

14 November 2016

Mr. Daniel F. Bennett
Building Commissioner
City of Brookline Building Department
333 Washington Street, 3rd Floor
Brookline MA, 02445

RECEIVED 12/7/2017
PLANNING DEPT.

RE: Type IIIA Construction for 40 Centre Street Residential, Brookline MA

Dear Mr. Bennett:

The summary provided below is based on the new construction provisions of the Massachusetts State Building Code (MSBC), 8th Edition. This memo specifically addresses construction options for the proposed Type IIIA Construction for 40 Centre Street, a new development containing residential dwelling units and residential parking located at 40 Centre Street in Brookline, MA.

At this time, the development team does not have a set documentation or construction schedule but does intend to submit for building permit under the 8th edition. Our team will work closely with the Brookline building department as code changes take effect during the concurrency period while the 9th edition is implemented.

Construction Type – Special Conditions

The code provisions of MSBC Section 509 permit the use of special conditions that are exempt from, or modify, the specific requirements of the MSBC related to height and area.

MSBC Section 509.2

Section 509.2 of the MSBC allows a 3-hour fire-rated horizontal assembly to create separate buildings. Buildings constructed using this option are typically referred to as 'podium' or 'platform' buildings. The structures built above and below the 3-hour fire-rated horizontal assembly are considered distinct buildings. As distinct buildings, they are individually evaluated with respect to allowable building area, the number of stories and type of construction. Furthermore, if a fire wall is needed to address building area issues in the upper building, the fire wall construction is permitted to stop at the 3-hour fire-rated horizontal assembly and does not need to extend into the lower building to the foundation.

There are seven (7) conditions that set the limits of MSBC Section 509.2:

1. The buildings are separated with a horizontal assembly having a minimum 3-hour fire-rating.
2. The building below the horizontal assembly is not more than one (1) story above grade plane.
There are no restrictions to the number of levels below grade.
3. The building below the horizontal assembly is of Type IA construction.
4. Shafts, stairs, ramps and escalator enclosures through the 3-hour fire-rated horizontal assembly must have not less than a 2-hour fire-rated enclosure, some exceptions apply.
5. The building above horizontal assembly is permitted to have multiple Group occupancy uses, each with an occupant load of less than 300, or Group B, M, R or S occupancies.

6. The building below the horizontal assembly must be provided throughout with an automatic sprinkler system and is permitted to be any of the following occupancies:
 - a. Group S-2 parking garage used for the parking and storage of private motor vehicles;
 - b. Multiple Group A, each with an occupant load of less than 300;
 - c. Group B;
 - d. Group M;
 - e. Group R; and
 - f. Uses incidental to the operation of the building (including entry lobbies, mechanical rooms, storage areas and similar uses).

7. The maximum building height in feet must not exceed the limits set forth in MSBC Section 503 for the building having the smaller allowable height as measures from the grade plane. Meaning, the height of the combined buildings above and below the horizontal assembly is limited to the number of feet above grade plane allowed by MSBC Table 503.

The following figure is provided in the 2009 IBC Code and Commentary. Figure 509.2 illustrates the special provisions of MSBC Section 509.2.

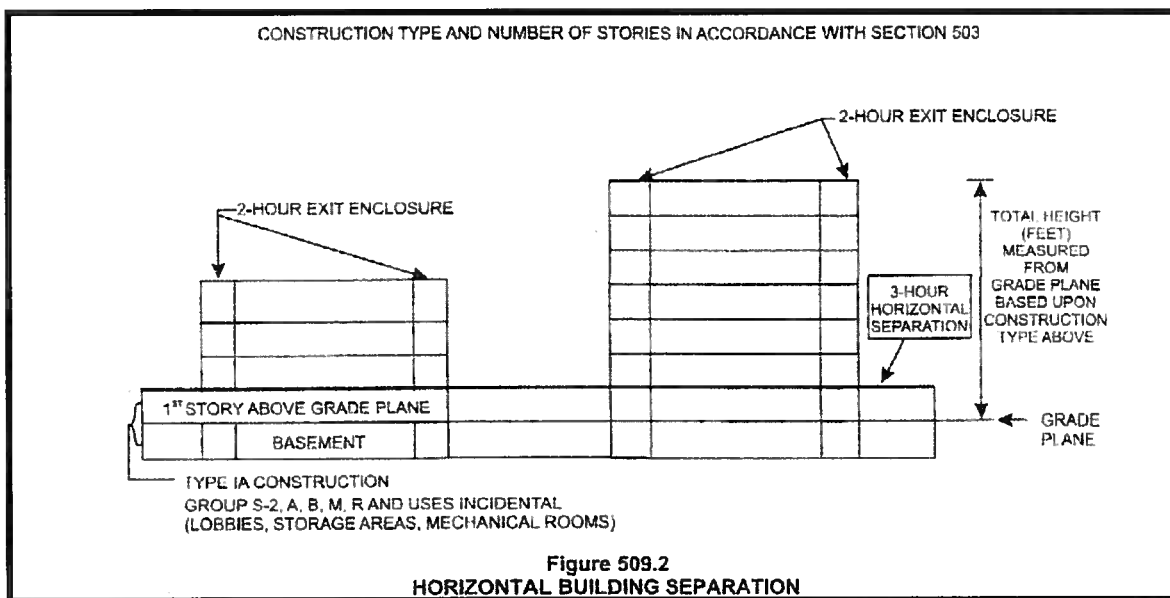


Figure 509.2
HORIZONTAL BUILDING SEPARATION
Figure 1: Special Provisions Section 509.2

Building Height and Area Modifications – Type IIIA Construction

The following sections discuss the construction type of the residential structure above the 3-hour fire-rated horizontal assembly. In accordance with MSBC Section 509.2 the parking structure below the 3-hour fire-rated horizontal assembly is Type IA construction.

Height – Type IIIA Construction (All residential buildings) The building height in stories is measured from the 3-hour fire-rated horizontal separation and is based upon the allowances for the construction type above the horizontal assembly, in this case Type IIIA. Type IIIA construction permits a base allowable building height of four (4) stories and/or 65 feet. The project is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13 and is permitted to increase the allowable building height to five (5) stores and/or 85 feet. Therefore, the total height (in stories) of the Type IIIA building is

limited to five (5) stories above the 3-hour fire-rated horizontal separation which is located at grade (MSBC Table 503 and Section 504.2 Automatic sprinkler system increase).

The actual height of a IIIA structure is limited to 85 feet. The building has a measured height of 69'-6" measured from the average grade plane to the average level of the roof.

Area – Type IIIA Construction (All Residential Buildings)

Type IIIA construction for Group R-2 occupancy permits a base allowable area of 24,000 square feet. The project is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13 and is permitted an area increase of 200 percent (MSBC 506.3). The total allowable area per residential floor per building is increased from 24,000 to 72,000 square feet for Type IIIA construction.

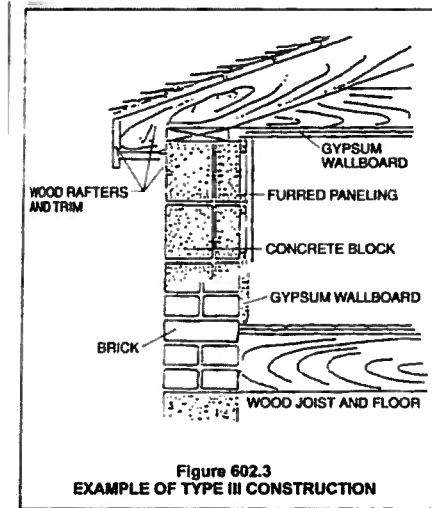
The total permitted area per building in accordance with MSBC 506.4 is 216,000 square feet base on Group R-2 occupancy. Based on the maximum permitted height of five (5) stories each residential floor is permitted a maximum area of 43,200 square feet. The proposed footprint area of the building is approximately 11,200 square feet as measured at the ground level. Therefore, Type IIIA construction is acceptable based on the area of the building.

Type IIIA Construction

Exterior Bearing Walls

As per MSBC 602.3, Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. *Fire-retardant-treated wood* framing complying with Section 2303.2 shall be permitted within *exterior wall* assemblies of a 2-hour rating or less. We plan on utilizing this approach for the design of 40 Centre Street, located in Brookline, MA. The primary building structure will be assembled via panelized construction, and will utilize Fire-retardant-treated wood framing for all exterior wall assemblies in order to maintain compliance with this Code and a 2-hour fire rating.

As per the 2009 IBC code commentary, specifically Section 602.3 states "*The elements within the perimeter established by the exterior walls (i.e., floors, roofs and walls) are permitted to be of combustible materials. An example of a typical building of Type III construction is a structure having its exterior walls constructed of concrete, masonry or other approved noncombustible materials, but with a wood frame floor, interior wall and roof construction.*" Further in the explanation it continues, "*Although fire-retardant-treated wood (FRTW) does not meet the specifications of the code as a noncombustible material, it is permitted as a substitute for noncombustible materials for framing within exterior wall assemblies of Type III Construction.*" Figure 602.3 shows an example of Type III Construction showing this approach, with a wood framed floor assembly intersecting the exterior wall as well as a wood framed roof assembly installed on top of the exterior wall.



Our team has reviewed additional information about the use of fire-retardant-treated wood framing and the introduction of such products in Type III Construction. As per the 1997 Uniform Building Code, specifically sections 503.4.3 and 503.4.4 allows the use of FRT wood. [See attached Exhibit A] The UBC Handbook states; *"These two sections establish exceptions for exterior wall construction for Types III and IV construction. Section 503.4.3 provides that fire-retardant-treated wood framing may be used within the assembly of exterior walls when Table 5-A allows a fire-resistive rating of two hours or less. When using this exception, the required fire resistance must be maintained and the exposed outer and inner faces of the wall must be of noncombustible material.*

The UBC Handbook continues to explain the use of FRT wood as follows; *"The rationale for this exception is that fire-retardant-treated wood, although a combustible material, will not support its own combustion, and the exposure hazards are low enough that the fire-retardant-treated wood will provide adequate performance. Also, the requirement that the exposed inner and outer faces be noncombustible provides that the likelihood of direct flame impingement of the fire-retardant-treated wood is unlikely. This is particularly true for the common case where the noncombustible exposed faces will be gypsum wallboard for the interior and either masonry veneer or metal siding for the exterior."* Our proposed design at the exterior wall follows this logic by placing two layers of GWB on the interior face, a layer of fire-retardant OSB sheathing on the exterior face as well as a layer of exterior Gypsum sheathing similar to UL assembly W408.

Floor and Roof Assemblies

As per Table 601, the floor and roof assemblies are required to have a 1-hour fire rating. The project will be designed based on the aforementioned Figure 602.3 and correspondence with representatives from the International Code Council, which suggest that the 1-hour rated floor assembly can penetrate the 2-hour exterior wall and that the exterior wall assembly stops at the underside of 1-hour roof assembly. [See attached Exhibit B]

The 1-hour rated roof assembly has been designed to be installed on top of the 2-hour exterior wall. This approach allows for the wood roof trusses and parapets to be constructed of combustible wood as it is not part of the exterior wall assembly.

Exterior Finish Materials

The proposed project also utilizes non-combustible exterior finish materials attached to the rated assembly that include; brick, and fiber cement siding.

Fire Resistance Ratings

The fire resistance ratings required for Type IIIA construction is summarized in the table below.

Building Element (MSBC Table 601)	Type IIIA Fire Resistance Rating Required (Hours)
Primary Structural Frame	1
Exterior Bearing Walls	2
Interior Bearing Walls	1
Exterior Non-bearing Walls	See Table 602
Interior Non-bearing Walls	0
Floor construction and secondary members	1
Roof construction and secondary members	1

We hope this memo answers your questions related to the Type IIIA Construction type. Please review and feel free to contact me if you have any further questions or comments.

Regards,


Peter W. Bartash

Associate Principal
CUBE 3 Studio LLC

Attachments:

Exhibit A: 1997 UBC Handbook Sections 503.4.3 and 503.4.4
Exhibit B: ICC Staff Interpretation – Wall Assembly to Floor Assembly Intersection