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Memo Report

From: W. Mark Cummings, P.E.

To: Mr. Jeremy Benn; Joe Flynn Real Estate

Subject: **Fire Safety Evaluation of Residential Property Located at 521 Cumberland Ave., Portland, ME**

As requested, Fire Risk Management, Inc. (FRM) reviewed several fire safety aspects associated with ongoing renovation activities within the building located at 521 Cumberland Avenue in Portland, ME. Specifically, questions were raised concerning vertical penetrations that spanned all levels of the building, separation requirements between the various apartment units and the stair enclosures, and potential fire protection concerns associated with the addition of lower ceiling heights in select areas of the apartments. The building that is the subject for this review houses two separate sets of apartment complexes, which have street addresses of 519 and 521 Cumberland Avenue. This review only addresses the "western half" of the building, which is adjacent to Mellen St., 521 Cumberland Ave., and will primarily focus on the issues outlined above.

Background

The building being reviewed has been subdivided into two separate sets of apartment complexes. The portion of the building that was reviewed consists of a 3-story structure above grade with a basement level. The building construction would be classified as a Type VB, per the International Building Code (IBC) or a Type V (000) as defined by the National Fire Protection Association (NFPA). This building would be classified as a Residential (R-3) occupancy, as defined by the IBC.

As part of the ongoing renovations within this half of the building, a fire sprinkler system has been installed throughout all levels of this portion of the building. Each of the three (3) above grade floors will consist of a single apartment. Each Apartment and the basement area can be accessed by stair enclosures at the front and rear of the building; south and north ends respectively.

Discussion

Since this building is "existing", the primary codes that would typically be used as reference for this review and evaluation are the Life Safety Code®, NFPA 101, and the International Existing Building Code (IEBC); albeit the extent of the renovations for this project are such that the IEBC would typically require that much of the IBC would still be applicable. NFPA 101 is being used as the principle reference for evaluating the life safety components of this building. Specifically, those requirements outlined in Chapter 31, *Existing Apartment Buildings*, were used in supporting this evaluation. Since the City's regulations would consider the extent of this renovation to exceed 50% of the building, the requirements for *New Apartment Buildings*, Chapter 30, were also reviewed for applicability. Chapter 31 provides a number of "options" that can be applied in supporting the overall goals for life safety. Given that a fire sprinkler system is being installed, this building is being evaluated using requirements associated with "Option 4," as outlined by Section 31.1.1.1. Although this chapter requires that the stair enclosures be provided with 1-hour fire rated enclosures, Option 4 also includes an allowance that for non-high rise buildings, stair enclosure doors that are of 1-$^3/_4$ inch solid-bonded wood core and are self-closing and self-latching will be considered acceptable for installation in the 1-hour fire rated wall that separates the stair enclosure(s) from the rest of the building.

Due to the height (3-story) and configuration of this building, including the inclusion of the fire sprinkler system, the Life Safety Code® would allow that only one means of egress (enclosed stairway) be provided; per Section 31.2.4.3 and 30.2.4.4, provided that the stair is enclosed with 1-hour fire barriers and each apartment is separated from the others by barriers having at least a ½-hour fire resistance rating.

There are deviations between the Life Safety Code® and the IBC regarding the requisite separation between the various apartments. For this evaluation, the most stringent requirement will be used, which will require that all horizontal and vertical barriers that separate individual apartments shall have at least a 1-hour fire resistance rating. As discussed, this will also apply to sealing any openings that currently exist in the floor/ceiling assemblies that separate the apartments. The existing floor/ceiling assemblies generally consist of heavy timber construction, which is accepted by the codes as having an inherent 1-hour fire resistance rating. As such, any openings in these assemblies will need to be filled using a fire penetration sealant and the manufacturer's listed configuration that provides the requisite 1-hour fire resistance rating.

NFPA 101 requires this building to be protected with a supervised, automatic fire sprinkler system. The sprinkler system shall be designed in accordance with the requirements outlined in NFPA 13R; T*he Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*. It was stated that questions had arisen regarding the need for additional sprinkler coverage within areas above the ceiling where the existing ceiling had been lowered to a level below the existing floor joists above. Based on the site review of the building performed on 23 January, 2014, the areas in question would not require additional sprinklers. These concealed areas are specifically addressed by Section 6.6.6 of NFPA 13R as not requiring sprinklers.

Due to the size and occupancy type of this building, it is not required to have a fire alarm/notification system. However, the fire sprinkler system is required to be supervised and, based on the requirements outlined in the City of Portland Fire Department Rules and Regulations, some level of fire alarm system will be required to support that feature.

Summary and Recommendations

A review has been completed of the planned renovations for the building at 521 Cumberland Avenue in Portland, ME. As a result of the site review, coupled with a review of the applicable code requirements, the installed fire sprinkler system appears to be adequately designed and no further modifications should be necessary to provide the requisite coverage to adequately protect this building. The following recommendations are provided to address other issues where additional measures may be required.

1. Ensure that the two stair enclosures are isolated from the rest of the building by barriers that have at least a 1-hour fire resistance rating. Although the codes would not require this building to have two separate stair enclosures, since the 2nd enclosure does exist and unless there are plans to remove this, it still represents a vertical opening that spans all floors and would be required to be separated by a 1-hour fire barrier anyway. As such, it is recommended that both stairs be maintained and provided with the necessary fire separation as outlined above.

2. All barriers that separate individual apartments should have at least a 1-hour fire resistance rating. Due to the heavy timber construction of the floor/ceiling assemblies, it is recommended that any openings in these assemblies be sealed with a listed fire penetration seal material, using a configuration that the manufacturer indicates has been listed as providing the 1-hour fire resistance. These actions should allow for the maintenance of the required fire separation between apartments. Any items that penetrate the floor/ceiling assemblies (piping, ducting, etc.) should be of non-combustible materials and/or meet the required flame spread rating for non-combustibility. Equally, the barrier(s) separating these apartments from the adjacent apartment complex shall also be constructed/repaired to ensure that a 1-hour fire resistance rating is maintained.

3. A fire alarm system will be needed to provide the proper supervision of the fire sprinkler system as outlined by the City of Portland. Given that a basic fire reporting (alarm) system will be needed, it

is also recommended that consideration be given to including horn/strobe devices outside each apartment (one per level) that would also be activated if fire sprinkler system activates. The cost of these devices is relatively small, but would provide a significant improvement in the overall level of life safety in this building. I must reiterate that this is NOT a code requirement, but simply a suggestion for consideration.

If the above recommendations are implemented as part of your renovation activities, I believe the building will not only be compliant with all applicable codes and regulations, but will certainly represent a vast improvement in the overall life safety of this building as compared to what it was. If you have any questions regarding what has been outlined above, please don't hesitate to contact me.

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