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Memo Report

From: W. Mark Cummings, P.E.

To: Mr. Will Savage; Acorn Engineering
Mr. Ryan Senator; Ryan Senator Architecture

Subject: Code Review; ICW Proposed Munjoy Heights Development

As requested, Fire Risk Management, Inc. (FRM) has performed a review of the information that has been provided with regards to the design for a new townhouse complex in Portland, ME. The focus for this review was primarily to evaluate the site access requirements needed to support fire department operations, but a brief review of the design plans for the individual buildings was also performed to evaluate code compliance.

Background

A new townhouse complex is being planned for construction on the north side of Walnut St., in the vicinity of the Sheridan St. intersection, in Portland, ME. This new development is to include six (6) separate buildings; with each having three (3) to six (6) separate living (townhouse) units. The buildings are being constructed to meet the requirements for Type V construction, as defined by the International Building Code (IBC). All units within the buildings are to be fully protected with automatic fire sprinkler systems; designed and installed in accordance with NFPA 13R.

The access road into the complex will be sufficient to support access by Fire Department apparatus; albeit the space available to accommodate the necessary turn-around area is limited. The total length of the access road is approximately 450 feet. Since no other means of access into this complex is available, this access road is a “dead end” and must be provided with an adequate turn-around area as outlined by both the National Fire Protection Association (NFPA) and the City’s requirements.

Discussion

The design documents that were used to support this review included the site plan provided by Acorn Engineering and a number of architectural plans for the various buildings provided by Senator Architecture. The Site Plan provided data with regards to the location of the buildings in relation to the adjacent City street, Walnut Street, along with the dimensions of the planned driveway and parking areas for the buildings. The architectural floor plans provided data regarding the overall dimensions of the buildings, along with the general layout of the living units within each building, which also included the planned fire separation for the living units.

The primary codes and regulations that were referenced during this review to determine code compliance were the most recent editions of NFPA 1, the *Fire Code*[®], the *International Building and Residential Codes* (IBC & IRC), NFPA 101, the *Life Safety Code*[®], and the City of Portland’s *Fire Department Rules and Regulations* and Section 3 – *Public Safety* of the City’s Technical Manual.

Based on a review of these documents, the following requirements were evaluated as being applicable to the site evaluation;

- *The City has a requirement that any development that includes up to 34 living units must include at least one (1) access road.* This townhouse complex will include 29 units and, as such, only requires one access road.

- *The City's standards require that the access road must extend to within 50 feet of an exterior door that provides access into the building. NFPA 1 has a similar requirement, but includes that when the building is provided with an automatic fire sprinkler system, this distance can be extended to 150 feet. The planned access road for this development extends all the way through the subdivision and, as such, will ensure that it will be within 50 feet of the front door of all units of all buildings; thereby still meeting the City's more stringent requirement.*
- *The access road must be within 450 feet of all portions of the building's exterior; which applies to buildings that are fully protected with an automatic fire sprinkler system. Due to the relatively small size of the various buildings within this complex, coupled with the proximity of each to the access road, this requirement is easily met for all buildings within the subdivision.*
- *The access road must be at least 16 feet in width to meet City requirements. The NFPA 1 would require this access road to have at least 20 feet in clear width. The access road shown on the site plan will provide up to 20 feet of clear width along its entire length.*
- *Any dead-end access roads in excess of 150 feet must be provided with an adequate turn-around area. The total length of the access road into this development is approximately 450 feet. As such, a turn-around area is required. As depicted on the site plan, a turn-around area is provided at the end of the access road that complies with the City's requirements for this feature. Specifically, the turn-around area that has been provided is in compliance with Figure I-5, *Turnaround On Dead End Street*, that is cited by the City's Public Safety Standards*
- *NFPA 1 requires that at least one (1) fire hydrant be within 250 feet of this site. The City also has a requirement that a hydrant must be within 100 feet of any Fire Department Connection (FDC). Given the water flow requirements needed to support firefighting operations, which is based on the building size and construction type, a fire hydrant must be within 250 feet of any part of the frontage on access road. A new, private fire hydrant is to be located at the end of the access road and a hydrant exists at the intersection of the access road and Walnut St. These hydrant locations ensure that all frontage on the development's access road will be within the 250-foot limit. However, the distance from the hydrants to the likely locations of some of the buildings' FDCs will be outside the 100-foot limit outlined by the City's Rules and Regulations. In recent discussions with a representative of the City's Fire Prevention Bureau, whereby the validity and benefit of this specific requirement has been questioned, it was stated that this regulation may be waived and only those requirements outlined in NFPA 1 must be adhered to for this particular project; which would require only a single additional hydrant be provided within the development.*
- *Based on the construction type and size of the largest individual building within the development, NFPA 1 would require a minimum fire flow (fire water supply capabilities) of at least 1000 gpm. Using the building parameters that resulted in the largest fire area (Building B), coupled with Type V (000) construction as defined by the NFPA, the initial fire flow requirements would be approximately 3500 gpm. However, this value can be reduced by 75% when the building is protected by an automatic fire sprinkler system; down to a minimum flow of 1000 gpm. This value could be reduced further if quick response sprinklers are used, which is likely for residential buildings, but this was not taken into account for this review. The fire hydrant that is located in the vicinity of the intersection of Walnut St. and the access road (corner of Walnut and Sheridan Streets) has a "light blue" color painted on the bonnet. This indicates that this hydrant can support fire flows in excess of 1500 gpm (at a minimum of 20 psig residual pressure at the hydrant). It will be assumed that the new private fire main system will tie into the City's fire main system in a near vicinity to this hydrant and, thus, the new private hydrant will also have water flow capabilities similar to that of the City's hydrant. As such, more than sufficient water can be provided by the available firemain system to support the requisite fire flows for this subdivision.*

Based on the review of the basic design plans for the individual buildings, it appears that these will be compliant with all applicable code requirements. In fact, a couple of aspects associated with the planned fire separation scheme for these buildings appear to be beyond what the codes would require. These include;

- Each living unit is being provided with an elevator. Although the code review documents provided with the architectural plans correctly indicate that no fire separation is required for the elevator shafts since they are installed completely within the individual residences and do not connect more than four stories in any of the

buildings, the floor plan drawings indicate a 1-hour fire separation for the shaft walls. This is not a code requirement and since these elevator shafts are adjacent to open stairways that connect all floors of the individual units, inclusion of these fire rated barriers would ultimately serve no purpose; either from a building protection or life safety standpoint.

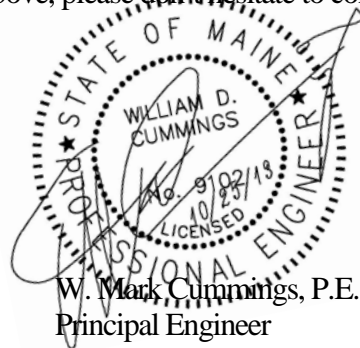
- Each of the buildings is being segregated by 2-hour fire-rated barriers, such that no more than two individual units are connected using only the required 1-hour fire rated barrier. It is assumed that the intent for these additional fire-rated barriers may be to address the fact that NFPA 101 does not adequately address townhouses in its various occupancy chapters, including Chapter 24, One- and Two-Family Dwellings. The IBC does not require this additional level of separation for townhouses, regardless of the number of units that are located in each individual building. Equally, if these buildings were considered to be “apartment” buildings, which generally have more stringent requirements, the vertical separation requirements for individual units would still only be one hour for those buildings of this size that are protected throughout by an approved fire sprinkler system. This fact, coupled with the fact that an adequate fire water supply exists that will readily accommodate the required fire flows for these buildings, the need for the addition of these 2-hour fire-rated barriers is questionable.

Based on a review of both the buildings’ design plans and the development’s site plan, along with comparing these data to the requirements needed to support fire department operations, the design plans for this townhouse complex appear to be generally compliant. The only item that will require further discussion with the City is verification that the need to have a fire hydrant within 100 feet of all buildings’ FDC will not be required for this development.

Summary and Recommendations

With the exception of the distance between the closest fire hydrant and the buildings’ FDCs, the site design plan for this building should meet all requirements for site access and water supply as outlined in both NFPA 1 and the City’s Rules and Regulations. In addition to obtaining verification from the City that it will not be required that all FDCs be within 100 feet of a hydrant, it is also recommended that unless the property owner has requested additional fire separation between the individual units to better assure property protection, that consideration be given to removing the 2-hour fire-rated barriers that currently subdivide each building. The limited benefit of adding these additional barriers may not warranted, given the likely costs associated with their construction.

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



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