city of burbank
community development department

memorandum

DATE: September 23, 2014

TO: Board of Building and Fire Code Appeals

FROM: Tom Sloan, Secretary to the Board
By Lukas Quach, Senior Plan Check Engineer
Mario Osuna, Senior Plan Check Engineer

SUBJECT: **Appeal to the Decision of the Assistant Community Development Director/Building Official Regarding Suitability of Alternative Methods and Types of Construction Required by the Building Code and Interpretations of the Building Code for Two-Hour Continuity Assemblies**

PROJECT: Hilton Garden Inn
401 S. San Fernando Blvd
Burbank, CA 91502
Applicant: Palmetto Hospitality of Burbank, LLC
Permit: BS1315034

PURPOSE

The purpose of this report is to present an appeal application to the Board of Building and Fire Code Appeals from Palmetto Hospitality of Burbank, LLC, owner of the above referenced Project, for the construction of wall assemblies that do not strictly comply with prescriptive assemblies in the California Building Code (CBC). These assemblies include the intersection of the 1-hour rated floor/ceiling/roof assemblies with the 2-hour rated exterior wall.

The project was submitted to Plan Check November 11, 2013, under the 2010 CBC. The appeal is submitted under the provisions of CBC Section 104.11 permitting alternative materials and methods of construction, and Section 113, describing the authority of the Board of Building and Fire Code Appeals.

Section 104.11 states that “the provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved.”

An alternative may be approved when the material and method proposed offer the equivalent of that prescribed in the CBC in quality, strength, effectiveness, fire resistance, durability and safety.

Section 113.2 grants authority to the Board to approve "an equally good or better form of construction," when it is proposed, without waiving the requirements of the CBC.

BACKGROUND

The proposed construction type of the hotel structure is Type IIIA construction. Type IIIA construction requires 2-hour fire-resistive rated exterior walls, as specified in CBC Table 601. Section 602.3 further specifies the construction materials permitted in Type III construction. The section states that "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 the exterior wall assemblies of a 2-hour rating or less." The fire-retardant-treated wood framing is permitted by the code as an alternative to noncombustible materials in Type III construction.

CBC Section 2303.2 defines fire-retardant-treated wood as "any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials,* or UL 723, *Tests for Surface Burning Characteristics of Building Materials,* a listed Flame Spread Index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 10-1/2 feet beyond the centerline of the burners at any time during the test." The Flame Spread Index calculated is a relative indication of the flammability of the test material with respect to a red oak standard, with a lower number representing a better performance

ISSUE

The type of framing affects the structural requirements and the necessity for an appeal. There are two standard methods of wood framing: balloon framing and platform framing. The proposed framing method for this project is platform framing. The structural requirements and standard framing practices for platform framing do not allow a complete separation of the wall assembly from the floor/ceiling/roof assembly at the intersection of the 2-hour rated exterior wall and the 1-hour rated floor/ceiling/roof assemblies. Because the floor/ceiling/roof assembly sits on top of the supporting walls, the 1-hour floor/ceiling/roof framing members penetrate the interior membrane of the exterior wall assembly and interrupt the 2-hour rating at each of the floor and the roof levels.

In contrast, balloon framing utilizes continuous framing members for the wall assembly. The floor/ceiling/roof assemblies are then supported by ledgers, allowing more continuity in the 2-hour rated exterior wall assembly. Balloon framing is not proposed for this project.

APPLICANT PROPOSED ALTERNATIVES

The Applicant describes the proposed framing details and justifications for their fire-resistive equivalency in Exhibit 2 of the staff report. Exhibit 2 is further broken down into specific exhibits labeled A through H.

- **Plywood Sheathing:** At the roof and floors the plywood sheathing breaks the interior gypsum board membrane and extends into the wall assembly. The proposed alternative is to install fire-treated plywood (pressure-treated method) at these locations. See exhibits C through G.

- **Floor and Roof Trusses:** At the roof and floors, the truss webs and as well as the top and bottom chords of the trusses extend into the exterior walls. The proposed alternative is to field treat the wood members with a fire-retardant coating to achieve the required fire protection, while maintaining the strength of the structural components. (Exhibits A through G)

  The fire treatment is proposed as follows:
  1. Apply Flame Stop II fire retardant, a topical (surface applied) product to wood members to achieve the fire protection required. Flame Stop II does not alter the structural integrity of the wood and after application achieves a class A rating with a Flame Spread Index of 25 and Smoke Developed rating of 25, which is considered equivalent to fire-retardant lumber.
  2. Installation of this type of fire-retardant treatment will be monitored and tested by a certified testing company. Proposed inspection service protocols are included in Exhibit H.

- **Floor framing members:** At wood framed floors, due to the structural requirements, the ledger is required to be attached to wall studs, preventing the gypsum board from being installed behind the ledger. The proposed alternative is to have the ledger be fire-retardant framing manufactured by the pressure-treated method. The ledger is further protected by being enclosed within the 1-hour rated floor/ceiling assembly. (Exhibit B)

APPLICANT JUSTIFICATIONS

CBC Section 602.3, 2010 edition, states that Type IIIA construction is that type in which the exterior walls are of noncombustible materials and the interior of the building elements are of any material permitted by the code.

Flame Stop II is a topically applied fire-retardant treatment that is 30-minute rated and achieves a Flame Spread of 25 and a Smoke Developed Coefficient of 25 with 1 coat, per ASTM E84. It does not alter the structural integrity of the wood members as pressure treatment does and meets the intent of the code requirement. (Exhibit H)

The proposed construction details in Exhibits A through G provide equivalent protection on the exterior wall assembly. The truss blocking and beams in the wall transfer the vertical gravity loads of the exterior stud walls. The floor trusses do not carry any of the exterior wall loads. As such, they can be considered as bracing members per Section 705.6 (Exhibit C) and need only be protected as required for the floor/ceiling assembly when outside the plan of the exterior wall. Penetrations at the exterior wall assemblies are not discussed in the code. In fact, Section 713.3 specifically excludes exterior wall assemblies. Based on this, the use of the fire-retardant materials, gypsum board, and fire caulking as indicated in Exhibit 2 meet the intent of the code to provide the required protection of the exterior wall at these specific locations.

STAFF ANALYSIS

Modifications to the code-prescribed requirements should only be accepted when significant difficulties make it impractical to comply with the prescriptive requirements of the code, and the proposed alternate materials, methods, and modifications are demonstrated to be equivalent in maintaining the effectiveness in fire and life safety, structural integrity and strength, as stated in CBC 104.10 and 104.11, respectively. In this project, complying with the code requirement can be achieved through the construction of a double wall per the requirements of NFPA 221, *Standard for High Challenge Fire Walls, Fire Wall, and Fire Barrier Walls*. Compliance may also be achieved by constructing a continuous 2-hour rated wall first at the intersection and then connecting the horizontal diaphragm. These methods should be explored because they do not require modifications to the existing code provisions. Some construction related challenges might be associated with these methods; however, they have not appeared to rise to the level of being significantly difficult in achieving compliance. Similar hotel projects have been constructed in the city and are currently being constructed in Burbank by the same, or similar, means.

Section 704.10, which applies to the load-bearing floor framing members that are framed into the exterior wall assembly as part of the platform framing method, requires that load-bearing structural members within the exterior walls are to be provided with the highest fire-resistance rating required in Tables 601 and 602. The highest rating required for Type IIIA construction with R occupancies is 2 hours for the exterior bearing wall. The *International Building Code Handbook (IBCH)* summarizing code Section 704.10 states that the intent of the provisions is to ensure the structural frame never has a lower rating than that required to protect the frame from internal fires.

Additionally, Section 705.5 states that exterior walls shall be fire-resistance rated in accordance with Tables 601 and 602, and that the required fire-resistance rating of the exterior walls with a fire separation distance of greater than 10 feet, as is provided on this project, shall be rated for exposure to fire from the inside. Further explanation of this provision continues by stating that for fire separation distances greater than 10 feet, the code recognizes the reduced risk from external sources, and that the hazard is considered to be primarily from the inside of the building.

Because the 1-hour assembly interrupts the 2-hour exterior wall assembly at each floor and the roof levels and the *IBCH* emphasizes the necessity to protect the frame from internal fires, the proposed details do not meet the stated intent of the code, as described above, specifying that the structural frame should never have a lower rating.

RECOMMENDATION

In staff's interpretation, the proposed alternate assemblies do not meet the 2-hour assembly requirements of the code. Building Division and Fire Department staff recommend the Board not approve the Alternative Materials and Method Request for the construction of wall assemblies that do not strictly comply with prescriptive assemblies in the CBC.

EXHIBIT 1: Appeal application
EXHIBIT 2: Applicant's proposal and justification
- Exhibit A: Exterior wall and floor connection plan detail
- Exhibit B: Exterior wall and floor connection plan detail
- Exhibit C: Exterior wall and roof connection section detail
- Exhibit D: Exterior wall and floor connection section detail
- Exhibit E: Floor/ceiling assembly at non-bearing wall section detail
- Exhibit F: Floor/ceiling assembly – floor joists section detail
- Exhibit G: Exterior wall and roof connection plan detail
- Exhibit H: Inspection section protocols: Flame Stop II
- Product Data