PART 1 - INTRODUCTION

1.1 PURPOSE

A. To reduce bird deaths caused by collisions with buildings, balancing use of façade glass and bird friendly design.

Windows are considered to be one of the largest sources of direct human-caused mortality for birds in North America. Glass, whether reflective or clear, is effectively invisible to birds. Birds collide with windows because they are trying to fly into the habitats they see beyond or reflected by the glass. It is estimated that across the United States, between 365 and 988 million birds are killed annually by collisions with buildings. *[footnote: reference study cited by the American Bird Conservancy]*. At Yale University, bird collisions occur often, and mitigation is a concern.

PART 2 - GENERAL DESIGN REQUIREMENTS

2.1 POTENTIAL RISK ANALYSIS

A. Project design teams are required to complete an analysis of the building site to determine potential risks of bird mortality. This analysis should include an assessment of risk factors and determination of risks that must be addressed. Analysis will be used to evaluate design strategies for building new structures, additions and retrofitting existing buildings. Analysis must consider the following:

1. Site - Is the structure within a major migratory route or within a high frequency interaction with bird flight patterns?
    a. See this link: http://arcg.is/1V45707 (Note: Once it is open, click on the layers button , fourth from the right, and select “Density of Migrating Birds”.)
    b. Review results with Yale Peabody museum staff (Kristof Zyskowski and Jim Sirch), or as directed by the Project Planner, to verify bird migration patterns at project site.

2. Building
    a. Is the structure located such that windows greater than 24 SF will be opposite of or will reflect interlocking tree canopies?
    b. Is the overall quantity of glazing as a percentage of facade less than 10%? more than 50% (increased risk)?
    c. Does the structure contain glazed passageways or lobbies with clear sightlines though the building? or transparent corners?

B. The completed assessment is to be included in the Schematic Design Submission as part of the Basis of Design.

2.2 MITIGATION

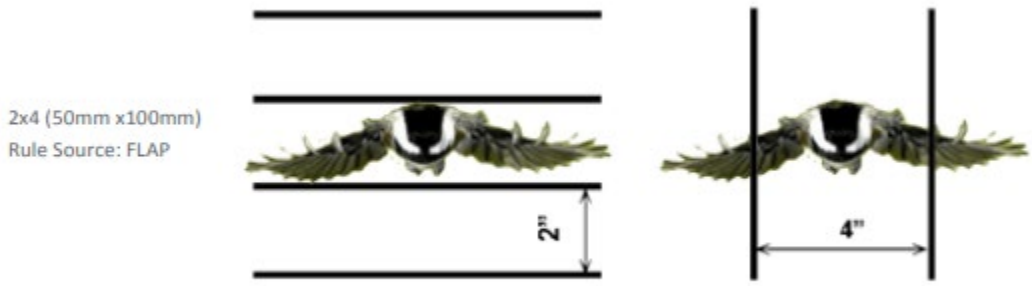
The assessment of risk factors and determination of risks shall be addressed through project specific design strategies as described below. Review results with the Yale University Project Planner and their representatives. If risks are not mitigated in the design, this is to be noted as a deviation in the Basis of Design.

PART 3 - MINIMUM PRODUCT REQUIREMENTS

3.1 Implement project specific design strategies to address bird collisions as per the American Bird Conservancy best practices.

A. Increase visibility of glass to reduce the appearance of clear passage to sky or vegetation.

1. The height that presents the highest collision probability, the critical zone, is up to mature tree height, or up to the fourth floor of a building, whichever is highest.
2. Design visual markers on the exterior of glass surfaces at the critical zone (markers on the interior surface of glass are less effective) with fritted glass or other solutions. Gaps between markers should be no greater than 2 inches vertically or 4 inches horizontally.



3. Interrupt reflective glass by increasing the density of external visual markers including spandrel panels and mullions.
4. Other strategies can include fenestration patterns, etching, fritting, external blinds, shutters, sunshades, screens, grilles, louvers or artwork.
5. Design corner windows, glass walkways, glass railings, and configurations in which vertical glass surfaces are located perpendicular to one another and other similar features to reduce the appearance of clear passage to sky or vegetation.

B. Dampen reflections to reduce the appearance of clear passage to sky or vegetation.

1. Use canopies or sunshades to cover windows at ground level.

2. Use screens, drapes or blinds to increase the opacity of clear glass.

C. Reduce the dangers of attractants and landscape reflections.

1. Ensure outdoor landscaping is at appropriate distance from glass, to reduce reflections. If this is not possible, landscaping should occur directly (0-3 feet) adjacent to glass or measures should be taken to make glass visible.
2. Avoid interior vegetation near windows. Pay special attention to glass located adjacent to vegetated areas, green roofs and raised courtyards
3. Locate bird feeders 0-3 feet from windows.

D. Reduce light pollution.

1. Reduce unnecessary light-spill through shielding, targeted lighting and reduction of vanity lighting to prevent collisions due to the combination of disorientation by and attraction to lights.

2. Down lighting should be selected over up lighting and floodlighting should be avoided to guard against disorientating night- migrating birds.

3. Reduce interior night lighting: provide interior 'lights out' motion sensors and minimize night lighting to levels needed for security to prevent collisions due to bird disorientation, bird attraction to lights inside buildings and the additional issue that lit rooms at night can render the glass invisible.

E. Reduce the dangers of bird traps by avoiding open pipes, ventilation grates and drains. Birds can become trapped in enclosed spaces and courtyards after colliding with buildings as well as while exploring potential nesting sites.

1. Ventilation grates and drains should have openings no larger than 2 by 2 cm or 1 by 4 cm to ensure that birds cannot be trapped within.
2. Cap the ends of all open pipes, large and small, so that birds do not become entrapped when investigating these openings for nesting opportunities.
3. Ensure enclosed spaces with large openings, such as courtyards, are generous enough for birds to engage in flight and escape. This dimension will vary depending on the bird species being considered.

F. See Bird-Friendly Building Design by the American Bird Conservancy for more information

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07/15/19	Entire document	-	cj385