

Chapter 22

DARK SKY (REGULATE ILLUMINATION)



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22.01 Purpose. The Village defines excessive, stray or wasted light from outdoor lights to be a public nuisance based on Wis. Stats. 66.1337 (7). In order to protect the health, safety, welfare, and convenience of the public, it is the policy of the Village to regulate outdoor lighting that will:

- (1) Permit reasonable uses of outdoor lighting for nighttime safety, utility, security, productivity, enjoyment and commerce.
- (2) Minimize light trespass, glare, obtrusive light, and artificial sky glow caused by misdirected, excessive, or unnecessary outdoor lighting.
- (3) Conserve energy and resources to the greatest extent possible.
- (4) Curtail and reverse the degradation of the nighttime visual environment and the night sky.
- (5) Help protect the natural environment from the damaging effects of night lighting from man-made sources.

22.02 Definitions. The following words, phrases and terms as used in this chapter shall have the following meaning:

- (1) Artificial Sky Glow means the brightening of the night sky attributable to man made sources of light.

- (2) Candela means the unit of luminous intensity of a lighting source emitted in a given direction.
- (3) Canopy means a roof-like covering over an area, in or under which a lighting fixture is mounted.
- (4) Curfew means a time each night after which certain electric illumination must be turned off or reduced in intensity.
- (5) Drip Line Area means the area on the ground enclosed by vertical planes extending downward from the outer solid edge of a canopy.
- (6) Facade means the exterior wall of a building.
- (7) Glare means light that causes visual discomfort, annoyance or disability, or a loss of visual performance.
- (8) Hardscape Lighting means lighting associated with architectural features, such as fountains, sculptures, and the like.
- (9) Landscape Lighting means luminaires mounted in or at grade (not to exceed 3 feet above grade) and used solely for landscape rather than area lighting, or fully shielded luminaires mounted in trees and used solely for landscape or Facade lighting.
- (10) Lighting Zone means a type of area defined on the basis of ambient lighting levels, population density, and/or other community considerations. A description of these five lighting zones is given in Table 1 of this ordinance.
- (11) Light Trespass means light flowing across the property boundary.
- (12) Lumen means the unit of luminous flux: a measure of the amount of light emitted by a lamp.
- (13) Luminaire (light fixture) means a complete lighting unit consisting of one or more electric lamps, the lamp holder or holders, reflector, lens, diffuser, ballast, and/or other components and accessories.
- (14) Luminance means the amount of light emitted in a given direction from a surface by the light source or by reflection from a surface. The unit is candela per square meter.
- (15) Luminous Flux means a measure of the total light output from a source, the unit being the lumen.
- (16) Mounting Height means the vertical distance between the lowest part of the luminaire and the ground surface directly below the luminaire.
- (17) Nadir means the downward direction; exactly vertical, directly below a luminaire.
- (18) Obtrusive Light means glare and light trespass.
- (19) Ornamental Lighting means outdoor lighting that is installed mainly or entirely

for its decorative effect or to accent an object or a feature, rather than for illumination.

- (20) Photometric Test Report means a report by an independent testing laboratory or one certified by the National Institute of Standards and Technology (NIST) describing the candela distribution, shielding type, luminance, and other optical characteristics of a specific luminaire.
- (21) External Point of Service means an outdoor service which a business provides some service to a customer, such as drive up food service, a bank transaction, or the like.
- (22) Property Line means the boundary line of a property and the vertical plane above the property line.
- (23) Shielding means a device or technique for controlling the distribution of light. Four levels of shielding are defined as follows:
 - (a) Fully Shielded – A luminaire emitting no luminous flux above the horizontal plane.
 - (b) Shielded – A luminaire emitting less than 2.0 percent of its luminous flux above the horizontal plane.
 - (c) Partly Shielded – A luminaire emitting less than 10 percent of its luminous flux above the horizontal plane.
 - (d) Unshielded – A luminaire that may emit its flux in any direction.
- (24) Spill Light means lighting from a lighting installation that falls outside of the boundaries of the property on which the installation is sited.
- (25) Temporary Lighting means lighting installed with temporary wiring and operated for less than 60 days in any calendar year.
- (26) Zoning Administrator means the administrator as designated in Chapter 10 of this code.

22.03 Conformance with Applicable Codes.

All outdoor lighting fixtures (luminaires) shall be installed in conformance with the provisions of this Ordinance, the Building Code, the Electrical Code, and the Sign Code of the Village as applicable and under appropriate permit and inspection.

22.04 Applicability.

- (1) **New uses, buildings and major additions or modifications.** For all proposed new land uses, developments, buildings, and structures that require a permit, all outdoor lighting fixtures shall meet the requirements of this Code. All building additions or modifications of twenty-five (25) percent or more in terms of additional dwelling units, gross floor area, or parking spaces, either with a single addition or with cumulative additions subsequent to the effective date of this

provision, shall invoke the requirements of this Code for the entire property, including previously installed and any new outdoor lighting. Cumulative modification or replacement of outdoor lighting constituting twenty-five (25) percent or more of the permitted lumens for the parcel shall also constitute a major addition for purposes of this section.

- (2) **Minor additions.** Additions or modifications of less than twenty-five (25) percent to existing uses, as defined in Section (a) above, and that require a permit, shall require the submission of a complete inventory and site plan detailing all existing and any proposed new outdoor lighting. Any new lighting on the site shall meet the requirements of this Code with regard to shielding and lamp type. The total outdoor light output after the modifications are complete shall not exceed that on the site before the modification, or that permitted by this Code, whichever is larger.
- (3) **Resumption of use after abandonment.** If a property or use with non-conforming lighting is abandoned as defined below, then all outdoor lighting shall be reviewed and brought into compliance with this Code before the use is resumed.
- (4) **Existing uses and buildings.** All luminaires installed after the date of the enactment shall come under the provisions of this code. After a period of three (3) years from the date of enactment of this Code, any lighting in place prior to the enactment date shall come under the provisions of the Code.
- (5) **Change of ownership.** If a property changes ownership, then all outdoor lighting shall be brought into compliance with this Code.

22.05 Lighting Zones.

- (1) **Zoning districts.** Zoning districts designated residential (R1, R2, R3, and R4) are designated lighting zone two (LZ 2). All other zoning districts (C1, C2, C3, CF, and P) are designated lighting zone three (LZ 3). All Village street lighting are designated as zone two (LZ 2).
- (2) **Lighting zone.** The Lighting Zone of a parcel or project shall determine the limitations for lighting as specified in this ordinance.

Table 1 – Lighting Zone Descriptions

Zone	Ambient Illumination	Representative Locations
LZ 0*	Very Dark	Critical dark environments, such as especially sensitive wildlife preserves, parks, and major astronomical observatories
LZ 1*	Dark	Developed areas in state and national parks, recreation areas, wetlands and wildlife preserves; developed areas in natural settings; areas near astronomical observatories; sensitive night environments; zoos; areas where residents have expressed the desire to conserve natural illumination levels.
LZ 2	Low	Rural areas, low-density urban neighborhoods and districts, residential historic districts. This zone is intended to be the default for residential areas.
LZ 3	Medium	High-density urban neighborhoods, shopping and commercial districts, industrial parks and districts. This zone is intended to be the default condition for commercial and industrial districts in urban areas.
LZ 4*	High	Major city centers, urban districts with especially high security requirements, thematic attractions and entertainment districts, and major auto sales districts.

* For reference only

22.06 Exempt Lighting. The following luminaires and lighting systems are exempt from the requirements of this Chapter.

- (1) Externally illuminated signs lit from above by fully shielded fixtures.
- (2) Temporary lighting for theatrical, television, and performance areas.
- (3) Lighting in swimming pools and other water features governed by Article 680 of the National Electrical Code.
- (4) Code required exit signs.
- (5) Code required lighting for stairs and ramps.
- (6) Lighting required and regulated by the Federal Aviation Administration, U.S. Coast Guard, or other federal, state, or county agency.
- (7) Interior lighting.
- (8) Holiday lights on the University Avenue side of the commercial district.
- (9) Temporary lights for emergency for public or private utility maintenance or

public safety.

- (10) Lighting fixtures existing prior to this ordinance not exceeding 30 watts (525 lumens).

22.07 Prohibited Light and Lighting.

- (1) All outdoor light sources, except street lights, shall be shielded or installed so that there is no direct line of sight between the light source or its reflection at a point 3' or higher above the ground at the property line of the source. Light that does not meet this requirement constitutes light trespass. Streetlights shall be fully shielded.
- (2) The following lighting systems are prohibited from being installed or used except by special use permit, which shall not be granted for any use in LZ 2.
 - (a) Aerial Lasers.
 - (b) "Searchlight" style lights.
 - (c) Other very intense lighting, defined as having a light source exceeding 200,000 lumens or intensity in any direction of 2,000,000 candelas or more.

22.08 Luminaire Lamp Wattage, Shielding, and Installation Requirements.

- (1) **Lamp limits.** All outdoor lighting shall comply with the limits to lamp wattage and the shielding requirements in Table 2. These limits are the upper limits. Good lighting design will usually result in lower limits.
- (2) **Flexible mounting systems.** Only luminaires that are allowed to be unshielded in Table 2 may employ flexible mounting systems. All other luminaires shall be permanently installed so as to maintain the shielding requirements of Table 2.
- (3) **Evidence of compliance.** The Zoning Administrator may accept a photometric test report, demonstration or sample, or other satisfactory confirmation that the luminaire meets the requirements of the shielding classification.
- (4) **Shielded fixture construction.** Such shielded fixtures must be constructed and installed in such a manner that all light emitted by the fixture complies with the specification given. This includes all the light emitted by the fixture, either directly from the lamp or by a diffusing element, or indirectly by reflection or refraction from any part of the fixture. Any structural part of the fixture providing this shielding must be permanently affixed.
- (5) **Canopy lighting.** All canopy lighting must be fully shielded. However, indirect up light is permitted under an opaque canopy provided that no lamp or vertical element of a lens or diffuser is visible from beyond the canopy and such that no direct up light is emitted beyond the opaque canopy. Landscape features shall be used to block vehicle headlight trespass while vehicles are at an external point of service.

- (6) **Facade lighting.** All facade lighting must be restricted to the facade surface. The margins of the Facade shall not be illuminated. Light trespass is prohibited. The sides of commercial buildings without a customer entrance shall not be lit.

Table 2 – Luminaire Maximum Wattage and the Required Shielding (incandescent equivalent, 1500 lumens/100 watts)

Lighting Zone	Fully Shielded	Shielded	Partly Shielded	Unshielded (Shielding is highly encouraged – Light trespass is prohibited)
LZ 0*	55	None permitted	None permitted	None permitted
LZ 1*	70	30	None permitted	None permitted
LZ 2	150	60	None permitted	Low voltage landscape lighting and temporary holiday lighting
LZ 3	450	100	60	Landscape and façade lighting 100 watts or less; ornamental lights of 60 watts and less
LZ 4*	1000	150	90	Landscape and façade lighting 250 watts or less; ornamental lights 70 watts or less; marquee lighting not employing medium based lamps

* For reference only

22.09 Height Limits. Pole and surface-mounted luminaires under this section must conform with section 22.08.

- (1) **Pole mounted lighting.** Lighting mounted onto poles or any structures intended primarily for mounting of lighting shall not exceed a mounting height of 40% of the horizontal distance of the light pole from the property line, nor a maximum height according to Table 3, whichever is lower. Exceptions:
 - (a) Lighting for residential sports courts and pools shall not exceed 15 feet above court or pool deck surface.
 - (b) Lights specifically for driveways, and then only at the intersection of the road providing access to the site, may be mounted at any distance relative to the property line, but may not exceed the mounting height listed in Table 3.
 - (c) Mounting heights greater than 40% of the horizontal distance to the property line but no greater than permitted by Table 3 may be used

provided that the luminaire is side shielded toward the property line.

- (d) Landscape lighting installed in a tree. See the Definitions section.
 - (e) Street and bicycle path lights.
- (2) **Lights mounted to buildings or structures.** Lighting mounted onto buildings or other structures shall not exceed a mounting height greater than 4 feet higher than the tallest part of the building or structure at the place where the lighting is installed, nor higher than 40% of the horizontal distance of the light from the property line, whichever is less. Exceptions:
- (a) Lighting attached to single family residences shall not exceed the height of the eave. Lighting for driveways shall conform to Table 3.
 - (b) Lighting for facades may be mounted at any height equal to or less than the total height of the structure being illuminated regardless of horizontal distance to property line.(c)For buildings less than 40 feet to the property line, including canopies or overhangs onto the sidewalk or public right of way, luminaires may be mounted to the vertical Facade or the underside of canopies at 16 feet or less.
 - (c) The top exterior deck of parking garages should be treated as normal pole mounted lighting rather than as Lights Mounted to Buildings. The lights on the outside edges of such a deck must be side shielded to the property line.

Table 3 – Maximum Lighting Mounting Height in Feet

Lighting Zone	Lighting for Driveways, Parking and Transit	Lighting for Walkways, Plazas and other Pedestrian Areas	All Other Lighting
LZ 0*	20.0	8.0	4.5
LZ 1*	25.0	12	4.5
LZ 2	35.0	18	8
LZ 3	37.5	18	15
LZ 4*	Height limit to be determined by Zoning Administrator		

* For reference only

22.10 Total Site Power Limits

- (1) **Outdoor lighting.** This section applies to all outdoor lighting, whether attached to building, poles, structure, or self supporting, including but not limited to hardscape areas (which include parking lots, lighting for building entrances, sales and non-sales canopies), lighting for all outdoor sales areas, and lighting for building facades.
- (2) **Energy code.** If there is an energy code in place, then the more restrictive of this

ordinance and that energy code shall apply.

- (3) **Maximum allowed lighting limit.** The Maximum Allowed Lighting Limit shall be the lesser of 6000 lumens or 400 watts (incandescent equivalent, 1500 lumens/100 watts) for residential properties and 70,000 lumens/acre for commercial properties.

22.11 Lighting for Externally Illuminated Signs.

Externally lit signs shall be lit from the top of the sign downward with fully shielded fixtures.

Exception: signs not taller than 10 feet above grade may be illuminated by landscape lighting complying with Table 2.

22.12 Lighting Controls.

- (1) **Commercial lighting controls.** Lighting systems for commercial properties shall be turned off or reduced in lighting by at least 50% beginning at the lighting curfew defined below, and continuing until dawn or start of business, whichever is sooner. The reduction shall be determined as an overall average for the site. When possible, the lighting system should be turned off rather than be reduced in lighting level.
- (2) **Residential lighting limits.** Holiday, ornamental, and decorative lighting for residential properties in LZ 2 shall be turned off at the lighting curfew defined below.

The lighting curfew shall be as follows:

- (a) LZ 2, 11:00 p.m.
- (b) LZ 3, the earlier of 11:00 p.m. or one-half hour after the close of business.
- (c) Exceptions:
 - (1) There is only one (conforming) luminaire for the site.
 - (2) When in the opinion of the Zoning Administrator, reduced lighting levels at a given location will cause unacceptable increased risk and design levels must be maintained.

NOTES: The Village strongly recommends the use of timers and/or motion detectors on outdoor lighting, and that motion detectors be set to minimize unnecessary activation, i.e., to the extent practical, entryway or driveway lights should not activate for pedestrians or cars off the property containing the motion detectors.

22.13 Special Permits.

- (1) **Special permits.** Upon special permit issued by the Zoning Administrator, lighting systems not complying with the technical requirements of this ordinance but consistent with the intent of the ordinance may be installed for the following applications:

- (a) Sport fields.
 - (b) Construction lighting.
 - (c) Industrial lighting for hazardous areas where the heat of the lighting fixture may cause a dangerous situation.
 - (d) National and State Flag lighting with spotlights greater than 40 watts.
- (2) **Obtain a permit.** To obtain such a permit, applicants shall demonstrate that the proposed lighting installation:
- (a) For applications a and b above, utilizes fully shielded luminaires and, if required, side shielded and internally shielded luminaires that are installed in a fashion that maintains the shielding characteristics unless certified in writing by a registered engineer or by a lighting certified professional that such shielding is impractical. Where fully shielded fixtures can not be utilized, acceptable luminaires shall include only those which are installed with minimum aiming angles of 25 degrees downward from the horizontal. Said aiming angle shall be measured from the axis of the luminaire's maximum beam candlepower as certified by independent testing agency.
 - (b) Has received every reasonable effort to mitigate obtrusive light and artificial sky glow, supported by a signed statement from a registered engineer or by a lighting certified professional describing the mitigation measures.
 - (c) Comply with all technical requirements of this section after curfew.
 - (d) The Zoning Administrator shall review each such application. A permit may be granted if, upon review, the Zoning Administrator believes that the proposed lighting will not create unwarranted glare, sky glow, or light trespass.

22.14 Applications for a Variance.

A person may apply to the Village Administrator for a variance from sections 33.04, 22.07, 22.08, 22.09, 22.10, 22.11, or 22.12 of this Chapter in order to accommodate special circumstances of limited duration or to alleviate an undue hardship on the part of the applicant or the community. In deciding to grant or deny a variance, the Village Administrator shall balance the purposes and standards of this Chapter against any special circumstance or undue hardship that may be cited by the applicant. For applications to accommodate special circumstances of limited duration, the Village Administrator may grant or deny the application; grant the application with reasonable conditions to minimize the impact of anticipated light levels; or refer the application to the Board of Trustees. Applications to alleviate undue hardship will be considered by the Board of Trustees, which may grant or deny the application, or grant the application with reasonable conditions to minimize the impact of anticipated lighting circumstances.

22.15 Enforcement.

This Chapter will be enforced in accordance with Chapter 31 of this Code.