

Maine Medical Center
Congress Street
New Construction Code Report
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INTRODUCTION

Perkins + Will has retained AKF Group LLC to prepare this narrative code report for the proposed Congress Street building on the Maine Medical Center (MMC) campus in Portland, ME. The seven-story high-rise building will have operating rooms, patient sleeping/recovery rooms, storage areas, offices, and staff facilities including locker rooms and lounges. The building will be constructed directly adjacent to the Visitor Garage and the Bean Building. A fire wall will be constructed between the Congress Street building and the Visitor Garage. A fire wall will not be constructed between the Congress Street building and the Bean Building since these buildings will be considered part of the same building. This report summarizes the code requirements for the Congress Street building.

QUICK FACTS

- Aggregate Area: Approximately 234,300 SF
- Height: 7 stories above grade; basement below grade
- Sprinkler Status: To be fully sprinklered
- Standpipe System: Class I standpipe system to be installed
- Occupancy: Use Groups A-3, B, I-2 (Condition 2), S-1, & S-2
- Construction Type: Modified Type IA (i.e. Type IB)

1. APPLICABLE CODES & STANDARDS

The State of Maine requires municipalities with more than 4,000 residents to adopt and enforce the Maine Uniform Building and Energy Code (MUBEC). The next edition of MUBEC became effective on January 23, 2018. The following codes and standards are applicable to the project.

- International Building Code (IBC), 2015 Edition with ME Amendments
- International Energy Conservation Code (IECC), 2009 Edition with ME Amendments
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62.1, Standard for Ventilation and Indoor Air Quality, 2013 edition

In addition to the codes identified above, the State Fire Marshal's Office promulgates the Rules of the State Fire Marshal, which adopt numerous NFPA codes and standards, including the following:

- NFPA 1, Uniform Fire Code, 2006 Edition with ME Amendments
- NFPA 13, Standard for Installation of Sprinkler Systems, 2016 Edition

The Plumbers' Examining Board promulgates the Maine Plumbing Code, which includes the following:

- International Association of Plumbing and Mechanical Officials (IAPMO), 2015 Uniform Plumbing Code (UPC), with ME amendments

The Electricians' Examining Board adopts and amends the following electrical code:

- NFPA 70, National Electrical Code, 2017 Edition

The following federal regulation also applies to the project (as referenced by the Maine Human Rights Commission – 5 M.R.S. §4594-G):

- Americans with Disabilities Act (ADA), 2010 Standards for Accessible Design

The Joint Commission also requires compliance with the following:

- NFPA 101, Life Safety Code, 2012 Edition
- NFPA 99, Health Care Facilities Code, 2012 Edition

The following design standards will also be used for the project:

- Facilities Guidelines Institute (FGI), Guidelines for Design and Construction of Hospitals and Outpatient Facilities, 2014 Edition

- ASHRAE Standard 170, Ventilation of Healthcare Facilities, 2013 edition

2. PROPOSED SCOPE OF WORK & USE

The proposed project involves the new construction of a seven story clinical building on Congress Street in Portland, Maine. The building will have operating rooms, patient sleeping/recovery rooms, storage areas, offices, and staff facilities including locker rooms and lounges.

The building will include the following use groups and occupancies:

Group A-3/ assembly:	Conference rooms, lounges, and multi-purpose spaces exceeding 750 SF and 50 people.
Group B/ business:	Office areas, staff lockers, conference/meeting space less than 750 SF or 50 people
Group I-2 (Condition 2)/ healthcare:	Inpatient hospital care
Group S-1/ ordinary hazard storage:	Linen storage
Group S-2/ low hazard storage:	Storage/utility spaces

As indicated in the list above, the building contains Use Groups A-3, B, I-2, S-1, and S-2. These occupancies are permitted as mixed, nonseparated occupancies per the height and area analysis located in Section 4 of this report.

3. HIGH-RISE BUILDING FEATURES

The building is considered a high-rise structure since it contains an occupied floor that is located more than 75 feet above the lowest level of fire department vehicle access (IBC 202 and NFPA 101 Section 3.3.32.7). High-rise buildings must comply with IBC 403 and NFPA 101 Section 11.8. The applicable provisions for high-rise buildings are summarized below.

3.1 Structural

Since the building is considered Risk Category IV per IBC Table 1604.5, the structural integrity requirements of IBC 403.2.3 apply. Section 403.2.3 requires interior exit stairway and elevator hoistway wall assemblies to comply with impact classifications of ASTM C 1629/ C 1629M. Spray fire-resistant materials (SFRM) must have a minimum bond strength of 430 psf (IBC Table 403.2.4).

3.2 Fire Protection Systems

The following fire protection systems are required within the building as noted. Refer to Section 8 of this report for further details regarding fire protection systems.

Automatic Sprinkler System

An automatic sprinkler system is required throughout the building per IBC Sections 403.3 & 903.2.6 and NFPA 101 Sections 11.8.3.1 & 18.3.5.1. A secondary onsite water supply is required if the building is located in seismic design category C, D, E, or F (IBC 403.3). The seismic design category should be confirmed with the geotechnical or structural engineer of record.

Standpipe System

Class I standpipes must be provided (IBC 905.3 & 403.4.3 and NFPA 101 Section 11.8.4.1).

Fire Alarm System

A manual fire alarm system with an emergency voice/alarm communication system must be provided in accordance with IBC 907.2.13 (IBC 403.4.2 & 403.4.4 and NFPA 101 Section 11.8.4.1).

Smoke Detection System

An automatic smoke detection system must be provided in accordance with IBC 907.2.13.1 (IBC 403.4.1).

Emergency Responder Radio Coverage

Emergency responder radio coverage or a two-way telephone communication system must be provided (IBC 403.4.5, NFPA 1 Section 13.7.2.27.2.2, and NFPA 101 Section 11.8.4.2).

Fire Command Center

A fire command center (FCC) complying with IBC 911 must be provided in a location approved by the fire department (IBC 403.4.6 & NFPA 101 Section 11.8.6). The fire command center will be located on Level CG adjacent to Stair 1. The FCC must comply with the following requirements and contain the following features.

1. Location, layout, and features must be approved by the fire chief
2. Must be separated by 1-hr rated construction
3. Must be 200 sf with minimum dimension of 10 ft
4. Unrelated storage is prohibited in the FCC
5. Emergency voice/alarm communication system control unit
6. Fire department communications system
7. Fire detection and alarm system annunciator
8. Annunciator unit visually indicating the location of the elevators and whether they are operational

9. System indicators and controls for air distribution systems
10. Fire fighter's control panel for smoke control systems
11. Controls for unlocking interior exit stairway doors simultaneously
12. Sprinkler valve and waterflow detector display panels
13. Emergency and standby power status indicators
14. Telephone for fire department use with controlled access to the public telephone system
15. Fire pump status indicators
16. Schematic building plans
17. Building Information Card

Smoke Removal

A means of smoke removal in post-fire salvage operations must be provided in accordance with IBC 403.4.7. The means of smoke removal may be provided by natural or mechanical ventilation. Post-fire smoke purge can be achieved through natural or mechanical ventilation. Natural ventilation must consist of operable windows /panels distributed at 50-foot intervals (maximum) and with a total area of at least 40 SF per 50 linear feet of perimeter. Mechanical ventilation must provide one air change every 15 minutes with return and exhaust air moved directly to the outside.

3.3 Standby and Emergency Power

Standby power must be provided for the following (IBC 403.4.8.3 and NFPA 101 Section 11.8.5.2.4):

1. Power and lighting for the fire command center
2. Ventilation and automatic fire detection equipment for smokeproof enclosures
3. Elevators, including elevators provided for accessible means of egress and fire service access, where applicable
4. Mechanical equipment for smoke control systems
5. Electric fire pump
6. Jockey pump
7. Air compressor serving dry-pipe and pre-action systems

Emergency power must be provided for the following (IBC 403.4.8.4):

1. Exit signs and means of egress illumination
2. Elevator car lighting
3. Automatic fire detection systems
4. Fire alarm systems

5. Electrically powered fire pumps

Standby and emergency power must comply with IBC 2702 and 3003. In addition, standby power for elevators serving as accessible means of egress must comply with IBC 1009.4. Generator sets and fuel line piping located inside the building must be protected in accordance with IBC 403.4.8.1 and 403.4.8.2.

3.4 Means of Egress

Means of egress in high-rise buildings must comply with the additional provisions of IBC 403.5. These provisions include the following.

Remoteness

Required interior exit stairways in the high-rise portions of the building must be separated by a distance of at least 30 feet or at least one quarter of the length of the maximum overall diagonal of the building or area served (whichever is less). This separation distance is measured in a straight line between the closest points of the stairway enclosures. Where three or more interior exit stairways exist, at least two must be separated in accordance with IBC 403.5.1. The proposed stairs comply with the remoteness criteria.

Stairwell Re-entry & Communication System

Since the stairs serve more than four stories, re-entry to other floors from inside the stairwells must be provided in accordance with NFPA 101 Section 7.2.1.5.8 (NFPA 101 Section 18.2.2.2.9). Per this section, all stair enclosure doors must meet one of the following conditions:

- 1) Re-entry from the stair enclosure to the interior of the building must be provided.
- 2) An automatic release that is actuated with the initiation of the building fire alarm system must be provided to unlock all stair enclosure door assemblies to allow re-entry.
- 3) Selected re-entry must be provided and must satisfy all of the following criteria:
 - a. There shall be not less than two levels where it is possible to leave the stair enclosure to access another exit.
 - b. There shall be not more than four stories intervening between stories where it is possible to leave the stair enclosure to access another exit.
 - c. Re-entry shall be possible on the top story or next-to-top story served by the stair enclosure, and such story shall allow access to another exit.
 - d. Door assemblies allowing re-entry shall be identified as such on the stair side of the door leaf.
 - e. Door assemblies not allowing re-entry shall be provided with a sign on the stair side indicating the location of the nearest door opening, in each direction of travel, that allows re-entry or exit.

In addition, stairway doors other than the discharge doors cannot be locked from the stairway side unless they can be unlocked simultaneously from the fire command center (IBC 403.5.3). This requires a stairwell communication system provided on at

least every fifth floor. The communication system must connect to an approved constantly attended station (IBC 403.5.3.1).

Smokeproof Enclosures

Every required exit stairway serving high-rise portions of the building must comply with the smokeproof enclosure requirements of IBC 909.20 and 1023.11 (IBC 403.5.4). The most common method for providing smokeproof enclosures in sprinklered buildings is through stair pressurization complying with IBC 909.20.5. A ventilated vestibule is not required using this method, provided that the pressure difference between the stair shaft and the balance of the building is a minimum of 0.10 inch of water and a maximum of 0.35 inch of water. The pressure difference must be measured with the stairway doors closed and under maximum anticipated conditions of stack effect and wind effect (IBC 909.20.5).

Luminous Egress Path Markings

Luminous egress path markings must be provided in accordance with IBC 1058.

3.5 Elevators

The following sections provide information regarding the elevator requirements.

Fire Service Access Elevators

A minimum of two fire service access elevators are required in buildings with an occupied floor greater than 120 feet above the lowest level of fire department vehicle access where at least two elevators are provided (IBC 403.6.1). Based on the plans provided to AKF on February 12, 2018 the highest occupied floor (i.e. Level G) is less than 120 feet above the lowest level of fire department vehicle access. Therefore, fire service access elevators are not required at this time. However, since future growth is expected to include a vertical expansion to the building, the current design includes two fire service access elevators. The fire service access elevator requirements of IBC 3007 include the following:

Every floor must be served by fire service access elevators (IBC 3007.1).

Fire service access elevators must be provided with a lobby complying with IBC 3007.6 (note that multiple fire service access elevators are permitted to be served by the same lobby). Per IBC 3007.6, the fire service access elevator lobbies must meet the following requirements:

- Enclosed with a smoke barrier having a minimum 1-hour fire-resistance rating and $\frac{3}{4}$ -hour fire door assemblies
 - Enclosed fire service access elevator lobbies are not required on the level of exit discharge
- Have access to an interior exit stairway either directly from the lobby or through a protected path travel
 - The protected path of travel must have the same level of fire protection as the elevator lobby

- The protected path of travel must be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly complying with IBC 716.5.3
- Must have a minimum area of 150 SF with a minimum dimension of 8 feet, regardless of how many fire service access elevators are served
- Symbols complying with 780 CMR 3007.6.5 must be installed on each side of the hoistway door frame of each fire service access elevators
- A Class I standpipe hose connection must be provided in the exit stairway adjacent to the lobby. Access to this stairway is also required from each floor without passing through the FSAE lobby. It is our understanding that the design team is seeking a variance for relief from this requirement.
- Fire service access elevators must be provided with an approved method to prevent the infiltration of water into the hoistway enclosure caused by the operation of the automatic sprinkler system outside of the enclosure (IBC 3007.3).

As indicated in Section 3.3 of this report, fire service access elevators are required to be provided with standby power.

Other Elevator Lobbies

Enclosed elevator lobbies are required for all other elevators that serve high-rise levels within the building (IBC 3006.2(5)). These lobbies are required to consist of smoke partitions complying with IBC 710. Doors penetrating the enclosed elevator lobby must comply with IBC 710.5.2.2, 710.5.2.3, and 716.5.9. Ducts and air transfer openings must comply with IBC 717.5.4.1.

Number of Elevator Cars per Hoistway

Where four or more elevator cars serve all or the same portion of a building, the elevators must be located in at least two separate hoistways. A maximum of four elevator cars can be located in a single hoistway (IBC 3002.2).

Two-Way Communication

A two-way communication system must be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the level of exit discharge. The two-way communication system must provide communication between the required location and the fire command center or a central control point location approved by the fire department. The system must include both audible and visible signals. Directions for the use of the system and written identification of the location must be posted adjacent to the system (IBC 1009.8).

4. HEIGHT & AREA

The building must comply with the building height and area limitations of IBC 504 and 506 based on the most restrictive occupancy classification of the building. The height and area limitations have been evaluated based on non-separated mixed uses including Use Groups A-3, B, I-2, S-1, and S-2. Since the building exceeds 5 stories in height, Type IA

construction (i.e. noncombustible, 3-hour rated) is required (IBC 503.3 and 504.4). Type IA construction is not limited in building height, number of stories, or floor area.

High-rise buildings are permitted a reduction in the required fire-resistance ratings for building elements where sprinkler control valves are provided with supervisory initiating devices and water-flow initiating devices on each floor (IBC 403.2.1.1). Since the building is less than 420 feet in height, the fire-resistance ratings required for Type IB construction (with the exception of columns) may be used while granting unlimited height and area allowances per Type IA construction (IBC 403.2.1). Although NFPA 101 does not contain a similar allowance, NFPA 101 Table 18.1.6.1 permits sprinklered healthcare buildings of Type IB (222) construction to be an unlimited in number of stories. Therefore, the building can be constructed using the required ratings for Type IB construction (except that columns must be 3-hour rated), while still utilizing the height and area limits applicable to Type IA construction.

Note that any future vertical expansion projects cannot extend the height of the building to above 420 feet since the reduction permitted by IBC 403.2.1 does not apply to buildings over 420 feet in height.

5. TYPE OF CONSTRUCTION

The following table summarizes the required ratings for modified Type IA construction (i.e. Type IB) in accordance with IBC Table 601 and NFPA 1 Table A.12.2.1.

**IBC Table 601 & NFPA 101 Table A.8.2.1.2
Fire-Resistance Rating Requirements for Building Elements (Hours)**

Element	Modified Type IA (i.e. Type IB) Rating (hours)
Primary structural frame (see Section 202) Columns Other	3 ^A 2 ^A
Bearing walls Exterior Interior	2 ^A 2 ^A
Nonbearing walls and partitions Exterior	See Table 602 discussion below.
Nonbearing walls and partitions Interior	0
Floor construction and secondary members (see Section 202)	2 ^A
Roof construction and secondary members (see Section 202)	1

^A Not less than the rating of the assemblies supported, i.e. shaft enclosures, etc.

The non-bearing exterior wall requirements are based on the fire separation distance (FSD) of each wall. The FSD is measured perpendicularly from the face of each exterior wall to the closest interior lot line, the centerline of a street, alley, or public way, or an imaginary lot line between two buildings on the same lot. Where the FSD is greater than or equal to 30 feet, the non-bearing exterior walls do not require a fire-resistance rating.

Where Table 601 or 602 requires an exterior wall to be fire-resistance rated and the FSD is less than or equal to 10 feet, the wall must be rated for exposure to fire from both sides (IBC 705.5). The exterior walls are required to maintain their structural stability for the duration of the time indicated by the fire-resistance rating.

IBC Table 602 Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance Type IA Construction

Fire Separation Distance = X (feet)	Required Fire Resistance Rating
$X < 5$	1-hr
$5 \leq X < 10$	1-hr
$10 \leq X < 20$	1-hr
$X \geq 20$	0

Since the Congress Street building and Bean building are considered part of the same building, exterior wall protection is not required for the walls facing the Bean building. In addition, the entire north and west walls of the Congress Street building have a FSD of more than 20 feet, thus allowing unrated exterior walls in these areas. A 3-hour fire wall will be provided between the Congress Street and Visitor Garage buildings. Any exterior walls facing the Visitor Garage (other than the fire wall) must have a 1-hour rating due to the distance between the Visitor Garage and the Congress Street building.

6. FIRE AND SMOKE PROTECTED FEATURES

6.1 Exterior Walls & Opening Protectives

Openings in the exterior walls must comply with IBC 406.5.2 based on the FSD of each wall. The opening limitations are summarized below for Type IA construction.

IBC Table 705.8 Maximum Area of Exterior Wall Openings Based on Fire Separation Distance and Degree of Opening Protection

Fire Separation Distance (feet)	Degree of Opening Protection	Allowable Area
$X < 3$	Unprotected, Sprinklered	Not Permitted
$3 \leq X < 5$	Unprotected, Sprinklered	15%
$5 \leq X < 10$	Unprotected, Sprinklered	25%
$10 \leq X < 15$	Unprotected, Sprinklered	45%
$15 \leq X < 20$	Unprotected, Sprinklered	75%
$20 \leq X$	Unprotected, Sprinklered	No Limit

Since the north and west walls of the Congress Street building have a FSD of more than 20 feet, these walls are permitted to have unlimited unprotected openings. Due to the separation distance between the Congress Street and Visitor Garage buildings, no openings are permitted in the exterior walls facing Visitor Garage.

6.2 Shaft Enclosures

Vertical openings must be enclosed with shaft construction unless an alternative provision in IBC 712 and NFPA 101 Section 8.6 is met. Shafts connecting four stories or more must be enclosed with at least 2-hour fire-resistance rated construction. Shafts connecting three stories or less must be enclosed with 1-hour rated construction (IBC 713.4 and NFPA 101 Section 8.6.5).

Where the exterior wall of an exit enclosure is exposed to adjacent exterior walls by an angle less than 180 degrees, the adjacent exterior wall, or the exit enclosure wall must be rated. Whichever wall is rated must have a rating of at least 1-hour with $\frac{3}{4}$ -hour opening protectives. The rating must extend at least 10 feet horizontally from the nonrated wall. The protection must extend from the ground to a level 10 feet above the highest landing of the stair, or the roofline, whichever is lower (IBC 1023.7).

6.3 Atrium

A 7-story atrium is proposed within the building. Atriums must comply the IBC 404 and NFPA 101 Section 8.6.7. In general, atriums must be enclosed with 1-hour fire barriers, with exceptions permitted for sprinkler-protected glass and glass-block walls. AKF is conducting perform a fire modeling analysis for the design of the atrium smoke control system to be reviewed with the local AHJ and State Fire Marshal's office.

Note that the atrium is not required to be included in the smoke compartment area since it is separated by sprinkler-protected glass in accordance with IBC 404.6(1.1) and NFPA 101 8.6.7 (NFPA 101 Section 18.3.7.1(3)).

6.4 Corridors

In Group I-2 occupancies, corridors must be continuous to exits and separated from other areas with walls that comply with the requirements for smoke partitions (IBC 407.2 & 407.3 and NFPA 101 Section 18.3.6.1). Doors within corridor walls are not required to be fire-resistance rated; however they must be self-latching, be provided with positive latching hardware, and must provide an effective barrier to limit smoke spread (IBC 407.3.1 and NFPA 101 Sections 18.3.6.2.2, 18.3.6.3.1, & 18.3.6.3.5). Note that there are some spaces that are permitted to be open to corridors as outlined below.

Waiting Areas

Waiting areas that are open to corridors must comply with the following requirements (IBC 407.2.1 and NFPA 101 Section 18.3.6.1(2)).

1. Must be constructed as required for corridors (i.e. smoke partitions);
2. Does not contain sleeping rooms, treatment rooms, incidental uses, or hazardous uses;
3. The space is protected by an automatic fire detection system complying with IBC 907;

4. The corridor into which the space opens is protected by an automatic fire detection system that complies with IBC 907 or the smoke compartment is protected by quick-response sprinklers;
5. The space does not obstruct access to required exits;
6. The aggregate waiting area open to the corridor in each smoke compartment is no more than 600 SF.

Care Providers' Stations

Corridors may be open to spaces for care providers, supervisory staff, doctors' and nurses' charting, communications, and related clerical areas so long as such spaces are constructed as required for corridors (i.e. smoke partitions) per IBC 407.2.2.

6.5 Smoke Compartments

Smoke barriers must be used to subdivide every story having an occupant load of 50 or more persons or used by persons receiving care, treatment or sleeping into at least two smoke compartments, each with a maximum area of 22,500 SF (as limited by NFPA 101 Section 18.3.7.1). Smoke compartments are not required on Level CB, B, or G since these spaces do not contain a healthcare occupancy and are located above or below the healthcare occupancy (NFPA 101 Section 18.3.7.2). Similarly, a smoke compartment and corresponding refuge area are not required for the lobby area of Level CG since the area does not contain a healthcare occupancy and the space is separated from the healthcare occupancy by a 2-hour horizontal exit (NFPA 101 Section 18.3.7.2 (2)). The following requirements apply to the smoke compartments.

Fire-Resistance

The smoke compartments must be separated by 1-hour rated smoke barriers with 20-minute opening protections complying with IBC 709 and NFPA 101 Section 8.5 (IBC 407.5 and NFPA 101 Section 18.3.7.3).

The smoke barrier walls will serve as horizontal exits on Level CG through C4 in order to provide additional capacity and/or reduce travel distances. Horizontal exit walls must have a 2-hour fire-resistance rating and must be constructed as fire barriers. The requirements for horizontal exits are found in Section 1.1 of this report.

Travel Distance

The travel distance from the most remote point in each smoke compartment to the smoke barrier door must be a maximum of 200 feet (IBC 407.5 and NFPA 101 Section 18.3.7.1(4)). Refer to associated Life Safety Plans for measurements of travel distances to the smoke barriers.

Refuge Area

Each smoke compartment must contain a refuge area sized to accommodate the inpatient care occupants from adjacent smoke compartments. The refuge areas must be sized using a factor of 30 SF per patient. Where the refuge area serves ambulatory occupants, the area must be sized using a factor of 6 SF per occupant. Refuge areas may consist of corridors, sleeping areas, treatment rooms, lounges, dining areas, and

other low-hazard areas (IBC 407.5.1 and NFPA 101 Section 18.3.7.5.1). Refer to the associated Life Safety Plans for illustrations of refuge areas.

Independent Egress

Means of egress from each smoke compartment must be arranged such that once occupants egress from a smoke compartment they are not required to return through the smoke compartment to evacuate the building (IBC 407.5.2 and NFPA 101 Section 18.2.4.4).

Horizontal Assemblies

Where horizontal assemblies support smoke barriers that are part of smoke compartments, such horizontal assemblies must be designed to resist the passage of smoke (IBC 407.5.3).

Smoke Dampers

Smoke dampers are required for duct penetrations through a smoke barrier wall; however there is an exception for Group I-2, Condition 2 occupancies. If the HVAC system is fully ducted and the building is equipped throughout with quick-response sprinklers in accordance with IBC 903.3.2, smoke dampers are not required (IBC 717.5.5(2)).

6.6 Care Suites

Care suites are provided on Level CG and C1. Care suites are permitted in lieu of providing patient sleeping rooms with direct access to a corridor (IBC 407.4.1 and NFPA 101 Section 18.2.5.6.4). The following requirements apply to the proposed care suites. Since the post-op patients may require up to 23-hour stays in these suites, the suites are considered “patient care sleeping suites” as defined by NFPA 101 Section 3.3.272.4).

Exit Access

Spaces not classified as care suites are not permitted to exit through a care suite. In care suites required to have more than one means of egress, an exit access path is permitted to pass through an adjacent care suite (IBC 407.4.4.1 and NFPA 101 Section 18.2.5.7.2.2(C)). One means of egress from the suite must be directly to a corridor (NFPA 101 Section 18.2.5.7.2.2(B)).

Separation

Care suites must be separated from other portions of the building by smoke partitions (IBC 407.4.4.2 and NFPA 101 Section 18.2.5.7.1.2).

Protection

Patient sleeping rooms must be provided with at least one of the following (IBC 407.4.4.5 and NFPA 101 Section 18.2.5.7.2.1(D)):

- Direct visual supervision from a normally attended location within the suite (glass walls and cubicle curtains are permitted) and any sleeping rooms not provided with direct visual supervision are provided with automatic smoke detection; or
- The entire suite is provided with automatic smoke detection.

Access to Corridor

Movement from habitable rooms within the care suite to a corridor door must not require passage through more than three doors and 100 feet of travel distance (IBC 407.4.4.3 and NFPA 101 Section 18.2.5.7.2.4(A)).

Number of Means of Egress

Care suites containing sleeping rooms must have two remote exit access doors from the suite where the suite is more than 1,000 SF (IBC 407.4.4.5.2 and NFPA 101 Section 18.2.5.7.2.2(A)).

Maximum Size

Care suites containing sleeping rooms must not exceed 7,500 SF. However, the maximum area of such care suites is permitted to be increased to 10,000 SF where both direct visual supervision and smoke detection are provided throughout the suite (IBC 407.4.4.5.1 and NFPA 101 Section 18.2.5.7.2.3).

All care suites included in the current design comply with the above requirements.

6.7 Incidental Uses

IBC Table 509 and NFPA 101 Table 8.5 prescribe requirements for the protection of several incidental uses in Group I-2/healthcare occupancies. The requirements of these tables are provided below.

Incidental Uses

Room or Area	Separation and/or Protection	Code Section
Boiler and fuel-fired heater rooms	1 hour	NFPA 101 Table 18.3.2.1
Laboratories not classified as Group H	1-hour and provide automatic sprinkler system	IBC Table 509
Laundry rooms over 100 SF	1 hour	IBC Table 509 & Section 509.4.2
Physical plant maintenance shops	1 hour	IBC Table 509 & NFPA 101 Table 18.3.2.1
In Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 64 gallons (8.6 ft ³) or more	1 hour	NFPA 101 Table 18.3.2.1
In Group I-2 occupancies, storage rooms greater than 100 SF	1 hour	IBC Table 509
In Group I-2 occupancies, storage rooms less than 100 SF but greater than 50 SF and storing combustible material	Smoke partition	NFPA 101 Table 18.3.2.1 & Section 8.7.1.2

Room or Area	Separation and/or Protection	Code Section
Fire Command Center	1 hour	IBC 403.4.6 & NFPA 101 Section 11.8.6
Fire Service Access Elevator Lobby	1-hour smoke barrier	IBC 3007.4.2
Other Elevator Lobbies	Smoke partition	IBC 3006.2(5)
Emergency Electrical Rooms	2-hours or sprinkler protection	NEC 700.10(D)(2)
Emergency Feeder Circuit Wiring	2-hours or sprinkler protection	NEC 700.10(D)(1)

Note that the 2-hour floor assembly between Level CB and Level CG will serve as the separation between the storage rooms located on Level CB and the Group I-2 occupancy located on Level CG. This arrangement is consistent with the approach for separated occupancies in both IBC 508.4 and NFPA 101 Section 6.1.14.4.

6.8 Fire Walls

The Congress Street building will be connected to two other buildings on the MMC site: the Bean Building and the Visitor Garage. A fire wall will be provided between the Congress Street Building and the Visitor Garage due to the difference in construction type between these two buildings. It is our understanding that the Congress Street building and Bean Building are considered part of the same building. Therefore, both the Congress Street and Bean buildings must be consistent with Type I construction. The requirements and implications for fire walls are identified in this section.

Fire-Resistance Rating

A 3-hour fire-resistance rating is required for fire walls in Group I occupancies (IBC 706.4).

Openings

The aggregate width of openings through a fire wall at any floor level cannot exceed 25% of the length of the wall (IBC 706.8). Doors or fire shutters in the fire wall must also have a 3-hour rating (IBC Table 716.5). Doors within the fire walls must be self- or automatic-closing (IBC 716.5.9). If doors are automatic-closing, they must be automatic-closing by the actuation of smoke detectors or by loss of power to the smoke detector or hold-open device. The doors must begin to close within 10 seconds of smoke detector activation or power failure (IBC 716.5.9.3).

Horizontal Continuity

Per IBC 706.5, fire walls must be continuous from exterior wall to exterior wall and must extend at least 18 inches beyond the exterior surface of exterior walls. However there are exceptions as follows:

1. The fire wall may terminate at combustible exterior sheathing or siding if the exterior walls within 4 feet of the fire wall on each side are 1-hour rated with $\frac{3}{4}$ -hour opening protectives.
2. The fire wall may terminate at noncombustible exterior sheathing, siding, or other finish if such noncombustible finishes are extended a distance of at least 4 feet on each side of the fire wall.

Per IBC 706.5.2, fire walls must extend to the outer edge of horizontal projecting elements such as balconies, roof overhangs, canopies, marquees, and similar projections that are within 4 feet of the fire wall. Note however there are some exceptions to this requirement. The applicability of the exceptions depends on whether the projections contain concealed openings. If the projections do not contain concealed spaces, the fire wall is not required to extend to the edge of the projection if the exterior wall behind and below the projection is 1-hour fire-resistance rated for a distance at least equal to the depth of the projection. Exterior openings within this rated wall must be protected with $\frac{3}{4}$ -hour opening protectives (IBC 706.5.2(1)).

Vertical Continuity

Per IBC 706.6, fire walls must have vertical continuity such that they extend from the foundation to a termination point at least 30 inches above both adjacent roofs unless one of the exceptions to Section 706.6 is met, as follows.

1. The buildings comply with the requirements for stepped buildings in IBC 706.6.1.
2. Two-hour fire-resistance rated fire walls may terminate at the underside of the roof sheathing, deck, or slab if the following provisions are met:
 - a. The lower roof assembly within 4 feet of the fire wall is at least 1-hour fire-resistance rated and the entire length of the span of supporting elements for the rated roof assembly are 1-hour rated as well.
 - b. There are no openings in the roof within 4 feet of the fire wall.
 - c. Each building has at least a Class B roof covering.
3. Where both buildings have at least a Class B roof covering, fire walls may terminate at the underside of noncombustible roof sheathing, deck or slabs. Openings in the roof within 4 feet of the fire wall are prohibited.
4. The buildings have sloped roofs complying with IBC 706.6.2.

Exterior Wall Exposure

Where the fire wall intersects the exterior walls and exterior walls form an angle of less than 180 degrees, protection must be provided by one of the following methods (IBC 706.5.1).

1. The exterior walls on both sides of the fire wall must have a 1-hour fire-resistance rating and $\frac{3}{4}$ -hour opening protectives for a distance of 4 feet from the intersection with the fire wall.
2. An imaginary lot line must extend beyond the fire wall and the required fire-resistance rating and opening protection for the exterior walls on either side of the fire wall must be based on the FSD to this imaginary lot line.

7. INTERIOR FINISH

The interior finishes of the walls, ceilings, and floors of the building are governed by IBC Chapter 8 and NFPA 101 Chapter 10. These chapters outline the testing requirements for the different surfaces. The required tests and finish classifications are summarized in the tables below.

Finish Characteristics

Element	Test Method	Criteria
Wall & Ceiling Finishes	ASTM E84 or UL 723	Class A = FSI 0-25; SDI 0-450
		Class B = FSI 26-75; SDI 0-450
		Class C = FSI 76-200; SDI 0-450
Floor Finish	NFPA 253	Class I = 0.45 W/cm ² or greater
		Class II = 0.22 W/cm ² up to 0.45 W/cm ²
	DOC FF-1	Pass

Notes:

FSI = flame spread index

SDI = smoke-developed index

Interior Wall and Ceiling Finish Requirements by Occupancy (Fully Sprinklered Building)

Use Group	Walls & Ceilings			Floors	
	Exit enclosures and exit passageways	Corridors	Rooms and enclosed spaces	Exits and corridors	Other spaces
A-3	B	B	C	DOC FF-1	DOC FF-1
B	B	C	C	DOC FF-1	DOC FF-1
I-2	B	B	B ^A	Class II	Class II
S-1 & S-2	C	C	C	DOC FF-1	DOC FF-1

^A Class C interior finish materials are permitted in rooms with a capacity of four persons or less.

The tables above show the required interior finish classes throughout the building based on the most restrictive requirements of IBC Table 803.11 and NFPA 101 Table A.10.2.2. Note that where corridors are shared by both occupancies, the most restrictive finish must be used (i.e. Class B). All floors throughout the building must pass the DOC FF-1 "pill test".

8. FIRE PROTECTION SYSTEMS

In addition to the systems discussed in Section 3 of this report, the following fire protection requirements also apply.

8.1 Automatic Sprinkler System

Since the smoke compartments contain patient sleeping rooms, listed quick-response or listed residential sprinklers must be used (NFPA 101 Section 18.3.5.6).

8.2 Fire Alarm and Detection System

In addition to the manual fire alarm system, an automatic smoke detection system must be provided in the inpatient corridors and in any areas open to the corridors (i.e. not separated by smoke partitions). Based on the plans provided to AKF on February 12, 2018, the proposed waiting areas are not open to the inpatient corridors.

The fire alarm system must transmit an alarm automatically to the municipal fire department (NFPA 101 Section 9.6.4 & 18.3.4.3.2.1).

8.3 Standpipe System

A standpipe system is required throughout the building since the floor level of the highest story is located more than 30 feet above the lowest level of fire department vehicle access. Class I standpipes must be provided in sprinklered high-rise buildings per IBC 905.3.1 and NFPA 101 Section 11.8.3.2.

Class I standpipes must be installed in the following locations in accordance with IBC 905.4:

- In every required interior exit stairway. Class I standpipe hose connections must be provided for each story above and below grade and must be located at an intermediate landing between stories, unless otherwise approved by the authority having jurisdiction (AHJ).
- At each horizontal exit. Class I standpipe hose connections must be provided on each side of the wall adjacent to the exit opening, unless the floor areas adjacent to the horizontal exit are reachable from an interior exit stairway hose connection by a 30-foot hose stream from a nozzle attached to 100 feet of hose.
- In every exit passageway. Class I standpipe hose connections must be provided at the entrance from the exit passageway to other areas of the building, unless the floor areas adjacent to the exit passageway are reachable from an interior exit stairway hose connection by a 30-foot hose stream from a nozzle attached to 100 feet of hose.
- In remote portions of the floor. Where the most remote portion of a sprinklered floor is more than 200 feet from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations.

8.4 Portable Fire Extinguishers

Portable fire extinguishers must be provided in accordance with NFPA 10 (IBC 906 and NFPA 101 Section 18.3.5.12).

8.5 Electrical Systems

The essential electrical system for electrical components, equipment, and systems must be designed and constructed in accordance with IBC Chapter 27 and NFPA 99 (IBC 407.10 and NFPA 101 Section 18.5.1.2).

9. MEANS OF EGRESS

The applicable means of egress requirements for the building are described below.

9.1 Egress Summary

See the associated Life Safety Plans for the calculated occupant loads throughout the building. The occupant loads of the building were calculated based on the occupant load factors in accordance with IBC Table 1004.1.2 and NFPA 101 Table 7.3.1.2. The capacities of the exits are calculated in accordance with IBC 1005.1 and NFPA 101 Table 7.3.3.1.

9.2 Exit Access Travel Distance

The exits are required to be arranged such that the maximum exit access travel distance is as follows (IBC 1017.2 and NFPA 101 Sections 12.2.6.2(1), 18.2.6.2.1, 38.2.6.3, & 42.2.6).

Occupancy	With Sprinkler System (feet)
A-3	250
B	300
I-2	200
S-1	250
S-2	400

The maximum travel distance allowed from a Group I-2 sleeping room to an exit access door in that room is 50 feet (IBC 407.4.2 and NFPA 101 Section 18.2.6.2.3).

Refer to the associated Life Safety Plans to note travel distance compliance.

9.3 Corridor Width

Corridors must provide the following minimum clear widths (IBC 1020.2 and NFPA 101 Section 18.2.3.4 & 38.2.3.2):

- 96 inches where serving bed movement areas;
- 44 inches in other areas where the occupant load is 50 or more; and
- 36 inches in other areas where the occupant load is less than 50 people.

Where corridors are required to be 96 inches, the following projections are permitted by NFPA 101 Section 18.2.3.4:

- Projections into the required width are permitted for wheeled equipment, provided all of the following conditions are met:
 - The wheeled equipment does not reduce the required clear unobstructed corridor width to less than 60 inches
 - The health care occupancy fire safety plan and training program address the relocation of the wheeled equipment during a fire or similar emergency
 - The wheeled equipment is limited to the following: equipment in use and carts in use, medical emergency equipment not in use, and patient lift and transport equipment

- Projections into the required width are permitted for fixed furniture, provided all of the following conditions are met:
 - The fixed furniture is securely attached to the floor or to the wall
 - The fixed furniture does not reduce the clear unobstructed corridor width to less than 6 feet
 - The fixed furniture is located only on one side of the corridor
 - The fixed furniture is grouped such that each grouping does not exceed an area of 50 sf
 - The fixed furniture groupings are separated from each other by a distance of at least 10 ft
 - The fixed furniture is located so as to not obstruct access to building service and fire protection equipment
 - Corridors throughout the smoke compartment are protected by an electrically supervised automatic smoke detection system, or the fixed furniture spaces are arranged and located to allow direct supervision by the facility staff from a nurses' station or similar space.

Since the IBC does not address corridor projections for I-2 Condition 2 occupancies, we recommend reviewing any proposed projections with the building official for approval.

The exit access must be arranged such that dead ends do not exceed 20 feet in corridors serving Group I-2 and A-3 occupancies and do not exceed 50 feet in corridors serving other occupancies (IBC 1020.4 and NFPA 101 Sections 38.2.5.2.1 & 42.2.5).

9.4 Number of Exits and Continuity

Two means of egress must be provided from individual spaces where the occupant load and/or common path of travel distance exceeds the limitations of IBC Table 1006.2.1 and NFPA 101 Sections 12.2.5.1.2, 38.2.5.3.1 & 42.2.5.

Spaces with One Means of Egress

Use Group	Maximum Occupant Load	Maximum Common Path of Travel Distance (ft)
A-3	49	75 ^A
B	49	100
I-2	10	75
S-1, S-2	29	100

^A The common path of travel in assembly occupancies is permitted to be 75 feet where the path serves not more than 50 occupants. Where the path serves more than 50 occupants, the common path of travel is limited to 20 feet; however, an occupant load exceeding 50 will require a second means of egress.

In addition, habitable spaces must have an exit access door leading directly to a corridor unless an exit door is provided directly to the exterior at ground level (IBC 407.4.1 and NFPA 101 Section 18.2.5.6.1).

All spaces within each story must have access to the minimum number of independent exits from the story as required by IBC Table 1006.3.1 and NFPA 101 Section 7.4.1.2 below.

Minimum Number of Exits Per Story

Occupant Load (persons per story)	Minimum Number of Exits (per story)
1-500	2
501-1,000	3
More than 1,000	4

Where more than one means of egress is required, the exits must be separated by $\frac{1}{3}$ of the overall diagonal distance of the space served (IBC 1007.1.1 and NFPA 101 Section 7.5.1.3.2). This separation distance is measured between the doors to Stair 1 and 2. See Section 3.4 of this report for the required separation between the closest points of the stairway enclosures.

Where more than one means of egress is required, at least two accessible means of egress must be provided. Where one means of egress is permitted, at least one means of egress must be accessible (IBC 1009.1 and NFPA 101 Section 7.5.4).

9.5 Exterior Stairs

An exterior stair is proposed for Level CG, C1, and C2 and the stair will be at or very near grade. The stair provides access from the building to Gilman Street. The use of the exterior stair as a means of egress from Level CG, C1, and the green roof on C2 will likely require a compliance alternative or variance.

There are two types of exterior stairs: exterior exit stairs and exterior exit discharge stairs. Exterior exit discharge stairs are generally considered stairs that provide occupants access to grade, but only require travel on the stair for less than a story.

Exterior exit stairs are those outside stairs that require occupants to travel a story or more to reach grade. The proposed stair falls into a gray area of the code because while occupants would travel more than a story to reach street level, the stair itself would be at grade or very near grade due to the sloped site.

Since exterior exit stairs require travel for a story or more, greater protection measures are required for such stairs. Typically these stairs are not permitted in Group I-2 occupancies and/or in buildings more than six stories in height or high-rise buildings (IBC 1027.2). That being said, the height limitation is to prevent occupants from experiencing vertigo or from being afraid to use the stair. Since the stair only connects the first through third story and will be at or near grade, it complies with the intent of the code and aligns with the intent of an exit discharge stair. In addition, NFPA 101 permits the use of exterior exit stairs in hospitals (Section 18.2.2.3). Therefore, in our opinion this is a reasonable compliance alternative approach to be reviewed with the building official.

Exterior stairs must comply with the following requirements. While the stair could be considered an exit discharge stair, we recommend complying with the following as part of the compliance alternative or variance approach.

- Exterior exit stairs must be open on at least one side, except as required for structural columns, beams, handrails, and guards (IBC 1027.3 and NFPA 101 Section 7.2.2.6.6).
 - Open sides must be at least 50% open and have an aggregate open area of at least 35 SF adjacent to each floor level and the level of each intermediate landing.
 - The required open area must be located at least 42 inches above the adjacent floor or landing level.
 - The stair must be arranged to avoid impediments to its use by persons having fear of high places. Stairs more than 36 feet above the finished ground level must be provided with an opaque visual obstruction not less than 48 inches in height (NFPA 101 Section 7.2.2.6.2).
- The open areas adjoining the stair must be either yards, courts, or public ways. The remaining sides may be enclosed by the exterior walls of the building (IBC 1027.4).
- The stair must have a minimum FSD of 10 feet measured at right angles from the exterior edge of the stair to adjacent lot lines, other portions of the building, and other buildings (IBC 1027.5).
- The exterior stairway must be separated from the interior of the building as required for interior stairs. Since the proposed stair connects less than 4 stories, a 1-hour separation is required (IBC 1027.6 & 1023.2 and NFPA 101 Section 7.2.2.6.3.1).
 - The 1-hour separation must extend horizontally for at least 10 feet beyond the stair and vertically from finished ground level to a point 10 feet above the topmost landing of the stair, or to the roofline (whichever is less) (NFPA 101 Section 7.2.2.6.3.2).
 - Roof construction must provide protection beneath the stairs and must extend horizontally at least 10 feet to each side of the stair (NFPA 101 Section 7.2.2.6.3.3).

- Where a vertical plane projecting from the edge of the stair and stair landing is exposed by other parts of the building by an angle less than 180 degrees, the exterior wall must be rated in accordance with IBC 1023.7. See section 6.2 of this report.
- All openings below the stair must have a $\frac{3}{4}$ -hour rating where the stair is located as follows (NFPA 101 Section 7.2.2.6.4):
 - In an enclosed court with a smallest dimension that does not exceed $\frac{1}{3}$ its height; or
 - In an alcove having a width that does not exceed $\frac{1}{3}$ its height and a depth that does not exceed $\frac{1}{4}$ its height.
- The stair must be designed to minimize water accumulation on the walking surface (IBC 1011.7.2 and NFPA 101 Section 7.2.2.6.5).

9.6 Horizontal Exits

Horizontal exits will be provided on various levels of the building. In addition to the inpatient floors, horizontal exits will also be provided at the connection to the Bean Building for Levels B and G. Requirements for horizontal exits are as follows.

Separation

The separation between buildings or portions thereof connected by a horizontal exit must be provided by a fire wall or fire barrier (IBC 1026.1). The minimum fire-resistance rating of the separation is 2 hours, but the separation cannot be less than required by other sections of the code. The fire wall between the Congress Street building and the Visitor Garage must have a minimum 3-hour fire-resistance rating per IBC 706.4.

Horizontal exits constructed as fire barriers must be continuous from exterior wall to exterior wall so as to divide completely the floor served by the horizontal exit. In addition, where the fire barrier serving as a horizontal exit intersects exterior walls at an angle of less than 180 degrees, the exterior walls must have a 1-hour fire-resistance rating with $\frac{3}{4}$ -hour rated opening protectives for a distance of at least 10 feet on both sides of the horizontal exit (IBC 1026.2 and NFPA 101 Section 7.2.4.3.). The smoke barrier/horizontal exit wall on Level C2 through C4 intersects exterior walls that are at an angle of less than 180 degrees. Therefore, exterior wall protection is required. Refer to the associated life safety plans for further details.

Opening Protectives

Fire doors in horizontal exits must be self-closing or automatic-closing when activated by a smoke detector. Doors, where located in a cross-corridor condition, must be automatic closing by smoke detector activation (IBC 2026.3 and NFPA 101 Sections 7.2.4.3.10 & 7.2.4.3.11). Doors in horizontal exits must provide a minimum 1½-hour fire-resistance rating. However, doors in 3-hour fire walls must provide a minimum 3-hour rating (IBC Table 716.5 and NFPA Table 101 8.3.4.2)

Refuge Areas & Capacity

The refuge area of a horizontal exit must be a space occupied by the same tenant or a public area. Each refuge area must be adequate to accommodate the original occupant load of the refuge area plus the occupant load anticipated from the

adjoining compartment. The anticipated occupant load from the adjoining compartment must be based on the capacity of the horizontal exit doors entering the refuge area (IBC 1026.4).

The capacity of the refuge area should be computed based on a net floor area allowance of 3 SF per occupant. The capacity of refuge areas serving Group I-2 occupants must be calculated at 15 SF per occupant for ambulatory occupancies and 30 SF per occupant for nonambulatory occupancies (IBC 1026.4.1 and NFPA 101 Section 7.2.4.2.4).

Not less than one means of egress from the area of refuge must lead directly to the exterior or to an interior exit stairway or ramp (IBC 1026.4.2).

9.7 Doors

Cross-corridor door openings in corridors required to be at least 96 inches wide must have a clear width as follows (NFPA 101 Section 18.2.3.4(6)):

- 6 feet, 11 inches for pairs of doors; and
- 41 ½ inches for a single door.

The above provisions also apply to any doors in the means of egress from the patient rooms (NFPA 101 Section 18.2.3.6). However, exit stair enclosure doors are only required to provide a minimum clear width of 32 inches (NFPA 101 Section 18.2.3.7). Since the proposed exterior stair will be serving as an exit stair, it is our opinion that the doors serving this stair are also only required to provide a minimum of 32 inches in clear width. Doors not serving bed-traffic must have a minimum clear width of 32 inches (IBC 1010.1.1 and NFPA 101 Section 7.2.1.2.3.2). All doors serving an occupant load of 50 or more people must swing in the direction of egress travel (IBC 1010.1.2 and NFPA 101 Section 7.2.1.4.2).

9.8 Locking Devices

Unless complying with IBC 1010.1.9.6 and NFPA 101 Section 18.2.2.2.5, locking devices that restrict access to a care recipient's room from the corridor and that are operable only by staff from the corridor side must not restrict the means of egress from the care recipient's room (IBC 407.4.1.1 and NFPA 101 Section 18.1.3.2(1)).

9.9 Aisles and Aisle Accessways

In assembly areas such as the Interprofessional Lounges on Level C2 and C3, aisles and aisle accessways must provide a minimum clear width between seating as summarized below.

Aisles

Aisles serving table seating on one side must have a clear width of at least 55 inches. Where seating is provided on both sides of the aisle, the aisle must have a clear width of 74 inches when serving less than 50 seats, and 80 inches when serving 50 or more

seats. The clear aisle width must be measured from the edge of the tables (IBC 1029.9.6 & 1029.12.1).

Aisle Accessways

Aisle accessways serving seating on one side must have a minimum clear width of 31 inches. Aisle accessways serving seating on both sides must have a minimum clear width of 50 inches. The clear width must be increased ½-inch for each additional foot, or fraction thereof, beyond 12 feet of aisle accessway length. No minimum width for aisle accessways having a length not exceeding 6 feet and used by a maximum of four people. The clear aisle accessway width must be measured from the edge of the tables (IBC 1029.12.1).

10. ACCESSIBILITY

Accessibility requirements for medical facilities are provided in the American's with Disabilities Act Standards (ADA). All of the patient sleeping rooms must comply with ADA 805 (ADA 223.2.2).

11. MECHANICAL

The building must be provided with mechanical ventilation in accordance with ASHRAE 62.1, 2013 edition.

12. ENERGY CONSERVATION

The building is subject to with the requirements of IECC 502, 503, and C504 or ASHRAE 90.1 – 2013 (IECC 501.2).

13. PLUMBING FIXTURES

The following table summarizes the plumbing fixtures provided in the Congress Street building. The subsequent sections discuss the analysis for each of the floors. The plumbing fixture analysis is based on the requirements of the 2015 IAPMO UPC as adopted and amended by Maine.

Floor Level ^A	Occupancy	Toilets Provided		Urinals	Lavatories Provided		Max Occupant Load Supported			Maximum Expected Occupant Load
		Male	Female		Male	Female	Male	Female	Total	
CB	Group B	1	1	0	1	1	50	15	30	11
CG	Group A-3	2	3	0	2	3	200	100	200	181
	Group I-2 - Employee	1	2	0	1	2	15	15	30	25
	Group I-2 - Patient	4 Unisex				32 patients			41 ^B	
C1	Group I-2 - Employee	2	3	0	2	3	35	35	70	4
C2	Group I-2 - Employee	1	2	0	1	2	15	15	30	16
	Group I-2 - Public	1	1	0	1	1	1 waiting room		1 waiting room	
	Group I-2 - Patient	1 per room				32 patient rooms			32 patient rooms	
C3	Group I-2 - Employee	1	2	0	1	2	15	15	30	16
	Group I-2 - Public	1	1	0	1	1	1 waiting room		1 waiting room	
	Group I-2 - Patient	1 per room				32 patient rooms			32 patient rooms	
B	Group I-2 - Employee	3	5	2	3	3	135	95	190	190
G	Group B	2	3	1	3	3	200	50	100	49

^A Level C4 is not included in the table since the space is shell space and will be fit-out at a future date.

Bathroom fixtures will be provided once the space is fit-out for occupancy.

^B While the post-op suite includes 41 beds, full occupancy is not expected at one time. The toilet fixtures provided for patients have a capacity of 32 patients, which is approximately 78% of the number of beds.

13.1 LEVEL CB

On Level CB, bathrooms are provided for the IT offices located on this level as well as potential transient staff. The IT office has 11 work stations. Although the floor plans show two toilets and lavatories for each sex, it is our understanding that the number of fixtures may be reduced to one toilet per sex. Therefore, the table above only includes one toilet and lavatory per sex. These fixtures support a total staff population of 30 people. This proves sufficient to support the IT staff as well as additional capacity for transient workers. It is also our understanding that additional staff bathrooms may be provided at or near the employee entrance on Gilman Street. Since staff members are accommodated with bathrooms on other floors, these additional staff toilet rooms are not required but provided for convenience purposes for staff arriving/leaving through the staff entrance at this location. The number of plumbing fixtures provided here is subject to the design team's consideration.

13.2 LEVEL CG

A combination of staff, public, and patient restrooms are provided on this floor. The following sections discuss each population.

Staff

A total of 3 unisex staff bathrooms are provided on Level CG. These fixtures can support a maximum of 30 staff members. Approximately 25 staff workstations are shown on the plans. Therefore, the proposed fixtures provide sufficient capacity.

Public

A total of 3 unisex bathrooms and one set of individual bathrooms for each sex are provided for public use. These fixtures can support a maximum of 200 people. Approximately 181 seats are shown in the CG waiting area. Therefore, the fixtures provide sufficient capacity for the expected occupant load.

Patients

A total of 4 unisex patient bathrooms are provided on Level CG. These fixtures can support a maximum of 32 patients.

While the post op suites contains 41 patient beds, we do not expect all beds to be occupied at one time and therefore the 4 patient toilet rooms are considered sufficient since they provide for 78% of the beds to be occupied. If all beds could be occupied at one time, two additional patient bathrooms are required. We recommend reviewing the proposed layout with MMC the local plumbing inspector for approval.

13.3 LEVEL C1

Level C1 is provided with 5 unisex staff toilets that are intended to serve staff in the PACU suite. The 5 staff toilets can support a maximum of 70 employees. A total of 4 staff workstations are shown in the PACU suite. Therefore, the proposed fixtures provide sufficient capacity.

Due to the de-gowning process for operating room (OR) staff, the OR employees are expected to use the bathrooms in the locker rooms located on Level B. No patient bathrooms are provided on this floor since patients in the PACU suite and ORs will be unconscious and unable to use the restroom. Once patients become conscious, they are moved to a different floor (i.e. Stage 2) where they will have access to restrooms. Stage 2 will be either Level CG post op suite to await discharge or relocation to an inpatient room.

13.4 LEVEL C2 & C3

A combination of staff, public, and patient restrooms are provided on Level C2 and C3. The following sections discuss each population.

Staff

A total of 3 unisex staff toilet rooms are provided on each floor. These toilet rooms can support a maximum of 30 employees. Levels C2 and C3 will contain a staff to patient ratio of 1:2. Since there are 32 beds on each floor, approximately 16 employees are expected on each floor. Therefore, the proposed staff fixtures can accommodate the expected staff population as well as additional transient staff who may be on the floors temporarily such as doctors, nutritionists, etc.

Public

A total of 2 unisex toilet fixtures are provided for the waiting rooms on each floor. These fixtures provide sufficient capacity in accordance with UPC Table 422.1.

Patient

Each patient room is provided with an individual toilet room in accordance with UPC Table 422.1.

13.5 Level C4

Level C4 is not included in the plumbing fixture analysis since the space is being constructed as shell space for future fit-out. Plumbing fixtures will be provided on Level C4 at a later date as needed for the future program.

13.6 LEVEL B

Locker rooms are provided on Level B for use by OR staff. There are 19 ORs provided on Level C1 with a maximum of 6-10 employees expected in each OR. This staff count totals a maximum of 190 people. With the ORs operating at 80% capacity, the typical OR staff population is approximately 152 people. As shown in the attached summary table, proposed locker room fixtures can support both the typical (i.e. 152) and maximum (i.e. 190) expected occupant loads for the OR staff.

13.7 LEVEL G

Level G contains a staff lounge as well as serves as a public entrance to the building from the Visitor Garage. Therefore, public restrooms have been provided at this level. As shown in the table on page 26, sufficient restrooms have been provided on other floors for both the public and staff populations. Therefore, the fixtures provided on Level G are for convenience only.

The staff lounge on Level G has a calculated occupant load of 49 people and therefore qualifies as a Group B occupancy. Using the factors applicable to Group B occupancies, the proposed fixtures can support 100 people (UPC Table 422.1). This capacity is sufficient for the population of the staff lounge and provides excess capacity for transient staff and/or members of the public.