

10 Clarify Construction Requirements in Flood Zones

I. Summary

Issue:

City regulations for new construction and substantial renovations provide for resiliency in flood zones. However, the requirements are not always clear to design professionals and contractors.

Recommendation:

Clarify flood zone construction requirements in code and through a Department of Buildings Bulletin. Allow more flexibility in requirements for enclosures below the flood line.

II. Proposed Legislation, Rule or Study

Amendments to the New York City Building Code:

1. Amend Section BC G201.2 to add a definition for “Attendant Utilities and Equipment” as follows, in alphabetical order:

ATTENDANT UTILITIES AND EQUIPMENT. Utilities, plumbing, HVAC, and related equipment, as well as services associated with new construction.

2. Amend Section 5.2.6 of BC G501 as follows:

5.2.6 Finishes and other materials. Interior and exterior finishes, as well as any materials not otherwise provided for in Sections 5.2.1 through 5.2.5, shall be flood damage-resistant materials in accordance with FEMA Technical Bulletin {2-93} 2-08, Flood-resistant Materials Requirement for Buildings Located in Special Flood Hazard Areas, or shall be required to be approved by the authority having jurisdiction.

3. Amend Section BC G304.1.1 by adding a new Item 2.1 as follows:

2.1 One- and two-family dwellings. In one- and two-family dwellings, enclosures with solid walls below the design flood elevation specified in Table 2-1 of ASCE-24 with a vertical clearance of five feet or more between the floor or ground surface and the underside of the structural ceiling above, shall be limited to 300 square feet. Any other spaces shall be enclosed only by open lattice or similarly open and permeable construction meeting the requirements of ASCE 24, Section 2.6.3.

4. Amend Section BC G501.1 by adding a new amendment to ASCE 24, Section 2.6.3, as follows:

2.6.3 One- and two-family dwellings. In one- and two-family dwellings, enclosures below the design flood elevation specified in Table 2-1 and with a vertical clearance of five feet or more between the floor or ground surface and the underside of the structural ceiling above, shall comply with Sections 2.6.3.1 and 2.6.3.2.

2.6.3.1 Maximum solid enclosure. Solid enclosures shall be limited to 300 square feet and shall be wet-floodproofed with openings complying with this standard.

2.3.6.2 Other enclosures. Enclosures in excess of 300 square feet shall be enclosed only by open and permeable construction in accordance with Sections 2.3.6.2.1 through 2.3.6.2.4.

2.6.3.2.1 The open and permeable construction shall have at least 50 percent openness when viewed horizontally in any 12-inch by 12-inch area, except that the following portions need not be included when calculating the 50% required openness:

1. Structural columns up to 12 inches in width and spaced no closer than six feet on center;
2. Curbs no higher than eight inches above the exterior grade;
3. Retaining walls where portions of the enclosed space are below grade; and
4. Walls, including party walls and fire walls, located at or within two feet of a side or rear lot line.

2.6.3.2.2 Louvers, glazing, doors or other movable elements shall not reduce the required opening to less than the specified 50%.

2.6.3.2.3 Enclosing materials below such design flood elevation shall be flood-damage resistant, including but not limited to metal pickets or wrought iron, fencing, concrete breeze blocks, screening or lattice.

2.6.3.2.4 All spaces or portion thereof limited to enclosure by open and permeable construction shall be designed as unconditioned space in accordance with the New York City Energy Conservation Construction Code.

Department of Buildings Bulletin:

The Department of Buildings should issue a Buildings Bulletin that would clarify in detail the items that are covered by Appendix G of the New York City Building code and ASCE 24. Examples include but are not limited to:

Materials: Materials used must resist damage, deterioration, corrosion, or decay due to floods, including mold and corrosion resistance. This includes wall framing, insulation, and covering as well as structural members.

Utilities: Appendix G applies to all utilities, plumbing, HVAC, and related equipment. A provision for reasonable exception for de minimis items may assist in compliance with and enforcement of this code.

Disconnect Switches: Main feeders serving electrical distribution or panelboards below the Design Flood Elevation should have disconnects above the flood elevation.

Design Flood Elevation: Provide easy method for converting and using the three datums¹ used by the city into a form suitable for design flood elevation (DFE) calculations, and explain how the DFE should be calculated on different points within the flood hazard area.

Future Updates to Appendix G:

The Department should also incorporate any updates from ASCE 24-13 (to be released this summer) into the next triennial code cycle.

III. Supporting Information

Expanded Issue and Benefits:

Appendix G of the New York City Building code references ASCE 24-05, and together these govern construction in flood zones. In some cases the Appendix G references to ASCE 24-05 are vague. For example, Appendix G contains reference to “Utilities and attendant equipment”, but omits the definition of these items found in ASCE 24. In some cases ASCE 24 itself is vague; with requirements that sometimes contain terms such as “as appropriate” and “when necessary”. For design professionals and contractors to properly comply with these important documents, more clarity regarding their intent is required.

Since Appendix G makes references to the ASCE 24 standard, which is updated via a national consensus-based process, it would be cumbersome to develop patches for Appendix G. Therefore, it is more simple and direct for the Department of Buildings to issue, as it does regularly, a separate bulletin clarifying the application of the code documents. The material to be contained in the Bulletin can be developed in consultation with citywide experts on flood-resistant construction.

The Department of Buildings should consider exempting certain mechanical equipment from flood proofing, such as equipment that only serves spaces below the flood elevation, or items that are small, inexpensive or easily replaced. However, the city may be preempted from making modifications to certain code requirements that are based on national standards approved by Congress.

Enclosure Design Options and Permitted Uses

Homes in high-risk areas are required to have Open Foundations per the prescriptive measures within BC § G304.2.3. A performance-based standard allows designers to develop creative

¹ FEMA Region II Coastal Analysis and Mapping, “Vertical Datums and Advisory Base Flood Elevation (ABFE) Maps: Frequently Asked Questions”, <http://www.region2coastal.com/sandy/abfe/vertical-datum>.

solutions that protect communities during non-flood times as well as during flood times. Mitigating floodwaters should be balanced against safety, aesthetics, usability and accessibility factors associated with raised homes.

The changes in the Zoning Resolution currently being put forth by the Department of City Planning to make permanent and to expand aspects of Mayor's Executive Order 230 will allow one- and two-family houses in areas of special flood hazard to be built higher in order to increase resiliency – but the effect is the creation of additional space below the buildings that will be subject to floodwaters and damage.

The Mayor's Executive Order 230 currently prohibits solid enclosures below 1- and 2-family dwellings where the headroom is more than five feet, with an exception for a vestibule and stair. This proposal is to continue the spirit of that prohibition, but to relax it to allow wet floodproofed enclosures up to 300 square feet.

The continuation of restrictions on the use of spaces below one- and two-family dwellings will greatly reduce flood damage. Also, such restrictions will help ensure that the spaces are not used for living spaces. The cumulative effect of restricting the levels below the flood elevation to enclosures no greater than 300 square feet would mean fewer damaged homes and fewer displaced persons, thus allowing the city to devote its post-recovery efforts and funding to projects other than restoring enclosed flood-damaged ground floor levels and finding accommodations for person displaced from makeshift and substandard housing. The National Flood Insurance Program encourages but does not require communities to place restrictions on ground-floor enclosures in A-zones.

Cost:

Turner Construction Company prepared cost estimates based upon several standardized building typologies. Due to the innate variances in construction costs between projects, the complexity of the Task Force proposals, and the wide range of buildings to which the proposals may apply, these cost estimations should only be used as rough order-of-magnitude guides. The cost analysis is presented at the end of this proposal; more information about the cost methodology is given at the end of the full report.

The following analysis was provided by the authors of this proposal:

The cost of the foundation system and ground wall bearing supports will increase the cost of construction, but not significantly relative to the overall cost of constructing a new building. The savings will be to the owner in reduced post-storm losses and insurance premiums. The savings will also be to the city in being able to allocate post-disaster recovery resources where needed with less resources devoted to flood damage to newly constructed dwellings.

