



Coshocton High School

Chiller Update / Controls Discussion

August 19, 2021

Chiller Project Update



- As of this time a week ago, we were optimistic we would have everything up and running in time for school.
 - New Cooling capable AHU for the Cafeteria is Set.
 - New Chilled water pump is set and piped.
 - Concrete pad for the chiller is poured and the chiller stand and the majority of the piping in the mechanical room is in place including the new diverting valves.
- The chiller was scheduled to ship out last Friday (8/13) and we anticipated arrival earlier this week.
- We got news early this week that the chiller did not ship out in time due to a quality issue with the brazing. This delayed the arrival until Monday (8/23).
- The Chiller will be arriving at 7A on Monday. Johnsons Plumbing & Heating have made arrangements with the crane and rigger to unload the new and remove the old.
- The goal will be to have the system in full operation by the end of next week. We will have a better feel for this after the equipment arrives Monday.
- We plan to control the equipment locally/manually until a decision is made on the best controls path forward

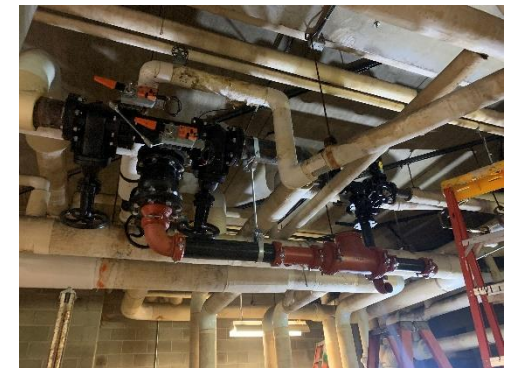
Controls Options - BASE

- **Central Energy Plant - \$46,284**

- (1) New Air-Cooled Chiller
- (3) Boilers
- (5) Pumps --> (4) existing + (1) new
- (8) Diverting Valves --> (2) existing + (6) new w/ new conduit to valve
- (1) New Cafeteria AHU (#11) --> Remove pneumatics and replace with Belimo actuators and DDC Controls.

- **WHY?**

- The existing hardware is obsolete and proprietary
- The hardware could be re-used if the plant is relocated in the future
- AHU#11 and the existing diverting valves still use pneumatic control.
- Proposed system allows for proper sequencing and efficient control of the central plant equipment.
- Takes advantage of funds that were allocated for tying the equipment into the existing system to upgrade to a open-protocol BACnet system.
- Upgrade is eligible for ESSER funds and has been priced with that in mind (prevailing wage).



Controls Options - UVs

- **4th Floor Unit Ventilators - \$97,454**
 - (18) existing 4th-floor Unit Ventilators (UVs)
 - Upgrade to BACnet Controls and re-control the unit:
 - Install new freeze stat tied to the control system (added due to known issues with freezing)
 - Install Fan Status via CT
 - Provide and install new Supply Air temperature sensor
 - Provide and install modulating hot/chilled water valve (originally priced as a valve retrofit)
 - Re-insulate all piping
 - Provide and install face & bypass damper actuator (and bracket kits)
 - Provide and install new outdoor air actuator (and bracket kits)
 - Demo and cap all pneumatics, leaving the broader system functional.
 - Provide and install new thermostat.
 - 5-year warranty on all controls hardware, actuators and valves.
 - Includes adding necessary power/transformers to each unit.
- **WHY?**
 - The pneumatic controls have been disconnected on the 4th floor UVs due to freeze issues.
 - This requires manual control of each unit by turning the fan on and off to control comfort (the coil is always full flow).
 - Proposed system allows for room level control of setpoint, schedule, outside air damper, valve, etc.
 - Upgrade includes a new valve due to unknown operability of existing
 - Improved comfort with more consistent temperatures from space-to-space
 - Upgrade includes freeze stat for proper shutdown of the unit in the event of low temperatures
 - Upgrade is eligible for ESSER funds and has been priced with that in mind (prevailing wage)



Controls Options - AHUs

- **4th Floor Air-Handling Units - \$110,621**
 - Upgrade to BACnet controls on (4) 4th floor AHUs. AHU 11 (Cafeteria) is included in the base scope.
 - AHU 10 (Kitchen) - Remove pneumatic damper actuators, pneumatic hot water valve and JCI Controls. Replace with Belimo damper actuators, Belimo hot water valve actuator and new hot water valve. Install BACnet controllers, be temperature sensors and supply fan status current sensors.
 - AHU 12 (Library) - Remove pneumatic damper actuators, pneumatic hot water & chilled water valves and JCI Controls. Replace with Belimo damper actuators, Belimo valve actuators and new hot/chilled water valves. Install BACnet controllers, be temperature sensors and supply fan status current sensors.
 - AHU 13 (Office) - Same as AHU 12 but with the addition of (9) new Belimo zone dampers and associated temperature sensor wires pulled to each room.
 - AHU 14 (Jr. High Core Rooms) - Same as AHU 12 but with the addition of (5) new Belimo zone dampers and associated temperature sensor wires pulled to each room.
- **WHY?**
 - This would complete the conversion to DDC Controls on the 4th Floor and make the equipment accessible from 1 platform.
 - Proposed system allows for advanced control strategies such as optimized start, and air-side economizing.
 - Upgrade includes new valves and new zone dampers on AHU 13 and AHU 14.
 - Upgrade is eligible for ESSER funds and has been priced with that in mind (prevailing wage)

Advantages of BACnet Reliable System



- ❑ **Non-Proprietary System** - BACNET is not software or hardware. It's an established and proven ASHRAE standard that allows for interoperability with other BACnet hardware. In this case, the Elementary points could be pulled into the system (or visa versa).
- ❑ **Lowest Cost of Ownership** –No back charging. Backward compatible. Built to last. Best warranty. 99.98% reliability.
- ❑ **Vendor Independence** – BACnet protocol requires control companies to share data and plug and play. Gives you choice.
- ❑ **Simple to Use** – Native BACnet system enables simple, intuitive, easy to use tools for staff to quickly come up to speed. Web-based system allows for on-site or remote access from any web-connected device.
- ❑ **Real-Time Alarming** – E-mail /text alarms can be created for any condition.



Energy Saving Strategies

- **Master Scheduling** - the ability to master schedule all classrooms (or individual rooms/zones) to setback during unoccupied times thereby reducing the heating and cooling loads. This also makes it easy to set equipment back on snow days, etc.
- **Air-Side Economizing** - when outdoor air conditions are favorable, the system will use outside air to provide "free cooling" thereby reducing the load on the chiller.
- **Optimized Start** - The system is able to learn the building over time and adjust the start times of the equipment according to the outside air conditions. For example, the boiler may need to start 2 hours earlier on a 15F day than it does on a 45F day. The more data the system gets, the better it gets at determining the optimal start time.
- **Uniform Setpoints** - The thermostats can be customized to provide the staff with any degree of control. We often see school districts allow for +/- 2-4 degrees. This provides more uniform temperatures from room-to-room and prevents students from having to bring a sweatshirt for 1 period and a t-shirt for the next.
- **Outside Air Damper Control** - The system will give you the ability to see the position of the outside air damper as well as override it to a desired %. Outside air damper positions can also be trended as needed. We've seen several districts request this type of control in light of the pandemic.

Plug Smart Controls Difference



Customers for life by **CHOICE**, not captivity.

- ❑ Plug Smart takes a platform **NEUTRAL** approach in helping our clients solve their controls problems.
- ❑ Plug Smart provides **FULL** software license access to customers on every job and trains the customer on building-specific uses.
- ❑ Plug Smart provides the names of other local control dealerships options to ensure **ACCOUNTABILITY**.

We EARN the continued business of our customers by simply “Doing what we say we will” and doing it “Better, Faster, and Cheaper”, in that order.

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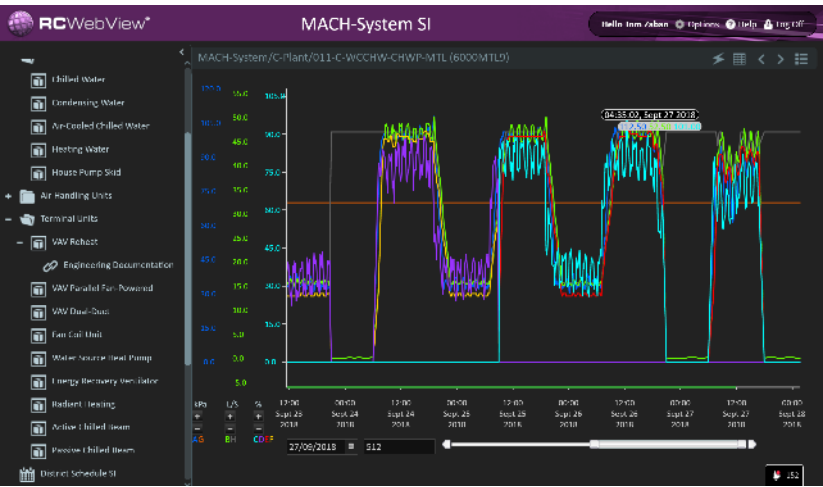
Integrated Graphical Interfaces



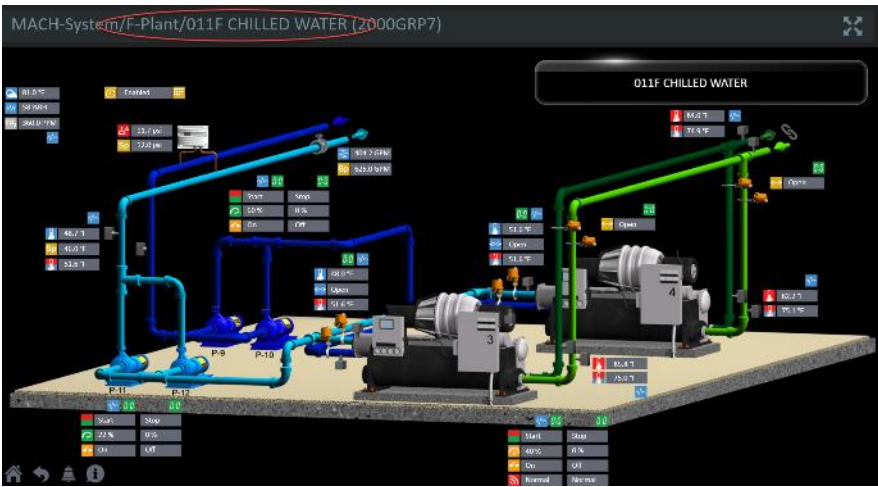
Fault Detections and Diagnostics



Trend Logs (Multi/Single Point)



Alarm Logs





Appendix


System Snapshot

Home
Admin



Building Status
Occupied

Conditions
 **40.0 °F**


Alarms


Service Request

District BAS Navigation



BE Barrington Elementary


TE Tremont Elementary


WP Wickliffe Progressive

GE Greensview Elementary

WE Windermere Elementary

HS UA High School

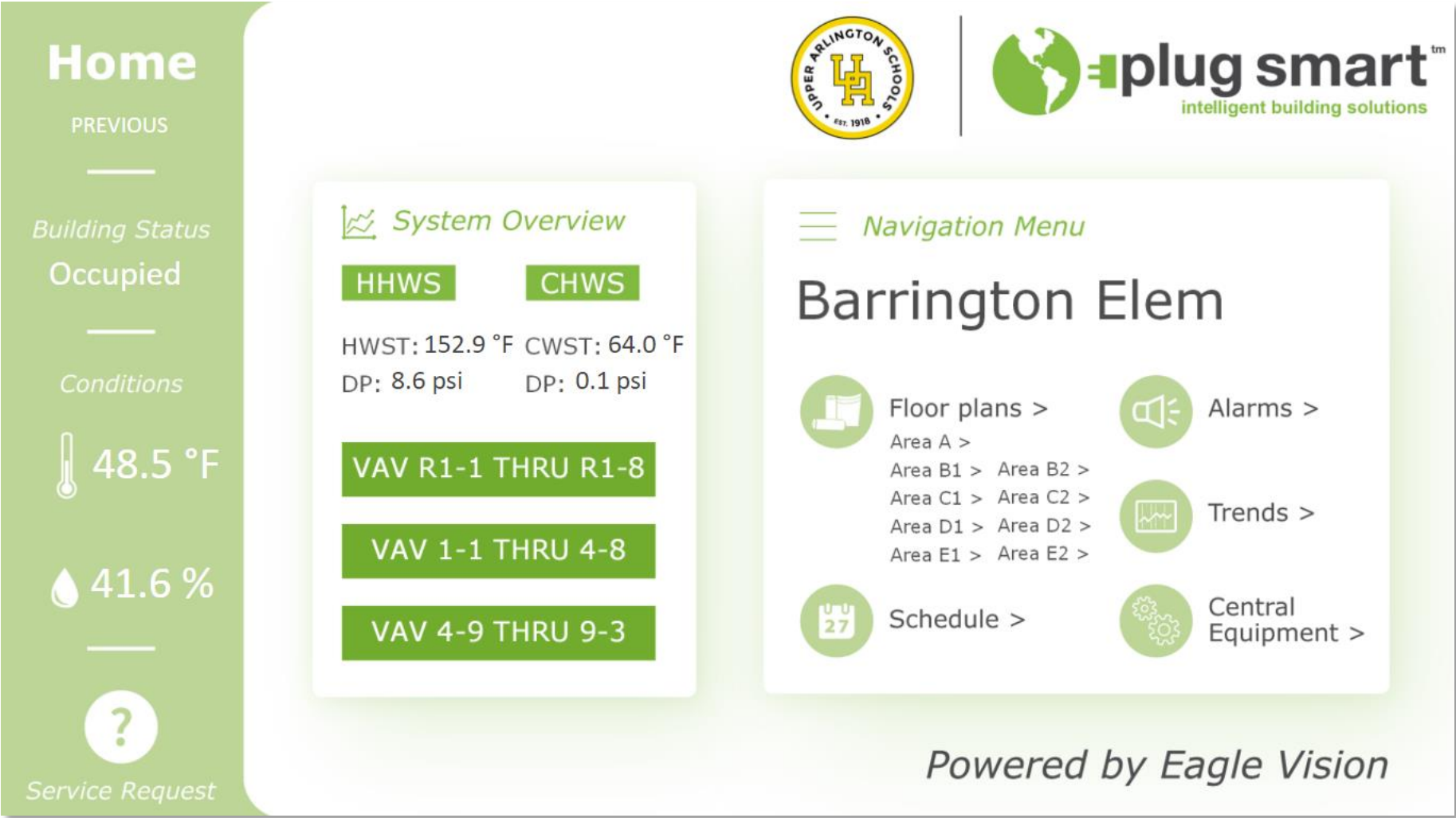

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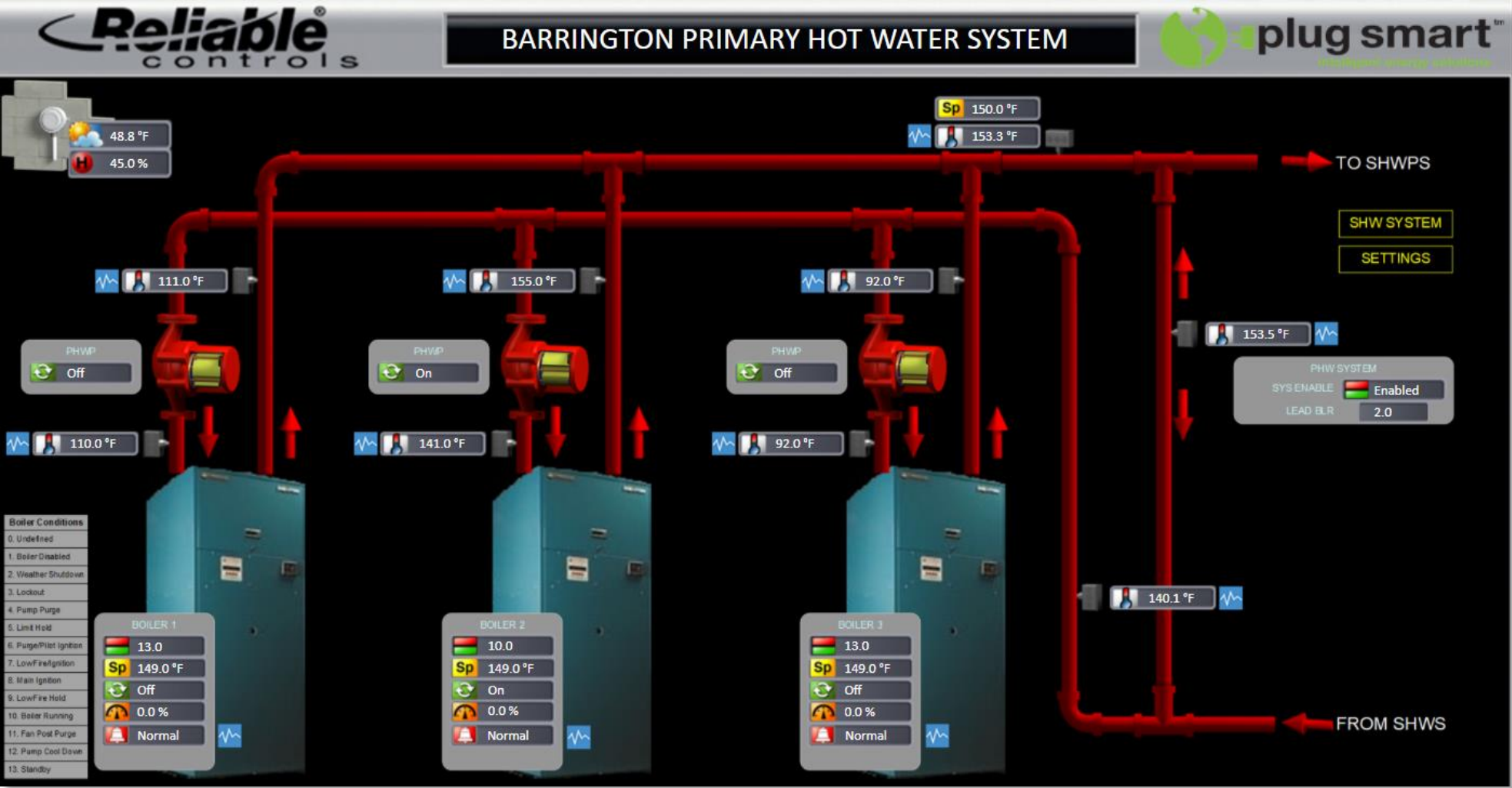
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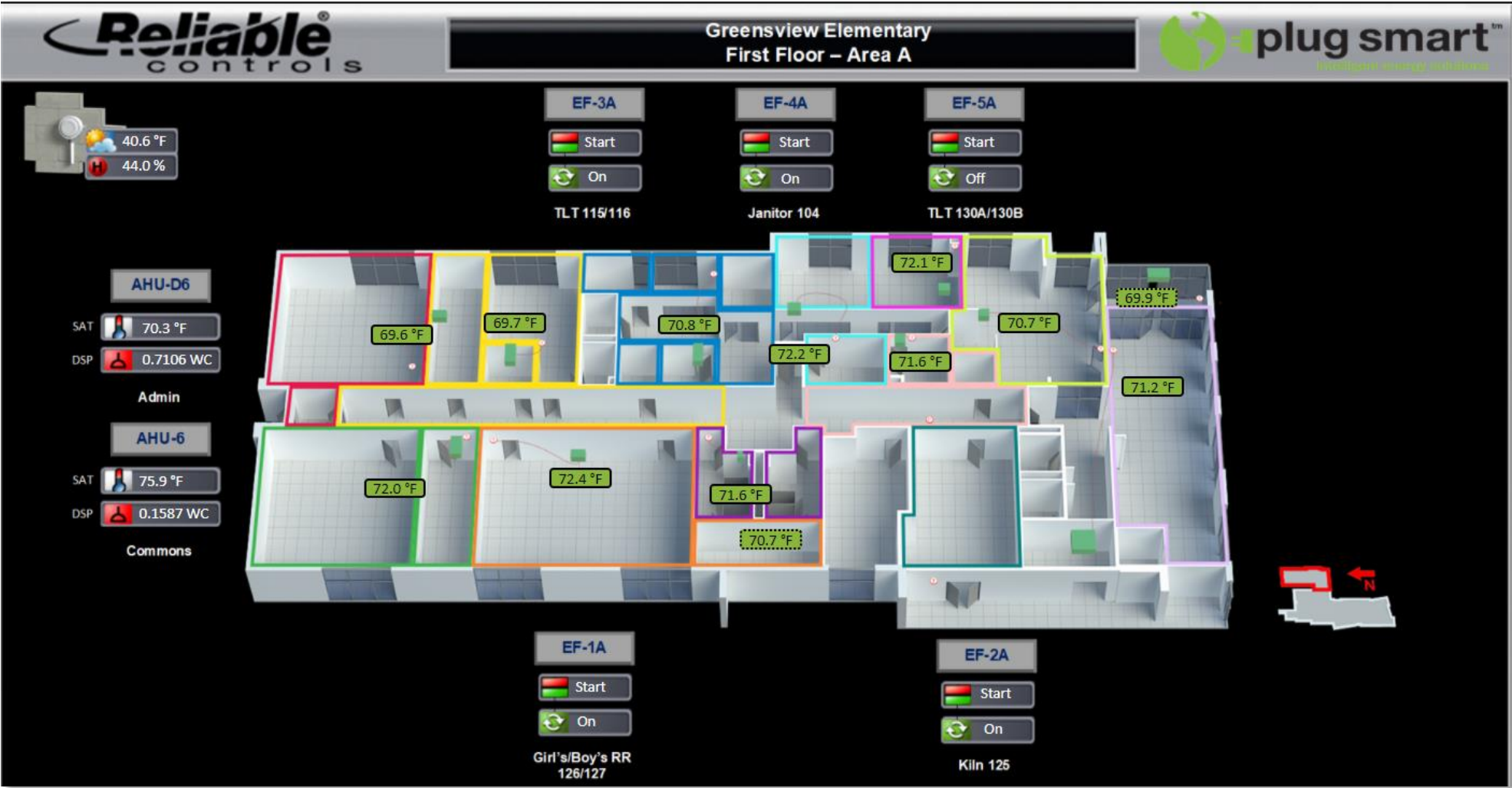
System Snapshot



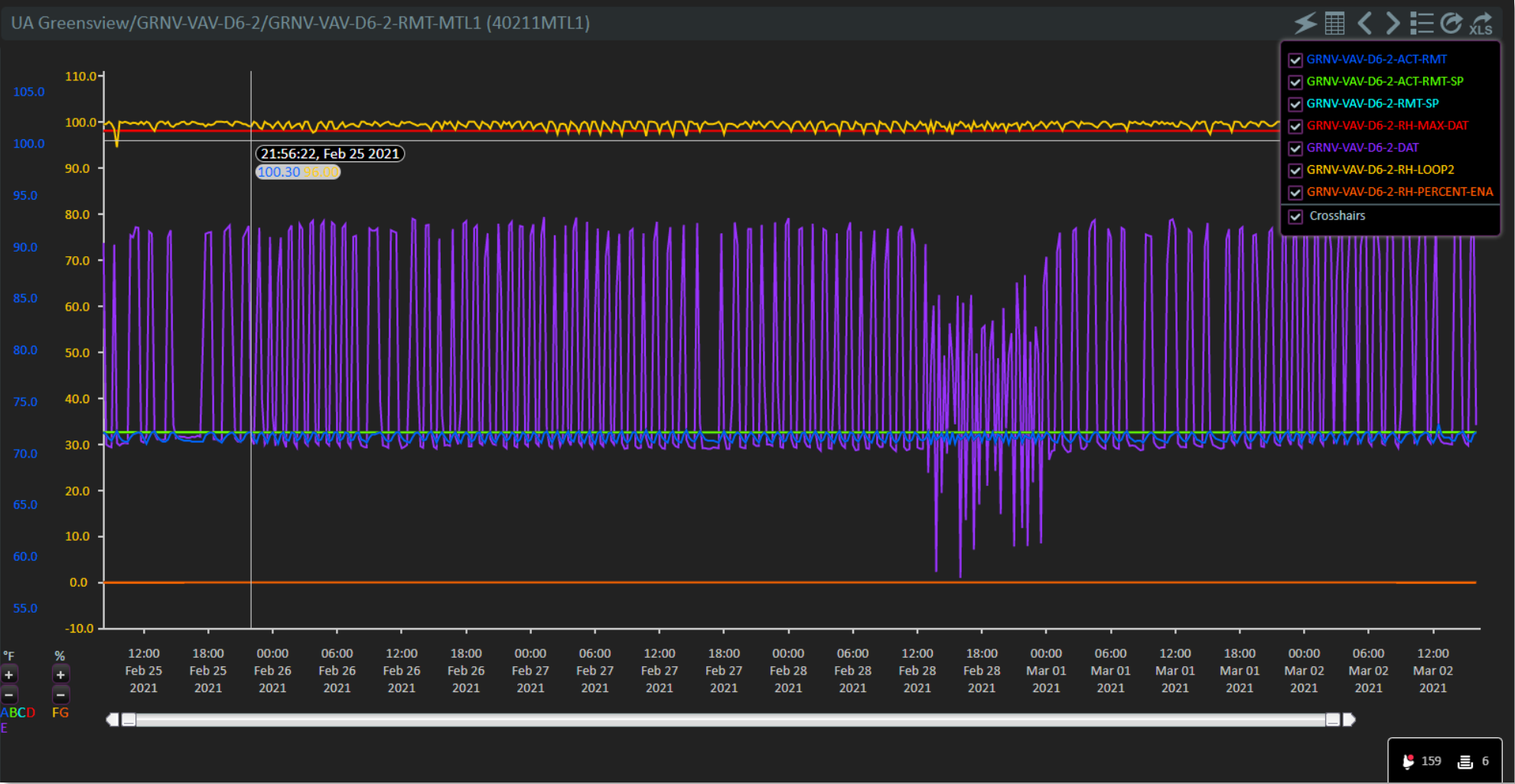
System Snapshot



System Snapshot



System Snapshot



Our Team's Controls Experience

550+ years	250+ Projects	\$110,000,000	All Major
Total industry experience	Projects delivered	Controls contracts	Market Segments

Key Accounts Include

101 Marietta Center
 AK Steel Corporation
 Ameriwood Industries
 Arthur Goldner & Assoc., Inc.
 Benton-Carroll-Salem LSD
 Blanchard Valley BODD
 Bridgestone/Firestone
 Brooklyn City Schools
 Campus Crusade for Christ (CRU)
 Chillicothe VAMC
 Chrysler
 Chrysler Sterling Stamping Plant
 Cincinnati Milacron
 Cintas World Headquarters
 Cleveland VA Hospital
 Collier County
 Columbiana County Board of DD
 Columbus City Schools
 Conestoga College
 Copeland (an Emerson Company)
 Crown Battery
 Dayton VAMC
 Denison University

Detroit Marriott
 Duct Fabricators, Inc.
 FFH Engineers
 Fidelity Investments
 Fifth Third Bank
 Frantz Investments, LLC
 GE Aircraft Engines
 GE Aircraft Engines
 GE Aircraft Engines Global HQ
 GE Transportation
 General Motors Global HQ at RenCen
 General Motors Powertrain Division
 George Brown College
 Greenon Local School District
 GSB Building
 Heidelberg University
 Hood River Consulting Engineer
 Humber College
 IMC Real Estate Management
 Kenyon College
 Kettering Tower PACE
 Kings Island
 Lee County Schools

Lion Apparel Building
 London City Schools
 Marlinton School District
 Marriott Renaissance Center
 Massarro Design Build, LLP
 MCR Services, Inc.
 Mechanical Construction Managers
 Miller-Valentine
 Minnesota Center
 Morehead State University
 Namho Enterprises, LLC
 Namvet Construction, LLC
 Naples Day Surgery
 National Institute of Standards and Technology
 NCH Healthcare
 Nelsonville - York City School
 North Canton School District
 North Olmsted Schools
 Northern Kentucky University
 Ohio Northern University
 Omni Properties
 Ontario College of Art and Design

Parker Aerospace
 Public Library of Cincinnati
 Ricart Automotive
 ROI Realty Services, Inc.
 Sheffer Corp.
 Springboro
 St. John Paul II College, Australia
 St. Lawrence College
 Stow-Munroe Falls City School
 Sugar Creek Packing Company
 Thermo Disc (an Emerson Company)
 Tipton & Assoc. – Signal hill
 Toledo Molding & Die, INC
 Tomko Development Company
 United Mechanical, Inc.
 University of Central Florida
 University of Houston
 University of Illinois at Chicago
 University of Toledo
 University of Victoria, BC
 Washington Local School
 Westward Success, LLC

Uniquely Qualified in K-12 Schools

900+ years	125+ Projects	\$15,345,800	209,879,560
Total industry experience	Ohio School Districts Served	Energy Savings	Pounds of CO2 Saved

Key Accounts Include

Adams County Ohio Valley Local Schools	East Liverpool City Schools	Leetonia Exempted Village Schools	Reynoldsburg City Schools
Amanda-Clearcreek Local Schools	Edison Local (Jefferson) Schools	Little Miami Local Schools	River Valley Local Schools
Archbold Area Local Schools	Elyria City Schools	London City Schools	Riverside Local (Lake) Schools
Ashland City Schools	Fairfield City Schools	Louisville City Schools	Sebring Local Schools
Austintown Local Schools	Fairfield Union Local Schools	Madeira City Schools	Southeastern Local (Clark) Schools
Barberton City Schools	Fairless Local Schools	Mapleton Local Schools	Southeastern Local (Ross) Schools
Beavercreek City Schools	Fairview Park City Schools	Marion City Schools	Southern Local (Perry) Schools
Benton Carroll Salem Local Schools	Findlay City Schools	Marlington Local Schools	Springboro City Schools
Berne Union Local Schools	Franklin Local Schools	Mason City Schools	St Vincent Catholic School
Bexley City Schools	Gallipolis City Schools	Miamisburg City Schools	Stow-Munroe Falls City Schools
Bristol Local Schools	Garfield Heights City Schools	Middletown City Schools	Strasburg-Franklin Local Schools
Brooklyn City Schools	Geneva Area City Schools	Miller City-New Cleveland Local Schools	Strongsville City Schools
Cabel County Schools	Georgetown Exempted Village Schools	Mount Healthy City Schools	Trotwood-Madison City Schools
Calvert Catholic Schools	Girard City Schools	Mount Vernon City Schools	Tuslaw Local Schools
Cambridge City Schools	Goshen Local Schools	Nelsonville-York City Schools	Twinsburg City Schools
Canfield Local Schools	Granville Exempted Village Schools	New Lebanon Local Schools	Union Scioto Local Schools
Canton City Schools	Green Local (Summit) Schools	North Canton City Schools	Upper Scioto Valley Local Schools
Carrollton Exempted Village Schools	Greenon Local Schools	North Olmsted City Schools	Vandalia-Butler City Schools
Centerburg Local Schools	Hamilton Local Schools	North Royalton City Schools	Wadsworth City Schools
Cincinnati Public Schools	Hillsboro City Schools	Northmont City Schools	Warren County Career Center
Clear Fork Valley Local Schools	Howland Local Schools	Northridge Local (Licking) Schools	Washington Court House City Schools
Clinton-Massie Local Schools	Huber Heights City Schools	Norton City Schools	Washington Local Schools
Collins Career Center Lawrence County	Huron City Schools	Oak Hill Union Local Schools	Wellston City Schools
Columbus City Schools	Jackson City Schools	Olmsted Falls City Schools	West Holmes Local Schools
Columbus Grove Local Schools	James A. Garfield Local Schools	Ottawa Hills Local Schools	West Jefferson Local Schools
Copley-Fairlawn City Schools	Johnstown-Monroe Local Schools	Pettisville Local Schools	Willard City Schools
Danville Local Schools	Jonathan Alder Local Schools	Pickaway-Ross County Career and Tech Center	Williamsburg Local Schools
Dawson-Bryant Local Schools	Kings Local Schools	Polaris Career Ctr	Willoughby-Eastlake City Schools
Defiance City Schools	Lake Local (Stark) Schools	Princeton City Schools	Wilmington City Schools
East Clinton Local Schools	Lakota Local (Butler) Schools	Revere Local Schools	Windham Exempted Village Schools
East Knox Local Schools	Lebanon City Schools		Winton Woods City Schools

