GG171-14
408.3.2

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Revise as follows:

408.3.2 Vegetative roofs. Vegetative roofs, where provided in accordance with Section 408.3, shall comply with the following:

1. All plantings shall be selected based on their hardiness zone classifications in accordance with USDA MP1475 and shall be capable of withstanding the climate conditions of the jurisdiction and the micro climate conditions of the building site including, but not limited to, wind, precipitation and temperature. Planting density shall provide foliage coverage, in the warm months, of not less than 80 percent within two years of the date of installation unless a different time period is established in the *approved* design. Plants shall be distributed to meet the coverage requirements. *Invasive plant species* shall not be planted.
2. The ~~engineered~~ soil medium shall be designed for the physical conditions and local climate to support the plants and shall consist of nonsynthetic materials. The planting design shall include measures to protect the engineered soil medium until the plants are established. Protection measures include, but are not limited to, installation of pregrown vegetated mats or modules, tackifying agents, fiber blankets and reinforcing mesh. The maximum wet weight and water holding capacity of ~~an engineered~~ a soil medium shall be determined in accordance with ASTM E 2399.
3. Where access to the building facades is provided from locations on the perimeter of the roof, nonvegetated buffers adequate to support associated equipment and to protect the roof shall be provided.
4. Nonvegetated clearances as required for fire classification of vegetative roof systems shall be provided in accordance with the *International Fire Code*.
5. Plantings shall be capable of being managed to maintain the function of the vegetative roof as provided in the documents required by Section 904.3.

Reason: As currently written, the code requires the use of engineered soils to meet the requirements of Section 408.3.2. The purpose of this proposal is to allow for the use of non-engineered soils. The proposal merely removes the word “engineered,” thus adding flexibility to the code, but still maintaining the requirements that the soil medium be appropriate for the site and be protected.

The use of non-engineered soil medium is advocated in design guidance in Basel, Switzerland, where “design criteria includes varying the substrate thickness and using natural soils from nearby areas” (Brenneisen, 2006). In the United Kingdom, studies have been conducted to characterize “alternative recycled waste materials” used in green roof applications. Such alternative soil medium materials can help improve biodiversity and enhance specific ecosystem services in urban settings (Molineux et al., 2009). Ecosystem services are a critical category of benefits of green roofs. One important ecosystem service of a green roof is cooling, due to evapotranspiration of stormwater and perhaps irrigation when applied. However, this benefit of cooling the local environment should be realized in combination with other important ecosystem services that green roofs afford (Oberndorfer et al., 2007). It should be understood that substrates used on green roofs can vary according to the design intention of the roof. The substrate chosen is based upon the intention of the green roofs design. The cooling benefit that green roofs provide is only partially based upon the type of soil medium selected for the roof. Other benefits that relate to the biological community depend upon the choice of soil medium, as has been shown in work on threatened and endangered bird species (Baumann, 2006; Fernandez-Canero and Conzalez-Redondo, 2010). Selecting a non-engineered soil medium based upon other design intentions of the green roof does not mean the cooling properties of the green roof are compromised and should not exclude any entity from obtaining credit for the design because a secondary design intention for a given application calls for a soil medium that is not considered ‘engineered’ soil medium.

Where load bearing capacity of a roof is adequate, it is possible, and may be preferable, to use native/natural soils rather than engineered substrates, or a blend of natural soils and engineered soil. The production of engineered substrates releases considerable carbon dioxide and engineered substrates must be transported from production facilities to the building site over indefinite distance. By contrast, native soils are acquired locally, thus avoiding the environmental impacts of manufacturing and transportation, and they also contain the microflora and microfauna community structure that is indigenous to the region. Native soil blended with an engineered soil medium will likely increase numbers of mycorrhizae fungi and nitrifying microorganisms, which can improve plant growth and resilience. Green roof installers, e.g., Green Roofs of Colorado, “topcoat” the green roof with soil from the site or even may blend local soils with engineered substrate.

Green roof technology is diversifying in step with the increase of design intentions, as the technology matures and as more environmentally friendly materials and methods are incorporated into the technology. For instance, the addition of biochar in green roof soil media reportedly improves the water quality of roof stormwater runoff, indefinitely stores greater amounts of carbon on the roof, and retains greater amounts of water and nutrients in the soil medium. Knowledge of green roof soil media is significant, yet knowledge of and information on the topic is steadily increasing at a significant rate. Therefore it is recommended that restrictive language be removed from this section as pertains to soil medium, according to the recommendation presented.

Bibliography:

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Cost Impact: Will not increase the cost of construction. This proposal adds flexibility to the text of IgCC and could potentially lower the costs of compliance.

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