

Bird-Safe Design Guidelines

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Overview

We humans typically rely upon a variety of culturally learned cues to recognize architectural glass as an object, such as right angles and mullions (the bars that divide windows into parts). Birds, on the contrary, do not possess the concept of a “window” or a “door.” Architectural glass thus presents one of two problems, depending on the type of glass and lighting conditions. It either reflects the surrounding environment, luring birds toward it with images of trees and bushes, or it disappears from sight entirely—a problem exacerbated when indoor plants or the illusion of unobstructed passage draws birds close. In both cases, birds fail to see the glass as such and fly into a solid material at fatal speeds.

The most common methodology to make existing buildings bird-safe is the addition of visual noise to external façades. By overlaying dots, lines, and other biologically salient markers onto architectural glass, we can interrupt reflections and signal the presence of a barrier to birds.

Current best practices follow what is known as the “2x2 rule.” There are five components to this design heuristic:

(1) Density

Markers should be spaced no farther apart than 2” vertically and 2” horizontally, whether they are placed inline or staggered. The amount of uninterrupted glass should be roughly the size of your palm (smaller is okay too).

When woodland species have to navigate forest landscapes, they make quick decisions about the size of an opening between branches based on their wingspan. If it is large enough, they will tuck their wings and fly through; if it is too small, they will swoop around it. By reducing the size of these openings, to a size less than that of the smallest species (hummingbirds), we are communicating that these spaces are impassable.

(2) Size

Markers should be a minimum of 1/4" in width.

(3) Contrast

Avian vision depends on contrast. As such, your markers should provide high contrast for peak legibility. White is the most common color used by designers.

N.B. Research has shown tinting to be ineffective. Only translucent or opaque materials offer meaningful information to birds. Scientists are still debating the effectiveness of ultraviolet patterns.

(4) Surface

Most architectural glass today is laminated, meaning that that multiple sheets of glass are fused together, typically with a vacuum in between for thermal purposes. Theoretically, this provides several surfaces onto which we can add visual noise (for instance, on the outer or inner side of sheet one, the outer or inner side of sheet two, and so on and so forth). In practice, however, inner markers can become less visible under particular lighting conditions. Therefore, you will be designing for surface one, the outermost surface of the glass pane. Collision deterrents placed here are known to be the most effective.

(5) Coverage

Ideally, the entire pane of glass should abide by the 2x2 rule. At a minimum, 90% of the façade should follow it.

While these components provide minimum specifications, there are multiple ways to realize a bird-safe window covering. See the case studies below for examples drawn from North America and Europe. As you work on your projects, you might consider the following:

- (A) Abstract patterns, text, and/or motifs that convey a sense of place, both culturally (identity, brand, history, &c.) and environmentally (i.e., local flora, fauna, and other landscape elements)
- (B) The effect of your design on external viewers (the image of the building) and internal occupants (the effect of your design on illumination, views to the outside, and mood overall)
- (C) Whether your design makes a critical statement about collisions themselves, our aesthetic idealization of transparency, our relationships to nonhuman animals, and so on

Case Studies

Simple Patterns

[Approved Bird-Safe Products](#) (see last page)

Complex Images

[University of British Columbia Bookstore](#)
[University of British Columbia Botanical Garden Pavilion](#)
[Swiss Ornithological Institute Visitor Center](#)
[Grange Insurance Audubon Center](#)
[Lundberg Design SF Fog](#)
[University of Ottawa University Center](#)
[Temple University Paley Library](#)
[Illinois Institute of Technology McCormick Tribune Campus Center](#)
[University of Toronto E.J. Pratt Library](#)
[University of Toronto Goldring Student Center](#)
[University of Pennsylvania “Disrupt the Reflection”](#)
[Ryerson University Student Learning Center](#)
[The Orange Cube \(with caveats\)](#)

References + Further Reading

American Bird Conservancy – [Bird-Friendly Building Design, 2nd Edition](#)
Swiss Ornithological Institute – [Bird-Friendly Building with Glass and Light](#)
Canadian Standards Association A460:19: “Bird-Friendly Building Design”
United States Fish and Wildlife Services - [Bird Collision Reduction Toolkits](#)
Ecological Design Lab – [Bird-Safe Design: Planner’s Toolkit](#)
City of Toronto – [Bird-Friendly Development Guidelines: Best practices, Glass](#)
New York City Buildings – [Bird Friendly Building Design & Construction Requirements
Guidance Document](#)
City of San Francisco Planning Department – Standards for Bird-Safe Buildings
University of British Columbia - [Bird Friendly Design Guidelines for Buildings](#)
University of Washington – [Bird-Friendly Campus Design Standards](#)