

**ORDINANCE # 2005-1**

**AN ORDINANCE FOR THE TOWN OF LIBERTY, VERNON COUNTY, WISCONSIN, TO BE KNOWN AS THE “DARK SKY ORDINANCE”.**

WHEREAS, unnecessary and improperly designed light fixtures cause glare, light pollution and light trespass,

WHEREAS, glare and light pollution can result in: hazardous circulation conditions for all modes of transportation, the diminishing ability to view the night sky, light trespass, environmental harm and unattractive townscape; and

WHEREAS, the Town of Liberty desires to protect the health, safety and welfare of the residents and general public, and to protect the night sky that adds to the quality of life and economic well-being of the Town; and,

WHEREAS, these regulations for exterior lighting will not sacrifice the safety of our citizens or visitors, or the security of property, but instead will result in safer, efficient and more cost-effective lighting.

NOW THEREFORE, BE IT ORDAINED BY THE TOWN BOARD OF THE TOWN OF LIBERTY, VERNON COUNTY, WISCONSIN:

(A) All newly installed or retrofitted Lighting Fixtures must be a Fully shielded design that is installed so that all light travels downward, and no light is allowed to escape the fixture horizontally, or any angle above horizontal; (Fixtures must have an uplight rating of U0 as defined in Addendum A of Illuminating Engineering Society (IES) “TM-15-11: Backlight, Uplight, and Glare (BUG) Ratings” and be installed with the lens of the fixture in a level position, not tipped. DarkSky International approved and/or DesignLights Consortium LUNA certified fixtures are strongly encouraged; and

(B) All newly installed or retrofitted Lighting Fixtures must comply with the currently adopted Wisconsin Energy Code, “Chapter SPS 363 ENERGY CONSERVATION” for outdoor lighting control requirements to turn off and/or reduce lighting levels after business hours. For all exterior lighting the use of motion sensing devices is strongly encouraged; and

(C) No lighting installation shall cause a level of illumination exceeding 0.3 foot candles horizontal, in a contiguous or adjacent agricultural or residential district. Light intensity shall be measured using a light meter calibrated within the last 12 months and accurate to 0.05 foot candles; and procedures established in “IES G-1-22: Guide for Security Lighting for People, Property, and Critical Infrastructure”

(D) No source of intense light or glare shall be visible from off the site where said light is generated. Construction welding is exempt from this standard; and

(E) No lighting shall blink, flash or be of unusual high intensity or brightness; and

(F) All lighting fixtures shall be appropriate in scale, intensity, and height to the use they are serving, but not to exceed 30 feet; and

(G) Light Emitting Diode (LED) lighting must have a correlated color temperature (CCT) of 3000K or less. Lower CCT values of 2700K, and 2200K are strongly encouraged to minimize glare and sky glow effects.

(H) Total initial lumens per site may not exceed the lower of 10,000 lumens per acre of total site or 1.25 lumens per SF of Hardscape. When lighting intersections of site drives and public streets or road, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting.

EXEMPTIONS:

- (1) Lighting fixtures used temporarily for emergency purposes;
- (2) Approved temporary special events lighting;
- (3) Lighting fixtures 750 lumens or less;
- (3) Existing signs and lighting:
  - (a) All existing signage not complying with the provisions of this ordinance shall come into compliance when:
    - i. The sign is relocated; or
    - ii. If more than 60% of the sign is damaged, replaced or repaired; or
    - iii. If the plastic panel of a box sign is replaced then any replacement panel shall utilize a dark colored background with light colored lettering; or
    - iv. If the existing property is sold or transferred, the new owners or lessors shall comply with the provisions of this ordinance.
  - (b) Existing lighting fixtures installed prior to the effective date of this ordinance are exempt unless:
    - i. The fixtures become inoperable except for bulb replacement, or
    - ii. The fixture can be retrofitted at the time of bulb replacement to come into compliance with this ordinance
    - iii. The property is sold or transferred.

PENALTIES FOR VIOLATION OF DARK SKY ORDINANCE

Any person violating any provision of this ordinance, shall, upon conviction, forfeit not less than \$10.00 nor more than \$100.00 and the costs of prosecution, and in default of payment of such forfeiture and costs of prosecution, shall be imprisoned in the County Jail until payment of such forfeiture and costs of prosecution, but not exceeding thirty days for each violation. Each day of violation shall constitute a separate offense.

Dated this 14<sup>th</sup> day of March, 2005 at the Liberty Town Hall.

/s/ Danny Deaver, Chairman/s/William Oliver, Supervisor

/s/ R. Craig Starr, Supervisor Passed: March 14, 2005

Posted in 3 places: 3/20/05

Published: 3/23/05

ATTESTED TO BY:

/s/ Lori Polhamus, Town Clerk

2

## FOR INFORMATION ONLY:

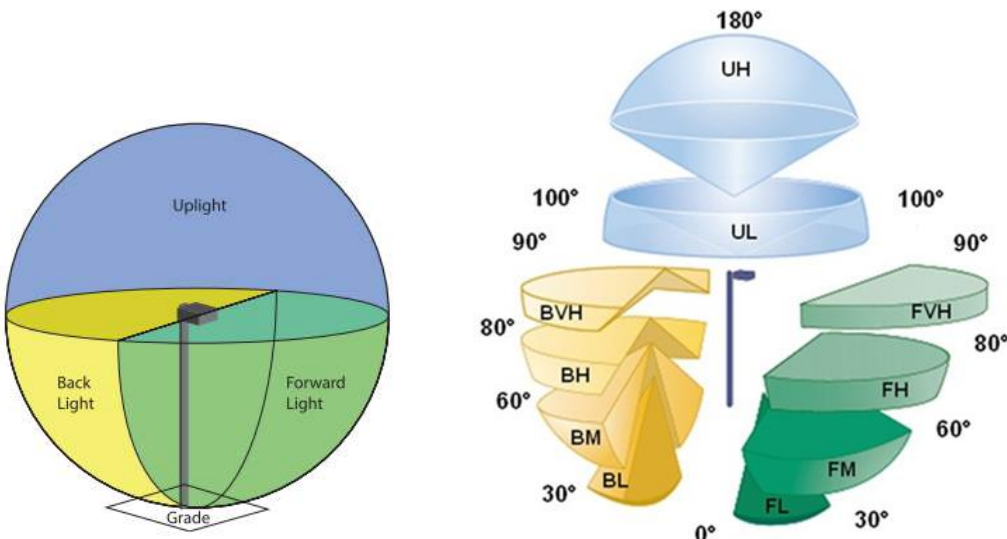
Definitions:

**Backlight, Uplight and Glare (BUG) rating:** The BUG rating for a fixture stands for backlight, uplight, and glare. Backlight (B) is the light directed behind the fixture, uplight (U) is any light directed upward above the horizontal plane of the luminaire, and glare (G) is the amount of light emitted from the luminaire at high angles. BUG ratings are defined by the Illuminating Engineering Society technical manual for each light fixture based on the design of the luminaire, its aiming, and lumen output. The three components of BUG ratings as shown in the figure below, are:

Backlight (B), which creates light trespass onto adjacent sites. The B rating takes into account the amount of light in the BL, BM, BH and BVH zones, which are in the direction of the luminaire OPPOSITE from the area intended to be lighted.

Uplight (U), which causes artificial sky glow and wasted energy. The U rating defines the amount of light traveling into the upper hemisphere with greater concern for the light at or near the horizontal angles (UL).

Glare (G), which can be annoying or visually disabling. The G rating takes into account the amount of frontlight in the FH and FVH zones as well as BH and BVH zones.



**CCT (correlated color temperature):** A measure (in kelvins, K) of the color appearance of a light source. Lower CCTs (1800 K to 2200 K) appear very warm or amber. Medium CCTs (2700 K to 3000 K) appear “warm white,” similar to standard incandescent bulbs. High CCTs (4000 K and higher) appear “cool white” or “blue.”



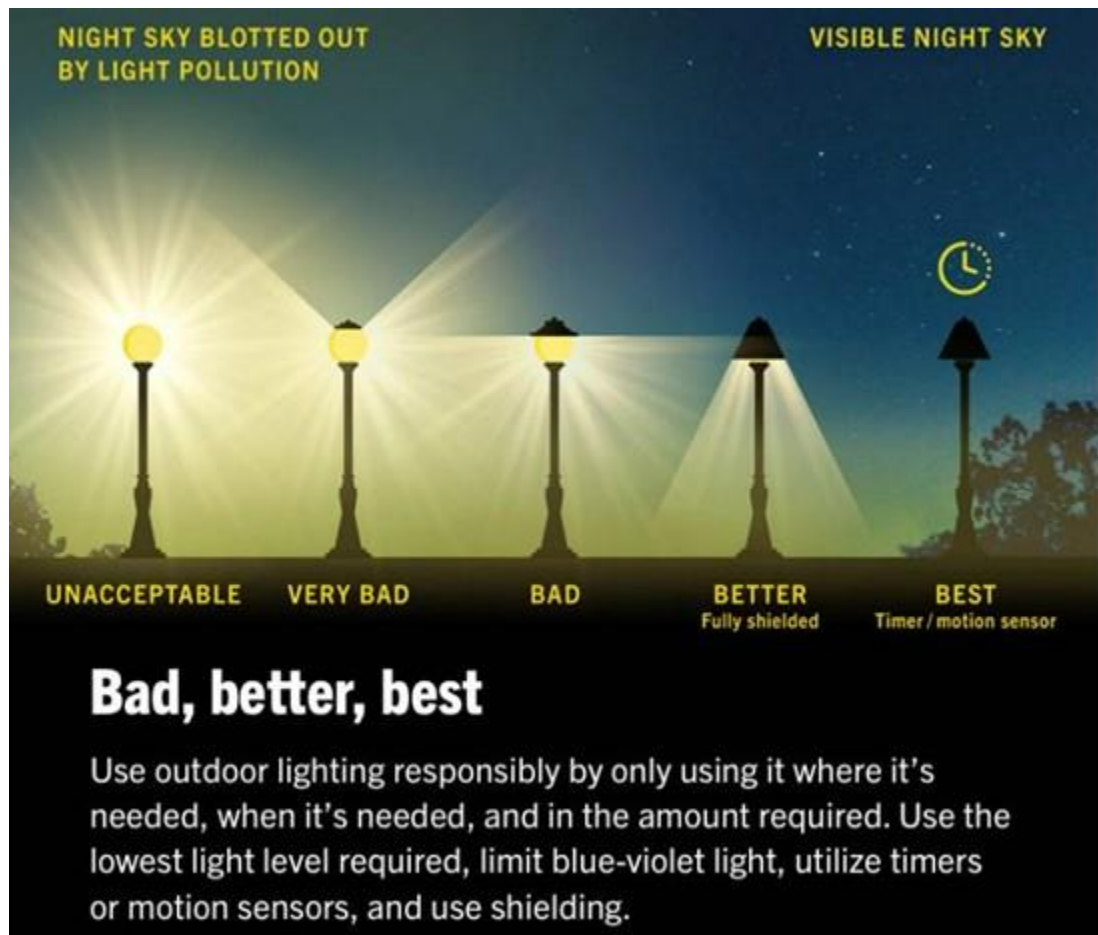
**DarkSky International:** A nonprofit organization building awareness of the value of dark skies, and of the need for quality outdoor lighting. <https://darksky.org/>

**DarkSky International Approved:** The DarkSky Approved program provides objective, third-party certification for products, designs, and completed projects that minimize glare, reduce light trespass, and don't pollute the night sky.

**DesignLights Consortium:** An independent non-profit organization that provides decision makers with data and resources on quality lighting and controls

**DLC LUNA:** DLC LUNA is a set of performance criteria and a list of qualified products that represent the highest quality outdoor lighting – lighting that minimizes light pollution, provides appropriate visibility for people, and limits negative impacts to the environment. In addition to these advantages, using LUNA products also help communities save energy because listed products also meet the DLC's rigorous requirements for all LED lighting. This enables lighting decision makers to identify products that save energy and minimize sky glow. <https://designlights.org/our-work/luna>

**Five Principles for Responsible Outdoor Lighting:** Refers to the Five Principles of Responsible Outdoor Lighting developed jointly by the IES and DarkSky. They are: 1) Use light only if needed; 2) distribute light only where it is needed; 3) use light that is no brighter than needed; 4) control light so it is on only when needed; and 5) use warmer color light when possible.



**Fixture:** a light fixture or luminaire. It includes the elements designed to give light output control, such as a reflector (mirror) and/or refractor (lens), driver, housing, and the attachment parts.

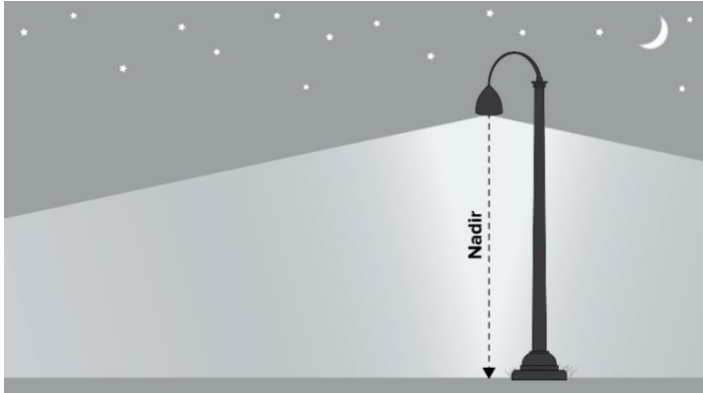
**Fixture lumens:** A light fixture's emitted light output.

**Fixture watts:** The total power consumed by a fixture. This includes the power consumed by the light source(s) and the driver(s).

**Floodlight:** A fixture designed to "flood" a well-defined area with light.

**Footcandle (fc):** A unit of illuminance. One lumen per square foot.

**Fully Shielded:** A fixture that allows no emission above a horizontal plane passing through the lowest light-emitting part of the fixture.



**Glare:** Visual condition of excessive contrast or incorrect distribution of light that disturbs the observer or limits the ability to distinguish details and objects

**Hardscape:** Permanent hardscape improvements to the site including parking lots, drives, entrances, curbs, ramps, stairs, steps, medians, and walkways. Materials may include concrete, asphalt, stone, gravel, etc.

**IES (Illuminating Engineering Society):** A non-profit lighting education and standards development organization. IES Recommended Practices are universally recognized as authoritative references for lighting applications.

**Light Pollution:** Artificial light traveling into areas where it is not needed or wanted. This can be in the form of *Light Trespass*, glare, or atmospheric sky glow.

**Light Trespass:** Artificial light illuminating past property lines without permission. Unless specified otherwise, light trespass limits are measured at any location along a property line both horizontally at the ground plane facing upward and vertically at 5ft above grade with the meter aimed toward the light source in question.

**Lumen (lm):** A unit of measure of *light output*. *The total quantity of visible light emitted by a source per unit of time.*

**Nighttime Hours:** The time between [10] PM and sunrise, or 7 AM (whichever comes earlier). For businesses and events with operating hours later than [10] PM, nighttime hours will begin one hour after closing.

**Non-essential:** Lighting that is not directly associated with the physical safety of motor vehicle and pedestrian threats, including but not limited to: landscape lighting, illuminated signage or advertising after business hours, façade lighting, vacant sports fields, and seasonal lighting.

**Residential Use:** Municipal zoning districts dedicated exclusively to places of low-rise (i.e., 3 stories or less) human residence and dwelling. Examples include single family, duplex, dual family, multi-family, apartment, townhouse, and mobile home. This does not include mixed-use or commercial districts with combined dwellings.

**Seasonal Lighting:** Outdoor or site lighting that is portable, temporary, decorative, and used in connection with holidays and traditions. This includes but is not limited to string lighting, icicle lighting, and lighted inflatables, none of which are intended for general illumination.

**Security Lighting:** Illumination used specifically to protect people, property, and infrastructure from criminal threat.

**Shielding:** A *Luminaire* design, optical intervention, or physical accessory (such as a louver) preventing light emission from traveling into a particular area, angle, or region.

**Wisconsin Energy Code:** Wisconsin state statute chapter SPS 363 ENERGY CONSERVATION that defines legally required energy efficiency requirements, including controls required for outdoor lighting fixtures on commercial and multi-family residential structures and sites. SPS 363 adopts by reference and modifies the International Energy Conservation Code.

[https://docs.legis.wisconsin.gov/code/admin\\_code/sps/safety\\_and\\_buildings\\_and\\_environment/361\\_366/363](https://docs.legis.wisconsin.gov/code/admin_code/sps/safety_and_buildings_and_environment/361_366/363)