ward Park Maintenance Building as a part of a contract with the City of Winter Park.

This report is related to the energy-consuming systems only and is intended to fulfill the requirements of an ASHRAE Level 2 Energy Audit, per the guidelines set forth by the ASHRAE document "Procedures for Commercial Building Energy Audits." The purpose was to observe existing conditions and gather information that would enable TLC to render an opinion concerning conditions or deficiencies that could affect efficient use of this facility, and to identify potential areas for improvement. Neither the field visits nor this report is intended to uncover hidden defects or the presence of hazardous materials.

TLC reviewed the drawings dated August 2010, current utility bills from January 2021 through December 2022, subsequent project documentation, and visited the site in January 2023 to review the mechanical and electrical equipment, the HVAC and lighting controls systems, and observe each space type and its general energy use intensity. In the course of its work, TLC obtained extensive photo documentation of the conditions of the facility. Several of the photographs are included in Appendix B of this report, and the reader is encouraged to thoroughly review the photographs and descriptions, as they are intended to support and supplement the observations described herein.

After the time on site, TLC developed energy saving spreadsheets to assist with the analysis of recommended Energy Conservation Measures (ECMs) and Facility Improvement Measures (FIMs). The combination of all the walkthrough and post-walkthrough activities led to the development of the ECM and FIM list. A complete description and analysis of each ECM, as well as a table summarizing estimated cost and savings of each measure, can be found later in this report in the Energy Saving Opportunities section.

Project Information & Contacts

ASHRAE Level II Audit of the Ward Park Maintenance Building.
288 Perth Ln, Winter Park, FL 32792

Gloria Eby
Natural Resources and Sustainability Director
geby@cityofwinterpark.org
Office: 407.599.3471

Lisa Pearcy
CEO, 15 Lightyears
lpearcy@15lightyears.com
Office: 855.438.1515

Eric McEwen
Principal, TLC Engineering Solutions
eric.mcewen@tlc-eng.com
Office: 407-487-1240
Cell: 904-635-0129

General Facility Description

The Ward Park Maintenance Building is a one-story civic building of approximately 8,304 square feet, which includes a storage area, an office, a break room, and a warehouse area. An aerial view of the Ward Park Maintenance Building is shown below.

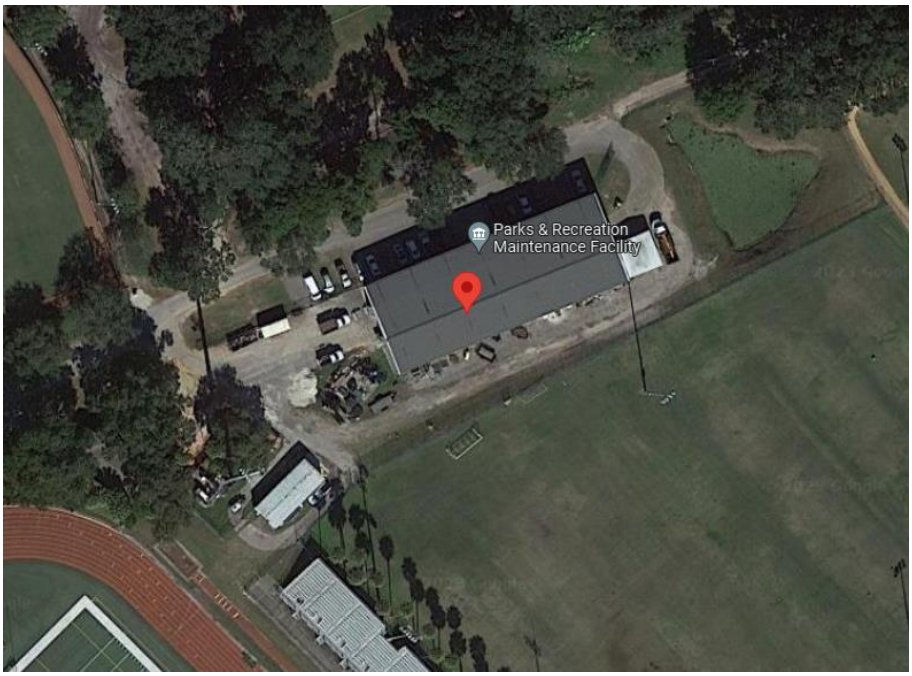

Figure 1: Aerial View of the Ward Park Maintenance Building

The maintenance building's largest component is the work warehouse area. Besides this space, there are restrooms, an office, a server/tel room, and storage.

Mechanical Systems

The Ward Park Maintenance Building features mechanical systems dated 2008 and 2010. Overall, the building utilizes Air Handling Units and Exhaust Fans. Mechanical system information came from a combination of resources, including information gathered during TLC's audit walk-through of the building and building automation system review. The below breakdown of the mechanical systems and areas they serve is TLC's best attempt to consolidate all avenues of information into one master list.

Equipment Naming Convention

The general naming convention used on the mechanical drawings is shown below. Please note, this convention applies to most of the equipment, but not all equipment.

AHU-1

Equipment Type (ie, AHU = Air-Handling Unit) | Equipment ID Number

Air Handling Units

Air conditioning for the majority of the building is provided by one (1) split-system air handling unit. The unit consists of a vertical air handler located within the building and a condensing unit located outside on a concrete pad.

Exhaust Fans

The restrooms within the building are provided with exhaust via ceiling-mounted exhaust fans ducted to the exterior of the building. These fans are operated via the wall switch that controls the lights.

Building Controls

The building is not currently controlled by a centralized Building Automation System (BAS). The building systems are currently controlled in a standalone manner with their own individual controls. The air conditioning system is controlled via the unit thermostat, and lighting in the main warehouse area is controlled via wall switches. The thermostat is capable of programming air temperature setpoints for different days of the week. The audit team noted that lighting in the office areas and restrooms are controlled via ceiling-mounted occupancy sensors.

Lighting Systems

Interior lighting throughout the facility is predominantly linear fluorescent fixtures utilizing T8 lamps. The audit team noted that some fixtures had been retrofitted with LED replacement tubes and additional LED lighting had been added to aid in common tasks.

Building Envelope

The Maintenance Building is a standard metal warehouse facility with roll-up doors for access to the outside. There is insulation on the underside of the roof to decrease the heat transferred into the warehouse space. The office spaces are insulated to allow for the use of air conditioning. No issues were noted associated with the building envelope as part of this audit.

Key Operating Parameters

The building is currently operated 7am to 3:30pm on weekdays only. However, maintenance personnel are typically present at varying times due to events scheduled at the park.

Site Visit

The site was audited by TLC engineers in January 2023. A full evaluation of existing energy consuming systems, compliant with ASHRAE Standard 211-2019 was performed. During the audit, TLC and 15 Lightyears personnel were escorted by the City of Winter Park facilities manager, Leif Bouffard. He, as

well as any facility staff that were available for comment, were questioned on system operation, condition, and maintenance of the building systems.

Utility Analysis

Historical Utility Data

The building is currently provided with electricity and water utilities. Electrical utility consumption values were provided for the months of January 2021 through June 2023. The monthly consumption profile is as expected, where values increase in the warmer months due to cooling needs. No billing statements were provided, but a blended rate for kWh savings was determined based on published rates. Calculation of the blended utility rate takes into account the non-fixed costs associated with electrical utilities use by the facility, including fuel charges, per-kWh cost, demand charges, etc. Table 3 details the components of the blended rate calculation.

Table 1: Annual Baseline Energy Consumption

Utility	Total
Annual Electrical Consumption (kWh)	50,107
Annual Electrical Cost	-

The following graph and table show the total consumption and demand per monthly billing period for electricity.

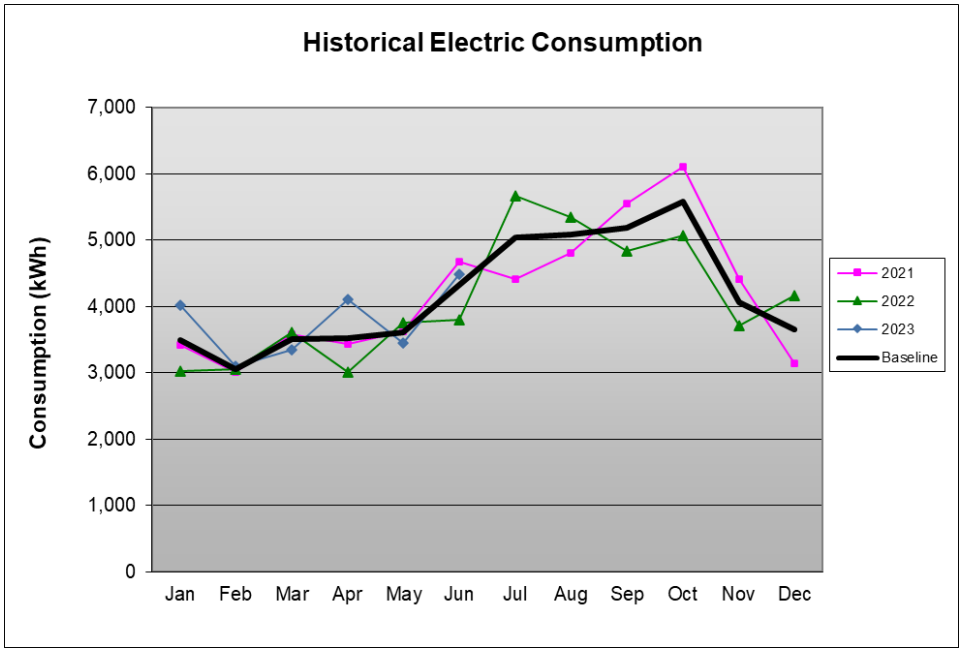

Figure 2: Ward Park Maintenance Building Electric Consumption

Table 2: Ward Park Maintenance Building Electricity Consumption Data

Date	Consumption (kWh)	Demand (kW)
Jan-21	3,418	21.12
Feb-21	3,013	25.86
Mar-21	3,575	25.95
Apr-21	3,441	25.98
May-21	3,624	24.41
Jun-21	4,677	27.75
Jul-21	4,407	29.09
Aug-21	4,809	15.4
Sep-21	5,544	15.51
Oct-21	6,102	14.34
Nov-21	4,412	14.31
Dec-21	3,145	11.97
Jan-22	3,031	10.72
Feb-22	3,049	14.42
Mar-22	3,612	14.42
Apr-22	3,015	14.42
May-22	3,752	12.13
Jun-22	3,794	13.59
Jul-22	5,670	14.19
Aug-22	5,353	13.854
Sep-22	4,830	14.148
Oct-22	5,072	14.148
Nov-22	3,707	14.148
Dec-22	4,168	14.148
Jan-23	4,013	14.726
Feb-23	3,092	14.726
Mar-23	3,342	14.726
Apr-23	4,099	14.726
May-23	3,453	14.726
Jun-23	4,491	14.726

Benchmarking

TLC compared energy consumption utilizing a common benchmark to gauge how the Maintenance Building compares to similar ones nationally. The main means of comparison is the Energy Use Intensity (EUI), which is used by energy engineers to determine overall energy consumption to a common unit of measure. The Energy Use Intensity measures annual consumption of electricity per square foot, in kBTU/sf/year.

This common benchmark for energy usage is nationally recognized. Using the utility billing information, performing energy analysis and observing the system operation allows the energy profiles to be broken

down to greater detail. The facility was entered into Energy Star Portfolio Manager as a repair services/maintenance building.

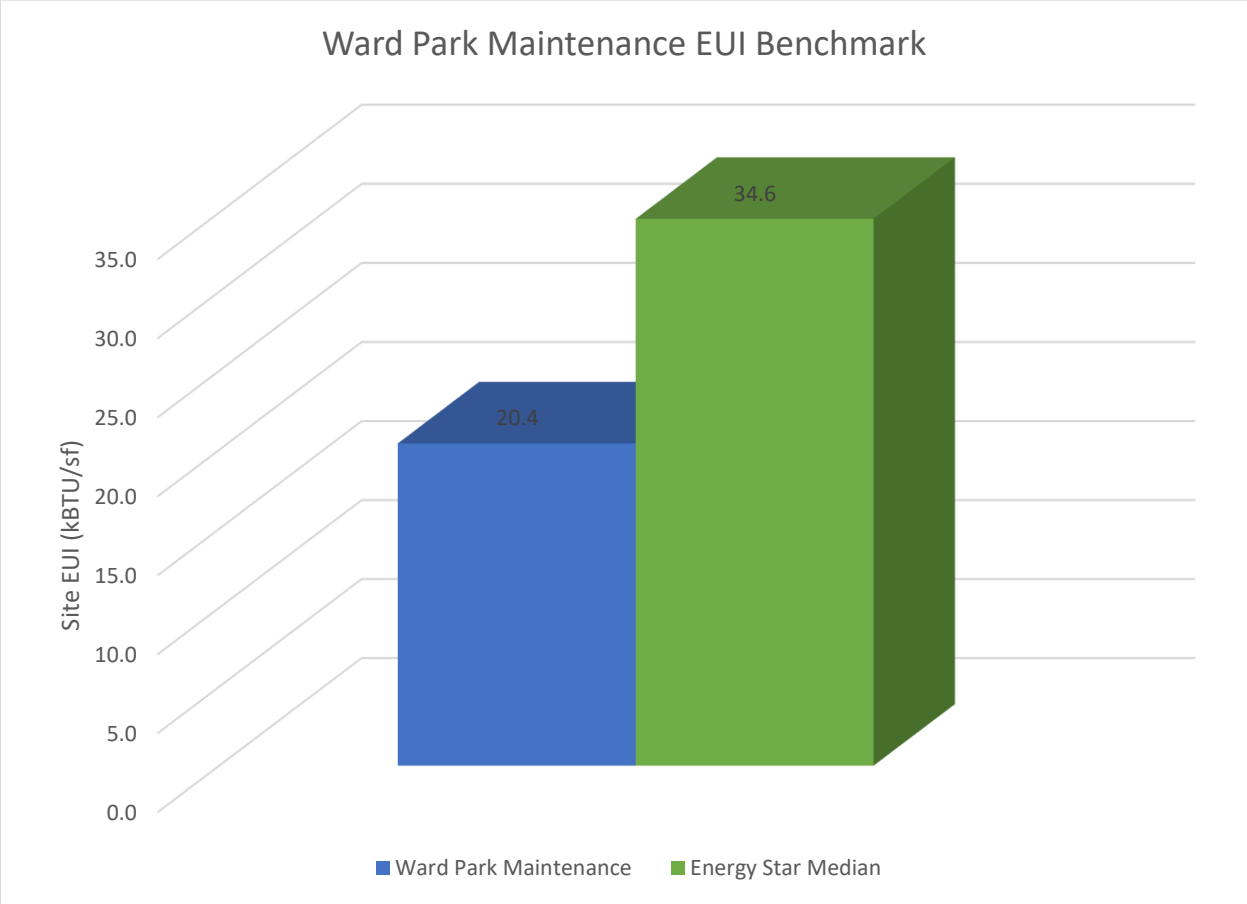

Figure 3: Ward Park Maintenance Energy Performance Comparison

Based on most recent 24 months of utility data, a comparison can be drawn between the Train Station and the average energy use intensity (EUI) of similar buildings throughout the United States. The median EUI for a repair/maintenance building in the United States is 34.6 kBTU/sf, and the calculated EUI of the Ward Park Maintenance Building is 20.4 kBTU/sf. It is worth noting that the median value reported by Energy Star is dependent on the annual responses from building surveys, and that the occupant load of buildings of the same type can vary significantly. Additionally, for maintenance buildings, the tools present in the building may create variations in the median EUI for other facilities. The Ward Park Maintenance Building's EUI is approximately 41% lower than the median. The energy conservation measures detailed in this report will serve to further decrease the EUI of the facility.

Utility Rate Analysis

The building is provided with electricity by the City of Winter Park (CoWP), following their Rate Schedule GSD-1, General Service – Demand. The utility rate charges shown below were used to calculate the costs associated with the provided consumption and demand. Energy savings calculated for this building have been assigned a blended rate of $0.1093/kWh, which is the calculated blended rate not including fixed customer charges.

Table 3: Utility Rate Schedule

Description	Charge
Demand Charge	$5.05 per kW of billing demand
Energy Charge	$0.04216 per kWh
Fuel Cost Recovery Factor	$0.02281 per kWh
Gross Receipts Tax	2.5641%
Franchise Fee	6.00%
Electric Utility Tax	10.00%
EL State Sales Tax (Commercial Only)	7.45% (First $5,000)
EL State Sales Tax (Commercial Only)	6.95% (Over $5,000)

Average Rates

As noted above, a blended cost per kWh has been calculated from the rate schedule. Savings for this building have been calculated using the blended rate. The following table details the average rate over the period of analysis.

Table 4: Average Utility Rate

Utility	Average
Electricity	$0.1093/kWh

Energy Saving Opportunities

The operation and condition of equipment at the Maintenance Building was observed to offer a few different avenues for improvement. Improvements can be made by optimizing the control sequences and settings. The following table summarizes the recommended ECMs for this facility that should be considered for future projects. In addition, the table distinguishes between measures specifically intended to save energy (ECMs) and facility improvement measures (FIM) that benefit the overall operation of the facility but may not provide significant energy savings.

Table 5: ECM/FIM Summary

Energy Savings Measure	FIM/ECM	ECM Category	Annual kWh Savings	Annual $ Savings	Cost $	Payback (years)
HVAC Controls Optimization	ECM	Low Cost	1,324	$145	$900	6.2
Totals			**1,324**	**$145**	**$900**	**6.2**

*ROI calculations exclude capital improvement items, as they are intended more for facility improvement than for energy savings.

The cost and paybacks shown in the table above are estimates based on the information gathered during the auditing process. TLC utilized RSMeans 2023, as well as engineering best practices, to estimate the cost of these suggested measures. Final pricing will vary based on contractors' estimation and final

equipment selections. Final payback periods are also dependent on contractor pricing and the facility's negotiated utility price.

HVAC Controls Optimization

General Description

The scope for this ECM involves optimizing the building HVAC controls through one or multiple controls strategies. For this project, the controls strategy recommended would be occupancy scheduling with setback temperatures.

Consistent occupied and unoccupied temperature settings will be implemented based on the building type and their needs. Occupied schedules for the HVAC controls will be set up to dictate the hours when the building is considered occupied versus unoccupied. Whenever a building enters unoccupied mode, the building HVAC controls will utilize the unoccupied settings in lieu of the occupied settings.

Site Specifics

The AC is set to 70F with no schedule noted in the system. Incorporating setback outside of normal working hours has potential to save about 10% of conditioning energy.

Calculation Methodology – Spreadsheet System Models

Savings for this report were evaluated using spreadsheet building models for the lighting and HVAC systems. The methodologies used for each measure are described separately in this section. Industry Standard methods of evaluation were used and are detailed in this section. Additionally, assumptions made to calculate the energy savings are detailed.

HVAC Controls Optimization

Savings for this measure have been based on a reduction in cooling energy due to setting back non-critical portions of the building that are not always occupied. The following table shows the major inputs used in the calculation of savings for this measure.

Table 6: Controls Optimization Major Inputs

Input Name	Bldg./Area Affected	Input Value	Basis of Input
% Cooling Energy Reduction	Entire building	10%	Engineering judgment

Calculations:

Savings for this measure were based on calculating the annual cooling energy and saving a percentage of it. The existing annual cooling energy was calculated from the electric utility baseline as the sum of all the electrical consumption for each month exceeding the lowest month's consumption. The following formula was used to calculate existing annual cooling energy.

$$Existing\ Cooling\ kWh = Annual\ Total\ kWh - (12 \times Baseload\ Month\ kWh)$$

Appendix A – Mechanical Equipment

The following table shows a listing of all recorded major equipment in the building.

Building	Type	Equip	Location Served	Tag	Qty	Capacity	Units	Make	Model	Serial Number	Year
rd Park Maintenar	AHU	Air Handling Unit			1	1/2	HP	Carrier	FV4CNF005	1510A87920	2010
rd Park Maintenar	CU	Condensing Unit			1	4.0	Ton	Carrier	24ABA348C003	1208E16018	2008

Appendix B – Site Walkthrough Photos

C-1: Exterior Lighting (1)

C-2: Interior Lighting

C-3: Ductwork

C-4: Air Handling Unit

C-5: Restroom Fixtures

C-6: Exterior Lighting (2)

C-7: Condensing Units