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## Shadowwood HVAC and Water Heating System Information

**Air Conditioning:** Original equipment: Westinghouse D/X air-conditioning units. Some have been replaced over the years. About 80% are original (1970's) units controlled by a load-management system.

All 450 a/c units are connected to an energy-management system with maximum property-wide peak demand limited to 975 kilowatts. Off-peak demand is limited to 1.2 megawatts. Units are connected to one of six zones with one or more zones round-robin automatically shed as needed to keep demand below setpoints. Original building specifications 4-6 SEER (at best):

Ground floor units	1.5 tons
Second floor units	2.0 tons
Third floor units	2.5 tons (2.0 tons in four-story building)
Fourth floor units	2.5 tons

**Unit Air Handlers:** Single-speed Westinghouse; about 95% are original.

**Heating:** hot-water heating coil installed upflow of the a/c coil in each air handler connected to a two-pipe hot-water loop. Original three-way zone valves failed with no current way to control heating other than cycling air handler blower cycle on and off. Therefore, impossible to have by-unit choice between heating or air conditioning. The entire property is in either heating or cooling mode.

**Heating Boilers & Hot Water Heaters:** A.O. Smith Boilers & Water Heaters in each building. No reset or other controls on the boilers. Boiler temperature set points are set to coldest design point (usually 200 degrees or more) and operate from approximately October 15<sup>th</sup> - April 15<sup>th</sup> without any reset control.

1, 6-unit building	HW200P Boiler BTC 120 HW Heater
7, 12-unit buildings	HW420 Boiler BTC 179 HW Heater
6, 18-unit buildings	HW520 Boiler BTC 240A HW Heater
8, 24-unit buildings	HW670 Boiler BTC 365A HW Heater
2, 30-unit buildings	2 - HW420 Boilers BTC 400A HW Heater
Clubhouse (all electric) water heater.	10-ton, 4-zone Carrier VAV heat pump installed in 2005, 40 gallon electric

**Non-Apartment Energy Use:** Clubhouse, stairwell and security lighting, telco, timers and house lighting in 148 storage and utility rooms on the ground floor of each building.

**Energy-Management System:** Watchdog by Square D (1982 installation - functionally obsolete)

**Electricity Sub-Metering System:** Metering Systems Inc. (Formerly ADEC - failed and decommissioned in 2007).