NYC Buildings

BIRD FRIENDLY BUILDING DESIGN & CONSTRUCTION REQUIREMENTS GUIDANCE DOCUMENT

LOCAL LAW 15 OF 2020

NOVEMBER 2020 • VERSION 1.0

BACKGROUND

The **Bird Friendly Building Design and Construction Requirements Guidance Document** provides useful terms and associated commentary, elaborates on design and construction requirements as it applies to bird hazard installations and provides figures, pictures and commentary to assist the designer, building owner and glazing manufacturer in understanding where bird friendly materials are required to be installed, how to verify a threat factor for a glazing assembly as well as how to obtain a threat factor for an assembly that has not yet been evaluated. This Guidance Document was developed through a collaborative approach between the department and members of the design, manufacturing, development and bird conservancy community.

I. INTRODUCTION

The New York City Council adopted **Local Law 15 of 2020**, which requires that materials that reduce bird strike fatalities be installed on newly constructed or altered buildings. The Local Law, effective January 10, 2021,amends the New York City Administrative Code (AC) and the New York City Building Code (BC) to mandate the use of bird friendly materials in exterior walls, balconies, parapets, and other similar locations. Projects filed on or after January 10, 2021, will be required to use bird-friendly materials in all new buildings, and where alterations of buildings include the replacement of all exterior glazing.

Local Law 15 of 2020 also requires that DOB post on its website requirements and information about compliance with NYC Building Code Section 1403.8 regarding the use of bird friendly building design and construction materials. To provide information and guidance regarding compliance, DOB developed **Buildings Bulletin 2020-022** and this Bird Friendly Design and Construction Requirements Guidance Document (Guide).

II. DEFINITIONS

For the purposes of using this Guide and interpreting the requirements of Section BC 1403.8, the following words and terms have been defined as follows:

A. Terms Not Defined

Terms not defined in the New York City Building Code but used when defining other terms, include **Threat Factor (TF)**, and **Assembly**. This section clarifies the meaning of each term as it relates to the purposes Section BC 1403.8 of the New York City Building Code.

1. Threat Factor (TF)

A Threat Factor quantifies the relative threat level to birds posed by various materials and design details. The Threat Factor is determined by a number ranging between 1 and 100 that indicates the relative effectiveness of materials or assemblies,

typically in reducing bird collisions, but not exclusively, evaluated per a binary choice flight-tunnel protocol involving live birds. A TF of 1 represents *least threatening* and a TF of 100 represents *most threatening*. A TF of 50 indicates no effect in reducing bird collisions, and materials with a TF greater than 50 have attributes that may contribute to collisions. For more information on determining the Threat Factor, see the definition of *Bird Friendly Material* below.

2. Assembly

A discrete combination of materials, which can include glazing, louvers, or screens (i.e. materials in front of glazing), and other combination of materials or use of evaluated strategies.

B. Clarification of Terms Defined in the NYC Building Code

1. Bird Hazard Installation

The New York City Building Code defines Bird Hazard Installation (BHI) in Section 1402.1, as follows:

"Bird Hazard Installation: *Monolithic glazing installations that provide a clear line of sight on the exterior of buildings, including, but not limited to glass awnings, glass handrails and guards, glass wind break panels or glass acoustic barriers."*

Chapter 14 of the New York City Building Code establishes the minimum requirements for exterior walls; wall coverings; wall openings; windows and doors; architectural trim; balconies; projections; and other appendages. As stated above, Section BC 1402.1 defines Bird Hazard Installations as monolithic glazing installations, and Section BC 1403.8.2 requires BHIs to be constructed of Bird Friendly Materials regardless of height. For the purposes of Section BC 1403.8, monolithic glazing shall mean glass and glazing, in accordance with Chapter 24 of the New York City Building Code, including but not limited to single pane or laminated glass, light transmitting ceramic, light-transmitting plastic panels for exterior use in both vertical and sloped applications in buildings and structures, as well as light transmitting plastics, in accordance with Chapter 26 of the New York City Building Code. Glazing extensions of façades, whether up, down or to the side that do not enclose indoor space, and glass fins greater than 10 inches from the face of the exterior wall envelope, highlighted yellow in *Figure 1* below, are considered Bird Hazard Installations. The elements highlighted in blue are not considered Bird Hazard Installations.

Highly reflective metal façade panels and highly reflective solar passive roofs (silver/white) do not constitute BHIs as defined above. However, even if a façade element or material does not constitute a BHI, exterior wall envelopes still must comply with the balance of the requirements for providing bird friendly materials found in Section BC 1403.8. Bird Hazard Installations constitute elements that protrude more than 10 inches from the face of the exterior wall envelope of a building and are see through (i.e. provide clear line of sight). Exterior Wall Envelope is defined in Section BC 202 as follows:

"Exterior Wall Envelope. *A system or assembly of exterior wall components, including exterior wall finish materials, that provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space, from the detrimental effects of the exterior environment."*

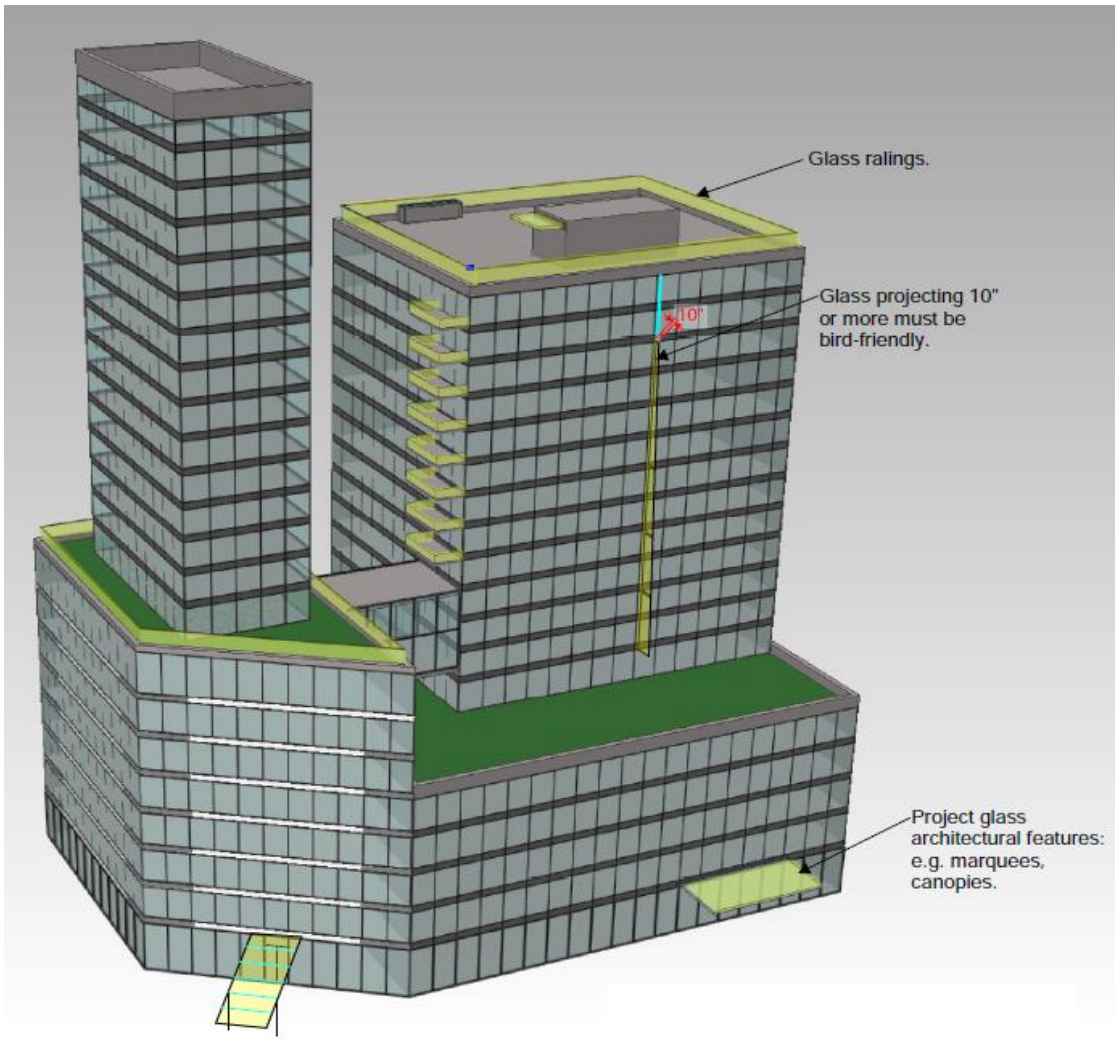

Figure 1. Bird Hazard Installations *(Source: Alina Kurchenko of Vidaris, Inc.)*

Section AC 28-101.4.3, item 20, requires that where the alteration of a building includes the replacement of all exterior glazing, such alteration shall be subject to the requirements of Section BC 1403.8 of the New York City Building Code.

In accordance with Section AC 28-101.5 of the New York City Administrative Code, which defines building as "*Any structure used or intended for supporting or sheltering any use or occupancy. The term shall be construed as if followed by the phrase structure, premises, lot or part thereof*" and unless otherwise indicated by the text, freestanding glass walls such as bus stops, ferry stops and similar structures shall be considered subject to the New York City Building Code and Bird Hazard Installations

which are required to be constructed of Bird Friendly Materials when they are newly constructed or have all their exterior glazing replaced as part of an alteration.

Accessibility ramp railings and guards fabricated of glazing materials are considered also considered Bird Hazard Installations and therefore subject to the requirements of New York City Building Code Section 1403.8.2. However, the following are not considered BHIs as they do not constitute major bird collision concerns:

a. Vertical glass fins applied to the exterior of façades, with a projection up to 10 inches from the face of the building.

b. Skylights *(see Figure 2)*

Figure 2. Skylight *(Source: VeluxUSA)*

2. Fly-Through Conditions

The New York City Building Code defines Fly-Through Conditions (FTC) in Section BC 1402.1, as follows:

"Fly-Through Conditions: *One or more panels of glass that provide a clear line of sight through such elements creating the illusion of a void leading to the other side, including parallel glass elements, at a distance of 17 feet or less, or a convergence of glass sides creating a perpendicular, acute or obtuse corner."*

A general rule to understanding FTCs is if people can see clearly through two parallel walls, birds are at risk of trying to 'Fly-Through' the walls. Where an FTC is created, the installation of bird friendly materials is required. Fly-Through Conditions exist in the following two circumstances:

- When a distance between parallel glass is 17 feet or less; **and**
- Within 12 feet from a corner where there is convergence of two glass sides creating a perpendicular, acute, or obtuse corner.

Figure 3 depicts locations where Fly-Through Conditions (highlighted yellow) were created, for which the installation of Bird Friendly Materials is required.

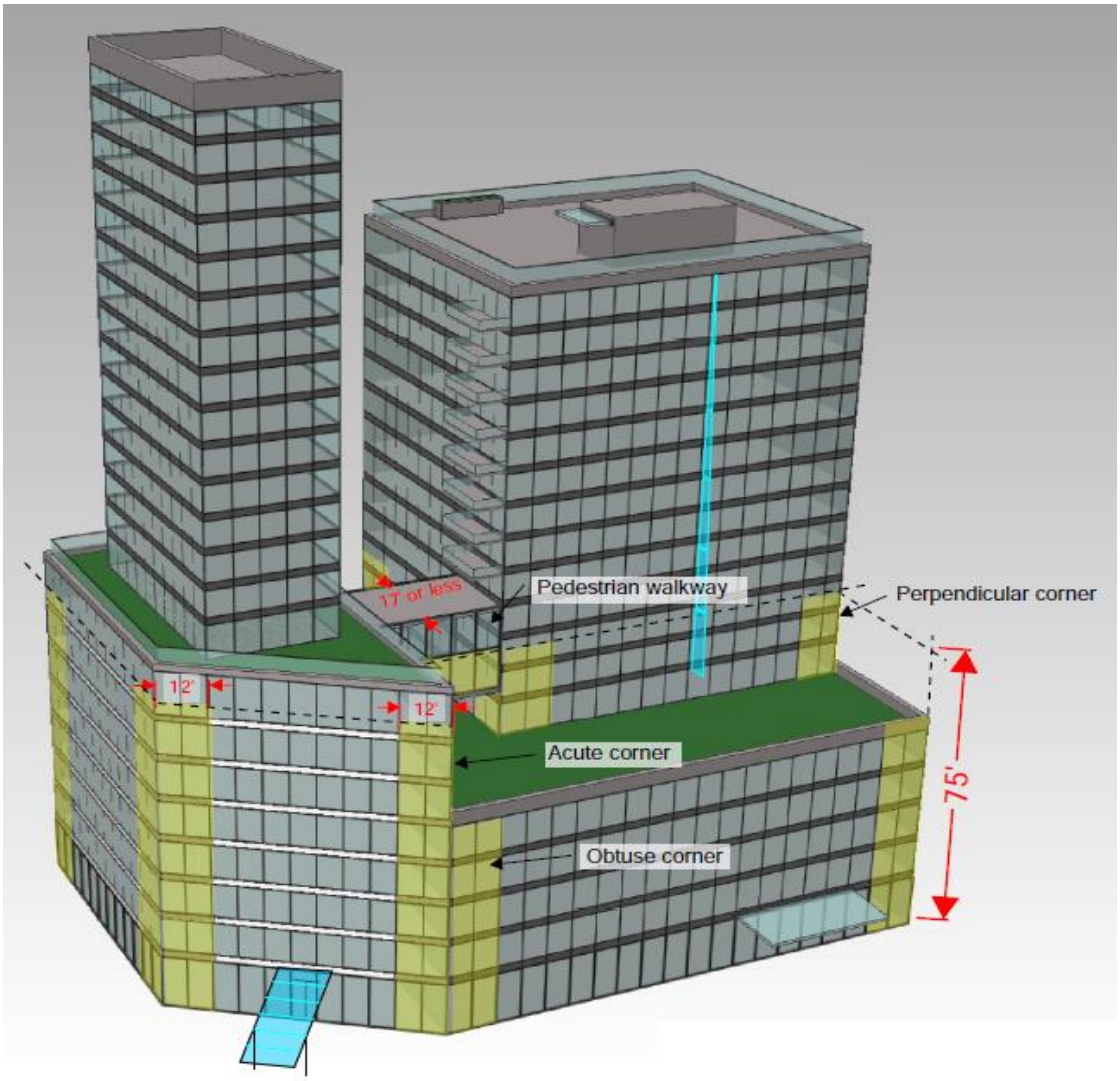

Figure 3. Fly-Through Conditions *(Source: Alina Kurchenko of Vidaris, Inc.)*

3. Bird Friendly Material

Bird Friendly Materials or assemblies do not eliminate collisions, they only help to reduce collisions. The New York City Building Code defines Bird Friendly Material (BFM) in Section BC 1402.1, as follows:

"Bird Friendly Material. *A material or assembly that has, or has been treated to have a maximum threat factor of 25 in accordance with the American Bird Conservancy Bird Collision Deterrence Material Threat Factor Reference Standard, or with the American Bird Conservancy Bird-friendly Materials Evaluation Program at Carnegie Museum's Avian Research Center Test Protocol, or with a relevant ASTM standard."*

An American Society for Testing and Materials (ASTM) standard, based upon the American Bird Conservancy (ABC) Bird Friendly Materials Evaluation Program at Carnegie Museum's Avian Research Center Test Protocol, is currently in development. As such, a material or assembly must have a maximum Threat Factor of 25 assigned by one the following two methods:

a. **ABC Bird Collision Deterrence Material Threat Factor Reference Standard**. Such reference standard consists of the ABC Bird Collision Program that can be found on the ABC website. ABC is developing a Threat Factor interactive database. It is anticipated that this database will be available to the public by January 10, 2021. The current version of the referenced standard and database is located on the ABC website at **https://abcbirds.org/threat-factor-table**. ABC's soon to be released Threat Factor Interactive Database will be user friendly, and allow users to find Threat Factors for a large range of BFM and Assemblies, including those that have been treated as follows:

   - *Glazing Treatments* (i.e. full surface treatment to render glazing visible, % of reflection performance)
   - *Visual Markers* (i.e. ceramic frit, printed film or digital prints)
   - *Building Integrated Structures* (i.e. screens, shades, grills, louvers, shades, mesh)
   - *UV-Reflective Configurations* with bird-friendly patterns - or add UV patterns to the visual marker list
   - *Low-Emissivity* (Low-E) coatings in varying color ranges

   The ABC Threat Factor Interactive Database will show some component materials as photographs or renderings, when possible.

   As part of the ABC reference standard, there will be options for users to obtain a TF for BFM or Assemblies not currently available. ABC will also consider requests for products to be added to the ABC Threat Factor Interactive Database based on the following:

   - *Software Models*, including **Optics** (https://windows.lbl.gov/software/optics), to address minor changes, like different Low-E coatings, for assemblies that have been rated.
   - *Descriptive Standards* to identify materials that can be rated because they comply with a set of criteria and/or allowable deviations of existing materials in the ABC Interactive Database. *Prescriptive Standards* are based on historical tunnel data, objective measurements of glass descriptors like reflectivity, and similarity to products that have been tunnel tested, etc.

   At this time, Registered Design Professionals (RDPs) cannot assign a TF for untested products. However, as part of the ABC reference standards in development, a certification process may be established for equivalent materials.

b. **ABC Bird-Friendly Materials Evaluation Program** at Carnegie Museum's Avian Research Center Test Protocol.

This approach consists of a non-injurious test protocol that uses live, migrant songbirds choosing between two possible flight routes, one through invisible, clear glass, the other through the material being tested. **Tunnel Testing** is conducted during each Spring and Fall migration period by ABC at a flight tunnel test facility located at Powdermill Nature Reserve in Rector, PA.

Birds are released inside a dark 30' flight tunnel with a side-by-side, clear-glass (invisible to birds) control pane and a test pane at the far end. Birds are attracted to light and try to fly out through one of the pieces of glass; an invisible net keeps them from hitting the glass and being injured. After the Tunnel Testing is performed, a **tunnel score** is calculated based on *Avoiding Bird Collisions with Glass Surfaces,* by Martin Rössler, Wolfgang Laube, Philipp Weihs, 2007. The tunnel score is calculated as [(flights to control/total flights)*100] and the Threat Factor is calculated as (flights to test panel/total flights*100). The tunnel score is the percentage of birds tested that avoid the test sample and fly towards the clear glass. At least 80 bird flights are tested per unit. For example, the tunnel score for 60 birds [flights] out of the 80, avoiding the test sample would be a 75% tunnel avoidance index and a TF of 25.

The following figures depict examples of Bird Friendly Materials in accordance with the New York City Building Code:

Figure 4. The Jacob K. Javits Center, Newly Completed Full Replacement of Exterior Glazing with Bird Friendly Material (TF < 25) *(Source: FXCollaborative)*

Figure 5. Statue of Liberty Museum with Bird Friendly Material (TF < 25) *(Source: FXCollaborative)*

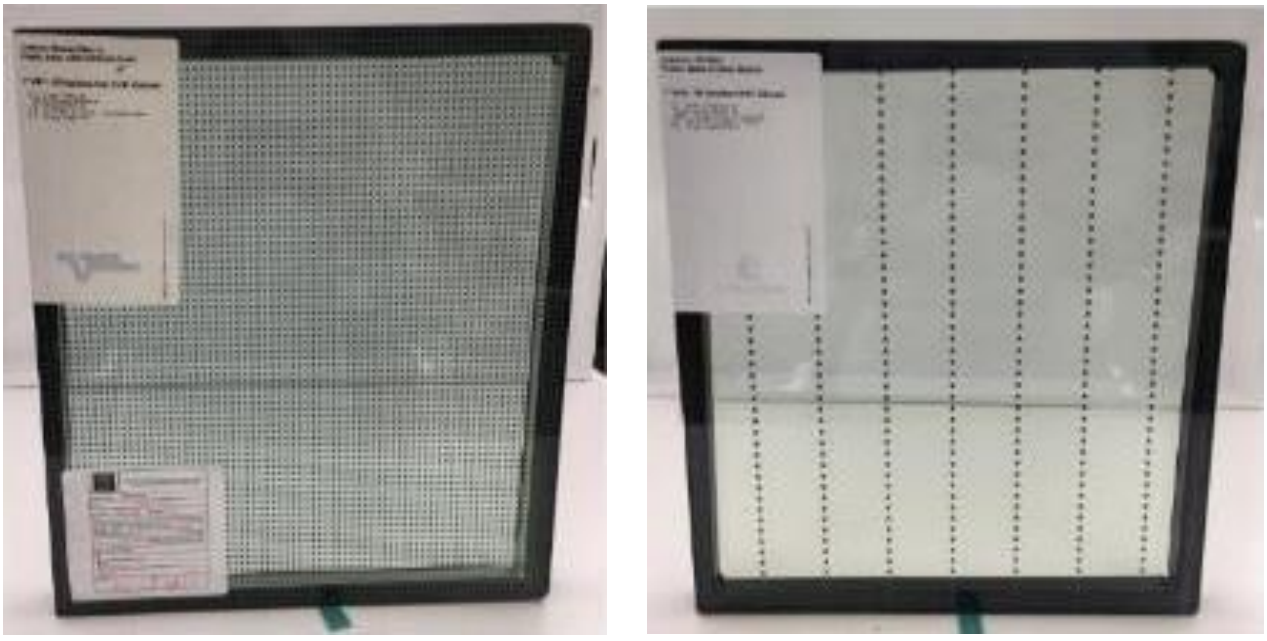

Figure 6. Examples of Ceramic Frit Patterns on glass with a TF of less than 25 at locations shown in Figure 4 and 5, respectively *(Source: FXCollaborative)*

Figure 7. Vassar College, Poughkeepsie, NY with a TF of 23, Credit: @ Vassar College/Tamar M. Thibodeau
(Source: Ennead Architects LLP)

Figure 8. Vassar College
Poughkeepsie, NY with a TF of 23
Credit: @ Vassar College/Richard Barnes
(Source: Ennead Architects LLP)

Figure 9. Stanford University Denning House
Stanford CA with a TF of 25
Credit: @ Tim Griffith
(Source: Ennead Architects LLP)

Figure 10. Stanford University Denning House, Stanford, CA with a TF of 25, Photo Credit: @ Tim Griffith *(Source: Ennead Architects LLP)*

III. CLARIFICATION OF PROJECT REQUIREMENTS

As part of the requirements set forth in Section BC 107.6, applicants for projects that are subject to Bird Friendly requirements of Section BC 1403.8 of the New York City Building Code shall provide detailed drawings of architectural elements of the building showing compliance with the local law.

Additionally, to assist the Department to verify compliance with the provisions of LL15 of 2020, such plans shall include the following:

- Elevations that highlight the areas where BFM are proposed, and relevant dimensions
- Axonometric diagrams denoting fly-through conditions and BHIs (optional)
- A table showing the location where BFM and assemblies are used, and the TF as shown in Table 1 below.

MATERIAL/ASSEMBLY	LOCATION	THREAT FACTOR
1/2" laminated glass with frit *(see specification…)*	All Balustrades	20
3/4" laminated glass with UV pattern *(see specification…)*	All Wind Screens	25
Insulating glass with frit	Glass below 75' unless otherwise noted.	20
Insulating glass unit with custom frit pattern covering 90% of the unit	Ground floor storefront	25

Table 1. Example of material location Threat Factor Table *(Example Only)*

- A note on the architectural drawings that states the following:

  "All exterior materials and glazing have been evaluated for compliance with BC 1403.8. Where Exterior Wall Envelope, Bird Hazard Installations, Fly-Through Conditions, or Adjacencies to Green Roofs are present in the design, Bird Friendly Materials with a Threat Factor Rating of 25 or less have been specified as indicated in the material location Threat Factor Table."

  Where an RDP elects to defer submittal per Section BC 107.6, the architectural plans shall note which materials and glazing have been deferred in the material location threat factor table and the minimum threat factor that the deferred item will have. In addition to the note above, where an exterior material and glazing is deferred the following additional note shall be contained on the architectural plans:

  "This application includes exterior materials and glazing which have been deferred for submittal per New York City Building Code Section 107. While the specifics of the materials and glazing are not available at this time, all exterior wall envelope, bird hazard installations, Fly-Through Conditions or Adjacencies To Green Roofs have been identified and where such locations require that Bird Friendly Materials be specified such deferred submittal will show materials with a Threat Factor rating of 25 or less."

  At this time, it is anticipated that the ABC Reference Standard will include a descriptive rating option and independent verification, and that it may establish a certification process for equivalent materials.

IV. WHERE REQUIRED

A. Up to 75' above grade

1. Exterior Wall Envelope

Requirements to provide BFM for Exterior Wall Envelope (EWE) are described in Section 1403.8.1 of the New York City Building Code, as follows:

*"**1403.8.1 Exterior Wall Envelope**. The exterior wall envelope, and any associated openings, shall be constructed with bird friendly materials up to 75 feet (22 860 mm) above grade. Materials other than bird friendly materials shall not exceed an aggregate of 10 square feet (0.93 m²) within any 10 feet (3048 mm) by 10 feet (3048 mm) square area of exterior wall below 75 feet (22 860 mm) above grade."*

This requirement is referred to as the *10 square feet allowance* in this document. Where exterior wall envelope is installed, it shall be constructed of BFM from grade to 75 ft. However, an allowance to provide non-BFM is given by the *10 square feet allowance*, which shall be interpreted to mean that non-BFM shall not exceed an aggregate of 10 square feet (0.93 m^2) within any 10 feet (3048 mm) by 10 feet (3048 mm) square area of exterior wall below 75 feet (22 860mm) above grade. Figure 11 shows locations where the exterior wall envelope is required to meet requirements

set forth in Section BC 1403.8.1, including the *10 square feet allowance*. Figure 12 shows locations in which BFM are not required to have a maximum Threat Factor of 25, in accordance with Exceptions 1 and 2 of Section BC 1403.8.1. Exceptions to constructing with bird friendly materials with a TF of 25 are:

- Where ground floor transparency is required by the New York City Zoning Resolution, transparent BFM with a UV-reflective pattern and a maximum TF of 27 shall be provided.

- In areas of special food hazard and shaded X-Zones where flood resistant glazing is proposed and ground floor transparency is required by the New York City Zoning Resolution, transparent BFM with a UV-reflective pattern and a maximum TF of 36 shall be provided.

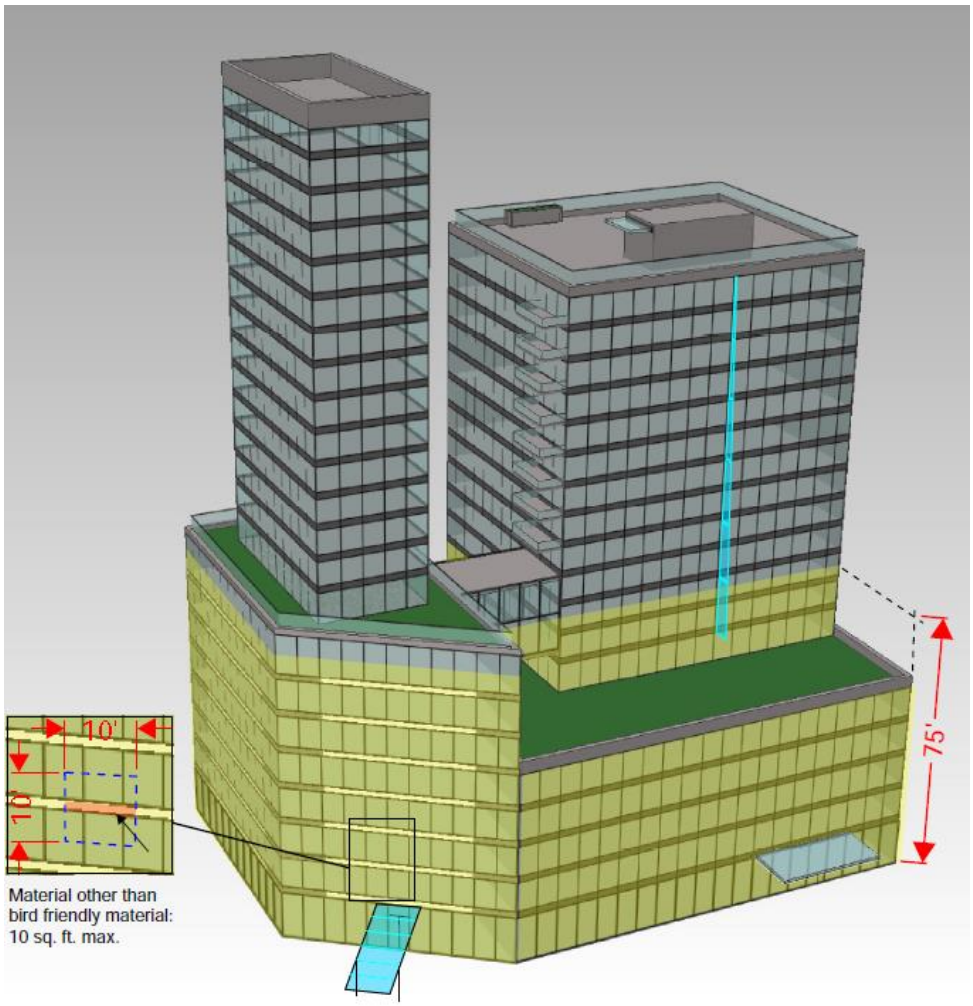

Figure 11. Locations where Exterior Wall Envelope is required to meet requirements set forth in Section BC 1403.8.1 *(Source: Alina Kurchenko of Vidaris, Inc.)*

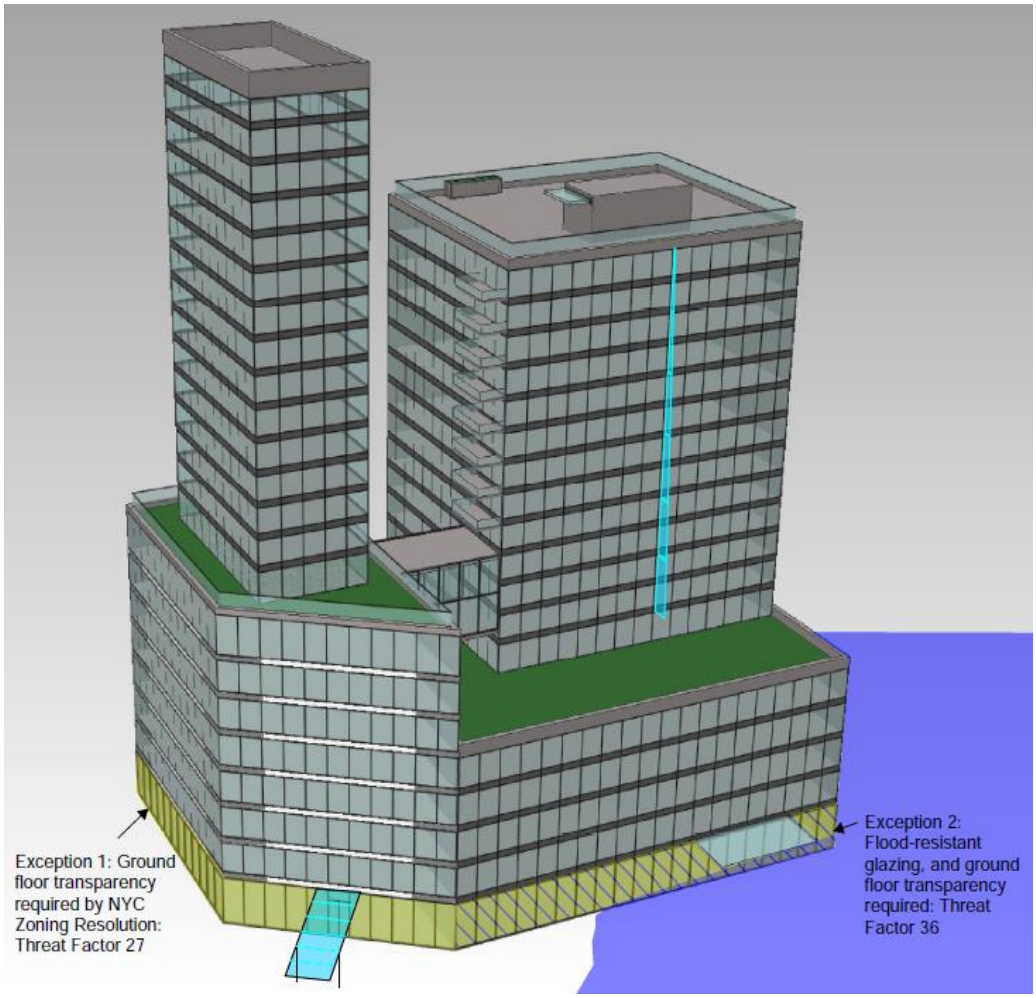

Figure 12. Locations where BFM are not required to have a maximum Threat Factor of 25, per Exceptions 1 and 2 of Section BC 1403.8.1 *(Source: Alina Kurchenko of Vidaris, Inc.)*

2. Fly-Through Conditions

Where a Fly-Through Condition (FTC) is created, and located 75 feet or less above grade, such FTC shall be constructed with Bird Friendly Materials in accordance with Section 1403.8.3 of the New York City Building Code *(See Section II.2.b, Figure 3, above)*.

B. At Any Height Above Grade

1. Bird Hazard Installations

Where Bird Hazard Installations (BHI) are proposed, regardless of the height of the building in which they are installed, such BHI shall be constructed with Bird Friendly Materials in accordance with Section 1403.8.2 of the New York City Building Code. The City's Building Code requires Bird Hazard Installations to be constructed of Bird Friendly Material regardless of their height above grade *(See Section II.B, Figure 1)*.

3. Adjacent to Green Roofs (AGR)

New Exterior Wall Envelope and associated openings, adjacent to a green roof system on the same building, shall be constructed with BFM up to 12 feet above the walking surface. In accordance with Section BC 1502.1, Green Roof Systems are defined as follows:

"***Green Roof System***. *A system constructed in-situ consisting of either a roof assembly and additional landscape material components, including growing media, engineered soils, filter fabric, integral drainage systems and roof surface to facilitate the growth of vegetation or a pre-vegetated tray or trays no more than 6 inches (152 mm) high and assembled on top of a roof covering*."

Roofs with planters are not Green Roof Systems per the above definition, therefore do not trigger the requirement to construct with BFM up to 12 feet above the walking surface for the purposes of this guidance document, and where there is a green roof system, *adjacency* shall mean directly next to the green roof system on the same building. When facades reflect the image of the vegetation on The Green Roof System, such façades are located adjacent to such Green Roof Systems.

Exterior walls adjacent to any new Green Roof System installations that meets the requirements of Chapter 15 of the New York City Building Code, will be required to use BFMs up to 12 feet vertically from the walking surface. BFMs shall be provided 12 feet beyond the perpendicular point for green roofs that only front a portion of the exterior wall.

Where Green Roof Systems have multiple/sloped/irregular walking surfaces at different elevations, such as an elevated platform above the green roof walking deck surface, the 12 feet shall be measured from the predominant walking surface elevation or the closest walking surface to the vertical wall where the BFM shall be installed. Figure 13 highlights where installation of BFM is required when Adjacent to Green Roof Systems.

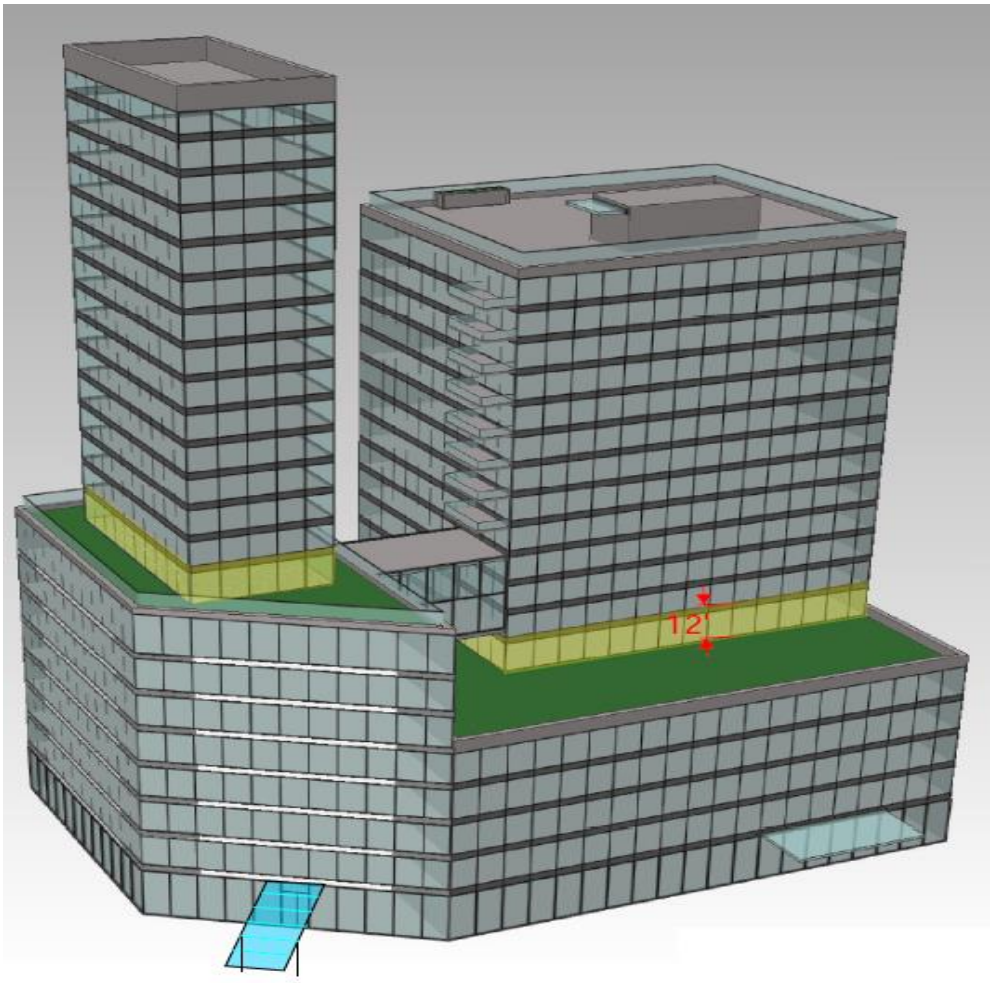

Figure 13. Adjacency to Green Roofs *(Source: Alina Kurchenko of Vidaris, Inc.)*

V. SUMMARY

In summary, BFMs are required to be installed from grade to 75' above grade for both the Exterior Wall Envelope and when fly-through conditions are created. Bird Hazard Installations are required to be constructed of BFM at any given height. In addition, BFM are required to be installed when Adjacent To Green Roof Systems, as indicated above. However, when there are overlapping requirements, the more restrictive requirement shall govern. For example, if Fly-Through Conditions exist at any height from grade to 75', BFM shall be used and the 10 square feet allowance, which allows non-BFM that does not exceed an aggregate of 10 square feet within any 10 feet by 10 feet square area of exterior wall, shall not be applicable. Fly-Through Conditions are more stringent than Exterior Wall Envelope requirements. As such, Fly-Through Condition requirements must be met rather than exterior wall envelope requirements.

APPENDIX A

Pictures of existing installations that depict locations (i.e. EWE, BHI, FTC, AGF) subject to the requirements of Section 1403 of the New York City Building Code.

NOTE: These pictures do not show BFMs used in compliance with Section 1403 of the New York City Building Code. These pictures are provided for the sole purpose of showing examples of the types of locations where BFM would be required when LL 15 of 2020 becomes effective.

Figure A1. BHI and FTC, Edge at Hudson Yards

Morgan Hines / USA TODAY

Figure A2. BHI and FTC, Edge at Hudson Yards

Max Touhey Curbed NY

Figure A3. BHI 200 Central Park South

StreetEasy

Figure A4. BHI, The High Line

Scenario Journal courtesy of James Corner Field Operations

Figure A5. EWE, BHI, Apple Store

Apple

Figure A6. BHI, 150 Central Park South

NestSeekers

Figure A7. EWE, FTC at corner, 505 Fifth Avenue

Google Street View

Figure A8. EWE, FTC at corner, 510 Fifth Avenue

Google Street View

Figure A9. EWE, FTC at corner, Time Warner Center

Google Street View

Figure A10. EWE, FTC and BHI, Jerome L. Greene

Google Street View

Figure A11. AGF, The Visionaire Landslides

Aerial Photography via dailymail.com

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