Franklin S Edmonds Elementary School
8025 Thouron Ave, Philadelphia, PA 19150

Uni-Vent and Temperature Control Replacement Project
Scope Determination Report

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1.0 Introduction

This report outlines a Scope of Work (SOW) for removal and replacement of the Building’s Automatic Temperature Controls and classroom and hallway steam radiators at Franklin S Edmonds Elementary School. This School is located at 8025 Thouron Avenue, Philadelphia, PA 19150

2.0 Background

The Franklin S Edmonds Elementary School building is located at 8025 in Philadelphia, PA. The 2 story, approximately 71,200 square foot main building was originally constructed in 1948. The year 2000 A.D., a 10,000 square foot single storied addition was added to the northeast corner of the main building. The main building was constructed with a partial basement.

The Existing Building HVAC System

1. Low pressure steam is generated at a minimum pressure of 10.66 PSI and a maximum of 28 PSI in by two (2) 156 HP Weil-McLain, Model 94 cast iron sectional boilers that have an efficiency rating of approximately 81%. Both Boilers were installed in 2017. Boiler B1 and B2 each have a heating capacity of 6,495 MBTUH and are fully operational. They were each designed for well over 100% heating capacity during the most extreme winter days.

2. A Shipco boiler feed tank and pump assembly are installed in the boiler room. The boiler feed tank provides treated make-up water to the boilers. The unit has three (3) 3/4HP pumps headered together and mounted on the tank. The unit appears to be in good condition and the Building Engineer reported no problems with the system. Three (3) condensate receivers are installed in the boiler room. Two (2) of the receivers have single 3/4HP pumps, the other receiver has two (2) 3/4HP pumps.

3. Steam piping mains are black steel with flanged fittings and smaller distribution piping is black steel with welded fittings. The condensate piping is black steel with threaded fittings. Steam and condensate piping mains run up through the building to the unit ventilators and fin tube radiators on both floors. The distribution piping has been in use well beyond its service life and will require more frequent attention from the maintenance staff to address pipe/valve failures as time passes.

4. Unit ventilators and fin tube radiators provide heating for classrooms, offices, and to the corridors. The unit ventilators and fin tube radiators are original to the building and well beyond their service lives. Outdoor air for the building is provided by wall openings in the unit ventilators. Ventilation is provided to the Cafeteria by four (4) unit ventilators that does not meet current IAQ code requirements. Heating is supplied to the Auditorium by unit ventilators, heating for the Gymnasium is supplied by fin tube radiators. Supplemental heating is provided to the Auditorium and Gymnasium by two (2) heating and ventilation units (HV). The Building Engineer rarely operates these units because heating for the area(s) is adequate. The units are original to the building and well beyond their service lives. Ventilation shall be provided to the Cafeteria by installing a constant volume air handling unit (AHU) with distribution ductwork and registers. The Gymnasium shall have a fan coil air handling unit hung from the steel structure with outdoor air ducted to the unit from louvers in the window openings. Similar units should be installed for the administration offices. Ventilation should be provided for the Auditorium by installing a constant volume air handling unit (AHU) with distribution ductwork and registers.
5. Unit ventilators and fin tube radiators provide heating for the individual classrooms. A single HV unit provides heating and ventilation for the corridor. These units shall be removed and replaced with Temperature Controls for each unit.

6. The original pneumatic system provides basic control functions. Pneumatic room thermostats are intended to control the unit ventilator control valves. In reality the ventilator control valves are wide open and heating control is achieved via the boilers. Pneumatic control air is supplied from one (1) duplex Honeywell compressor located in the boiler room. The Building Engineer reported that the control air line is constantly blowing down and thus the air compressor is constantly running. The pneumatic systems are beyond their service life and require too much attention from the maintenance staff. The original control valves and pneumatic actuators are beyond their service life and should be rebuilt or replaced. These controls should be converted to DDC with Bacnet protocol.

7. A new building automation system (BAS) with modern DDC modules and communications network shall be installed to serve the HVAC systems in this building to improve reliability and energy efficiency. An interface should be provided with the preferred system in use throughout the District or a web based software that can be integrated into the SDP System.

3.0. Scope of Work – Unit ventilator/Radiator and Temperature Control Replacement

Environmental, Mechanical, Electrical and Plumbing.

3.1 Environmental

The School District of Philadelphia (SDP) Office of Environmental Management & Services (OEMS) developed the Scope of Work (SOW) for remediation services where applicable. Work will involve removal and proper disposal of asbestos materials prior to any removal, repair and/or construction of piping, insulation, and/or any miscellaneous equipment and materials. Environmental scope of work will also include abatement required for other work described hereinafter.

3.2 Mechanical

A. Automatic Temperature Control(s) (ATC) System

The SOW listed below encompasses the demolition, removal and replacement of the original Classroom Radiators and all associated ancillary valves, piping and controls, located throughout the school.

1. Demolition shall consist of, but not limited to, the following:

   a. Removal of approximately 84 classroom UV’s from the classrooms.
   b. Removal of a compressor unit and all pneumatic controls.
   c. Removal of the Air Handling Unit (AHU), located on the 2nd floor, servicing the Auditorium.
   d. Removal of the AHU located on the 2nd floor, servicing the Gymnasium.
   e. Removal of approximately 200 L.F. of 4” diameter steel condensate piping located in the basement boiler room crawl space.
f. Removal of approximately 300 L.F. of 6” diameter steel steam piping located in the boiler room and crawl space.

g. Removal of all control wiring and conduit associated with the removal of each radiator located in the classrooms, hallways and stairwells.

h. Miscellaneous piping and control valves for each steam/hot water UV system(s).

i. Removal of all convctor heaters in the boys and girls bathrooms throughout the original building and the new building boys and

2. Installation shall consist of, but not limited to, the following SOW

a. Furnish and install approximately 84 new (UV’s) and new control valves with electric thermostats in school building classrooms and common areas. The EOR shall confirm the existing radiator UV quantities and capacities in each classroom, hallway and stairwell. Calculations shall be performed on all units to confirm flow rates and heating capacity of each unit.

b. Furnish and install approximately 2 new Air handling Units for the Auditorium and Gymnasium. The EOR shall provide calculations for each unit in accordance with the new 2018 IBC, IECC and IMC codes and the ASHRAE 62.15 IAQ Standard.

c. Furnish and install approximately 300 LF of 6” diameter steel low pressure steam lines throughout the boiler room and crawl space areas.

d. Furnish and install approximately 200 LF of 6” diameter steel condensate lines throughout the boiler room and crawl space areas.

e. Furnish and install a new DDC system to control all new equipment. A BacNet communications protocol network shall be specified as the Building Management System (BMS) communications software for design purposes.

3.3 Electrical

A. Electrical Service

Furnish and install all new disconnect switches and miscellaneous wiring to each branch panel for the new unit ventilators. The EOR shall confirm wiring replacement to each hot water UV.

All new replaced mechanical equipment listed in the above SOW shall be properly re-wired to coincide with the correct voltage, amperage and frequency and grounded per the local NEC requirements.

Each classroom shall have a thermostat sensor built onto the radiator for DDC control to each of the newly installed radiators to efficiently control the heating within each classroom and common area.
3.4 Proposed Project Schedule

25% Schematics: May 24, 2019
60% Design Development Drawings: August 16, 2019
90% Contract Documents: October 25, 2019
100% Bid Documents: December 27, 2019
Advertise Date: January 24, 2020
Bid Receipt: February 25, 2020
SRC Date: April 23, 2020
Construction NTP: May 7, 2020

4.0 Project Cost Estimate

A cost estimate for Major Renovations at F S Edmonds Elementary School is based on the Scope of Work (SOW) described in the aforementioned sections and developed by the Philadelphia BOE estimating department. As-built drawings circa 1948 were used for the development of this SDR and the mechanical and electrical quantity take-offs to estimate the cost to fund this Capital Project. See the attached SDP Construction Estimate of Probable Cost for a detailed line item breakdown.

Cost Estimate Breakdown for Major Renovation

TOTAL $4,500,000
(Construction Budget)
Photographs
Photo #1 – New Boiler No. 1 installed @ 2016-17 Located in the Boiler Room.
Photo No. 2 – New Boiler No. 2 installed@ 2016-17 located in the Boiler Room
Photo No. 3 - Typical Fin Tube Hallway Radiator Coil.
Photo No. 4 – Typical Classroom Unit Ventilator.
Photo No. 5 – Typical Classroom Unit Ventilator Coil, Filter and Fan Assembly.
Photo No. 6 – Typical Classroom Unit Ventilator Piping and Control Valve Assembly.
Photo No. 7 – Typical Corridor Radiator with Metal Vent Cover Assembly.
Photo No. 8 – The Original Unit Ventilator with the Metal Cover Assembly.
Photo No. 10 – Two Unit Ventilators Per Classroom.
Photo No. 11 – Typical Bathroom Radiator Assembly
Photo No. 12 – Original Belt Driven Air Handling Unit for the Gym and Typical for the Auditorium.
Photo No. 13 – Typical Kindergarten Classroom UV with Metal Cover.