



CITY OF BISBEE

DARK SKY

Guidebook

NOVEMBER 2024



WHAT IS LIGHT POLLUTION?

Light pollution is “the appropriate or excessive use of artificial light,” and consists of four main factors:

1. **Glare:** Excessive brightness that causes visual discomfort
2. **Sky glow:** Brightening of the night sky over inhabited areas
3. **Light trespass:** Light falling where it is not intended or needed
4. **Clutter:** Bright, confusing and excessive groupings of light sources

Light pollution caused by the inappropriate or inefficient use of outdoor lighting is costly, and affects people, wildlife, and outdoor environments-most noticeably, it limits our view of the starry night sky.

DARK SKY LIGHTING BASICS:

We need lighting for safety at night, However, many city lights are undirected and waste energy while causing light pollution. Proper lighting begins with:

1. **Shielding**
2. **Appropriate Lighting levels**
3. **Lighting color**

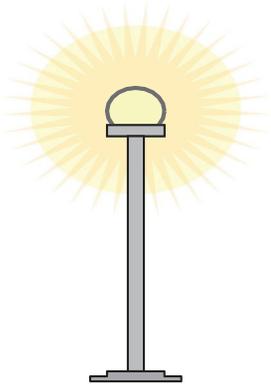
These three basic design principles form the basis for good lighting design, and when applied correctly, will reduce light pollution.

LIGHTING SHIELDING

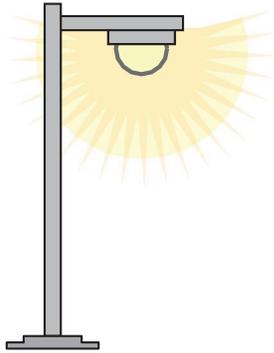
Outdoor lighting should be “fully shielded,” meaning no light above a 90-degree angle. The goal of fully shielded light fixtures is to prevent:

- **Light trespass** is light falling where it is not wanted or needed. Light trespass can create problems for neighboring and distant properties.
- **Glare** is intense and blinding light that can cause discomfort and temporary blindness.
- **Skyglow** reduces our ability to view celestial objects due to scattered light from sources on the ground.

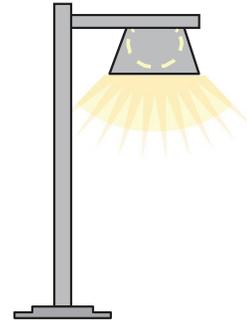
***RULE OF THUMB: Light should go down, not up.
Light should glow, not glare.***



UNSHIELDED



PARTIALLY SHIELDED



FULLY SHIELDED

The more light is directed towards the intended subject, the better.

APPROPRIATE LIGHTING LEVELS

Outdoor lighting can easily become excessive or “cluttered.” Appropriate lighting levels mean practically managing the amount of outdoor lighting in terms of duration and illuminated area.

- **Lumens** are a measurement unit of the brightness from a light source.
- **Clutter** is excessive groupings of light sources that create a bright and confusing environment.
- **Reflection** off of what is being illuminated causes light to be redirected back into the sky, contributing to sky glow.

Times, motion sensors, dimmers switches, and turning lights off when not in use can help improve lighting levels.

LIGHTING COLOR

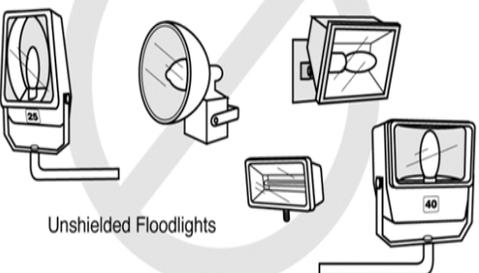
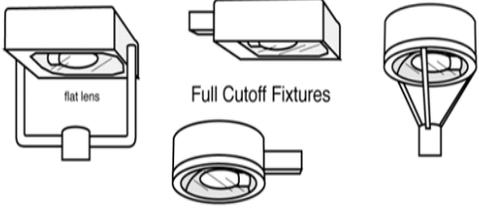
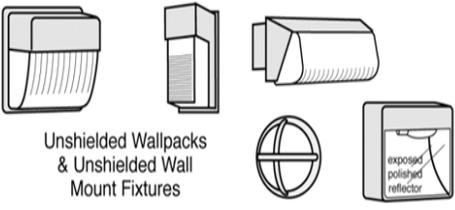
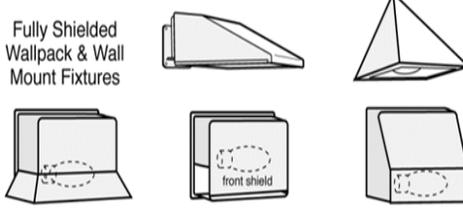
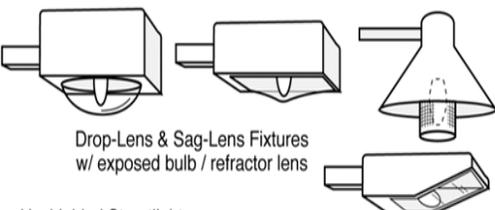
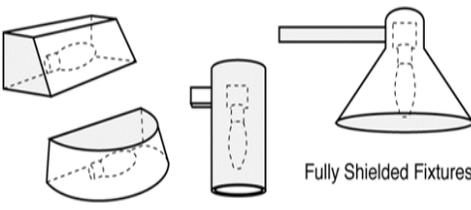
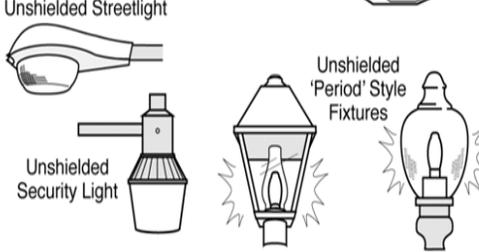
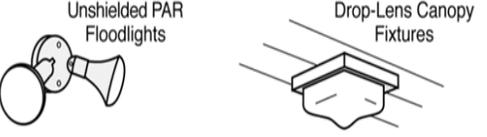
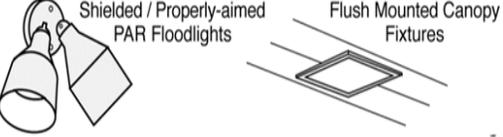
The color of the light is important as well. Cool blue spectrum lights brighten the night sky more than amber colored light.

- **Kelvin** refers to a temperature scale used to measure light’s warmth or coolness. *Color temperatures below 3000 °K are preferred.*
- **Color Spectrum** refers to the portion of the electromagnetic spectrum that is visible to the human eye. *Look for lights that eliminate the color blue from the spectrum, if possible.*

GENERALLY, USE LIGHTING WHERE IT'S NEEDED, WHEN IT'S NEEDED AND ONLY AS BRIGHT AS NEEDED.

ACCEPTABLE LIGHTING TYPES

The images below illustrate various acceptable lighting forms.

Unacceptable / Discouraged	Acceptable
Fixtures that produce glare and light trespass	Fixtures that shield the light source to minimize glare and light trespass and to facilitate better vision at night
 <p>Unshielded Floodlights</p>	 <p>flat lens Full Cutoff Fixtures</p>
 <p>Unshielded Wallpacks & Unshielded Wall Mount Fixtures</p>	 <p>Fully Shielded Wallpack & Wall Mount Fixtures</p> <p>front shield</p>
 <p>Drop-Lens & Sag-Lens Fixtures w/ exposed bulb / refractor lens</p>	 <p>Fully Shielded Fixtures</p>
 <p>Unshielded Streetlight</p> <p>Unshielded Security Light</p> <p>Unshielded 'Period' Style Fixtures</p>	 <p>Full Cutoff Streetlight</p> <p>Fully Shielded Security Light</p> <p>Fully Shielded 'Period' Style Fixtures bulb shielded in opaque top</p>
 <p>Unshielded PAR Floodlights</p> <p>Drop-Lens Canopy Fixtures</p>	 <p>Shielded / Properly-aimed PAR Floodlights</p> <p>Flush Mounted Canopy Fixtures</p>

To View the entire Light Pollution Code (Article 7.10) in our City Code Article go to <https://www.bisbeeaz.gov/DocumentCenter/View/8472/City-Code-Updated-May-2024>