FIREPRO Incorporated
1600 Osgood Street, Suite 2082, North Andover, MA 01845-1063
T: 781.270.5200 F: 781.229.2922
www.fireproincorporated.com

FIREPRO

44 Oak Street
Portland, Maine

Change Occupancy to Mixed Use

Prepared by
Lee C. DeVito, P.E.
December 10, 2014

STATE OF MAINE DEVITO No. 7853 LICENSED PROFESSIONAL ENGINEER
12-10-14

CITY OF PORTLAND MAINE RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 08/04/15

CALEB JOH ARCHITECTS + B
265 MAIN STREET, SUITE 201 BIDDEFO
T: 207.283.8778 F: 207.283.8778

Introduction

The following is a review of the building located at 44 Oak Street located in Portland, Maine and the application of adding a single family residential occupancy to include the fourth and fifth floors of the building.

FIREPRO, makes all reasonable efforts to incorporate practical and advanced fire protection concepts into its advice. The extent to which this advice is carried out affects the probability of fire safety. It should be recognized, however, that fire protection is not an exact science. No amount of advice can, therefore, guarantee freedom from either ignition or fire damage.

Referenced Documents

1. International Existing Building Code, 2009 edition, with Maine Amendments
2. International Building Code, 2009 edition, with Maine Amendments
3. International Residential Building Code, 2009 edition, with Maine Amendments
4. NFPA 101, Life Safety Code, 2009 edition
5. NFPA 1, Fire Code, 2006 edition
6. NFPA 13, Standard for the Installation of Sprinkler Systems, 2007 edition
7. Fire Resistance of Timber Decking for Heavy Timber Construction - L. R. Richardson and M. Batista Fire Research Department, Forintek Canada Corporation, Suite 4100 CTTC, 1125 Colonel By Drive, Ottawa, Canada K1S 5R1

Building Description

The Frye Building is an existing building located at 44 Oak Street in Portland, Maine. It is a five story building with a basement. It was constructed in 1940, its construction is Type 3 B construction. Its total building area is approximately 15,500 square feet, with an average story floor area of approximately 2,800 square feet.

The building is equipped with an automatic sprinkler system.

The building use group is currently defined as a Business Group B. The change of use for the fourth and fifth floors to a single family Residential Group R would make the building a "mixed use" building.

Change of Occupancy

The proposed single residential occupancy will be the only residential occupancy in the 44 Oak

Street building. It shall be classified as a Group R-3 as the occupants are primarily permanent in nature and the space can not be classified as a Group R-1, R-2, or R-4.

The change of occupancy from a classification Business Group B to a Mixed Use building with classifications Business Group B and a Residential Group R-3 classifications is addressed in Chapter 9, Change of Occupancy in the International Existing Building Code.

Requirements for Change of Occupancy

Chapter 9 Change of Occupancy of the International Existing Building Code , Section 901.3 states that a change in occupancy classification of a building the provisions of sections 902 through 912 shall apply. The following of those sections shall apply:

Section 903 *Building Elements and Materials* - Building elements and materials in portions of buildings undergoing a change of occupancy classification shall comply with Section 912.

Section 904 *Fire Protection* - Fire protection requirements of Section 912 shall apply where a building or portions thereof undergo a change of occupancy classification.

Section 905 *Means of Egress* - Means of egress in portions of buildings undergoing a change of occupancy shall comply with Section 912.

Section 906 *Accessibility* - Accessibility in portions of buildings undergoing a change of occupancy classification shall comply with Section 912.8.

Section 912.8 Accessibility. Existing buildings that undergo a change of group or occupancy classification shall comply with this section.

Section 912.8.1 Partial change in occupancy. Where a portion of the building is changed to a new occupancy classification, any alterations shall comply with Sections 605 and 706, as applicable.

Section 605.1 General. A building, facility or element that is altered shall comply with the applicable provisions in section 605.1.1 through 605.1.14, chapter 11 of the International Building Code and ICC A117.1 unless it is technically infeasible. Where compliance with this section is technically infeasible, the alteration shall provide access to the maximum extent that is technically feasible.

A building, facility or element that is constructed or altered to be accessible shall be maintained accessible during occupancy.

Exceptions

2. Accessible means of egress required by Chapter 10 of the International Building Code are not required to be provided in existing buildings and facilities.

And, the International Building Code Section 1007.1 (1) states that Accessible means of egress are not required in alteration to existing buildings.

Therefore this section does not apply.

Section 907 *Structural* - Buildings or portions thereof subject to a change of occupancy where such change in the nature of occupancy results in higher uniform or concentrated loads based on Tables 1607.1 and 1607.6 of the International Building Code shall comply with the gravity load provisions of the International Building Code. The applicable Table is 1607.1 which indicates:

Business Use - Offices:

Uniform Load: 50 pounds per square foot
Concentrated: 2,000 pounds

Residential One and Two Family Dwelling

Uniform Load: 40 pounds per square foot
Concentrated: N/A

The uniform load and the concentrated load for a residential occupancy are lower than the uniform load and the concentrated load for a business occupancy, therefore this section does not apply.

Section 908 *Electrical* - Where the occupancy of an existing building or part of an existing building is changed to one of the following special occupancies as described in NFPA 70, the electrical wiring and equipment of the building or portion thereof that contains the proposed occupancy shall comply with the applicable requirements of NFPA 70 whether or not a change of occupancy group is involved.

The change of occupancy to an R-3 is not considered to be a special occupancy as listed in Section 908. Therefore, this section does not apply.

Section 909 *Mechanical* - Where the occupancy of an existing building or part of an existing building is changed such that the new occupancy is subject to different kitchen exhaust requirements or to increased mechanical ventilation requirements provisions of NFPA 96; Fire codes and standards adopted pursuant to Title 25 Section 2452 and 2465.

Ventilation for an R-3 occupancy does not apply.

Section 910 *Plumbing* - Where the occupancy of an existing building or part of an existing building is changed such that the new occupancy is subject to increased or different plumbing fixture requirements or to increased water supply requirements in accordance with the Maine State Plumbing Code, the new occupancy shall comply with the intent of the respective International Plumbing Code provisions.

Section 911 *Other Requirements* Light and ventilation shall comply with the requirements of the International Building Code.

Section 912 *Change of Occupancy Classification*

Section 912.1.1 Compliance with Chapter - The requirements of Chapter 8 shall be applicable throughout the building for the new occupancy classification based on the separation conditions set forth in Sections 912.1.1.1 and 912.1.1.2

Section 912.1.1.1 Change of occupancy classification without separation. Where a portion of an existing building is changed to a new occupancy classification and that portion is not separated from the remainder of the building with fire barriers having a fire-resistance rating as required in the International Building Code for the separate occupancy, the entire building shall comply with all of the requirements of Chapter 8 applied throuout the building for the most restrictive occupancy classification in the building and with the requirements fo this chapter.

Section 912.1.1.2 Change of occupancy classification with separation. Where a portion of an existing building that is changed to a new occupancy classification and that portion is separated from the remainder of the building with fire barriers having a fire-resistance rating as required in the International Building Code for the separation occupancy, that portion shall comply with all the requirements of Chapter 8 for the new occupancy classification and with the requirements of this chapter.

Area Separation - International Building Code

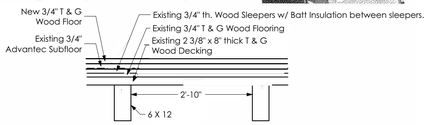
Section 508, Mixed Use and Occupancy, of the International Building Code provides requirements for Mixed Use building, and Section 508.4 states that buildings or portions of a building that comply with the provisions of this section shall be considered as separated occupancies.

Section 508.4.4 Separation. states that individual occupancies shall be separated from adjacent occupancies in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both, so as to completely separate adjacent

occupancies.

Table 508.4, Required Separation of Occupancies (Hours). The requirement for the separation between a business occupancy, B, and a residential occupancy, R, is one hour for a building with an automatic sprinkler system installed in it.

The existing floor separation is based on heavy timber. Its typical fire rating is in the area of three quarters of an hour. "Fire Resistance of Timber Decking for Heavy Timber Construction" report indicates that the addition of plywood to the floor will provide a one hour separation.



Section 912.1.2 *Fire Protection and Interior Finish* - The provisions of sections 912.2 and 912.3 for fire protection and interior finish, respectively, shall apply to all buildings undergoing a change of occupancy classification.

Section 912.2 *Fire Protection Systems* - Fire protection systems shall be provided in accordance with Sections 912.2.1 and 912.2.2

Section 912.2.1 Where a change in occupancy classification occurs that requires an automatic fire sprinkler system to be provided based on the new occupancy in accordance with Chapter 9 of the International Building code, such system shall be provided throughout the area where the change of occupancy occurs.

The building currently has an automatic fire sprinkler system installed in it.

Section 912.2.2 Where a change in occupancy classification occurs that requires a fire alarm and detection system to be provided based o the new occupancy in accordance with Chapter 9 of the International Building Code, such system shall be provided throughout the area where the change of occupancy occurs. Existing alarm notification appliances shall be automatically activated throughout the building. Where the building is not

equipped with a fire alarm system, alarm notification appliances shall be provided throughout the area where the change of occupancy occurs and shall be automatically activated.

The building has a fire alarm system, however, the quantity of notification appliances are not consistent with the current requirements of NFPA 72. Therefore, additional notification appliances will be added.

Section 912.3 *Interior Finish* - In areas of the building undergoing the change of occupancy classification, the interior finish of walls and ceiling shall comply with the requirements of the International Building Code for the new occupancy classification.

Section 912.4 Means of Egress - Hazard categories in regard to life safety and means of egress shall be in accordance with Table 912.4

Table 912.4
Means of Egress Hazard Categories

Relative Hazard	Occupancy Classifications
1 (Highest Hazard)	H
2	I-2, I-3, I-4
3	A, E, I-1, R-1, R-2, R-4
4	B, F-1, R-3, S-1
5 (Lowest Hazard)	F-2, S-2, U

Section 912.4.1 Means of egress for change to higher hazard category. When a change of occupancy classification is made to a higher hazard category (lower number) as shown in Table 912.4, the means of egress shall comply with the requirements of Chapter 10 of the International Building Code.

The Means of Egress Relative Hazard Categories for the B and R-3 occupancy classifications is equal to 4. Therefore, this section does not apply.

Section 912.4.2 Means of egress for change of use to equal or lower hazard category. When a change of occupancy classification is made to an equal or lesser hazard category (higher number) as shown in Table 912.4, existing elements of the means of egress shall comply with the requirements of Section 805 for the new occupancy classification. Newly constructed or configured means of egress shall comply with the

requirement of Chapter 10 of the International Building Code.

Section 805 Means of Egress

Section 805.1 General - The means of egress shall comply with the requirements of 705 except as specifically required in Sections 805.2 and 805.3

Section 805.2 Means-of-lighting. Means of egress from the highest work area floor to the floor of exit discharge shall be provided with artificial lighting within the exit enclosure in accordance with the requirements of the International Building Code.

Section 805.3 Exit signs - Means of egress from the higher work area floor to the floor ot exit discharge shall be provided with exit signs in accordance with the requirements of the International Building Code.

Section 705 Means of Egress

Section 705.1 Scope. The requirements of this section shall be limited to work areas that include exits or corridors shared by more than one tenant within the work area in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.

The existing exit stair is not part of the alteration level.

A review of Chapter 10 of the International Building Code provides the following

Occupant Load

The maximum allowed occupant load for the business use floors of 44 Oak Street are based on 100 gross square feet per floor per Table 1004.1.1 of the International Building Code. The gross square feet per floor is less than 2,800 square feet. Therefore, the maximum occupant load per floor is 27 occupants.

The maximum allowed occupant load for the residential use floors of 44 Oak Street are based on 200 gross square feet per floor per Table 1004.1.1 of the International Building Code. The gross square feet per floor is 2,788 square feet for the fourth floor and 1,573 square feet for the fifth

floor. Therefore, the maximum occupant load for the fourth floor is 13 and the fifth floor is 7, for a total of 20.

Egress Requirement

The internal egress stairs travels from the ground floor up to the fifth floor. There is an external fire escape that goes from the second floor to the fourth floor. Therefore, the fourth floor, which would be the first floor of the proposed dwelling unit has two exits, and the fifth floor, which is the second floor of the proposed dwelling unit has one exit.

Section 1021 of the International Building Code provides the requirements for the number of exits from stories of buildings. Table 1021.1 indicates that for an occupant load of up to 500 occupants the minimum number of exits is two per story.

However, there is an exception for an R-3 occupancy. One means of egress is permitted within and from individual dwelling units with a maximum occupant load of 20 where the dwelling unit is equipped throughout with an automatic sprinkler system in accordance with Sections 903.3.1.1 or 903.3.1.2. Section 903.3.1.1 is for sprinkler systems that conform to NFPA 13, and Section 903.3.1.2 is for sprinkler systems that conform to NFPA 13 R. The sprinkler system in the building conforms to NFPA 13. Therefore, one exit is required for the proposed R-3 dwelling unit.

Additionally, Section 1021.2 states that only one exit shall be required from Group R-3 occupancy buildings.

One exit is acceptable to an R-3 occupancy.

Exit Travel Distance

Section 1016 of the International Building Code states that exits be so located on each story such that the maximum length of exit access travel, measured from the most remote point within a story along the natural and unobstructed path of egress travel to a vertical exit enclosure shall not exceed 250 feet in a building equipped throughout with an automatic sprinkler system in accordance with Sections 903.3.1.1 or 903.3.1.2.

In the proposed R-3 dwelling unit the maximum travel distance to an enclosed exit enclosure would be an estimated 75 feet, which is less than 250.

912.5 Heights and areas - Hazard categories in regard to height and area shall be

in accordance with Table 912.5

Table 912.5
Heights and Areas Hazard Categories

Relative Hazard	Occupancy Classifications
1 (Highest Hazard)	H
2	A-1, A-2, A-3, A-4, I, R-1, R-2, R-4
3	E, F-1, S-1, M
4 (Lowest Hazard)	B, F-2, S-2, A-5, R-3, U

The Heights and Areas Relative Hazard Categories for the B and R-3 occupancy classifications is equal to 4.

912.5.2 Height and area for change to equal or lesser hazard category. When a change of occupancy classification is made to an equal or lesser hazard category as shown in Table 912.5, the height and area of the existing building shall be deemed acceptable.

Therefore, the requirements from the International Building Code do not apply.

912.6 Exterior wall fire-resistance ratings . Hazard categories in regard to fire-resistance ratings of exterior wall shall be in accordance with Table 912.6.

Table 912.6
Exposure of Exterior Walls Hazard Categories

Relative Hazard	Occupancy Classifications
1 (Highest Hazard)	H
2	F-1, M, S-1
3	A, B, E, I, R
4 (Lowest Hazard)	F-2, S-2, U

The Exposure of Exterior Wall Relative Hazard Categories for the B and R occupancy classifications is equal to 3.

912.6.2 Exterior wall rating for change of occupancy classification to an equal or lesser hazard category. When a change of occupancy

classification is made to an equal or lesser hazard category as shown in Table 912.6, existing exterior wall, including openings, shall be accepted.

Therefore, no changes will be required for the existing exterior walls.

912.7 Enclosure of Vertical shaft. Enclosure of vertical shafts shall be in accordance with Sections 912.7.1 through 912.7.4.

912.7.1 Minimum requirements. Vertical shafts shall be designed to meet the International Building code requirements for atriums or the requirements of this section.

Atriums are not include in the proposed work area.

912.7.2 Stairways - when a change of occupancy classification is made to a higher hazard category as shown in Table 912.4, interior stairways shall be enclosed as required by the International Building code.

The Means of Egress Relative Hazard Categories from Table 912.4 indicate that for the B and R-3 occupancy classifications is equal to 4. There is no higher hazard therefore Section 912.7.2 does not apply.

912.7.3 Other vertical shafts Interior vertical shafts other than stairways, including but not limited to elevator hoistways and service and utility shafts, shall be enclosed as required by the International Building code when there is a change of use to a higher hazard category as specified in Table 912.4.

The Means of Egress Relative Hazard Categories from Table 912.4 indicate that for the B and R-3 occupancy classifications is equal to 4. There is no higher hazard therefore Section 912.7.3 does not apply.

Conclusions

The change of occupancy from a Business Group, B, to a Residential Group, R-3, on the fourth and fifth floors of the Frye Building at 44 Oak Street in Portland, Maine is acceptable, provided the construction features discussed for the hazard separation of the fourth floor and the fire alarm system are provided.

PERMIT SET
5/5/2015

PROJECT STATUS: Schematic design
STUDIO MANAGER:
PROJECT ARCHITECT:
SUBMISSIONS:
CONSULTANTS:
SURVEY: LOWER VILLAGE SURVEY CO. 207.942.3545
STRUCTURE:
DRAFTSPERSON: DGB
DATE OF ISSUE: 05/04/15
PROJECT STATUS: Schematic design

44 Oak Street
Michael Keton
44 Oak Street Portland, ME 04101

FIRE PRO CODE ANALYSIS
G3

/Volumes/Network Files/CIJAB/PROJECTS/h:\CURRENT PROJECTS/KEON/KEON 2/1 DESIGN/DRAWINGS/5 CD/ARCHICAD/Keon_G LS Plan.pln