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Inspections Division
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Memo Report

From: W. Mark Cummings, P.E.

To: Mr. Matt Provencal; Mueller Architects

Subject: **Code Review and Life Safety Evaluation; ICW Building Located at 46 Market St., Portland, ME**

As requested, Fire Risk Management, Inc. (FRM) has performed a review of the information that has been provided with regards to the proposed design changes associated with renovating the building located at 46 Market Street in Portland, ME. A site visit was performed on November 19th to review the building, including the available means of egress, and develop an understanding of both the current and proposed configurations. Additionally, we have reviewed the general building plans that outline the proposed design changes for the 2nd and 3rd floors of the building; which will house the proposed residential units. Although the 1st floor of this building is also to be renovated, it is currently not part of the scope of this review and code evaluation.

The primary focus for this review is to evaluate the available means of egress for the occupants on the 2nd and 3rd floors of the Market St. building, including the fact that the current means of access to these floors is from the adjacent building located on Exchange St. Although recommended modifications to the Exchange St. building are discussed in this evaluation, these are primarily limited to those modifications that will support providing adequate life safety for the occupants of the Market St. building. Although the recommended modifications will also improve the life safety within the Exchange St. building, no specific code evaluation of this building is being performed; outside of that needed to support the evaluation of the Market St. building.

Background

The building located at 46 Market St. in Portland, ME consists of three (3) stories above grade with a basement. Renovations are planned for the 2nd and 3rd floors of this building. Although these floors had previously been configured at some point in time to support residential occupancies (apartments), it is understood that the most recent set of plans filed with the City of Portland's Planning Division indicated these were business occupancies (office space). As such, from the City's perspective, the proposed renovations represented a "change in use" for these floors of the building. The 1st floor of the building is currently unoccupied, but it is planned that this floor is to be renovated to accommodate a new restaurant or pub; assembly occupancy.

It is also understood that at some point in the building's past, it was owned by the same individual(s) as that for the adjacent building located at 31 Exchange St. In connection with past renovations of both buildings, these two structures were connected to one another; both physically and through shared use of spaces, including for mechanical services and means of ingress and egress. Currently, the only means of accessing the 2nd and 3rd floors of the Market St. building is via corridors from the Exchange St. building that were constructed and now span the gap between the buildings; connecting the 2nd and 3rd floors of each. The Exchange St. building is also a 3-story structure that includes assembly (restaurants) and business occupancies on the 1st and 2nd floors, with the 3rd floor having residential occupancies (apartments). The

stairway that provides access to the 2nd and 3rd floors of this building is separated from the 1st floor occupancies and provides direct access to the exterior, at ground level, from the 2nd floor. The 2nd floor of the Exchange St. building consists of nothing but business occupancies (office spaces). The stairway that connects this floor to the ground level exit and the 3rd floor above is open to the corridor that connects it to the various office spaces. The doors that connect the corridor to the various offices are wood and include integral glass panels. Additionally, glass transoms are installed above the doors. The staircase and doorways are all part of the building's original construction features.

An exterior fire escape is connected to the Market St. building that can be accessed, via windows, from the corridors that connect the 2nd and 3rd floors of the two buildings. The general condition of this fire escape appears to be questionable and the final set of stairs (or ladder) that was originally provided to connect to the ground level is missing..

Based on a report developed by Portland's Historic Preservation Board that addressed proposed renovations of the 1st floor of the Market St. building, this structure dates back to 1902. It is assumed that the Exchange St. building is likely of a similar age and historic value to the City.

The results of the site review of the buildings indicate that they would generally be considered as a non-separated, mixed use occupancies. The buildings appear to generally consist of Type IIIB construction. The buildings are, and will continue to be, fully protected with automatic fire sprinkler systems. No fire detection/alarm/notification system was noted as being installed in any of the areas reviewed.

The primary codes and regulations used in support of this building evaluation include the following;

1. The International Building and Existing Building Codes (IBC / IEBC); 2009 ed.
2. The Life Safety Code, NFPA 101; 2009 ed.
3. The City of Portland Code of Ordinances, Chapter 10 – Fire Prevention and Protection
4. The City of Portland Fire Department Rules and Regulations; dated 10/11/2012

Discussion

Based on the review of the current configurations of both the Market and Exchange Street buildings, as they relate to the renovations of the 2nd and 3rd floors of the Market St. building, they must be generally considered as a single building; at least regarding the available means of egress for each. Prior renovations have completely removed any internal stairs (means of egress) from the 2nd and 3rd levels of the Market St. building. Additionally, the shared mechanical systems and the legal covenants and tenants that exist between the two buildings make it extremely difficult, if it is even possible, to fully separate these two buildings such that they could "stand alone" from a codes perspective. Furthermore, the historic nature of these buildings further complicates potential options regarding modifications to the existing means of egress.

The original scope for the planned renovations was initially limited to the Market St. building. Based on the proposed design documents for these renovation activities, they would be classified as "Level 2 Alterations," as outlined by the IEBC. However, based on the review of the current configuration of the buildings and the synergy between these buildings that has been imposed by prior modifications, any pragmatic and/or cost-effective solution to the means of egress from the upper floors of the Market St. building must include travel through the Exchange St. building as its primary route. Additionally, having access to a fire escape at the Market St. building is also very advantageous to the occupants of the upper floors of the Exchange St. building.

The egress requirements contained within Chapter 30 of NFPA 101 for *New Apartment Buildings* were used in support of this evaluation since they represent the most stringent requirements for the various

occupancies located within the areas of the buildings being evaluated. The following parameters associated with egress travel distances for a fully sprinklered building apply:

- Max. common path of travel: 50 feet
- Max. dead end corridor length: 50 feet
- Max.travel distance within a residential unit to the corridor: 125 feet
- Max. travel distance from dwelling (corridor door) to an exit: 200 feet
- Max. total travel distance from other than residential units to an exit: 250 feet

NFPA 101 does allow for the sole means of egress from residential occupancies to be through a "non-residential" occupancy as long as it does not include a "high hazard contents" area. However, this is meant to apply to occupancies within the same building. As stated above, for the purposes of this evaluation, including any recommendations to be provided to support adequate life safety for both buildings, these buildings are to be considered as a single building as it applies to the life safety requirements.

Typically, the codes would require that the egress stair(s) be separated from the rest of the building with barriers having a fire resistance rating of at least one hour. Given the configuration of the buildings and the desire to maintain their original, historic nature, providing a one-hour separation for the stairway would be very problematic. In addition to the costs associated with adding additional barriers and modifying the existing walls and doorway openings, the original configuration of the Exchange St. building's historic character would be completely lost; at least at the 2nd floor level. However, due to the low occupant loading of both buildings at each of the 2nd and 3rd floor levels, along with the relatively short travel distances, it is believed that an acceptable level of life safety for both buildings can be achieved without the need for extensive and obtrusive renovations to the Exchange St. building that would damage its historic character.

The following occupant loads are estimated for each floor level using the NFPA load factors for residential and business occupancies:

	3rd Floor Level	2nd Floor Level
Market St.:	7 persons	7 persons
Exchange St.:	16 persons	22 persons
Total:	**23 persons**	**29 persons**

When evaluating the maximum travel distance to the primary egress exit, which is the exterior door at ground level of the Exchange St. building, the furthest point from this exit would be from inside one of the Market St. apartments at the 3rd floor level. Using the floor plans provided, the estimated maximum travel distance from within the apartments at this level to the exit door at ground level is estimated as being less than 180 feet; well below the 200-foot maximum that the codes would allow from an apartment's door to an exit. As such, the travel distance from an apartment in the Market St. building to the exterior represents no greater hazard, from a code perspective, than would that same travel distance from leaving an apartment in a larger building, via a corridor, to a point where the occupant entered a stair enclosure. The requirements for separation of the (exit access) corridor from surrounding apartments would be barriers having a fire resistance rating of at least ½-hour. Given the types of doorways that exist within the Exchange St. building, adjacent to the corridor and stairway, these barriers could not be classified as having a ½-hour fire resistance rating. However, if modifications are made to the existing sprinkler system to ensure rapid actuation, along with providing early notification to all occupants, it is believed that maintaining a smoke-tight exit access corridor would be sufficient to provide adequate protection throughout the time needed for egress of all floors.

For both buildings, the codes require that at least two (2) means of egress be provided. Given that these buildings are "existing", the use of fire escape stairs as one of the two required means of egress is code

compliant for both business and residential occupancies. There is currently no fire separation of the two means of egress; albeit the proposed renovation design provided does include the addition of fire rated barriers that would separate the two means of egress. Based on the size and type of buildings, it is recommended that to better ensure that a fire in one building does not affect the egress from the other building, the buildings be separated by barriers having at least a 1-hour fire resistance rating. With the exception of the corridors that connect these two buildings, they are provided with adequate separation between their exterior walls, such that no additional measures need to be implemented to provide the fire separation. Therefore, to achieve this separation, it would only necessary to provide fire rated barriers at the corridor locations at both the 2nd and 3rd floor levels.

Based on the above travel distances, coupled with the fact that the buildings are fully protected with automatic fire sprinkler systems, it is considered that with some additional fire separation between the buildings, along with the addition of an integrated fire detection/alarm/notification system, the level of life safety within both the Market St. and Exchange St. buildings can be improved such that the means of egress from both buildings will be sufficient to afford all occupants adequate protection. To achieve an acceptable level of life safety and ensure that all building occupants are provided with adequate fire notification, both buildings should be provided with a complete fire detection/alarm/notification system that meets the requirements of NFPA 72, the National Fire Alarm and Signaling Code®. This is to be a single system that provides coverage throughout both buildings. The combination of having some fire separation between the two means of egress and early notification should provide more than sufficient protection for all occupants on the 2nd and 3rd floor levels of both buildings.

To achieve the level of life safety outlined above, the following building modifications are recommended:

- Add a fire-rated barrier that separates the Exchange St. building from the corridor connecting this building to the Market St. building, including the fire escape stairs mounted on this building that represent the second means of egress. This can be accomplished by the addition of a fire-rated doorway at the Exchange St. end of this corridor. The door assembly and the new wall in which it is installed should have a fire resistance rating of at least one hour. This configuration applies to both the 2nd and 3rd floor levels.
- Any unprotected openings in the exterior walls (windows, etc.) adjacent to, and within 10 feet of, the corridors connecting the two buildings should be modified to provide at least a 1-hour fire resistance rating. Alternatively, the exterior walls of the corridors within 10 feet of an unprotected opening in the buildings' exterior walls can be modified to provide a 1-hour fire resistance rating.
- The 2nd and 3rd floor corridors that access the Market St. apartments, on the Market St. side of the fire-rated door that separates these corridors from the Exchange St. building, should be considered as "exit access" corridors and should be enclosed by barriers that meet a ½ hour fire resistance rating, including the apartment doors leading to the corridor.
- Add automatic door closing devices to all doors that access the corridors used for exit access.
- Install a new fire detection/alarm/notification system throughout all levels of both buildings. This system shall include all initiating and notification devices; located and installed in accordance with NFPA 72. Initiation of the system shall be by both the operation of the fire sprinkler system and manual pull stations. In addition to the code-required detection devices, smoke detection should be provided in all exit access corridors. Since trying to provide ½-hour rated barriers at the 2nd floor level in the Exchange St. building would have a negative impact on the historical aspects of this building, the additional of these devices would provide an additional means of early notification to ensure all occupants can safely exit before conditions within the means of egress become untenable. This system must include the use of horns/speakers within each of the dwelling units that actuate upon initiation of the fire alarm system. Additionally, since the primary means of access for the 2nd and 3rd floors of both the Market St. and Exchange St. buildings will be via the Exchange St. entrance, any knox box and/or annunciators would need to be installed at this location. Coordination with the Portland Fire Department will be needed to ensure that all aspects of a fire department response are properly planned.

- Modify the existing sprinkler system to include the use of quick-response sprinklers throughout. This will further ensure early operation of this system and early notification (via flow switch) of all occupants; thereby allowing additional time for egress.
- Provide new fire escape stairs to replace the existing fire escape stairs on the Market St. building that are in very poor condition and do not provide access to the ground level. Access to the fire escape stairs should be from new doorways installed in each of the 2nd and 3rd floor corridors that connect the two buildings.

Summary and Recommendations

Based on the configuration of the existing buildings, it is not possible to fully comply with NFPA 101 with regards to providing means of egress. However, by providing alternate fire and life safety measures to both the Market St. and Exchange St. buildings, it is believed that an adequate level of life safety for occupants located on the 2nd and 3rd floors of both buildings can be achieved. Currently, the occupants of the 2nd and 3rd floors of the Exchange St. building only have one means of egress. By implementing the above recommendations, not only would the occupants of the proposed apartments in the Market St. building be afforded a higher level of life safety, but so too would those of the Exchange St. building; which would currently not be a requirement since this building is not within the scope of the proposed renovations. Although the specific configurations for the proposed primary means of egress from the 2nd and 3rd floors of the Market St. building are not fully compliant with the requirements of NFPA 101, it is believed that the additional measures outlined above, when coupled with the relatively short travel distances to the available exits, will mitigate any potential risks of non-code compliance.

It is recommended that the above listed building modifications be implemented as outlined. Subsequent to these modifications and verification of proper operation of the new fire alarm system, it is considered that the 2nd and 3rd floors of the Market St. building will be provided with both adequate means of egress and life safety protection. Equally, these measures will do nothing more than improve the overall life safety throughout the Exchange St. building as well.

If you have any questions regarding what has been outlined above, please don't hesitate to contact me.

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