



**EVALUATION OF M-E-P-FP SYSTEMS
TEMPORARY SCHOOL
1 ELMCROFT ROAD – 3RD & 4TH FLOORS
STAMFORD, CT
November 12, 2018
Updated November 13, 2018**

Introduction

The services of Silver/Petrucci + Associates (S/P+A), Inc. have been secured by the City of Stamford for the purpose of evaluating existing mechanical, electrical, plumbing and fire protections systems serving the third and fourth floors of the former Pitney Bowes building at 1 Elmcroft Road in Stamford. We were directed to focus on life safety issues.

A walk-thru was conducted by S/P+A on Friday, November 9, 2018 and several meetings were conducted with City officials at that time. A follow-up walk-thru was conducted on Monday, November 12, 2018. Preliminary conclusions are outlined below.

Mechanical

Mechanical drawings of the fourth floor from a previous Pitney Bowes renovation were provided for reference, and they indicate supply air quantities for the fourth floor project area. These documents do not provide any information regarding the third floor nor has documentation of outside air quantities been provided. While the supply air information serves as a reference, actual current conditions remain unknown.

While no documentation of outside air quantities has been provided, it is reasonable to estimate the value at 10-15% of total supply air based on the office environment that the systems were designed for. S/P+A entered one mechanical room on the lower level and confirmed that outside air dampers were partially open at the time of the investigation.

As proposed, the fourth floor presents two very different situations in terms of ventilation air. The northern wing – defined approximately by columns 3–57 on the north face, A–E on the east side, and A-F on the west side – consists, for the most part, of densely populated perimeter classrooms and large unoccupied areas. The southern/eastern wing – defined approximately by E-R2 on the east side, and 38-57 on the south face – is mostly occupied with classrooms, offices and the cafeteria. While not nearly as significant as in the northern wing, there are unoccupied areas in the southern/eastern wing.

In the case of the southern wing, the system outside air supply needs to be approximately 30% of total supply air, so air supplied directly to each space does not, in all likelihood, contain sufficient outside air for ventilation. The air handling systems serving this area should be rebalanced to provide 30% outside air. Alternatively, fans and ductwork could be added to transfer from surrounding unoccupied areas into classrooms to supplement ventilation air and also provide additional air for cooling or heating. While no information on air terminal units (VAV boxes) was available, it's clear that zone air flow quantities cannot be increased through existing ductwork. However, ductwork could be added to supplement air flow to classrooms.

In the case of the northern wing, the system outside air ratio can be closer to the 10-15% that may be in effect now, or that could easily be implemented through testing & balancing procedures. This reduced ratio is possible because the International Mechanical Code and ASHRAE allow for taking credit for the "unused" air delivered to the substantial open and unoccupied areas that border the classroom in this wing.

No information was available pertaining to systems serving the third floor, therefore S/P+A's evaluation was limited. Since this area is mostly occupied, the associated mechanical systems will probably need to deliver 30% outside air to achieve required ventilation rates. If kilns are proposed for use in art areas, exhaust provisions will need to be made.

Carbon dioxide sensors should be installed to monitor representative classrooms in all areas. Baseline CO₂ levels are site specific but probably are approximately 800 ppm for this location. This value can be verified with a portable detector. There is no codified threshold for CO₂ but industry practice suggests that a sustained measured level 1200 ppm or higher trigger some corrective action.

Delivery of carbon dioxide sensors is expected today (11/13/2018) and S/P+A has provided suggested locations for monitoring on the third and fourth floors; we expect that the detectors will be installed this evening. We utilized a hand-held meter to measure CO₂ levels throughout both floors and readings, for the most part, fell in the 600-650 ppm range. A meeting consisting of ten adults took place in one of the classrooms and CO₂ levels ranged from 650-850 ppm during the meeting. This is a very favorable indicator of concentrations that can be expected when classrooms are fully occupied by young students.

Active service to the Gymnasium is unknown and the cutoff round ducts in the vacant space raises questions as to adequate (or any) air supply to that area. We spoke with the building owner on 11/13/2018 and he committed to connecting two of the cut-off supply ducts to the central system intended to serve that area. That work is expected to be complete before the arrival students.

All open ductwork entering the vacant space should be capped to minimize the possibility of cross-contamination.

The atrium is served by a smoke evacuation system for which no information was available. The system was manually tested on 11/12/2018 and the exhaust fans energized. No make-up air was evident on the lowest (third floor) level and we were told that make-up air is provided through sidewall grilles on the sixth floor. The building engineer will attempt to find documentation describing the system so that we can be further assured that the system is operating as originally designed.

A Testing & Balancing contractor should measure air flow quantities at each supply diffuser/grille and should document outside air quantities for all air distribution systems that serve the project area. Toilet exhaust systems should also be checked for proper operation and flow rates.

The Sequence of Operation, for all systems should be verified and given the significant, fast-paced modifications, use of a Commissioning Agent should be contemplated to verify proper system operation. The commissioning process requires witnessed demonstration of proper system operation.

Plumbing

S/P+A did not evaluate plumbing systems as part of this initial investigation, but we understand that new plumbing work on the third floor will be ADA compliant. It appears that modifications will be required on the fourth floor, but a separate evaluation will be required to confirm that assumption.

Fire Protection

Sprinkler system modifications are required due to the installation of new walls. Mack Fire Protection is in the process of modifying the system, and they will provide a record of their calculations and system modifications. These modifications appear to be complete.

Work on the third floor must include protection of Gymnasium sprinkler heads with guards and providing upright heads in the unfinished/unoccupied space next to the Gymnasium. Both of these tasks were completed by the time of our walk-thru on 11/13/2018.

ELECTRICAL

Exit Signage: The Fire Marshall walked the space and indicated exit sign additions and modifications that will be required. This will be memorialized by the building owner's code consultant.

Emergency Lighting: With few exceptions, emergency lighting is accomplished by general lighting fixtures that are circuited through the emergency power distribution system. The proper function and adequacy of emergency lighting will be assessed through a shut-down of the emergency generator. S/P+A understands that this testing will be witnessed by the Fire Marshall who will make the determination on adequacy.

Fire Alarm System: S/P+A understands that system modifications are being accomplished by the electrical contractor who is on-site, and it seems clear that notification devices will need to be added. The electrical contractor should document enhancements for review by the Fire Marshall's office, and the Fire Marshall will need to witness at test of the completed system.

General Lighting: Light fixtures have been removed or are not operating in areas of the fourth floor, and fixture switching was not apparent. The electrical contractor stated that he was modifying the switching. Also, it should be insured that the entire floor is illuminated satisfactorily.

Power Outlets: Power needs to be circuited to new equipment (e.g. smart boards) and outlets should be provided where required to served educational needs.

Low Voltage: S/P+A understands that all communications system work – including intercom, public address, master clock, two-way radios, and telephone - will be installed without design input from S/P+A.

ACTION ITEMS

1. A Testing & Balancing Contractor should measure and document all relevant parameters for the project area. It is important that this take place within the next week or two.
2. Air handling systems serving the southern/eastern wing should be adjusted to provide 30% outside air, and this work can initially be performed initially by the mechanical and/or control contractor – to be verified by a Testing & Balancing Contractor.
3. Air handling systems serving the third floor should be adjusted to provide 30% outside air, and this work can initially be performed initially by the mechanical and/or control contractor – to be verified by a Testing & Balancing Contractor.
4. Deliver supply air from the central system to two round ducts in the third floor vacant space to introduce a minimal amount of ventilation air to the Gymnasium.
5. Install carbon dioxide sensors in representative spaces on the third and fourth floors so that CO2 levels can be monitored while the building is occupied.
6. Provide ductwork drawings of third floor systems so that HVAC services can be evaluated. Preferably, this should be accomplished prior to testing and balancing.
7. Block duct openings to the third floor vacant area to minimize the possibility of cross-contamination of atmospheres.
8. Provide documentation of smoke evacuation system operation.

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