CITY OF PALO ALTO

Architectural Review Board
Staff Report

From: Planning and Development Services Director
Lead Department: Planning and Development Services

Meeting Date: February 15, 2024
Report #: 2401-2568

TITLE
Study Session to Discuss the Concepts of an Ordinance to Reduce Light Pollution and Increase Bird Safety

RECOMMENDATION
Staff recommend the Architectural Review Board (ARB) hold a study session to discuss the concepts of an ordinance to amend the municipal code in order to reduce light pollution and increase bird safety. No formal action is requested.

EXECUTIVE SUMMARY
This report reviews the elements that could be included in a forthcoming ordinance to decrease light pollution in the City of Palo Alto and to protect avian wildlife by reducing bird collisions with the built environment. The policy effort and staff report address two distinct areas:

(1) Dark Skies - Enhancing the natural environment by limiting nighttime light pollution
(2) Bird Safety - Decreasing threats to avian life by increasing the use of “bird safe” glass and bird safe features in the built environment.

Growing evidence in recent years has recognized the significant negative impact of artificial light at night on ecosystems and human health. DarkSky International is a recognized worldwide authority combatting light pollution. Staff proposes to utilize five (5) principles for responsible outdoor lighting developed by DarkSky International in addition to building upon the City’s existing lighting standards (Attachment A) to develop Palo Alto’s ordinance. The proposal emphasizes limiting unnecessary nighttime lighting through measures like shielding fixtures, reducing illumination levels, and setting curfews.

Additionally, this ordinance would seek to implement Comprehensive Plan Policy L-6.3.1, which states “develop guidelines for bird-friendly building design that minimizes hazards for birds and reduces the potential for collisions.” The ordinance would include requirements for the use of bird-safe glass treatments for building facades above a certain height, with exemptions for specific structures.

The report discusses approaches the city could take to regulate the built environment towards these ends. Staff seeks the ARB's feedback on the proposed methods and approaches. Feedback from the public and other stakeholders coupled with further research will inform the final ordinance, which aims to improve nighttime sky visibility, conserve energy, protect wildlife, and reduce bird mortality. While balancing property owner concerns and navigating different building needs pose challenges, this initiative represents a significant step towards a more sustainable and bird-friendly Palo Alto.

BACKGROUND

On July 3, 2014, the ARB received a presentation (Attachment D) from the Santa Clara Valley Audobon Society entitled 'Building with Birds in Mind' presentation and since that time, staff and the ARB have been discussing and adding conditions of approval related to bird safety on a case-by-case basis.

On February 13, 2023, the Council selected and approved the 2023 City Council Priorities and Objectives. Under the Climate Change and the Natural Environment category, the City Council directed staff to initiate evaluation of strategies to protect natural habitats such as bird safe glass and wildlife protection from light pollution. On Monday January 29, 2024, Council included "Climate Change and the Natural Environment: Protection and Adaptation" as a continued priority for this year.

The Planning and Development Services Department has worked with advocates, researched the topic, and is collaborating with the City Attorney's Office to draft an ordinance. The ordinance would build upon and incorporate existing lighting standards codified in Palo Alto Municipal Code 18.40.250 (Attachment A) as well as input from stakeholders related to light pollution and avian safety in the built environment.

Following this study session, staff would develop a draft ordinance with input from stakeholders, including the ARB's input. In order to develop the framework for the ordinance and suggestions within this report, staff has worked closely with Santa Clara Valley Audubon Society and Sierra Club Loma Prieta Chapter, both of which have shared significant and meaningful research on these topics. The ordinance, once drafted, will be brought to the Planning and Transportation Commission (PTC) for recommendation and then to Council for decision. Council has encouraged staff to bring forth an ordinance for its consideration by June 2024.

Dark Skies

Growing evidence in recent years has recognized the significant negative impact of artificial light at night on ecosystems and human health. Light pollution disrupts wildlife[1], impacts human health[2], wastes money and energy[3], contributes to climate change[4], and blocks our view of the universe.[5] Light pollution may be defined as:

[1] Wildlife Impacts: https://darksky.org/resources/what-is-light-pollution/effects/wildlife-ecosystems/
[2] Human Health Impacts: https://darksky.org/resources/what-is-light-pollution/effects/human-health/
[3] Money and Energy: https://darksky.org/resources/what-is-light-pollution/effects/energy-climate/
[4] Climate Change: https://darksky.org/resources/what-is-light-pollution/effects/energy-climate/
[5] Views of the Universe: https://darksky.org/resources/what-is-light-pollution/effects/night-sky-heritage

> "the material adverse effect of artificial light, including, but not limited to, glare, light trespass, sky glow, energy waste, compromised safety and security, and impacts on the nocturnal environment, including light sources that are left on when they no longer serve a useful function."

DarkSky International is a recognized worldwide authority combatting light pollution.[6] The organization publishes guidance for communities seeking to achieve a "dark sky" and decrease light pollution. Staff have familiarized themselves with the organization and its standards in order to understand the scope and scale of what may be possible as Palo Alto seeks to decrease light pollution. Reviewing the organization's framework also helps staff, decision-makers, and the public understand the dark sky topic and make informed decisions regarding the City's actions to decrease light pollution. DarkSky International has established five principles for responsible outdoor lighting, which staff would utilize to develop Palo Alto's ordinance. These include:

1. Useful: Use light only if it is needed. All light should have a clear purpose. Consider how the use of light would impact the area, including wildlife and their habitat.
2. Targeted: Direct light so it falls only where needed. Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.
3. Low Level: Light should be no brighter than necessary. Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.
4. Controlled. Use light only when it is needed. Use controls sch as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.
5. Warm-colored. Use warmer color lights where possible. Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.

As Palo Alto pursues decreasing light pollution, the City may also consider pursuing designation as a Dark Sky Community. DarkSky International defines an International Dark Sky Community as:

> *"a town, city, municipality, or other similar political entity that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of quality lighting policies, dark-sky education, and citizen support of the ideal of dark skies."*

The guidelines to achieve this status are included in attachment B for reference.

Bird Safe Glass

Bird safe glass regulations are intended to protect the natural environment, particularly by enhancing bird-safety. The City's Comprehensive Plan includes a policy and associated program related to bird-friendly design.

[6] https://darksky.org/who-we-are/advocates

- **Policy L-6.3**: Encourage bird-friendly design.
    - **Program L6.3.1**: Develop guidelines for bird-friendly building design that minimizes hazards for birds and reduces the potential for collisions.

Through this ordinance, the City seeks to establish regulations to reduce avian mortality as it relates to the built environment, particularly windows and other glass features on buildings. This ordinance will implement the Comprehensive Plan policy and establish standards that will be uniformly applied to development applications, eliminating the need for a case-by-case approach. Examples of bird safe features include:

- Fritted/Patterned Glass
- Window Screens and/or Netting
- Vertical and Horizontal Mullions
- Frosted or Opaque Glass
- Exterior Architectural Elements

Attachment C, from the City of Cupertino's program, provides images of these measures. To learn more about bird safe features and impacts in other cities, staff recommends reading Building Safer Cities for Birds from Law, Ethics, and Animals program at Yale University[7]. A companion interview from the authors provides a more concise summary of the report[8].

ANALYSIS

This section reviews major conceptual areas considered for inclusion or exclusion in the draft ordinance. Staff seek the ARB's comments regarding these areas. Further, through the hearing process, staff requests additional input and feedback from the local community regarding aspects to include or exclude from the ordinance.

Dark Skies

The ordinance will touch on the following components:

- Applicability (location, implementation/compliance time, exclusions)
- Timing (lighting curfew)
- Color temperature and Brightness
- Shielding
- Specific lighting types (security, outdoor recreation, string lighting)

Applicability (location, implementation/compliance time, and exclusions)

Location: Overall, staff recommend simplified regulations that are easy to understand and easier for property owners to comply with. Currently, staff intends to propose an ordinance that applies citywide. However, exterior lightings regulations in the Foothills, Baylands, and within a certain

[7] Building Safer Cities for Birds: abcbirds.org/wp-content/uploads/2023/08/2023-Yale-Report.pdf
[8] Building Safer Cities for Birds: A Q&A with Viveca Morris and Meredith Barges: https://law.yale.edu/yls-today/news/building-safer-cities-birds-qa-viveca-morris-and-meredith-barges

distance from creeks and streams could be stricter, reflecting the natural environment of these more sensitive areas.

Implementation/Compliance: At minimum, the ordinance is anticipated to require new projects and remodel projects that include modifications to exterior lighting, to comply with new standards. This approach would change the quality of lighting in Palo Alto on a gradual basis over time. To achieve quicker results, the City could require existing exterior lighting, and other types of lighting addressed in the ordinance, to come into compliance within a fixed time period.

Advocates have suggested an approach that is two pronged. First, immediately requiring the following to be implemented on existing structures in addition to applying all new regulations to new projects:

- Outdoor light fixtures that have the ability to be redirected, shall be directed downward so as to minimize sky glow, glare, and light trespass onto adjacent properties.
- Outdoor light fixtures that have adjustable dimmers with color temperature that exceeds twenty-seven hundred (2,700) Kelvin shall be dimmed to comply with Section 3 to minimize glare and light trespass onto adjacent properties.
- Where possible, light bulbs that are replaced within the first five years of the effective date of the ordinance shall meet the standards (i.e., color temperature and illumination limit)

Second, within five years of the ordinance adoption all lighting would be required to comply with the ordinance.

Without allocation of additional resources for proactive outreach and enforcement, it may be challenging for existing uses/facilities to come into compliance with the new regulations. Therefore, at this time, staff would recommend that the regulations either apply only to new projects, or to include only the first prong of dark sky advocates' approach. This would still require proactive outreach and enforcement but would require less resources than bringing the entire City into compliance within a set time period.

Exclusions: The proposed policy would exempt certain types and categories of lighting from the regulations.

- California Building Code - When a conflict in the proposed policy conflicts with California Building Code required lighting, the California Building Code shall prevail. This might include certain types of life safety lighting, for example, that cannot be extinguished at curfew or must have certain characteristics.
- Federally required and/or regulated lighting – Federally regulated lights might commonly be related to aircraft navigation and/or communications equipment.
- Seasonal Lighting - "Seasonal lighting" means lighting installed and operated in connection with holidays or traditions. Temporary Seasonal lighting would be allowed from October 15 to January 15 and would not be subjected to the rules regarding shielding, illumination level, and light trespass. Seasonal lighting would still need to be

extinguished by curfew, which can be achieved through automatic timers, being turned off manually.

- Public Street lighting - A commitment to adjust street lighting to comply with new measures should be accompanied by the appropriation of funds and/or the development of a multi-year capital improvement program budget to facilitate any changes to street lighting that are not easily achieved with existing infrastructure. Therefore, staff is not recommending that requirements apply to public street lighting at this time.
- Signage - Changes to a signage code can be complex, in part due to the numerous stakeholders. Staff recommends pursuing this effort separately from this ordinance if there is interest in further regulating signage lighting.

Timing (Curfew)

Implementing a curfew, or a time of day when lighting restrictions are in effect, can ensure that light is only used when and if it is needed. Staff recommend that, in most cases, outdoor lighting be extinguished at curfew or when not occupied by persons—whichever is later. For businesses, the curfew is in effect 2 hours after the business closes—or when no persons are present—whichever is later. This is to allow for the staff who may remain on site with closing duties to have sufficient illumination to exit the site and travel home. It also recognizes that some, though few, sites have ongoing operations even after hours. These include hotels and emergency health facilities, among other uses. Therefore, exceptions to the curfew timing may be written into the code for select uses.

After the curfew, exterior lighting (with some exceptions) would be motion sensor activated and set to extinguish 5 minutes after activation. Building code required lighting, such as lighting at building entrances, ramps, and other similar necessary lighting would not be subject to this curfew. Further, commercial uses shall utilize automated control systems such as motion sensors, timers and/or photocells which are programmable and have battery backup.

Alternative considerations may be to include a set time in the night.

Color Temperature

The policy should establish a maximum color temperature for outdoor lighting (measure on the kelvin scale) as well as an illumination level/brightness (measured in lumens).

With respect to color temperature of lighting, the lower the Kelvin rating, the “warmer” the light will appear. The higher the Kelvin rating, the “cooler” the light will appear. Staff suggests that the City consider requiring a maximum color temperature of 2700 Kelvin, (as stated below in draft language) for luminaires (a complete electrical light unit). This aligns with, though is stricter than, the DarkSky International Dark Sky Community Guidelines, which allows a maximum correlated color temperature of 3000 Kelvin. Staff also suggests encouraging (and possibly requiring in more sensitive areas) luminaires at or below 2200 Kelvin for better nighttime visibility, protection of wildlife, and reduction of glare and light pollution.

To regulate brightness, staff suggests that no single luminaire exceed 20,000 lumens and that the total lighting load of lighting on a property should not exceed 160,000 lumens. In order to provide an accommodation for uses that may require an exception to this, the code could allow for a conditional use permit for applicants that wish to exceed the required threshold. Additionally, the policy can regulate the lumens for specific types of lighting. This allows these types of lights, which are typically not able to be shielded, to be in use while limiting their brightness. This is especially important for lights, where shielding of the light eliminates or severely inhibits the intended use and impact of the light.

Table 1: Certain Lights Exempt from Illumination Requirements	
Lighting Type	**Recommended Max Lumen**
Low-voltage Landscape Lighting	Low-voltage landscape lighting, such as that used to illuminate fountains, shrubbery, trees, and walkways, do not have to be shielded fixtures, provided that they use no more than 150 lumens.
Greenhouse Lighting	At or under 200 lumens, a fixture can be unshielded as long as no light shines outside the structure or is visible from another property or the sky.
Outdoor solar-powered pathway lights	Outdoor solar-powered pathway lights without controls that are 25 lumens or less.
Motion-activated security lights	Motion-activated security lights shall not use luminaires that exceed a maximum of 1,600 lumens.
String Lights	Allowed to emit no more than 300 lumens per string.

Shielding and Light Trespass

Shielding of light fixtures and directing them downwards helps to decrease sky glow and light trespass. Sky glow is a result of light fixtures that emit a portion of their light directly upward into the sky where light scatters, creating a diffuse glow above a city or town. Light trespass occurs when light that falls beyond the boundary of the property on which the light is installed.

The Palo Alto Municipal Code 18.40.250(c)(7) requires that:

> *Pedestrian and security lighting fixtures shall be fully shielded. Architectural lighting that projects upward from the ground as used in landscaping, courtyards, or building accent should be directed onto the building face.*

To further reduce light pollution, staff suggests expanding this requirement to encompass all light fixtures. Up lighting of architectural features would no longer be permitted. In addition to shielding, the legislation would decrease light trespass by revising the distance which light can spill over from one property onto another. Currently, the Palo Alto Municipal code states: “Where the light source is visible from outside the property boundaries on an abutting residential use, such lighting shall not exceed 0.5 foot-candle as measured at the abutting property line.”

This would be reduced to 0.1 (zero point one) foot-candle onto an adjacent and nearby property, with the illumination level measured at the property line between the lot on which the light is located and the adjacent lot, at the point nearest to the light source, except if two adjacent

properties are non-residential, or function as a shopping center, and agree to coordinate lighting. Further, staff suggests that no direct off-site glare from a light source be visible above three feet at a public right-of-way.

Lighting for specific uses (Security, Outdoor lighting, and string lighting)

Security Lighting: Property owners often install exterior lighting to promote security, including the life and safety of nighttime visitors and users of the property, as well as to prevent theft, vandalism, or other criminal activity from occurring on the property. Security lighting, however, can contribute to light pollution by being brighter than necessary, being activated longer than necessary, and casting its light too far. To address these concerns while still allowing properties to benefit from security lighting, staff suggests incorporating the following requirements into the proposed ordinance:

- Security lighting shall be controlled by a programmable motion-sensor device that extinguishes the light 5 minutes after activation except where continuous lighting is otherwise required in accordance with federal or state regulations.
- Security lighting shall be downward directed, fully shielded, and not be mounted at a height that exceeds 12 feet, measured from the adjacent grade to the bottom of the fixture except where taller lighting is required in accordance with federal or state regulations (e.g., FAA regulations).
- Floodlights shall not be permitted.
- Security lights intended to illuminate a perimeter, such as a fence line, are permitted only if such lights do not result in light trespass above 0.1 foot-candle onto an adjacent or nearby property, with the illumination level measured at the property line.
- Motion-activated security lights shall not use luminaires that exceed a maximum of 1,600 lumens.

Outdoor Recreational Facilities: Lighting of outdoor recreational facilities is important to extend the use of the facilities into evening and nighttime hours allowing play to be conducted. Yet, the evening and nighttime lighting can cause light pollution. Outdoor recreational facilities include outdoor athletic and sports areas, such as ball fields, courts, swimming pools, skate parks and similar uses. For the purposes of this ordinance and discussion outdoor recreational facilities are not intended to include trails or playgrounds. In many cases, these facilities are publicly owned and operated (such as facilities owned and operated by the City of Palo Alto, Santa Clara County, or Palo Alto Unified School District) or may be owned and operated by a private educational facility. Staff suggests incorporating the following requirements into the proposed ordinance related to outdoor lighting, but acknowledges that further input from Public Works and the City's Community Services Division would be needed to better inform any restrictions to outdoor recreational facilities:

- Provide levels of illuminance that are adjustable, allowing for illuminating levels not to exceed nationally recognized Illuminating Engineering Society (IES) standards
- Be provided exclusively for illumination of the surface of play and adjacent viewing stands, and not for any other application, such as lighting a parking lot.
- Must be extinguished by 10:00 pm or within one (1) hour of the end of the active play, whichever is later.

- Shall be fitted with electronic timers to prevent lights from being left on overnight.

Service Station Lighting: Staff recommends considering specific requirements for service stations, such as requirements along the following lines:

- Service station canopies shall not be transparent or translucent.
- Lighting fixtures in the ceiling of canopies shall be fully recessed into the underside of the canopy. All lighting fixtures shall be located so as to shield direct rays from adjoining properties or public rights-of-way.
- Light fixtures shall not be mounted on top of the fascia of such canopies.
- The maximum light intensity under the canopy shall not exceed an average maintained foot-candle (horizontal) of 12.5, when measured at finished grade. Luminaires shall be of a low level, indirect diffused type.
- No luminaire shall be higher than 15 feet above the finished grade.
- The fascia of such canopies shall not be illuminated, except for approved signage in compliance with Section 5.

String lighting: String lighting has become popular for both commercial and residential uses. Due to its widespread use, string lighting is proposed to have its own section. Potential regulations for string lighting could include the following:

- Overall Limitations
    - String light cannot:
        - Emit more than 42 lumens
        - Have a correlated color temperature of 2,700 Kelvin
        - Be blinking or chasing
        - Be secured with materials or in a manner that punctures the skin or restricts growth of living landscape features
        - Attached to a fence in a manner that permits light trespass onto adjacent property.
- Residential Uses
    - It shall not illuminate more than fifty (50) percent of the rear yard or 500 sq. ft., whichever is more restrictive
    - It shall not be visible from a public right-of-way.
    - It shall be used primarily to illuminate patio areas.
    - It shall be extinguished by curfew.

In contrast, staff propose the following recommendation for string lights in commercial districts, which was implemented in the City of Malibu:

- String lights may be allowed in occupied dining and entertainment areas only and must not exceed three thousand (2,700) Kelvin. (Though the City of Malibu allowed up to 3,000 Kelvin).
- String lights shall not be used as landscape lights.
- These requirements do not apply to seasonal lighting as a business may have additional or alternative lighting during the holiday season.

Alternatively, and proposed by advocates, the City could pursue the following:

- String lights shall not illuminate an area greater than five (5) percent of a building's footprint of a shopping center and fifteen (15) percent for a freestanding commercial building not part of a shopping center.
- String lights are limited to designated outdoor dining or to display areas.
- Extinguished at curfew or 2 hours after the close of business, whichever is later.

Staff propose the clearer and simpler regulations for string lights which will be accessible for property owners and the public to interpret. Further staff suggest not requiring applications for string lights.

Bird Safe Glass

The City intends to take a straightforward approach of drafting an ordinance that would apply citywide. After reviewing several ordinances in cities throughout the Bay Area, staff is considering incorporation of the following requirements into the ordinance, which are modeled primarily after the City of Cupertino's ordinance:

- Facades of all projects subject to bird-safe development requirements shall have:
    - No more than 10% of the surface area of the façade be untreated glass between the ground and 60 feet above ground.
    - No more than 5% of the surface area of the façade be untreated glass between 60 feet above ground and up.

- Standard Compliance Treatments:
    - The Planning and Development Services Department may maintain a list of acceptable bird-safe treatments that may be updated from time to time. The list may include, but not be limited to, permanent treatments such as opaque glass, window muntins, exterior insect screens, exterior netting, or special glass treatments such as fritting to provide visual cues and reduce the likelihood of bird collisions.
    - Glass treatments must have high color contrast with the glass and be applied to the outermost surface.
    - Prior to publication of the list, the Planning and Development Services Department may review information available from interest groups, such as the National Audubon Society.

- Alternative Compliance Method
    - Property owners/applicants may propose an alternate compliance method recommended by a qualified biologist to meet the requirements and intent of this section.
    - The alternate compliance method shall be peer-reviewed by a third-party consultant, paid for by the applicant, and subject to the approval of the Director of Planning and Development Services.

- Bird-safe Design Requirements.
    - All projects shall:
        - Avoid the funneling of flight paths along buildings or trees towards a building façade.
        - Avoid use of highly reflective glass or highly transparent glass.
        - Not include skyways or walkways, balconies, freestanding walls, or building corners made of untreated glass or other transparent materials, or any other design elements that are untreated and through which trees, landscape areas, water features or the sky are visible from the exterior or from one side of the transparent element to the other.

At this time staff recommends that historic structures and first floor retail storefronts (up to a certain height) be excluded from the ordinance. Additionally, where the requirements of the ordinance would conflict with implementation of state or federal regulations, exemptions be provided for those features.

NEXT STEPS

Following discussion and feedback from the ARB and the public, staff will draft a proposed ordinance. Staff will meet with advocates to discuss the draft ordinance, as well as discuss the topic with any additional city departments or stakeholders.

The draft ordinance will be presented to the Planning & Transportation Commission for its recommendation and then to Council for a final decision. Council has directed staff to bring forward an ordinance for their consideration by June 2024.

ENVIRONMENTAL REVIEW

This item is a study session provided to inform the public as well as to receive comments and feedback from the Architectural Review Board and public. This item is exempt from the California Environmental Quality Act (CEQA).

PUBLIC NOTIFICATION & COMMENTS

Notice of a public hearing for this project was published in the Daily Post on February 2, 2024, which is 12 days in advance of the meeting. At the time of this report, no public comments have been received on this agenda item; however, this meeting provides an initial opportunity for community members to provide feedback on the contents of the forthcoming ordinance.

Prior to publication of this report, staff met with members of the Santa Clara Valley Audubon Society and Sierra Club Loma Prieta Chapter. Their knowledge, research, and collaboration contributed extensively to the crafting of this staff report and will be utilized to inform the future ordinance. Staff wish to thank them for their time, enthusiasm, and willingness to collaborate on this project.

ATTACHMENTS

Attachment A: Palo Alto 18.40.250 Current Lighting Code
Attachment B: Dark Sky Community Guidelines
Attachment C: Examples of Bird Safe Treatment-Cupertino

AUTHOR/TITLE:
Kelly Cha, Senior Planner

18.40.250 Lighting

(a) Purpose:

Exterior lighting of parking areas, pathways, and common open spaces, including fixtures on building facades and free-standing lighting should aim to:

(1) Minimize the visual impacts of lighting on abutting or nearby properties and from adjacent roadways.

(2) Provide for safe and secure access on a site and adjacent pedestrian routes.

(3) Achieve maximum energy efficiency.

(4) Complement the architectural design of the project.

(b) Guidelines:

(1) Lighting of the building exterior, parking areas and pedestrian ways should be of the lowest intensity and energy use adequate for its purpose, and be designed to focus illumination downward to avoid excessive illumination above the light fixture.

(2) Interior lighting shall be designed to minimize nighttime glow visible from and/or intruding into nearby properties.

(3) Unnecessary continued illumination, such as illuminated signs or back-lit awnings, should be avoided. Internal illumination of signs, where allowed, should be limited to letters and graphic elements, with the surrounding background opaque. Illumination should be by low intensity lamps.

(4) Timing devices and dimmers should be used for exterior and interior lights in order to minimize light glare at night and control lighting levels. At the time of project approval, the project applicant should demonstrate how interior and exterior lighting sources will be reduced after operating hours or when the use of the facility is reduced.

(c) Requirements

(1) The use of high pressure sodium and metal halide are permitted light sources. Low pressure sodium is not allowed.

(2) Exterior lighting fixtures shall be mounted less than or equal to 15 feet from grade to top of fixture in low activity or residential parking lots and 20 feet in medium or high activity parking lots.

(3) Levels of exterior illumination for most uses range from 0.5 to 5 footcandles. Areas of higher or lower levels of illumination should be indicated on project plans.

(4) Where the light source is visible from outside the property boundaries on an abutting residential use, such lighting shall not exceed 0.5 foot-candle as measured at the abutting property line.

(5) Interior lighting shall be shielded to eliminate glare and light spillover beyond the perimeter property line of the development.

(6) Light fixtures shall be located at least three feet from curbs and ten feet from driveways or intersections, to avoid obstructing clear sight distance triangles.

(7) Pedestrian and security lighting fixtures shall be fully shielded. Architectural lighting that projects upward from the ground as used in landscaping, courtyards, or building accent should be directed onto the building face.

(8) Non-residential projects, adjacent to residential zoning districts or residential uses, shall use timing devices, dimmers, and/or window shades with timers in order to minimize light glare at night and control lighting levels from exterior and interior lights.

(Ord. 5554 § 19, 2022)

DARKSKY INTERNATIONAL

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TO PRESERVE AND PROTECT THE NIGHTTIME ENVIRONMENT AND OUR HERITAGE OF DARK SKIES THROUGH ENVIRONMENTALLY RESPONSIBLE OUTDOOR LIGHTING

International Dark Sky Community Program Guidelines

2018 Version
Updated September 2023

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DEFINITION OF AN INTERNATIONAL DARK SKY COMMUNITY

An International Dark Sky Community (IDSC) is town, city, municipality, or other similar political entity that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of quality lighting policies, dark-sky education, and citizen support of the ideal of dark skies.

GOALS FOR IDSC CREATION

- To identify communities with exceptional commitment to and success in pursuing dark sky preservation and restoration, and their promotion of quality outdoor lighting
- To promote improved outdoor nighttime quality of life for residents and visitors
- To support protection of human health, nocturnal habitats, public enjoyment of the night sky and its heritage, and/or areas ideal for professional and amateur astronomy
- To provide local, national, and international recognition for such communities
- To promote the ideals of DarkSky by encouraging communities to identify dark skies as a valuable community asset and aspiration

DESIGNATION BENEFITS

Achieving this designation brings recognition of the efforts made by the Community government, residents, and public and private organizations to protect the night sky and the nocturnal environment dependent on it. The IDSC designation enhances awareness of dark sky matters on the part of Community residents and visitors.

Designation as an IDSC entitles the Community to display the International Dark Sky Community logo in official publications and promotions and on signs at entrances or within the Community, and to retain the use of this logo by other groups within the Community when identifying the area itself.[1] DarkSky will promote and highlight ongoing Community efforts to protect night skies, and will maintain pages identifying and describing all IDSCs on its website.

[1] For instance, a Community can identify itself as “Flagstaff, the world’s first International Dark Sky Community” or other words to the same effect, or an organization within the Community can state “located in Flagstaff, an International Dark Sky Community.”

ELIGIBILITY

The Community must have some type of legal organization that is officially recognized by outside groups. This can be in the form of a town, city, municipality, or other legally organized community (such as urban neighborhoods and subdivisions), but need not be an incorporated entity. Unincorporated or otherwise informally organized communities are eligible for IDSC status if their governing jurisdictions enact public policy consistent with the requirements of "Minimum Requirements for All Communities" (below) that are legally binding in at least the territory of the Community.

MINIMUM REQUIREMENTS FOR ALL COMMUNITIES

1) A quality comprehensive lighting policy like the IDA-IES Model Lighting Ordinance (MLO)[2] that includes all of the following minimum standards for permanent lighting installations[3,4]:

   A) Full shielding[5] of all lighting fixtures over 1,000 initial lamp lumens[6]

   B) A limit on the emission of short-wavelength light through one of the following restrictions:

      i) The correlated color temperature (CCT) of lamps must not exceed 3000 kelvins; *or*

      ii) Allowed lighting must not emit more than 25% of its total spectral power at wavelengths <550 nanometers; *or*

      iii) The scotopic-to-photopic (S/P) ratio of allowed lighting must not exceed 1.3.

   C) A restriction on the total amount of unshielded lighting, such as a limit on lumens per net acre or a total site lumen allowance in unshielded fixtures (or equivalent wattages)

   D) A policy to address over-lighting. This may be accomplished by limiting the average illuminance for any outdoor application, over the entire task area, to no more than 10% over the light levels recommended by, for example, the Illuminating Engineering Society (North America), the Society of Light and Lighting (United Kingdom), or other similar organization.

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[2] Online: https://darksky.org/resources/guides-and-how-tos/model-lighting-ordinances/. (Accessed 2023 Sep 25).

[3] More information on developing a lighting policy may be found on the DarkSky website: https://darksky.org/resources/guides-and-how-tos/outdoor-lighting-for-policy-makers/. (Accessed 2023 Sep 25).

[4] Lighting required by law under the authority of any legal jurisdiction higher than that of the Community may be formally exempted from the requirements of this section.

[5] "Fully shielded" is defined as a light source screened and its light directed in such a way that none is emitted above the horizontal plane passing through its lowest light-emitting part.

[6] "Initial lamp lumens" is defined as the number of lumens of light emitted by a lamp when new and not counting any depreciation of output due to the age of the lamp. This information can be found in manufacturer data sheets.

E) Regulations of new installations of publicly owned outdoor lighting:

i) A provision that clearly indicates where, when, and under what circumstances new publicly owned outdoor lighting, including street lighting, is warranted, and will be permitted; *and*

ii) A provision that requires that adaptive controls[7] and/or curfews[8] be employed in all future installations of public outdoor lighting

F) There must be restrictions on the installation and operation of illuminated signs,[9] including *all* of the following:

i) Luminance levels for operation between sunset and sunrise shall not exceed 100 nits (100 candelas per square meter, cd/m^2) as measured under conditions of a full white display; and

ii) During the first hour after sunset and during the last hour immediately preceding sunrise, sign luminance shall not exceed 100 nits (100 candelas per square meter, cd/m^2); and

iii) Signs may only be illuminated while the associated activity is taking place; for businesses, sign illumination must be extinguished completely during the hours the business is closed; and

iv) The luminous or illuminated surface area of an individual sign must not exceed 18.6 square meters (200 square feet).

G) Outdoor recreational and/or athletic field lighting may be exempted from the strict shielding and short-wavelength emission requirements above provided that *all* of the following conditions are met:

i) Illuminating Engineering Society (IES) lighting guidelines (RP-6) are followed according to the appropriate class of play

ii) Field lighting is provided exclusively for illumination of the surface of play and viewing stands, and not for any other applications

iii) Illuminance levels must be adjustable based on the task (e.g., active play vs. field maintenance)

iv) Off-site impacts of the lighting will be limited to the greatest practical extent possible

v) A strict curfew requirement (e.g., lights must be extinguished by 10 PM (2200 h) or one hour after the end of play, whichever is later) is observed

vi) Timers must be installed to prevent lights being left on accidentally overnight by automatically extinguishing them

[7] "Adaptive controls" is defined as devices such as timers, motion sensors, and light-sensitive switches used to actively regulate the emission of light from light fixtures.

[8] "Curfew" is defined as a period of time at night during which lighting must be significantly dimmed in output or extinguished in accordance with an expected decrease in human presence.

[9] "Illuminated sign" is defined as any informational or advertising sign that is illuminated by either internal or external means. Descriptive terms are adjusted here according to the type of illumination.

H) Affects an amortization period, applicable to *all* publicly *and* privately owned lighting, to end not more than 10 years from the effective date of the outdoor lighting policy, after which all non-conforming lighting extant at the time of enactment must be brought into compliance with the policy.

2) Community commitment to dark skies and quality lighting as shown by:

   A) City owned lighting conforming with, or committed to conforming with, the lighting policy (if the latter, a detailed plan with a timeline for completion in no more than five years); *and*

   B) Municipal support of dark skies and quality lighting as demonstrated by city publications, flyers, public service announcements, funding of lighting upgrades, etc.

3) Broad support for dark skies from a wide range of community organizations such as chambers of commerce, local electrical utilities, DarkSky Chapters, lighting retailers, homeowners' associations, and others.

4) Community commitment to dark skies and education as shown by at least one of the following:

   A) Planning and execution of at least two community dark sky awareness events[10] per year. This may be organized through a local astronomy club, municipality, school, etc.

   B) Inclusion of dark sky awareness documents (DarkSky brochures or Community-created brochures) with other Community informational documents for residents and visitors.

   C) Inclusion of dark sky education in Community schools and curriculum.

5) Success in light pollution control as demonstrated by at least one of the following:

   A) Examples of a number of construction projects appropriate to the Community population and amount of new construction and renovation activity, built under the lighting policy and demonstrating its effective application

   B) Alternative evidence of success in light pollution control, to be discussed with the International Dark Sky Places Program Manager for compliance.

6) A sky brightness measurement program must be established and maintained either by the Community or by a public or private entity (e.g., university, research center, DarkSky Chapter, astronomy club) to follow the evolution of light pollution in the IDSC. Applicants are encouraged, but not required, to submit their measurements to the citizen science projects such as My Sky At Night (myskyatnight.com) and Globe At Night (globeatnight.org).

7) Once established, the Community must erect and maintain appropriate signage indicating the International Dark Sky Community designation along a roadway entrance, along a footpath entrance if no roadway exists, a public gathering place such as a square or common, or at a municipal government center such as a city or town hall. If

[10] Note that astronomy education events such as star parties do *not* qualify as "community dark sky awareness events" unless the presentation explicitly includes a message relating to dark skies and outdoor lighting.

approved by DarkSky International, language as an alternative to "International Dark Sky Community" may appear on the signage and in Community communications regarding the IDSC status. Once the sign is erected, a photograph documenting it must be taken and sent to DarkSky International along with a description of its location.

PROVISIONAL STATUS

In some cases, a Community interested in the program may lack all of the resources required to achieve a designation outright. If resource unavailability otherwise hinders the progress of a Community's application, that Community may apply for and be granted Provisional status at the discretion of the DarkSky Board of Directors. Provisional status recognizes the Community's ongoing work to become an International Dark Sky Community and is intended as a leverage point to successfully enable actions such as lighting upgrades and retrofits.

Provisional status expires after three years. At any time before the end of this period, a Community may reapply for full status. Material submitted for the removal of Provisional status may be an addendum to the initial application as long as the material includes a current assessment of the goals, outreach efforts, and lighting policy listed in the original application and clearly demonstrates that any program requirements left unmet at receipt of the Provisional status have been satisfied.

To be considered for Provisional status, send a nomination package to DarkSky International that includes *all* of the following information:

1) Documented intent to create and support an International Dark Sky Community (IDSC)
2) An enacted and legally effective outdoor lighting policy, and summary of outreach efforts to date
3) A description of the circumstances that currently prevent the Community from meeting the minimum IDSC requirements
4) An action plan describing steps the aspiring Community will take to meet all program requirements in the specified Provisional status period

IDSC APPLICATION PROCESS

NOMINATION

The nomination may be initiated by a DarkSky qualified nominator[11] who has personally

[11] A "DarkSky qualified nominator" is defined here as an individual or organization holding a DarkSky membership in good standing at the time that the IDSC application is submitted. The Community itself may join DarkSky as an

reviewed a Community's outdoor lighting and commitment to night sky preservation. Nominators are encouraged to correspond with DarkSky International staff and the Community throughout this process. In addition, the application must include evidence, such as in the form of a letter of support, from the Community government (e.g., mayor, council) consenting to the nomination for IDSC status.

STEPS FOR APPLICANT

1. Make initial contact with DarkSky International by phone or email to discuss the process and receive recommendations, followed by continued communications to update DarkSky International staff on progress and receive continued assistance.
2. Designate a formal point of contact (POC) person, such as a project manager, and provide their telephone number, address, and email address to DarkSky International staff. Before and after designation, any changes to this POC, or their information, must be communicated to DarkSky International immediately in order to ensure accurate communication at all times.
3. Obtain a letter of nomination from a qualified DarkSky member nominator, as well as a supporting letter from elected representatives of the Community, such as the mayor and/or council of a municipality. Solicit additional letters of support from Community organizations, clubs, groups, universities, etc.
4. Upon completion, send the application to DarkSky International staff for review of the document at least one month before the chosen submission deadline date. DarkSky International staff will confirm that the application is complete and ready for submission or return it with suggestions for improvements.
5. Submit the final application packet electronically in PDF and/or Microsoft Word format to DarkSky International staff for formal review. Submit in plenty of time for staff to review and prepare your application to make the bi-monthly deadline that you prefer, as found on the DarkSky website. Requests to rush applications will *not* be honored; planning ahead is essential if the Community wishes to meet a specific deadline.

TO BE INCLUDED IN IDSC APPLICATION PACKAGE

1. Map of the Community clearly indicating its legal boundaries, and basic factual information about the Community; *and*
2. Letters of nomination support by DarkSky qualified nominator and elected representatives of the Community such as the mayor and/or council; *and*
3. The Community's lighting policy, meeting the minimum requirements as stated in the "Minimum Requirements for All Communities" section; *and*
4. Documentation of examples of Community commitment and construction or renovation projects demonstrating effective application of the lighting policy; *and*

organizational member and self-nominate.

5. Proposed alternative wording for the IDSC (e.g., Dark Sky Village, Starry Sky City), if desired, with a justification for the request.

DARKSKY REVIEW PROCESS

Six application submission deadlines occur in each calendar year, commencing in January and continuing every other month. Before the Community's final application is submitted, it is highly recommended that the Community be in regular communication with the International Dark Sky Places Program Manager to perfect the application by the next application deadline.

The International Dark Sky Places Manager will forward applications to the International Dark Sky Places Committee (DSPC) for review. DSPC review lags the submission dates by one two-month cycle. The total elapsed time between deadline and final IDSC designation approval is approximately 10 weeks.

Endorsement of applications by the DSPC is by a 2/3 supermajority vote; otherwise, the DSPC will return applications with reasons for denial of an endorsement and specific recommendations for improvement. If endorsed, the applicants will be notified, and the International Dark Sky Places Program Manager will present the application to the DarkSky Board of Directors (BOD) for final review and approval. A waiting period of 10 calendar days then commences during which the Board of Directors has the right to deny IDSC status should it determine that any problems with the application exist.

If the BOD registers no objection within the waiting period, the IDSC designation is considered immediately awarded by DarkSky. The Community has the right to choose when the designation is made public, but it must organize the announcement to be made at the same time as the DarkSky public notice unless otherwise agreed by both parties. Along with the announcement notice, DarkSky will publish the Community's application on its website; by submitting the application, the Community acknowledges in advance that the application will be made publicly available. If an application is denied final approval by the DarkSky BOD, a letter will be sent to the applicant outlining elements of the application that need improvement along with specific recommendations for ways to remedy any problems the BOD identifies. Applications may be resubmitted for future consideration after remediation is complete. Resubmitted applications will be considered without prejudice.

DarkSky realizes that certain circumstances surrounding an IDSC application may cause some potential authors of letters of support (or opposition) to feel uneasy about publicly declaring their opinions about the IDSC designation. In the interest of providing the DSPC with as full a picture of Community sentiment about applications as possible, certain letters may be suppressed from online publication if it is felt that making the letters publicly available will subject their authors to retaliation or harassment. A prospective IDSC seeking this protection for letter-writers must make a formal written request. The International Dark Sky Places Program Manager must approve suppression of publication of any part of an application. Note that suppression of online publication does not prevent either the DSPC or the DarkSky BOD from reading all submitted letters.

POST-DESIGNATION REVIEW AND MAINTENANCE

The IDSC designation is not awarded in perpetuity. Rather, it is subject to regular review by DarkSky and possible revocation if the minimum program requirements are not maintained. More details may be found in the "Reassessment of IDSC Designation" section below.

To ensure that Communities remain exemplary in their protection and restoration of natural nighttime darkness, DarkSky will periodically reevaluate each site in the International Dark Sky Places Program. This is done to confirm that the Community continues to meet the minimum requirements and is making adequate progress toward LMP compliance goals outlined in this document.

Each designated IDSC must submit to DarkSky International a written report of its activities related to the maintenance of its designation on or before 1 October of each calendar year. The report is a short (typically less than 10-page) synopsis of the Community's activities and initiatives during the intervening year.[12] The report should include dates and brief descriptions of any interpretive events, lighting retrofit projects, outreach efforts, etc. Samples of printed materials and press articles should also be included, if available.

Annual reports should not be burdensome to produce, as they are intended as a compilation of information accumulated throughout the year. Annual reports and supporting documentation must be submitted electronically to the International Dark Sky Places Program Manager in either PDF or Microsoft Word format. If the annual report is not received by DarkSky International in a timely fashion, DarkSky may suspend the site's IDSC status until the annual reporting requirement has been met (see the following section). On or about 1 August and 1 September of each year, the International Dark Sky Places Program Manager will remind local contacts at each IDSC of the pending 1 October annual report submission deadline.

A designated IDSC is exempt from the annual reporting requirement in the calendar year in which the IDSC designation was awarded. If the designation is received after 1 October of a given calendar year, the IDSC's first annual report to DarkSky International will be due on 1 October of the following calendar year.

REASSESSMENT OF IDSC DESIGNATIONS

From time to time, DarkSky receives comments from visitors to Communities that raise concerns about the veracity and timeliness of information provided to DarkSky by site administrators. DarkSky may, at its discretion, investigate claims in which it is alleged that IDSCs are not adhering to commitments made to DarkSky and to the public in their applications to the Program. This section details the DarkSky procedure for carrying out such investigations, and the rights of IDSCs in such matters.

An allegation of impropriety concerning any of the elements of participation in the Program outlined in this document is subject to DarkSky investigation and potential remedial action

[12] Examples of acceptable annual reports are available on the individual IDSC pages on the DarkSky website.

including temporary suspension and/or permanent revocation of the IDSC designation. DarkSky International staff shall perform due diligence in gathering facts concerning such allegations it deems credible, and will prepare a report of its findings for consideration by the DSPC. The DSPC commits to weighing the evidence fairly and impartially, and to seek to resolve disputes whenever possible through dialog. A Community subject to an investigation shall be notified in a timely manner and solicited for evidence contrary to the specifics of the allegation at hand. The Community will be given an opportunity to correct any deficiencies with regard to the Program guidelines established by the DarkSky investigation within a reasonable time period to be prescribed by the DSPC.

Failure to achieve consensus through these means risks a DSPC recommendation for suspension or revocation of the IDSC designation. If made, such a recommendation will be forwarded to the DarkSky Board of Directors for formal ratification before coming into force. The Board's decision on any disciplinary matters involving an IDSC shall be considered definitive and binding.

Any IDSC so investigated has the right to review the allegations against it and all factual information collected by DarkSky pertinent to the allegations.

REINSTATEMENT FOLLOWING SUSPENSION

If the DSPC recommends a suspension of a Community's IDSC designation and the Board ratifies the suspension, the Community administration shall be immediately notified. The status of a suspended IDSC shall be changed to "Provisional" in all DarkSky communications until the designation is reinstated or revoked; however, the process of obtaining reinstatement of a designation is not the same as that outlined in the "Provisional Status" section of these guidelines.

To obtain reinstatement of a suspended designation, the IDSC must provide evidence to the DSPC's satisfaction that the specific issues identified by the DSPC as grounds for the suspension have been corrected and that all Program guidelines are once again met. The DSPC will consider the evidence presented by the IDSC and render a judgment to:

- Accept the reinstatement petition; *or*
- Reject the petition and recommend revocation; *or*
- Return the petition with further instructions and a defined deadline for an IDSC response.

REVOCATION

A suspension left unresolved after one year from the date of the Board's assent to the suspension automatically becomes a permanent revocation. Revocation entails removal of the IDSC from DarkSky's roll of approved International Dark Sky Places, and from mention on the DarkSky website and in member and external communications. DarkSky reserves the right to take legal action against any former IDSC whose designation is duly revoked but continues to use the DarkSky name or logo in advertising, communications, and/or signage.

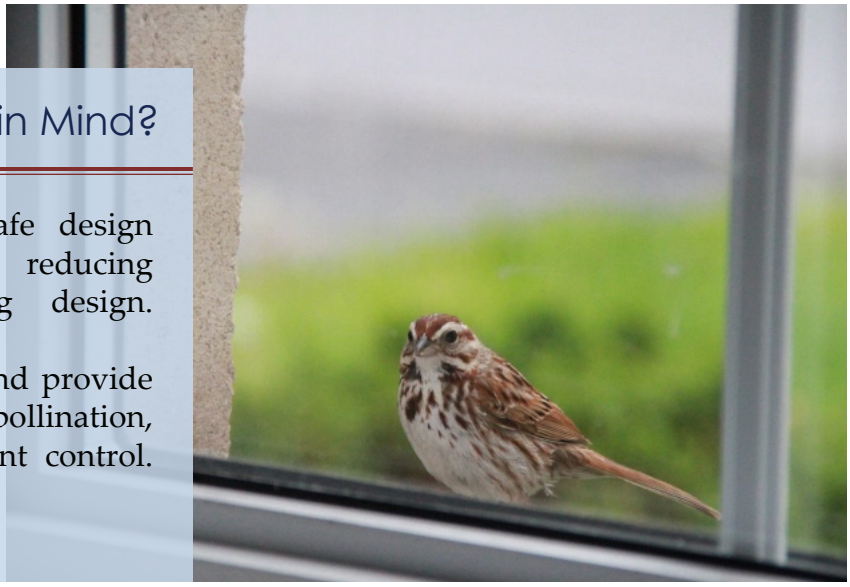
CUPERTINO

BIRD-SAFE DESIGN

Why Design with Bird Safety in Mind?

The purpose of implementing bird-safe design is to increase bird safety by reducing hazardous building and lighting design.

Birds are critical to our ecosystem and provide many benefits including plant pollination, seed dispersal and insect and rodent control.



Bird Hazards

- Exposed reflective glass.
- Large expanse of highly transparent glass.
- Bright lighting.

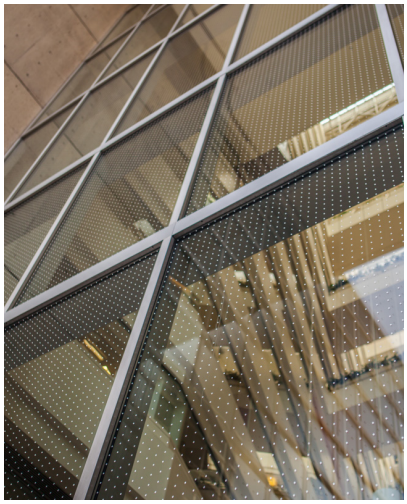
Bird-safe Solutions

- Treated Glass/Transparent Elements.
- Window Screens or Nets.
- Permanent Exterior Architectural Elements.

For birdsafe design regulations visit: **www.cupertino.org/municode**

Examples of Bird-safe Design Compliance

Example 1: Fritted/Patterned Glass

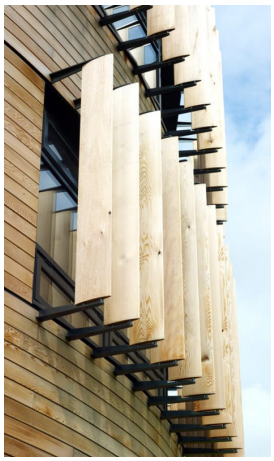
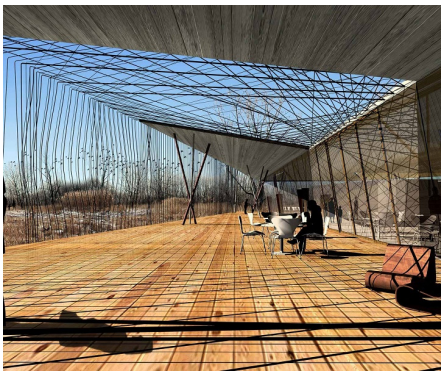



Example 2: Frosted/Opaque Glass


Example 3: Window Netting/Screens

Example 4: Vertical and Horizontal Mullions

Example 5: Permanent Exterior Archiectural Elements

Alternative Compliance Methods

Property owners and applicants may propose an alternate compliance method as recommended by a qualified biologist, in order to meet the requirements and intent of this ordinance, subject to review and approval by the City.

BUILDING WITH BIRDS IN MIND

Santa Clara Valley Audubon Society

Cedar Waxwings. Photo by Tom Grey

Glass Structures Kill Birds

- **Birds collide with glass that reflect** the sky, trees, landscaping

- **Birds collide with transparent windows or glass walls** (if they perceive a passage through, or see vegetation inside or beyond)

Photo by Jan Hintermeister, Sunny

Birds migrate at night

- Night flying migrating birds are attracted to light(thus to urban areas with no food)
- or can get “trapped” in a light plume

White specs in the photo are birds trapped in the 9-11 memorial beams, NY

gs/wire
dscience/2010/09/tribute-in-
light

The Condor

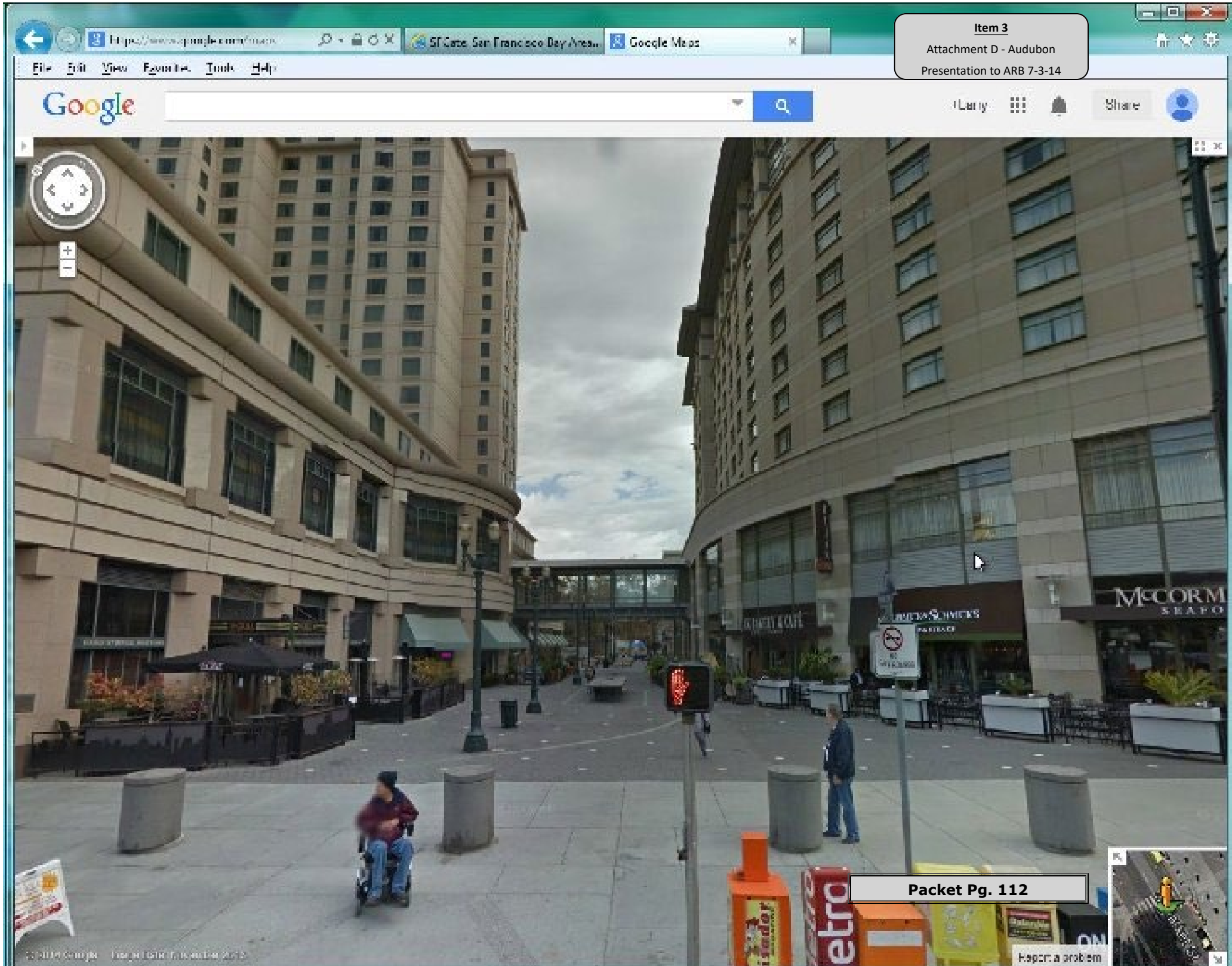
Published by: Cooper Ornithological Society

« previous article : next article »

The Condor 116(1):8-23. 2014
doi: http://dx.doi.org/10.1650/CONDOR-13-090.1

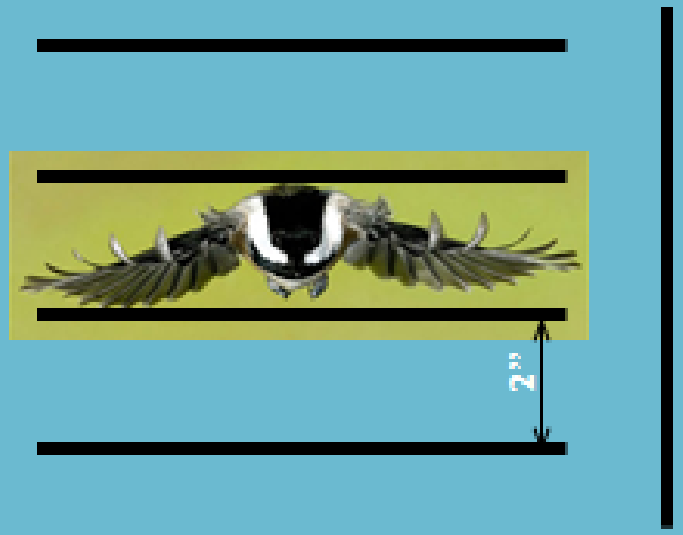
Bird–building collisions in the United States: Estimates of annual mortality and species vulnerability

"…Based on 23 studies, we estimate that between 365 and 988 million birds (median = 599 million) are killed annually by building collisions in the U.S., with roughly 56% of mortality at low-rises, 44% at residences, and <1% at high-rises. Based on >92,000 fatality records, and after controlling for population abundance and range overlap with study sites, we identified several species that are disproportionately vulnerable to collisions at all building types…"

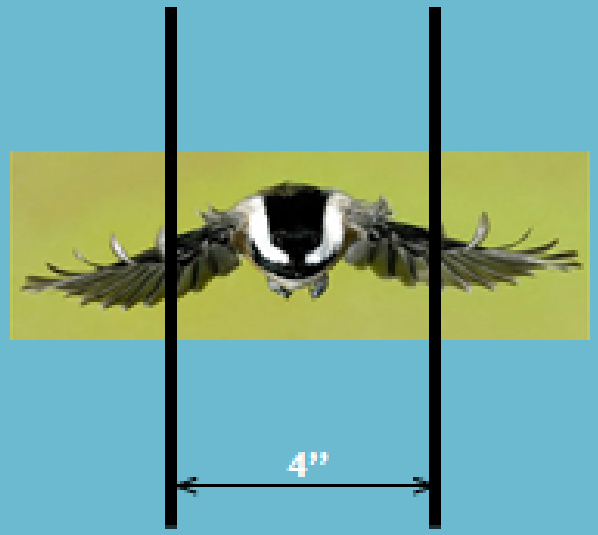

Google Maps
Google
Share
Report a problem

Collision Studies (American Bird Conservancy))

DAYTIME SOLUTIONS - 2" / 4" RULE



Horizontal lines with a maximum spacing of 2"



Vertical lines with a maximum spacing of 4"

LEED

LEED Pilot Credit Library

Pilot Credit 55: Bird Collision Deterrence

1 or Façade Zone 2. Façade Zone 1 includes the first 3 floors above ground level, as well as 1 floor above any green roofs. Façade Zone 2 includes all façade areas above the 3rd floor. Then identify the Material Types present on the building façade and the Threat Factor of each type (for detailed material types and associated threat factors, see the *Bird Collision Deterrence: Summary of Material Threat Factors* table developed by the American Bird Conservancy). Determine the total area of each Material Type.

No more than 15% of the glazed area in Façade Zone 1 can have a Threat Factor higher than 75. However, more than 15% of the glazed area in Zone 2 may have a Factor higher than 75. All glazed corners or fly-through conditions[2] must have a Threat Factor less than or equal to 25.

Table 1: General Material Types: Threat Potential

Material Type	
Greatest Threat Potential	Glass: Highly reflective and/or completely transparent surface

Table 1: General Material Types: Threat Potential

Material Type	
Greatest Threat Potential	Glass: Highly reflective and/or completely transparent surface
	Glass: Reflective or transparent surface interrupted by a visible pattern based on the 2 x 4 Rule*.
	Glass: Reflective or transparent surface shielded by screens, shutters, or louvers where the resultant exposed glass satisfies the 2 x 4 Rule*.
	Glass: Translucent with matte or textured surface.
Least Threat Potential	Opaque surface

*The 2 x 4 Rule is defined as a collision deterrence module based upon the physical profile of a bird in flight. Current research has established maximum module dimensions of 2" high x 4" wide.

http://www.usgbc.org/Docs/Archive/General/Docs10402.pdf

The American Bird Conservancy July 2013
Threat Table 1

Façade Material Type	Threat Factor:	Testing location:	Pattern on surface:
Opaque Material			
Brick	0		
Stone	0		
Wood	0		
Thermoplastic/acrylic			
Clear plexiglass with 5/64" thick black filament in horizontal arrangement spaced 1-3/16" apart[1]	8	Hohenau Powdermill	embedded
Clear plexiglass with 5/64" thick black filament in vertical arrangement spaced 1-3/16" apart[1]	25	Hohenau	
Translucent Plastics- all colors except clear			
Fiberglass panel, single pane or insulated[2]	2		
Corrugated fiberglass panel, single pane or insulated[3]	2		
Glass			
Mirrored glass, single pane or insulated	100		
Clear Glass, single pane or insulated	100		
	15	Powdermill	Surface 1

Government

- Birds Safe Design/Light Out Ordinances and Guidelines:
  - San Francisco, CA
  - Oakland, CA
  - Sunnyvale, CA
  - (San Jose, CA)

Corporate Campuses:

- Corporations moving towards Bird Friendly campus and building Design:
  - Facebook
  - Intuit

SAN FRANCISCO PLANNING DEPARTMENT

Standards for Bird-Safe Buildings

SAN FRANCISCO PLANNING DEPARTMENT | ADOPTED JULY 14, 2011

http://www.sf-planning.org/ftp/files/publications_reports/bird_safe_bldgs/Standards%20for%20Bird%20Safe%20Buildings%20-%2011-30-11.pdf

CITY OF OAKLAND

BIRD SAFETY MEASURES

The following applies to all construction projects which include glass as part of the building's exterior AND at least one of the following:

a) **The project is located immediately adjacent to a substantial water body larger than 1 acre (i.e. Oakland Estuary, San Francisco Bay, Lake Merritt or other lake, reservoir or wetland). OR**
b) **The project is located immediately adjacent to a substantial recreation area or park (i.e. a region-serving park, resource conservation area, neighborhood park, linear park, or special use park and generally over 1 acre in size) which contains substantial vegetation. OR**
c) **The project includes substantial vegetated or green roof or green wall (roof or wall with growing medium and plants taking the place of conventional roofing such as asphalt, tile, gravel or shingles) but excluding container gardens OR**

http://www.goldengateaudubon.org/wp-content/uploads/Oakland-Bird-Safety-Measures.pdf

San Jose Mercury News
SUNNYVALE

Sunnyvale adopts bird-safe building guidelines

By Alia Wilson

awilson@community-newspapers.com

POSTED: 01/30/2014 08:06:14 AM PST
UPDATED: 02/05/2014 06:02:42 PM PST

1 COMMENT

The Sunnyvale City Council on Jan. 28 voted to adopt bird-safe building guidelines to help address bird deaths caused by window collisions, particularly with tall glass office buildings.

Recent studies have shown that annual bird fatalities in North America from window collisions may be as high as 1 to 5 percent of all birds, according to city staff. The most dangerous are from taller glass buildings, similar to those located in Moffett Park.

http://www.mercurynews.com/sunnyvale/ci_25026760/sunnyvale-adopts-bird-safe-building-guidelines

San Jose Mercury News
OPINION

Birds and glass: San Jose can prevent needless deaths of birds with building rules

By Shani Kleinhaus

Special to the Mercury News

POSTED: 07/02/2014 11:47:41 AM PDT
UPDATED: 07/02/2014 11:47:42 AM PDT

When Orion, a 7-week-old fledgling Peregrine Falcon collided with a window at San Jose City Hall last year, the many Bay Area residents who follow the life story of Clara and her mate Fernando El Cohete on the City Hall web cam went into mourning.

In fact fledglings and migratory birds comprise the majority of the hundreds of millions of birds that die tragically each year due to collisions with glass building facades and windows. And the

Bird Friendly Campus

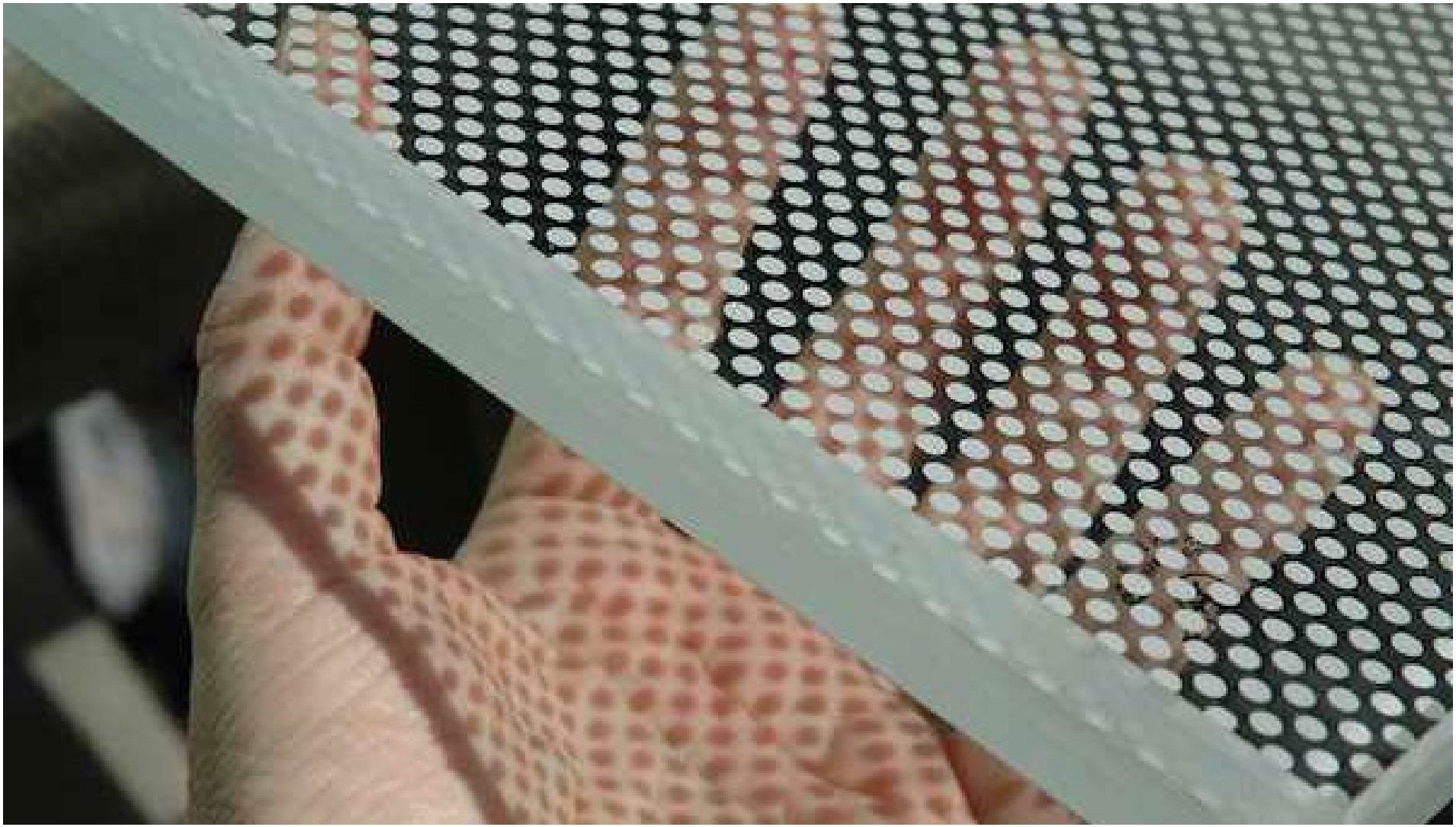
- Create habitat for birds (shelter, food, water)
- Turn off night lighting (dark sky, especially during migration seasons)
- Incorporate Bird Safe Building Design Architecture Principles (less glass, visual cues)
- Consider interactions with landscaping

Photo by Tom Grey

Facebook, Menlo Park- Frank Ghery (design features, fritted glass)

Intuit, Mountain View (design features, fritted glass)

Source: Intuit



Vassar College, NY
UV glass

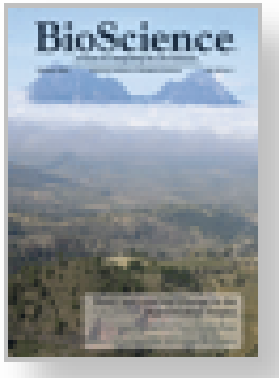
Ennead Architects

UV Patterns (Ornilux)

Brooklyn Botanical Garden's Visitor Center


EXIT
EXIT

Photo by Amos Butler Audubon. http://lightsoutindy.org/



Full Text (HTML)

Does Green Building Come up Short in Considering Biodiversity?: Focus on a growing concern.

BioScience (February 2014) 64 (2): 83-89 first published online January 15, 2014

Insight Can Highly Glazed Building Façades Be Green?

By John Straube, Ph.D., P.Eng.

Straube is a building science consultant and University of Waterloo professor. This paper was published on buildingscience.com in 2008.