

**HAMDEN HIGH SCHOOL  
B, C & D WINGS BMS UPGRADE  
2040 DIXWELL AVENUE  
HAMDEN, CT**

**Environmental Systems Corporation  
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**Proposal Date: 12/23/2021**

**Hamden High School- BMS Upgrade  
Hamden, CT**

**Furnish and install and extension of Honeywell Control BMS including software, building controllers, application controllers, temperature sensors for DDC HVAC equipment as indicated in the scope below. This scope of work is based on Equipment and I/O Points from the Carrier DDC As-built plans dated 02/19/2007.**

**Scope of Work Includes:**

**B Wing Controls Upgrade:**

- ESC shall provide (Qty 1) supervisory controller w/ UPS
  - Customer to provide IP Address
- DDC Control of VAV Boxes w/ Hot Water Reheat (Qty 25)
  - B Wing VAV Boxes are associated with the following Rooftop Units:
    - RTU-2 (5 VAV Boxes)
    - RTU-7 (12 VAV Boxes)
    - RTU-14 (8 VAV Boxes)
  - Demo of existing Carrier VAV controllers
    - Includes labeling input & output wires before removal of existing controllers
  - ESC shall provide Honeywell controllers and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
    - Space Temperature
    - Airflow (integral sensor, existing flow ring to remain)
    - VAV Damper (integral actuator, existing damper to remain)
    - Supply Air Temp
    - Hot Water Reheat (existing valve to remain)
  - Connect new VAV controllers to existing Niagara 4 system
    - Includes running new BACnet communications wiring from VAV controller to new JACE
- ESC shall provide (2) Hours of Training
- Project Supervision
- Control Wiring
  - Prevailing Wage Rate
- Floor Plan Graphics
- Engineering, Programming, Graphics, Start-up and Commissioning of the New Control Systems
- Trending and Alarming
- Submittals, As-built drawings and O & M documentation
- 1 Year Warranty
- Work is to be Performed During Normal Working hours (See add for after hours work)

### C Wing Controls Upgrade:

- ESC shall provide (Qty 1) supervisory controller w/ UPS
  - Customer to provide IP Address
- DDC Control of VAV Boxes w/ Hot Water Reheat (Qty 26)
  - C Wing VAV Boxes are associated with the following Rooftop Units:
    - RTU-3 (3 VAV Boxes)
    - RTU-4 (7 VAV Boxes)
    - RTU-8 (4 VAV Boxes)
    - RTU-15 (2 VAV Boxes)
    - RTU-17 (3 VAV Boxes)
    - RTU-18 (2 VAV Boxes)
    - RTU-23 (\*5 VAV Boxes)

*\*Note: Controls for VAV B300 are being replaced under a separate repair project and are not included in the counts above for RTU-23*
  - Demo of existing Carrier VAV controllers
    - Includes labeling input & output wires before removal of existing controllers
  - ESC shall provide Honeywell controllers and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
    - Space Temperature
    - Airflow (integral sensor, existing flow ring to remain)
    - VAV Damper (integral actuator, existing damper to remain)
    - Supply Air Temp
    - Hot Water Reheat (existing valve to remain)
  - Connect new VAV controllers to existing Niagara 4 system
    - Includes running new BACnet communications wiring from VAV controller to new JACE
- DDC Control of Duct Reheats & Misc Control Points (4 Panel Locations)
  - Demo of existing Carrier 6400 controllers
    - Includes labeling input & output wires before removal of existing controllers
  - **Second Floor North Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
    - Space Temperature (QTY 8)
    - Discharge Air Temperature (QTY 8)
    - Reheat Valve (QTY 8, existing valves to remain)
  - **Third Floor North Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
    - Space Temperature (QTY 8)
    - Discharge Air Temperature (QTY 7)
    - Reheat Valve (QTY 8, existing valves to remain)

- Exhaust Fan Start/Stop & Status (QTY 6 EF, existing devices to remain)
- RTU-16 Run Status (existing devices to remain)
- RTU-24 Run Status (existing devices to remain)
- **First Floor South Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
  - Space Temperature (QTY 4)
  - Discharge Air Temperature (QTY 4)
  - Reheat Valve (QTY 4, existing valves to remain)
- **Third Floor South Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
  - Space Temperature (QTY 5)
  - Discharge Air Temperature (QTY 5)
  - Reheat Valve (QTY 5, existing valves to remain)
  - Exhaust Fan Start/Stop & Status (QTY 10 EF, existing devices to remain)

*Note: This panel originally included control points for RTU-4 & RTU-8 both of which were replaced under a sperate project and can be eliminated from this panel since the new units have factory controls*
- Connect new Honeywell controllers to Niagara 4 system
  - Includes running new BACnet communications wiring from new controller to existing Honeywell JACE that was provided under previous project
- ESC shall provide (2) Hours of Training
- Project Supervision
- Control Wiring
  - Prevailing Wage Rate
- Floor Plan Graphics
- Engineering, Programming, Graphics, Start-up and Commissioning of the New Control Systems
- Trending and Alarming
- Submittals, As-built drawings and O & M documentation
- 1 Year Warranty
- Work is to be Performed During Normal Working hours (See add for after hours work)

**D Wing Controls Upgrade:**

- ESC shall provide (Qty 1) supervisory controller w/ UPS
  - Customer to provide IP Address
- DDC Control of VAV Boxes w/ Hot Water Reheat (Qty 24)
  - D Wing VAV Boxes are associated with the following Rooftop Units:
    - RTU-6 (12 VAV Boxes)
    - RTU-13 (12 VAV Boxes)

- Demo of existing Carrier VAV controllers
  - Includes labeling input & output wires before removal of existing controllers
- ESC shall provide Honeywell controllers and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
  - Space Temperature
  - Airflow (integral sensor, existing flow ring to remain)
  - VAV Damper (integral actuator, existing damper to remain)
  - Supply Air Temp
  - Hot Water Reheat (existing valve to remain)
- Connect new VAV controllers to existing Niagara 4 system
  - Includes running new BACnet communications wiring from VAV controller to new JACE
- DDC Control of Duct Reheats & Misc Control Points (1 Panel Location)
  - Demo of existing Carrier 6400 controller
    - Includes labeling input & output wires before removal of existing controller
  - **First Floor North Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
    - Space Temperature (QTY 14)
    - Discharge Air Temperature (QTY 14)
    - Reheat Valve (QTY 14, existing valves to remain)
  - Connect new Honeywell controller to Niagara 4 system
    - Includes running new BACnet communications wiring from new controller to existing Honeywell JACE that was provided under previous project
- ESC shall provide (2) Hours of Training
- Project Supervision
- Control Wiring
  - Prevailing Wage Rate
- Floor Plan Graphics
- Engineering, Programming, Graphics, Start-up and Commissioning of the New Control Systems
- Trending and Alarming
- Submittals, As-built drawings and O & M documentation
- 1 Year Warranty
- Work is to be Performed During Normal Working hours (See add for after hours work)

**Hot Water & Chilled Water Plant Controls Upgrade:**

- ESC shall provide (Qty 1) supervisory controller w/ UPS
  - Customer to provide IP Address
- DDC Control of Boiler & Chiller Panels (2 Panel Locations)

- Demo of existing Carrier 6400 controllers
  - Includes labeling input & output wires before removal of existing controllers
- **Boiler Room Control Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
  - Hot Water Pressure (existing device to remain)
  - Hot Water Pump Start/Stop & Status (QTY 2 Pumps, existing devices to remain)
  - Hot Water Supply & Return Temperature (new sensors, existing wells)
  - Boiler Header Temperature (new sensors, existing well)
  - Boiler Enable (existing relay to remain)
  - Boiler Bypass Valve (existing valve to remain)
  - Exhaust Fan Start/Stop (existing relay to remain)
  - VFD Speed
  - Pool Heat Exchanger Valve (existing valve to remain)
  - Locker Room Space Temperature (QTY 6)
  - Locker Room Heating Valves (QTY 6, existing valves to remain)
  - Low Air Pressure- Pneumatics (existing devices to remain)
- **Chilled Water Control Panel:** ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below. Existing wiring to remain:
  - Chilled Water Pump Start/Stop & Status (QTY 4 Pumps, existing devices to remain)
  - Chiller Water Supply & Return Temperature (QTY 4 new sensors, existing wells)
  - Chiller Enable (QTY 2, existing relays to remain)
  - Outside Air Temperature & Humidity (new combination sensor)
- Connect new Honeywell controller to Niagara 4 system
  - Includes running new BACnet communications wiring from new controller to existing Honeywell JACE that was provided under previous project
- ESC shall provide (2) Hours of Training
- Project Supervision
- Control Wiring
  - Prevailing Wage Rate
- Floor Plan Graphics
- Engineering, Programming, Graphics, Start-up and Commissioning of the New Control Systems
- Trending and Alarming
- Submittals, As-built drawings and O & M documentation
- 1 Year Warranty
- Work is to be Performed During Normal Working hours

**Constant Volume Rooftop Units (QTY 6):** Replace existing Carrier Controls for six (6) existing Constant Volume RTU with Honeywell controls

- DDC Control of RTU-5 (Auditorium), RTU-9 (Pool Bleachers), RTU-16 (Boys Locker), RTU-19, RTU-20 & RTU-24 (Cafeteria)
  - ESC shall provide Honeywell controller and new Controls end devices as noted for the existing control points below:
    - Supply Air Temp
    - Supply Fan Start/Stop
    - Supply Fan Status
    - Heating Stages
    - Cooling Stages
    - Return Air Temperature
    - Mixed Air Temperature
    - Outside Air Damper- Existing Damper & Actuator to remain
  - Connect RTU controls into Niagara 4 system
    - Includes running new BACnet communications wiring from RTU-24 controller to existing Honeywell JACE that was provided under previous project
- ESC shall provide (2) Hours of Training
- Project Supervision
- Control Wiring
  - Prevailing Wage Rate
- Floor Plan Graphics
- Engineering, Programming, Graphics, Start-up and Commissioning of the New Control Systems
- Trending and Alarming
- Submittals, As-built drawings and O & M documentation
- 1 Year Warranty
- Work is to be Performed During Normal Working hours

**Add/Alternate #1: VFDs for Hot Water Pumps (QTY 2):**

- Demo existing 40 HP Variable Frequency Drive (VFD) which serves both HWP-1 & HWP-2
- Provide & Install new Variable Frequency Drives for each pump (QTY 2)
- Includes new control wiring, programming & graphics for second VFD
- Includes Start-up by Factory Certified VFD Technician
- Project Supervision
- As-Built Documentation
- 3 Year on-site warranty for VFDs

**Add/Alternate #2: Duct Cleaning VAV systems RTU-3, 4, 6, 7, 8, 13, 14 & 23: Duct Cleaning of VAV Boxes & Ductwork upstream & downstream**

- Cut access as needed into ductwork for cleaning and inspection purposes.
- Connect HEPA equipped high volume vacuum to duct system(s).
- Zone off duct system(s) as necessary to obtain a minimum air speed of 1,250 linear feet per minute toward the HEPA vacuum.
- Using a variety of air whips, skippers, brushes etc., attached to a compressor hose, dislodge visible contaminants into the HEPA vacuum.
- Contact clean insulated ducts where applicable.
- Access and clean the dampers, coils, VAVs and turning vanes.
- Access and clean the air handling units.
- Perform a visual inspection of the duct system to ensure all debris has been removed.
- Sanitize the systems by applying a biocide through an atomizer machine – only applied if suspected mold is visually observed in compliance with EPA and NADCA recommendations.
- Seal all access openings with metal plates, sheet metal screws, and foil tape.
- Replace filters as necessary – filters will be supplied by customer if this is desired.
- Project Supervision
- Controls Technician to assist in making sure units are shut down prior to cleaning

**Add/Alternate #3: Air & Water Balancing: Air & Water Balancing for VAV Box & Reheat Zones**

- Air Balancing: Test, Adjust & Calibrate Rooftop Units (QTY 11) VAV Boxes (QTY 80) & associated diffusers (Approximately 300)
- Water Balancing: Test Adjust & Calibrate VAV (80) & Ducted Reheat (QTY 45) Coils
- Project Supervision
- Controls Technician to assist balancer
- Based on normal working hours

**Exclusions and Clarifications to this Proposal:**

- Excludes modification of existing building controls beyond scope described above
- Excludes provision, installation, or repair of mechanical equipment
- Duct Cleaning is specifically for VAV Box systems. RTUs serving other areas (such as ducted reheats) will be quoted as a phase 2 if desired
- Water Balancing, Air Balancing is excluded unless price #10 is accepted
- IP Address(s) to be provided by Owner
- Line voltage power wiring is excluded
- Existing smoke detectors (where applicable) to remain
- Monitoring by the fire alarm system by others



- Permits, Bonds are excluded
- Cutting, patching, and painting or channeling of walls, floors or ceilings is not included
- Premium or overtime costs associated with overtime are not included (unless after hours option is selected)
- Sales tax is NOT included in our pricing

**DDC Pricing:**

**DDC Controls Pricing for B, C & D Wings, Heating/Cooling Plant & Constant Volume RTUs:**

- **DDC Controls Price:** \$330,835
- **Add for After Hours:** \$ 10,580

**DDC Controls Unit Pricing:**

- **VAV Space Temp w/ Setpoint Adjust:** \$ 516 add/each  
(includes sensor upgrade & new wiring)
- **VAV Space Temperature/CO2 Combo:** \$ 972 add/each  
(includes sensor upgrade & new wiring)
- **Room Occupancy Sensor (soft setback):** \$ 470 add/each  
(Includes Provision & Installation of new sensor to be tied into VAV controller)
- **Reheat Valve Replacement:** \$ 785 add/each  
(Includes provision & installation of new valve, assumes isolation valves hold)

**Add/Alternate #1: Hot Water Pump VFDs:** \$ 25,150 add

**Add/Alternate #2: Duct Cleaning VAV systems:**

- **Duct Cleaning Price:** \$109,250 add

**Add/Alternate #3: Air & Water Balancing:**

- **Air/Water Balancing:** \$ 55,850 add

If you should have any questions, please do not hesitate to give me a call. Thank you for this opportunity.

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