

5 Remove Barriers to Sidewalk Flood Protection

I. Summary

Issue:

Building owners may wish to install flood barriers on sidewalks, but are deterred by codes that limit sidewalk use and that assume buildings are fully occupied during floods.

Recommendation:

Allow underground sidewalk attachments for temporary flood barriers. After evacuation, allow nonresidential buildings to maintain a single entrance/exit for emergency personnel so that flood barriers can be installed.

II. Proposed Legislation, Rule or Study

Amendments to the New York City Building Code:

1. Amend Section BC G501 Modifications, G501.1 Amendments to ASCE 24-05, Section 6.2.2, Item 3, as follows:

3. Have either:

All required means of egress elevated to or above the applicable DFE specified in Table 6-1, capable of providing human ingress and egress during the design flood; or

At least one elevated door located in close proximity to each required means of egress to the exterior that is to be blocked by flood shields or flood control devices, such that the face of the elevated door itself, and not merely its directional signage, is clearly visible to a person approaching the blocked egress door(s). Such door(s) shall be elevated to at or above the applicable DFE specified in Table 6-1, capable of providing human ingress and egress during the design flood. Such door(s) shall meet all New York City Building Code requirements for a required means of egress to the exterior of the structure including hardware and signage, but shall not be required to comply with the occupant load calculations, unless the structure is intended for occupancy during the design flood. Such door(s) may be accessed by open steps and shall not be required to comply with Chapter 11 of the New York City Building Code if its only purpose is to provide supplemental egress and ingress during conditions of flooding and to provide emergency egress at other times.

Exception: During conditions of flooding, buildings of non-residential occupancy that have been entirely evacuated except for emergency personnel shall not be required to maintain more than one means of egress complying with the requirements of this section.

2. Amend Section BC 3202 Encroachments by adding a subsection as follows:

3202.4.3 Flood related egress. Temporary stairs and/or ramps may be permitted during flood events for access to flood related egress locations. Construction of temporary stairs and ramps must comply with the requirements of Chapter 11 of this code *and any other regulations affecting such encroachments.*

[Note: The regulations governing temporary stairs and/or ramps should be developed by the city and incorporated into this code section.]

3. Amend Section BC 3202 Encroachments:

3202.1.1 Footings. Exterior wall and column footings may be constructed to project beyond the street line not more than 12 inches (305 mm), provided that the top of the footing is not less than 8 feet (2438 mm) below the ground or sidewalk level. Foundation walls required to support permitted projections may be constructed to project not more than the permitted projection beyond the street line. Continuous footings for the support and attachment of removable dry floodproofing barriers/shields may be constructed to project beyond the street line not more than 12 inches (305 mm) both at grade and below grade.

Amendments to NYCDOT Rules Related to Revocable Consent:

1. Modified on February 4, 2012: Title 34, Section 7-04, Eligible Improvements: Standards; Annual Rates.
(24) Retaining Walls
(i) *Standard.* Retaining walls may be constructed only where warranted by existing grade or by a change in grade undertaken with prior approval by the Department of Buildings.
(ii) *Temporary flood protection.* Removable dry flood proofing barriers/shields may be erected only during flood events.
(iii) *Annual rate.* See §7-10.

III. Supporting Information

Expanded Issue and Benefits:

Many existing buildings located in flood zones have adjacent street grades with elevations below the Design Flood Elevation (DFE). Buildings often have exterior perimeter walls and egress doors at the property lines, presenting significant challenges to building owners that wish to voluntarily incorporate dry floodproofing (flood barriers and/or shields) around the building perimeter.

This proposal modifies egress requirements for evacuated non-residential buildings to more closely resemble the application of ASCE 24 nationally (requiring only one discharge point in an evacuated building). Further discussion with FDNY should clarify the definition of an evacuated

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building. In the case of very large buildings, multiple egresses may be required, as substantial travel from one end of building to another may not be feasible or advisable.

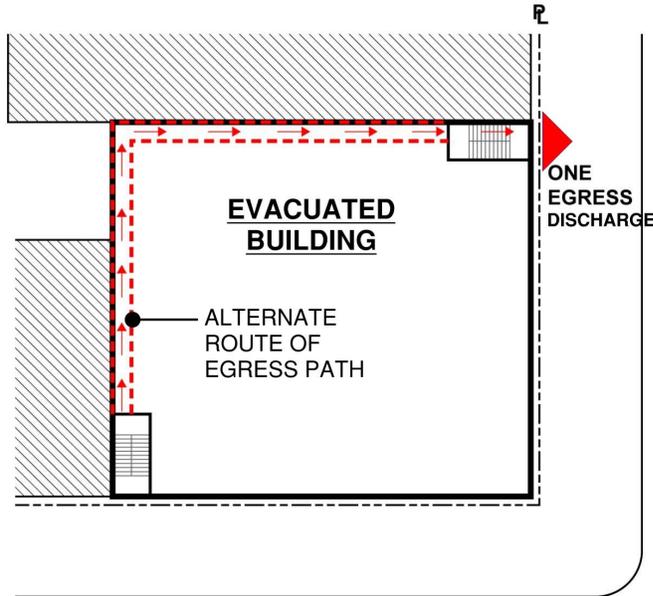


Figure 1: Diagram for single point egress discharge for evacuated non-residential buildings.

This proposal allows for the temporary placement of flood barriers (and temporary stairs over those barriers to provide access to building egress discharge points) within the public right of way. These may require physical connections to materials in the public right-of-way (including temporary attachments and bracings to sidewalks.) The placement of barriers and access structures like stairs will require coordination with those agencies or entities with jurisdiction over the right-of-way (ROW) in question, such as the Department of Transportation.

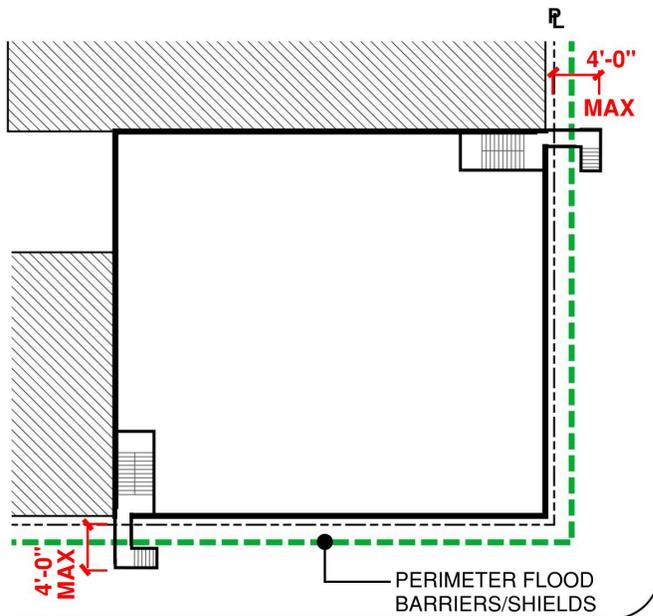


Figure 2: Diagram showing encroachments into public ROW for flood barriers & temporary stairs.

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In many cases, permanent encroachments within the public ROW (such as haunches projecting from the building foundations) would facilitate the temporary support and attachment of flood barriers. This is especially true in situations (like zero-lot-line buildings) where the position of the exterior wall of the building does not accommodate the placement of barriers inside of the property lines. The allowable dimensions and character of these haunches (or other barrier support encroachments) should be determined in concert with the related agencies or entities with jurisdiction over the public right-of-way, and a process for the application and review of associated consent orders should be developed. Regulatory stakeholders in this process should include, at a minimum: NYC Dept. of Transportation (lead agency), NYC Dept. of Buildings, Metropolitan Transportation Authority, the NYC Parks Department, Con Edison, NYC Fire Department, and the New York Power Authority.

In discussions with the city, the clear preference was for barriers that protect entire blocks or neighborhoods, rather than single buildings. It is hard to predict the effects that individual building barriers may have on neighboring structures, making it difficult to evaluate plans for proposed barriers and grant permits. Flood protection systems located in the public right-of-way will be deployed more uniformly, and with better city control over the timing of when they are erected and removed, if they are designed to protect groups of buildings.

If whole blocks or neighborhoods do not have flood protection, individual buildings may desire to protect themselves using temporary storm barriers. If egress over the temporary storm barriers requires temporary stairs or ramps that encroach into the public right-of-way, the city would need to balance the value of this protection against the public needs of evacuation and safe use of sidewalks and roadways. The intent of this proposal is not to specify the details of temporary ramps and stairs, but to recommend the city discuss and develop regulations governing the conditions under which these encroachments could be allowed. In doing so, the city should consider factors including but not limited to the width of the sidewalk and street, the width of the stair or ramp, alternate means of egress that might be employed, operational concerns involving the permanent fixtures to which temporary structures would be attached, and the timing of when obstructing means of egress would be allowed to be erected and when they would be required to be removed.

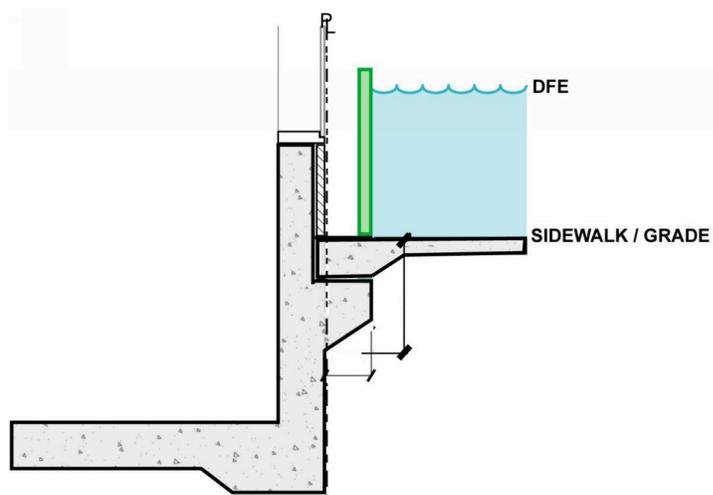


Figure 3: Diagram showing encroachments into public ROW for flood barriers attachment and support.

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Each building should have in place an Emergency Preparedness Plan (EPP) that, 1) outlines a process to ensure that all non-essential building occupants have vacated the building, 2) describes the layout of temporary flood protection measures coordinated with relevant agencies, 3) indicates any temporary ramps or stairs (over flood barriers) required to allow building access to occupants and emergency personnel, and 4) addresses the placement and installation of any egress signage needed to accommodate alternate egress route(s). The EPP should make it clear that temporary dry floodproofing measures (such as removable barriers or sandbags) that encroach upon the public right-of-way are only permitted when a Flash Flood Emergency or Coastal Flood Emergency has been declared, and the EPP should indicate the number of days post-event that such temporary structures will be allowed to remain (as determined by the City of New York).

Appendix G of the New York City Building Code includes guidelines for the design of flood barriers and/or shields design, including requirements for flood barrier systems to resist loads as identified in ASCE 7. Appendix G also requires inspections to confirm the proper installation of flood barriers and/or shields, as well as the inspection of required egress signage (per ASCE 24, Section 6.2.3, Item 3).

Sandbags are among the most common components of temporary flood barriers and are a viable method to restrict water flow into buildings. The US Army Corp of Engineers recommends a height-to-width ratio for sandbag barrier construction of 1:3, with a recommended maximum height of 5 feet. Regulations pertaining to sandbag barriers should limit their use to flood events and should restrict their placement to sidewalks and other areas adjacent to buildings that do not impede the street or any other recognized access pathways for emergency vehicles.

Cost:

No cost estimation was performed for this proposal.

Sources:

1. US Army Corp of Engineers, St Paul District, Flood- Fight Handbook- Preparing for a Flood, 2009 Edition
2. ASCE 24
3. ASCE 7