

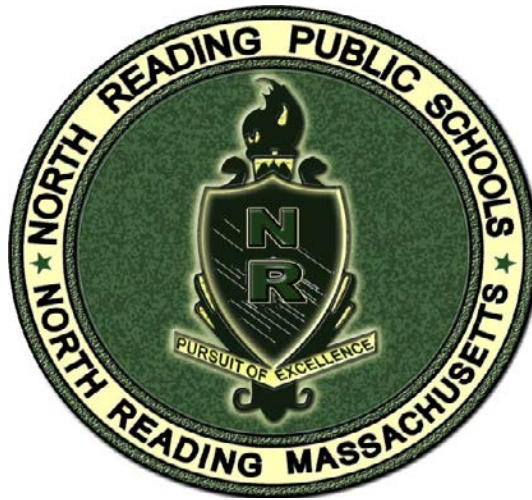
NORTH READING PUBLIC SCHOOL

"Pursuit of Excellence"

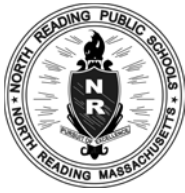
Invitation for Bids

"E. Ethel Little Elementary School HVAC Upgrade"

Direct Digital Control (DDC) system HVAC Project



Submittal Deadline
Friday, May 14, 2021



NORTH READING PUBLIC SCHOOLS

OFFICE OF THE SUPERINTENDENT OF SCHOOLS

189 Park Street
North Reading, Massachusetts 01864
Telephone 978-664-7810
FAX 978-664-0252

INVITATION FOR BIDS

The School Department for the Town of North Reading, Massachusetts requests bids for the installation of a new Direct Digital Control (DDC) system at the E. Ethel Little Elementary School.

The North Reading Public Schools are seeking bids for a qualified firm to install a new Direct Digital Control (DDC) system and upgrade the HVAC systems at the E. Ethel Little Elementary School. Bids will be received in the Business Office, 189 Park Street, North Reading, MA 01864, until 11:00 a.m. on Friday, May 14, 2021. Bidders may mail their bid response to the above address or drop off their sealed bid package to Michael Connelly, Assistant Superintendent of Finance and Operations, at mconnelly@nrpsk12.org.

Complete information for bidders may be obtained at the North Reading Public Schools Business Office, 189 Park Street, North Reading, MA 01864, and Monday through Friday from 8:00 AM until 4:00 PM beginning Monday, April 26, 2021. Bidders may email Michael A. Connelly, Assistant Superintendent of Finance and Operations, at mconnelly@nrpsk12.org to request a copy of the bid documents.

The North Reading Public Schools reserves the right to reject any or all bids, or to accept any parts thereof which it considers most advantageous to the Town of North Reading.

INVITATION TO BID AND INSTRUCTION TO BIDDERS

I. Background

The North Reading Public Schools is seeking bids from qualified firms to install a new Direct Digital Control (DDC) system and upgrade its HVAC and heating systems at the E. Ethel Little Elementary School. The E. Ethel Little Elementary School serves a population of 350 students in grades PreK through Grade 5. The school was originally built in 1960 and renovated in 1977. The building is a 48,700 square feet and is made up of four different wings. The original building construction consists of approximately 16,200 square feet of space, the 1968 B-Wing addition consists of approximately 20,000 square feet of space and the 1997 C-Wing addition consists of approximately 12,800 square feet of space for a total building of approximately 49,000 square feet. The project will include installation of a new Direct Digital Control (DDC) system. This system will include all necessary components and functionality to provide proper control, including zoning and scheduling, of the existing heating and ventilating equipment throughout the building. New controls components will include, among other items, new electronic actuators for outdoor and return air dampers at each unit ventilator throughout the building.

Interested bidders will be expected to perform site walk through with members of the North Reading Public School's Buildings and Grounds Department to review the scope of work on site. The successful contractor will be expected to familiarize themselves with the existing environment and systems at the school and provide accurate pricing based on the acceptable minimum equipment and software standards including in the specifications and scope of work listed herein. Once the contract is awarded, the successful contractor will be expected to commence work as soon as possible. Alternative hours, late afternoons, evening, and school vacation weeks may be required to minimize interruptions while school is in session. It is the desire of the North Reading Public Schools that all work to be completed no later than August 31, 2021. This deadline may be extended at the sole discretion of the Assistant Superintendent of Finance and Operations, of the North Reading Public Schools.

II. Submission Deadline and Instructions

1. Bids will be accepted by the North Reading Public Schools, District Administration, 189 Park Street, North Reading, MA 01864, until **Friday, May 14, 2021 at 11:00 a.m.** and will be publicly opened at that time. Two copies of the bid are required. The bid envelope must be sealed and clearly marked:
Little School Direct Digital Control (DDC) system HVAC Project.
2. The successful contractor shall be the one(s) with the lowest responsive and responsible bid with the demonstrated ability to perform the work within an acceptable time frame. It is the desire for the North Reading Public Schools to either award the contract in whole or in parts by School whatever is deemed to be in the best interest of the North Reading Public Schools or the Town of North Reading.
3. Questions concerning this IFB must be submitted in writing to: Michael Connelly, Assistant Superintendent of Finance and Operations, North Reading Public Schools, North Reading, MA 01864. All questions received five (5) or more days prior to the submittal deadline will be considered, which Monday, May 10, 2021. Questions may be emailed to Mr. Michael

Connelly, at mconnelly@nrpsk12.org. Written responses will be emailed to all applicants on record as having received the IFB.

4. If any changes are made to this IFB, an addendum will be issued. Addenda will be emailed to all Applicants on record as having received the IFB.
5. All proposals submitted in response to this IFB shall remain firm for the 2020-21 school year. It is anticipated that the contract will be officially awarded within ten days of the deadline as stated herein.
6. A pre-bid site visit and informational meeting is scheduled for 10:00 a.m. on Monday, May 3, 2021. Interested contractors will be asked to report to the E. Ethel Little Elementary School located at 7 Barberry Road, North Reading, MA 01864.
7. Bids must be made on the forms provided, either in ink or typewritten. Bids must be submitted in a sealed envelope and clearly marked with the name of the bidder and the words "Little School Direct Digital Control (DDC) system HVAC Project" to the attention of Michael Connelly, Assistant Superintendent of Finance and Operations. Bids must be received prior to 11:00 AM on Friday, May 14, 2021.
8. Bidders are asked to submit a minimum of three (3) references for projects of equal size and scope the firm has serviced in the last three years.
9. This is being bid in accordance with MGL Chapter 149, sections 44A-H, inclusive.
10. A copy of the Prevailing Wage Rates from the Division of Occupational Safety is included with this Invitation to Bid.
11. The successful bidder(s) shall submit proof of having completed at least 10 hours of OSHA training.
12. The bid, and any subsequent contract for the services, is hereby issued in accordance with applicable Massachusetts General Laws. The selected bidder shall be expected to comply with all applicable state and federal laws in performance of service.
13. Bids received prior to the date of opening will be securely kept, unopened. No responsibility will attach to an officer or person for the premature opening of a bid not properly addressed and identified.
14. Any bids received after the advertised date and time for opening will be returned to the responder unopened.
15. Purchases by the North Reading Public Schools are exempt from federal, state and municipal sales and/or excise taxes.
16. The Tax Compliance Certification and the Certificate of Non-Collusion must be included with the bid response. The bid must be signed by the authorized individual(s).
17. The successful contractor shall submit an insurance binder showing proof of the following

insurances and amount coverages:

- a. General Liability: \$1,000,000 Aggregate coverage, \$500,000 per person, or a combined \$1,000,000 bodily injury coverage.
- b. Property Liability: \$1,000,000 Aggregate coverage, \$500,000 per person, or a combined \$1,000,000 property damage coverage.
- c. Worker's Compensation: In amounts and as required by the Commonwealth of Massachusetts.

The Contractor shall carry and continuously maintain until completion of the Contract, insurance as specified in Agreement and in such form as shall protect him performing work covered by this Contract, and the Town of North Reading and its employees, agents and officials, from all claims an liability for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this Contract. The Town shall be named as an additional insured. The Contractor covenants and agrees to hold the Town and its employees, agents and officials harmless from loss or damage due to claims for bodily injury or death and/or property damage arising from, or in connection with, operations under this Contract.

18. The North Reading Public Schools will conduct CORI background checks on the successful contractor's staff that will be working in the school buildings prior to work commencing. The CORI forms will be provide by the North Reading Public Schools.
19. The North Reading Public Schools will not be responsible for any expenses incurred in preparing and submitting bids. All bids shall become the property of the North Reading Public Schools.
20. The North Reading Public Schools reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in its best interest.
21. Each bidder must familiarize himself fully with the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract. Insofar as possible the Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.
22. The Contractor shall comply with the provisions of Massachusetts General Laws, Chapter 30, Section 39R concerning Contractor records.
23. Prevailing Wage Rates as determined by the Commissioner of Department of Labor and Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Section 26 to 27G, as amended, apply to this project. It is the responsibility of the bidder, before bid opening, to request any additional information on Prevailing Wage Rates for those tradespeople who may be employed for the proposed work under this contract.
24. Comparison of Bids: Bids will be compared on the basis of prices set forth in the bid forms. In the event that there is a discrepancy between the lump sum or unit prices written in words and

figures, the prices written in words will govern.

25. Comparison of Bids: Bids will be compared on the basis of prices set forth in the bid forms. In the event that there is a discrepancy between the lump sum or unit prices written in words and figures, the prices written in words will govern.
26. Award of the Contract: The Contract will be awarded to "the lowest responsible and eligible bidder. Such a bidder shall possess the skill, ability and integrity necessary for the faithful performance of the work, shall be able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, in the work, and shall otherwise comply with all applicable provisions of law. Contract award shall be subject to availability of an appropriation for funding.

III. Summary of Submission Requirements

1. Interested companies shall include the following information in their proposal:
 - Description of firm
 - Proposed pricing completed on the bid pricing form attached or in similar format is required.
 - A minimum of three references
2. The deadline for submitted proposals is Friday, May 14, 2021 at 11:00 a.m. The pre-bid site visit and informational meeting is scheduled for Monday, May 3, 2021 at 11:00 a.m. in the Superintendents Conference Room, located at 189 Park Street, North Reading, MA 01864.

SUBMITTAL REQUIREMENTS

1. Pricing Form for General Bid
2. Certificate of Non-Collusion & Tax Compliance
3. Certificate of Labor Harmony and OSHA Training Certification
4. Company Profile as listed in item
5. References as listed in item
6. Proof of Insurance

IV. PROJECT SCOPE OF WORK

1.0 GENERAL

- A. The Contractor shall supply and install a complete Direct Digital Control (DDC) Building Automation System (BAS) as required to accomplish the Sequences of Control for heating, ventilating, air-conditioning and other building-level equipment and systems as described herein.

1.1 WORK INCLUDED

- A. Furnish all labor, materials, equipment and service necessary for a complete and operational DDC BAS.
- B. The successful Proponent will be the Prime Contractor for this project.
- C. Coordinate the existing conditions and requirements of all mechanical and electrical equipment that will be controlled by the DDC BAS.
- D. Removal of existing pneumatic thermostats along with exposed pneumatic piping in occupied areas. Provide and install wall cover plate to existing thermostat locations. Install new space DDC sensors at same location as existing thermostats when possible.
- E. Include labor and material to replace existing pneumatic control valves for controlled equipment. New control valves shall be selected to match existing CV sizing and to meet the sequence of operation as detailed in Section 1.9 below. New control valves shall be 2-way NPT Belimo CCV with fail safe actuators.
- F. Include labor and material to replace existing pneumatic damper actuators for controlled equipment. New actuators shall be selected to provide required damper torque requirements and to meet the sequence of operation as detailed in Section 1.9 below. New damper actuators shall be fail-safe Belimo electronic.
- G. All BAS controllers, if not internally mounted inside equipment served, shall be housed in a (hinged cover) NEMA 1 enclosure. 120/24VAC power for BAS controllers and associated devices shall be from equipment served or dedicated 120VAC source.
- H. Space temperature sensor functionality will vary per system and area served and shall be chosen in coordination with Owner preferences. If CO2 sensor is not integral it shall have an accuracy of ± 40 ppm, $\pm 3\%$ of reading.
- I. All labor, material, equipment and service not specifically referred to in this specification or on associated drawings that are required to fulfill the functional intent of this specification shall be provided at no additional cost to the Town.
- J. Note: Installation of required control valves is not included as part of this scope of work. A Mechanical Contractor under separate contract through the Town of North Reading will provide installation.

1.2 DDC SYSTEM REQUIREMENTS

- A. GENERAL:
DDC Systems installed under this specification shall adhere to the following characteristics and include all low voltage wiring, devices, hardware and programming to control and monitor the following delineated scope of work.
- B. SCOPE OF WORK:

Scope of work will be completed in two phases per the anticipated schedule:

PHASE 1	Summer of 2021
PHASE 2	Anticipated Summer of 2022

Note: Phase 1 work will include required operator interface and system graphics associated with controlled equipment.

C. PHASE 1:

1. Unit Ventilator with FTR (Typ of 14)
2. Unit Ventilator without FTR (Typ of 10)
3. Unit Ventilator with DX (Typ of 1)
4. Computer Lab Unit Ventilator (Typ of 1)
5. Hot Water System

D. PHASE 2:

1. Gymnasium AHU-1 & 2
2. Cafeteria AHU-3
3. Computer Lab Unit RTU
4. Baseboard Radiation (Typ of 14)
5. Ceiling Unit Heaters (Typ of 8)

Note: Equipment quantities to be field verified by vendor

1.3 BASIC SYSTEM ARCHITECTURE

- A. The DDC BAS as provided and installed under this specification shall be a complete graphics based system from a single manufacturer designed for use on intranets and the internet. System graphics shall be animated and designed with Owner input to ensure layout and functionality are acceptable.

1.4 QUALITY ASSURANCE

- A. The Contractor shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship provided under this Specification.
- B. BAS components shall be manufactured by firms regularly engaged in the manufacture of equipment of the types, sizes and service required.
- C. The Contractor shall be a factory certified contractor specializing and experienced in BAS installations and with experience in networked microprocessor based commercial HVAC, building and enterprise level control systems.

- D. The Contractor shall use technicians and application engineers certified by the manufacturer in the installation, configuration, programming and service of the BAS products.
- E. The Contractor shall have demonstrated past experience on twenty projects of similar complexity, scope and value.
- F. The Contractor shall have in-place facility located within 50 miles of Project and located within the State of Massachusetts.
- G. The BACnet internetwork shall be based upon the manufacturer's standard integrated hardware and software product design intent and in accordance with Manufacturer's installation and application documentation.
- H. MANUFACTURERS
 - 1. Basis of Design: Automated Logic Corporation
 - 2. Alternate 1: Alerton
 - 3. Alternate 2: Delta Controls

1.5 SUBMITTALS

- A. Upon completion of installation and systems commissioning, the Contractor shall submit record documents for review.
- B. "As-Built" Project Record Documents, including:
 - 1. Project Record Application Engineering Drawings shall include all BAS System
 - 2. Engineering Design Submittal with Drawings updated to reflect actual field conditions, architecture and execution
 - 3. Operating & Maintenance (O&M) Manual, including:
 - a. Operator's Manual with Manufacturers' complete operating instructions.
- C. Programming Manual, including:
 - 1. All necessary system Administrator-Level passwords and/or required access credentials
 - 2. Complete Final Point Schedule
- D. Final Bill of Material with all installed parts, manufacturers, manufacturers' part numbers and ordering information
- E. Complete system database as functional at the conclusion of systems commissioning and functional testing including all graphics and images used by and/or created for BAS on electronic format as accepted by the Town.

1.6 CALIBRATION AND COMMISSIONING, DEMONSTRATION AND ACCEPTANCE

- A. Calibration and Commissioning: As a part of this contract, the Contractor shall fully commission the entire BAS. All commissioning shall be fully documented and all documentation shall be submitted prior to Demonstration and Acceptance testing. Commissioning shall include a “point-to-point” check- out of the following at a minimum:
 - 1. Verify that all Temperature Control Panels (TCP), BAS equipment, controllers, devices and sensors are installed and operational according to the specifications, submittals and manufacturer’s installation and application instructions
 - 2. Test, calibrate and bring on-line every control device
 - 3. Calibrate all inputs by comparing the actual site condition with the B-OWS point display.
 - 4. Verify all outputs from B-OWS command to observed response of controlled device.
 - 5. Each control program shall be fully commissioned and tested for complete design intent compliance and functionality.
 - 6. Verify overall network performance of BAS for complete design intent compliance and functionality with all devices on-line, communicating and fully-operational

1.7 TRAINING

- A. As a part of this contract, the Contractor shall provide instruction on the adjustment, operation of the BAS as installed including all hardware and software provided. All training equipment and material shall be provided by this Contractor.
- B. Training shall be scheduled within seven (7) days of BAS Acceptance and shall consist of, at minimum, a 1/2-day operational training program for up to 4 operators at the discretion of the Town. The training shall be provided during the Town’s regular working hours.

1.8 WARRANTY, MAINTENANCE, NORMAL AND EMERGENCY SERVICE

- A. BAS manufacturer shall warranty all DDC controllers to be free of defect in material and workmanship under normal operation and expected service as published by the manufacturer in the unit’s performance specifications for a period of five (5) years, at a minimum.
- B. As a part of this contract, the Contractor shall warranty all other components of the BAS and installation to be free of defects in workmanship and material under normal expected service and use for a period of one (1) year from the date of acceptance by the Town.
- C. During the installation warranty period the Contractor shall provide all labor and materials required to repair or to replace all items or components that fail

due to defects in workmanship or manufacturer at no charge or reduction in service to the Town.

- D. Except in the event of property loss or damage, warranty service shall be provided during regular working hours Monday through Friday at no charge unless otherwise explicitly outlined in the Contract.

1.9 SEQUENCE OF OPERATION (INCLUDING POINTS LIST)

A. BASEBOARD RADIATION CONTROL (PHASE 2)

1. A space sensor shall cycle the low voltage 2-position spring return, normally open, radiation valve in order to maintain its occupied and unoccupied setpoint.
2. Points

<u>Point Type</u>	<u>Point Name</u>
AI	Space temperature
BO	FTR valve command

B. CEILING UNIT HEATERS (PHASE 2)

1. A space sensor shall cycle the cabinet/unit heater control valve and fan as needed to maintain the space temperature. A software permissive will not allow fan operation if the building hot water supply temperature is below 125 F. (adj)
2. Points

<u>Point Type</u>	<u>Point Name</u>
AI	Space temperature
BO	UH valve command
BO	Fan Command

C. UNIT VENTILATOR CONTROL (PHASE 1)

(Typ of 10 without FTR) Base sequence of operation
(Typ of 14 with FTR) Base + additional sequence of operation
(Typ of 1 with DX) Base + additional sequence of operation

1. Base Sequence of Operation:
 - a. System will be indexed occupied /unoccupied & warm-up/cool-down by the optimal start program in the BMS.
 - b. In the heating mode the 2-way control valve will modulate to satisfy the desired discharge air set point.
2. Warm-up/Cool-down Mode:
 - a. System supply fan will start subject to heating coil discharge low temperature thermostat.
 - b. Outside air damper will remain closed unless economizer mode is permitted and outside air is needed to satisfy setpoint.
 - c. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)
 - d. The space temperature sensor will reset discharge air to maintain

the following schedule:

Space Temp.	Discharge Air Temp.
75 deg.f.	55 deg.f.
65 deg.f.	90 deg.f.

3. Occupied Mode:

- a. Fan will be started/stopped through the BMS and will run continuously. Should fan de-energize as monitored through current switch an alarm will occur.
- b. System supply fan will continue to run subject to heating coil discharge low temperature thermostat.
- c. Outside air damper will remain at minimum position unless economizer mode is permitted and outside air is needed to satisfy setpoint.
- d. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F (adj)
- e. Reset controller will modulate outside and return air damper through discharge air low limit in sequence with heating action control of 2-way coil valve
- f. The space sensor will reset discharge air to maintain the following schedule:

Space temp.	Discharge air temp.
75 deg F	65 deg F
65 deg F	85 deg F

4. Unoccupied/Heating:

- a. Supply fan will cycle subject to heating coil discharge low temperature thermostat with outside air damper closed and heating coil valve full open and when the space temperature drops below 60°.

5. Unit Ventilator w/ Fin Tube Radiation - FTR Control (PHASE 1)

- a. Occupied Mode: Baseboard radiation valve will open upon a call for heat when space temperature is below occupied space temperature setpoint. Initial setpoint = 70 F
- b. Unoccupied Mode: Baseboard radiation valve will open upon a call for heat when space temperature is below unoccupied space temperature setpoint. Initial setpoint = 62 F

6. Unit Ventilator with DX (Principal's Office) DX Cooling Control

- a. Occupied Mode: DX cooling will be allowed if fan status is proven on and outside air temperature is above 55 F (adj DX cooling will be enabled upon a call for cooling when space temperature is above space temperature setpoint. Initial setpoint = 74 F
- b. Unoccupied Mode: DX cooling will be disabled.

7. Points

<u>Point Type</u>	<u>Point Name</u>
AI	Space temperature
AI	Supply air temperature
BI	Supply fan status
AO	Heating valve command
AO	Mixing damper command
BO	Supply fan command
BO	FTR valve (Qty 14)
BO	DX command (Qty 1)

D. COMPUTER LAB UNIT VENTILATOR CONTROL w/RTU (PHASE 1 & 2)

1. General:

- a. System will be indexed occupied /unoccupied & warm-up/cool-down by the optimal start program in the BMS.
- b. Computer Lab RTU will be enabled to operate only on a call for cooling unless heat operation is selected. (via system graphic) Unit ventilator operation will be disabled when RTU is enabled.
- c. Unit Ventilator - In the heating mode the 2-way control valve will modulate to satisfy the desired discharge air setpoint.

2. Warm-up/Cool-down Mode:

- a. System supply fan will start subject to heating coil discharge low temperature thermostat.
- b. Outside air damper will remain closed unless economizer mode is permitted and outside air is needed to satisfy setpoint.
- c. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)
- d. The space temperature sensor will reset discharge air to maintain the following schedule:

Space Temp.	Discharge Air Temp.
75 deg.f.	55 deg.f.
65 deg.f.	90 deg.f.

3. Occupied Mode:

- a. Fan will be started/stopped through the BMS and will run continuously. Should fan de- energize as monitored through current switch an alarm will occur.
- b. System supply fan will continue to run subject to heating coil discharge low temperature thermostat.
- c. Outside air damper will remain at minimum position unless economizer mode is permitted and outside air is needed to satisfy setpoint.
- d. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)

- e. Reset controller will modulate outside and return air damper through discharge air low limit in sequence with heating action control of 2-way coil valve
- f. The space sensor will reset discharge air to maintain the following schedule:

Space temp.	Discharge air temp.
75 deg F	65 deg F
65 deg F	85 deg F
- g. RTU Cooling: DX cooling will be allowed if fan status is proven on and outside air temperature is above 55 F (adj) DX cooling will be enabled upon a call for cooling when space temperature is above space temperature setpoint and both RTU and UV heating is disabled Initial setpoint = 74 F
Unoccupied Mode: DX cooling will be disabled.
- h. RTU Heating: - In the heating mode the gas heat exchanger will be enabled and modulate to satisfy the desired discharge air setpoint.

4. Points

<u>Point Type</u>	<u>Point Name</u>
AI	Space temperature
AI	UV Supply air temperature
BI	UV Supply fan status
AO	UV Heating valve command
AO	UV Mixing damper command
BO	UV Supply fan command
AI	RTU Supply air temperature
BI	RTU Supply fan status
BI	RTU Low temp alarm
BO	RTU Gas Heat command
BO	RTU DX command
AO	RTU Economizer
AO	RTU Gas Heat modulation

E. GYMNASIUM AHU-1 & AHU-2 CONTROL (PHASE 2)

- 1. System will be indexed occupied /unoccupied & warm-up/cool-down by the optimal start program in the BMS. In the heating mode the 3-way control valve will modulate to satisfy the desired discharge air setpoint.
- 2. Warm-up/Cool-down Mode:
 - a. System supply fan will start subject to heating coil discharge low temperature thermostat.
 - b. Outside air damper will remain closed unless economizer mode is permitted and outside air is needed to satisfy setpoint.
 - c. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)
 - d. The space temperature sensor will reset discharge air to maintain the following schedule:

Space Temp.	Discharge Air Temp.
75 deg.f.	55 deg.f.
65 deg.f.	90 deg.f.

3. Occupied Mode:

- a. Fan will be started/stopped through the BMS and will run continuously
- b. Should fan de-energize as monitored through current switch an alarm will occur.
- c. System supply fan will continue to run subject to heating coil discharge low temperature thermostat.
- d. Outside air damper will remain at minimum position unless economizer mode is permitted and outside air is needed to satisfy setpoint.
- e. Upon an elevated level of space CO2 the AHU -1 & 2 outside air dampers shall be allowed to modulate open beyond minimum, subject to maintaining supply air temperature setpoint. If heating valve is at 100% open and not meeting setpoint the outside air damper will modulate closed as needed. Initial CO2 setpoint to be 900 ppm.
- f. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)
- g. Reset controller will modulate outside and return air damper through discharge air low limit in sequence with heating action control of 2-way coil valve
- h. The space sensor will reset discharge air to maintain the following schedule:

Space temp.	Discharge air temp.
75 deg F	65 deg F
65 deg F	85 deg F

4. Unoccupied/Heating:

- a. Supply fan will cycle subject to heating coil discharge low temperature thermostat with outside air damper closed and heating coil valve full open and when the space temperature drops below 60 F.

5. Points

<u>Point Type</u>	<u>Point Name</u>
AI	Space temperature (shared)
AI	Space CO2
AI	Supply air temperature

BI	Supply fan status
AO	Heating valve command
AO	Mixing damper command
BO	Supply fan command

F. CAFETERIA AHU-3 CONTROL w/CAFETERIA & KITCHEN FTR
CONTROL (PHASE 2)

1. System will be indexed occupied /unoccupied & warm-up/cool-down by the optimal start program in the BMS. In the heating mode the 3-way control valve will modulate to satisfy the desired discharge air setpoint.
2. Warm-up/Cool-down Mode:
 - a. System supply fan will start subject to heating coil discharge low temperature thermostat.
 - b. Outside air damper will remain closed unless economizer mode is permitted and outside air is needed to satisfy setpoint.
 - c. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)
 - d. The space temperature sensor will reset discharge air to maintain the following schedule:

Space Temp.	Discharge Air Temp.
75 deg.f.	55 deg.f.
65 deg.f.	90 deg.f.

3. Occupied Mode:
 - a. Fan will be started/stopped through the BMS and will run continuously.
 - b. Should fan de- energize as monitored through current switch an alarm will occur.
 - c. System supply fan will continue to run subject to heating coil discharge low temperature thermostat.
 - d. Outside air damper will remain at minimum position unless economizer mode is permitted and outside air is needed to satisfy setpoint.
 - e. Upon an elevated level of space CO2 the AHU outside air damper shall be allowed to modulate open beyond minimum, subject to maintaining supply air temperature setpoint. If heating valve is at 100% open and not meeting setpoint the outside air damper will modulate closed as needed. Initial CO2 setpoint to be 900 ppm
 - f. Economizer cooling will be allowed when outside air enthalpy is below 22 Btu/lb (adj) and outside air temperature is below 65 F. (adj)
 - g. Reset controller will modulate outside and return air damper through discharge air low limit in sequence with heating action

- control of 2-way coil valve
- h. The space sensor will reset discharge air to maintain the following schedule:

Space temp.	Discharge air temp.
75 deg F	65 deg F
65 deg F	85 deg F

4. Unoccupied/Heating:
- a. Supply fan will cycle subject to heating coil discharge low temperature thermostat with outside air damper closed and heating coil valve full open and when the space temperature drops below 60 F.

5. Points

<u>Point Type</u>	<u>Point Name</u>
AI	Space temperature
AI	Space CO2
AI	Supply air temperature
BI	Supply fan status
AO	Heating valve command
AO	Mixing damper command
BO	Supply fan command
BO	Cafeteria FTR Valve
BO	Kitchen FTR Valve

G. HEATING SYSTEM CONTROL (PHASE 1)

1. GENERAL:

- a. The heating system shall be monitored and controlled by the EMS. The building controller shall totalize the run time of each boiler. The sequences listed below are reversible unless noted otherwise.

2. BOILERS:

- a. The boilers shall be energized when the EMS is indexed to the heating mode of operation. When the heating system is enabled, the lead primary hot water circulating pump (P-1 or P-2) shall be energized and operate continuously.
- b. Boilers shall operate through the EMS and boiler control panel to provide lead/lag control. The lead boiler and associated boiler pumps shall be enabled.
- c. Upon a call for boiler burner to operate, the boilers burner shall be energized and shall operate to maintain the boiler water temperature setpoint.
- d. Upon a further call for heat, the lag boilers and associated boiler pumps shall be energized in sequence as required to maintain the boiler water temperature setpoint.
- e. Hot water temperature setpoint shall be reset through the EM S and

boiler control panels based on outside air temperature. The hot water supply water temperature shall be 190F (adj.) when the outside air temperature is 10F (adj.) or below, 140F (adj.) when the outside air temperature is above 40F (adj.) and shall vary linearly between 190F (adj.) and 140F (adj.).

- f. The EMS shall enable/disable, monitor status and be transmitted alarm signals for flame failure and low water for each boiler.
- g. Upon a boiler failure alarm, a flame failure or low water alarm from a boiler, the respective boiler shall be de-energized; the next boiler in the lead/lag sequence of operation shall be energized; the appropriate alarm signal shall be transmitted to the EMS; and a general alarm signal shall be transmitted to the security system.
- h. The EMS shall also monitor the hot water supply water temperature and return water temperature. Upon sensing a high limit or low limit water temperature, the appropriate alarm signal shall be transmitted to EMS.
- i. The EMS shall rotate the sequence of boiler operation after the system has logged 300 hours (adj.) of runtime.

3. BUILDING HOT WATER CIRCULATING PUMPS:

- a. The building hot water lead supply pump (P-1 or P-2) shall be energized.
- b. Differential pressure sensors shall measure differential pressure across HWS & HWR where indicated on the water flow schematic. Differential pressure shall be controlled through the differential pressure bypass valve.
- c. Pump status of all pumps shall be monitored by the EMS.
 - 1) After start-up flows have been established, If a “no flow” condition is sensed the appropriate alarm signal shall be transmitted to the EMS; The respective pump shall be de-energized and the next pump in the sequence shall be energized.
- d. The EMS shall rotate the lead and lag pumps after each has logged 300 hours (adj.) of runtime.

4. Points

<u>Point Type</u>	<u>Point Name</u>
AI	HWS Temp
AI	HWS Pressure
AI	HWR Pressure
BI	P-1 Status
BI	P-2 Status
AO	Bypass Valve Control
BO	P-1 Command
BO	P-2 Command
Modbus	Boiler integration (required for sequence of op)

BID GENERAL PRICING FORM

The Breakdown of this Price is as follows Per Project Score of Work:

Phase 1:

Description	Amount
1. Unit Ventilator with FTR (Typ of 14) including Labor, materials, and electrical costs	\$
2. Unit Ventilator without FTR (Typ of 10) including Labor, materials, and electrical costs	\$
3. Unit Ventilator with DX (Typ of 1) including Labor, materials, and electrical costs	\$
4. Computer Lab Unit Ventilator (Typ of 1) including Labor, materials, and electrical costs	\$
Operator Interface and System Graphics:	\$
Other Services and Training:	\$
Total Project Cost:	\$

Phase 2:

Description	Amount
1. Gymnasium AHU-1 & 2 including Labor, materials, and electrical costs	\$
2. Cafeteria AHU-3 including Labor, materials, and electrical costs	\$
3. Computer Lab Unit RTU including Labor, materials, and electrical costs	\$
4. Baseboard Radiation (Typ of 14) including Labor, materials, and electrical costs	\$
5. Ceiling Unit Heaters (Typ of 8) including Labor, materials, and electrical costs	\$
Operator Interface and System Graphics:	\$
Other Services and Training:	\$
Total Project Cost:	\$

Note: Equipment Quantities to be field verified by the vendor.

Rule for Award: Award will be based upon the total amount of each phase of the project: The award is contingent upon the School District receiving the approval of appropriation at annual Town Meeting in June 2021 and June 2021 for phase II. Bidders must be able to bid on all phases and part of the project to be considered a responsible and responsive bidder.

Bidder Name: _____ Telephone:_____

Signature _____ Title: _____

Address _____

I/we certify, under pains and penalties of perjury, and in accordance with the provisions of
Massachusetts General Law, Chapter 62C, Section 49A, that:

Name of Bidder

Federal I.D. Number

Has complied with all of the laws of the Commonwealth of Massachusetts in relation to taxation.

Date: _____

Authorized Signature: _____

CERTIFICATE OF NON – COLLUSION & TAX COMPLIANCE

As required under Chapter 233 and 701 of the Massachusetts Acts and Resolves of 1983, all bidders must certify to the following, by signing this page in the space indicated below:

1. “The undersigned certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph, the word ‘person’ shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.”
2. “Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes required under law.

FIRM NAME

ADDRESS

TELEPHONE NUMBER

DATE

SIGNATURE OF CORPORATE AUTHORITY

TITLE

SOCIAL SECURITY NUMBER OR FEDERAL I.D NUMBER OF BIDDER

CERTIFICATE OF LABOR HARMONY AND OSHA TRAINING CERTIFICATION

All bidders must certify to the following, by signing this page in the space indicated below:

1. That the undersigned is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed at the work; and
2. That all employees to be employed at the worksite in the work subject to this bid will have successfully completed a course in construction safety and health approved by the United States OSHA that is at least 10 hours in duration.

FIRM NAME

ADDRESS

TELEPHONE NUMBER

DATE

SIGNATURE OF CORPORATE AUTHORITY

TITLE

SOCIAL SECURITY NUMBER OR FEDERAL I.D NUMBER OF BIDDER

REFERENCE FORM

The bidder is requested to state below what work of a similar character to that included in the proposed contract he has done, and give references that will enable the Owner to judge his experience, skill and business standing.

Completion Date	Town / District	Project Name	Contract Amount	Email:	Telephone No.