

ORDINANCE 135

AN ORDINANCE OF THE TOWNSHIP OF NOCKAMIXON TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA, AMENDING CHAPTER 234 & 196 OF THE CODE OF ORDINANCES OF NOCKAMIXON TOWNSHIP PERTAINING TO ZONING AND SUBDIVISION & LAND DEVELOPMENT TO REVISE REGULATIONS FOR OUTDOOR LIGHTING

Section I Purpose: to require and set standards for outdoor lighting in order to:

1. Protect neighbors and the night sky from nuisance glare, light trespass, light disturbance, and stray light due to poorly aimed, placed, applied, maintained, or shielded light sources.
2. Protect the rural character and ecological resource values of the township from light disturbance.
3. Protect drivers and pedestrians from the glare of non-vehicular light sources that shine into their eyes and thereby impair safe traverse through the community.
4. Limit height, intensity and design of light standards and devices to preclude or lessen light pollution, encourage efficiency, and promote energy conservation.
5. Control lighting in outdoor public places where public health, safety and welfare are potential concerns.

Section II Replace Section 234-29 of the Zoning Ordinance in its entirety with the following:

A. General:

1. All outdoor illumination for all uses shall be diffused or shielded in such a manner as not to create any hazardous glare for passing vehicular traffic or a nuisance to persons beyond its lot lines.
2. The following additional regulation shall apply to all outdoor lighting in Nockamixon Township, where permitted or required by the Zoning Ordinance or other township ordinances, except for Agricultural uses, Residential uses other than multifamily, uses accessory thereto, and parking areas/lots of three spaces or less.
3. The glare control requirements herein contained shall apply to all lighting, including signage.
4. Where more stringent requirements concerning light abatement are contained in other rules, regulations, or ordinances, the more stringent regulations shall apply.

B. Definitions

1. Candela – The SI unit of luminous intensity. One candela is one lumen per steradian (lm/sr).
2. Candlepower – Luminous intensity expressed in candelas.

3. Cutoff Angle (of a luminaries) – The angle, measured up from the lowest point (nadir), between the vertical axis and the first line of sight at which the bare source is not visible.
4. Direct Light – Light emitted directly from the lamp, off of the reflector or reflector diffuser, or through the refractor or diffuser lens, of a luminaire.
5. Fixture – The assembly that house the lamp or lamps and can include all or some of the following parts: a housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and/or a refractor or lens.
6. Flood or Spot Light – Any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.
7. Foot-candle – A unit of light intensity on a plane (horizontal or vertical) stated in lumens per square foot and measurable with a light meter. One foot-candle is one lumen per square foot (lm/ft²). Horizontal foot-candles are measured on the horizontal plane of a lamp (bulb), and vertical foot-candles on a perpendicular line above the bulb.
8. Full Cutoff – Attribute of a lighting fixture from which no light is emitted at or above a horizontal plane drawn through the bottom of the fixture, and no more than 10% of the lamp's intensity is emitted at or above an angle 10 degrees below that horizontal plane, at all lateral angles around the fixture.
9. Fully Shielded Lights – Outdoor light fixtures shielded or constructed in such a manner that all light emitted by the fixture, either directly from the lamp or diffusion element or indirectly by reflection or refraction, is projected below the horizontal plane through the fixture's lowest light-emitting part as certified by a photometric test report and does not cause glare at normal viewing angles.
10. Glare – The sensation produced by luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance or visibility.
 - a. Blinding Glare: Glare that is so intense that for an appreciable length of time after it has been removed, no object can be seen.
 - b. Direct Glare: Glare resulting from high luminance or insufficiently shielded light sources in the field of view.
 - c. Disability Glare: The effect of stray light in the eye whereby visibility and visual performance are reduced.
 - d. Discomfort Glare: Glare that produces discomfort. It does not necessarily interfere with visual performance or visibility.
 - e. Reflected Glare: Glare resulting from reflections of high luminance in polished or glossy surfaces in the filed of view.
11. Height of Luminaire – The height of a luminaire shall be the vertical distance from the ground directly below the centerline of the luminaire to the lowest direct-light-emitting part of the luminaire.
12. Illuminance – the quantity of light measured in footcandles or lux

13. Illumination – An alternative term for illuminance. Commonly used in a qualitative or general sense to designate the act of illuminating or the state of being illuminated.
14. Indirect Light – Direct light that has been reflected or has scattered off of other surfaces.
15. Isofootcandle (isolux) – A line plotted on any appropriate set of coordinates to show all the points on a surface where the illuminance is the same. A series of such lines for various illuminance values is called an isolux (isofootcandle) diagram.
16. Lamp – The component of a luminaire that produces light. A generic term for a man-made source of light, i.e. a light bulb.
17. Light – Radiant energy that is capable of exciting the retina and producing a visual sensation. The visible portion of the electromagnetic spectrum extends from about 380 to 770 nanometers.
18. Light Trespass – light emitted by a lighting installation that extends beyond the boundaries of the property on which the installation is sited.
19. Lumen – the light output of a lamp (light bulb), as specified by the manufacturer. More technically, it is the luminous flux emitted within a solid angle (one steradian) by a point source having a uniform luminous intensity of one candela. One footcandle is one lumen per square foot. For the purposes of this Ordinance, the lumen-output values shall be the initial output ratings of a lamp, as specified by the manufacturer of the lamp. For example, a 60 watt GE Soft White bulb emits 840 lumens, a similar 100 watt bulb, 1690 lumens.
20. Luminaire – A complete lighting unit consisting of one or more lamps together with the fixture; other parts designed to control the light distribution; and other mechanical and electrical components.
21. Luminaire Cutoff – A luminaire whose candle power per 1000 lumens does not numerically exceed 25(2.5%) at an angle of 90 above nadir (horizontal) and 100 (10%) at a vertical angle of 80 above nadir.
22. Luminance – A quantity of light measurable with a luminance meter (light meter). It may be expressed in candelas per square meter (cd/m²) footcandles (lm/m²), or lux.
23. Lux – a unit of light intensity stated in lumens per square meter. (Approximately 10.7 lux per footcandle; May be measured with a light meter.
24. Outdoor Lighting – The nighttime illumination of an outside area or object by any man-made device that produces light by any means.
25. Steradian, sr (unit of solid angle) – The solid angle subtended at the center of a sphere by an area on the surface of the sphere equal to the square of the sphere radius.
26. Uniformity Ratio – The highest luminance or illuminance point divided by the lowest luminance or illuminance point respectively.

C. Criteria

1. Illumination levels

- a. Lighting shall have luminance/illuminance values and uniformity ratios in accordance with the current recommended practices of the Illuminating Engineering Society of North America (IESNA) contained in the IESNA Lighting Handbook and from time to time amended.
- b. Future amendments to the recommended practices contained within IESNA shall become part of this Ordinance without further action of Nockamixon Township.
- c. Intensities for typical outdoor applications are presented below: (Note: illuminance levels for lighting of public roadways/streets, and pedestrian/bicycle facilities shall be measured at a point 50 feet beyond the facility being illuminated)

**MAXIMUM MAINTAINED ILLUMINANCE
LEVELS PERMITTED AT PROPERTY LINES
PRODUCED BY OUTDOOR AREA LIGHTING INSTALLATION**

For outdoor area lighting installations to which the requirements of this Ordinance apply:	Maximum maintained illuminance level permitted at property line measured at grade in Horizontal Footcandles	Maximum maintained illuminance level permitted at property line measured at grade in Horizontal Lux
Outdoor area lighting installation is located on said property and property line adjoins a public roadway or public right-of-way.	0.5	5.4
Outdoor area lighting installation is located on said property and property line adjoins a non-residential property.	0.2	2.2
Outdoor area lighting installation is located on said property and property line adjoins a residential property.	0.1	1.1

2. Lighting Fixture Design

- a. Fixtures shall be of a type and design appropriate to the lighting application and meet the requirements of this ordinance.
- b. For horizontal tasks (roadways, sidewalks, parking areas), fixtures shall meet IESNA "full cutoff" criteria, i.e., no light output emitted above 90 degrees at any lateral angle around the fixture. If full cutoff fixtures for lighting of public streets are not available from the servicing utility, an alternate fixture most closely meeting the standards contained herein may be accepted by the Township upon submission of technical specifications for review.
- c. Fixtures shall be equipped with, or be capable of being modified to incorporate, light directing and/or shielding devices, such as shields, visors, skirts, or hoods to redirect offending light distribution and/or reduce direct or reflected glare.
- d. All fixtures shall be energy efficient and appropriate for proposed use.

3. Control of Nuisance and Disabling Glare

- a. All outdoor lighting, whether or not required, on all properties shall be aimed, located, designed, fitted and maintained so as not to present a hazard to drivers or pedestrians by impairing their ability to travel safely, and so as not to create a nuisance or disturbance by projecting or reflecting objectionable light onto a neighboring use or property.
- b. All outdoor lighting fixtures shall be shielded in such a manner that no light be emitted above a horizontal plane passing through the lowest point of the light emitting element, i.e., no direct light is emitted above the horizontal plane. This includes outdoor lighting fixtures that illuminate the area under outdoor canopies, including fuel island canopies, storefront and shopping mall canopies, driveway and building entrance canopies, and pavilions and gazebos.
- c. Floodlights and spotlights where permitted, shall be installed or aimed so that they do not project their output into the windows of neighboring residences, adjacent uses, skyward or onto a roadway.
- d. Unless otherwise permitted by the Board of Supervisors for safety or security or all-night operations, non-residential exterior lighting shall be controlled by automatic switching devices such as time clocks or combination motion detectors and photocells, to permit extinguishing outdoor lighting fixtures between 10 p.m. and dawn to mitigate nuisance glare and sky - lighting consequences.
- e. Where all-night safety or security lighting is to be provided, the lighting intensity levels shall not exceed 25% of the levels normally permitted by this Ordinance for the use. (Lighting shall be reduced by 75% from normally permitted levels.)
- f. All lighting for advertising signs, buildings and/or surrounding landscapes serving decorative, advertising or esthetic purposes is prohibited between 10:00 p.m. and sunrise; except that such lighting on the premises of a commercial establishment may remain illuminated while the establishment is open for business, and until one hour after closing.
- g. Vegetation screens shall not be employed as the primary means for controlling glare, although they are encouraged for additional protection against nuisance lighting. Rather, glare control shall be achieved primarily through the use of cutoff fixtures, shields and baffles, and appropriate application of mounting heights, wattage, aiming angle and fixture placement.
- h. Externally lit signs and billboards shall be lighted by top mounted fixtures aimed downwards. Such fixtures shall be automatically extinguished between the hours of 10 p.m. and sunrise unless specifically approved by Nockamixon Township.
- i. Directional fixtures for applications such as façade, fountain, feature, and landscape illumination shall be aimed so that they do not project output beyond the objects to be illuminated, shall be extinguished between the hours of 10 p.m. and dawn, and shall not be in conflict with the Municipality's aim to protect its natural resources and maintain its rural character.
- j. Service station or other similar canopy lighting shall use flat-lens full cutoff downlighting fixtures, shielded in such a manner that the edge of the fixture shall be level with or below the light source envelope. Additionally top or outside surfaces of canopies may not be illuminated except for signage in accordance with applicable regulations of this ordinance.

- k. The use of white strobe lighting for tall structures such as smokestacks, chimneys, radio/communication/television towers is prohibited except as required by the F.A.A.

4. Installation

- a. Electrical feeds for fixtures mounted on poles shall be run underground, not overhead.
- b. Poles supporting lighting fixtures for the illumination of parking areas and located directly behind parking spaces, shall be placed a minimum of five (5) feet outside paved area, or suitably protected by other means.
- c. Lighting fixtures shall not be mounted more than twenty (20) feet above finished grade.

5. Compliance

- a. Lighting fixtures and ancillary equipment shall meet the requirements of this Ordinance at all times.

D. Outdoor Sports and Recreational Lighting

- 1. These regulations apply to all sports and recreational facilities including, but not limited to, ballfields, ballparks, stadiums, tennis courts, basketball courts, soccer fields, recreation fields, swimming pools, skating rinks, golf driving ranged, golf courses, firearm shooting facilities and the like. Where permitted, the outdoor lighting of sports and recreational facilities shall comply with the following requirements:
- 2. The requirements of this subsection apply to all outdoor lighting installations employed for nighttime area illumination of sports and recreational facilities. All sports and recreational facilities shall be illuminated with the following two systems:
 - a. **Performance Area Lighting.** This is the lighting directed upon the field, court, rink, etc., to illuminate the sports/recreational activity taking place upon/within the facility. The maximum permitted post height for the Performance Area Lighting is 60 feet. Post height shall be limited to minimum height necessary to meet the Performance Area Lighting needs of that specific sports/recreational use as determined by the Township.
 - b. **General Area Lighting.** This is a low level lighting system used to facilitate pedestrian circulation, patrons leaving the facility, cleanup, nighttime maintenance, etc. General Area Lighting shall meet all the requirements for outdoor area and roadway lighting installations listed above in subsection (C).
- 3. **Use of Full Cutoff Luminaries Required.** All luminaries employed in outdoor sports and recreational lighting installation shall be the full cutoff luminary type unless the performance area lighting need of the sport/recreational use cannot be met through the use of full cutoff luminaries, as determined by the Township.
- 4. **Use of Glare Shields Required for Non-Cutoff Luminaire Types.** Where non-cutoff luminaries such as floodlights must be used to meet the lighting design objectives for the Performance Area Lighting, the luminaries shall be equipped with glare shields, visors, barn doors and other similar shielding accessories as required to meet the following criteria:
 - a. Luminaries shall be fully shielded.

- b. To the extent practicable, the candlepower distribution from all luminaries shall be further cut off at angles below the horizontal (level) to restrict direct illumination to within the Performance Area being illuminated for sports and recreations purposes.
5. **Maximum Maintained Illuminance Levels.** The maximum maintained illuminance levels permitted at the property line(s) during the nighttime, produced by the sum of all outdoor sports and recreation lighting installations on a lot, shall meet the requirement of the table at subsection C.1.
6. **Design Submittal and Approval Requirements.** The design for all outdoor sports and recreation lighting installations shall be submitted for review and approval by the Township. The submission shall include a visual-impact plan that demonstrates appropriate steps have been taken to prevent or mitigate glare on-site, off-site, as viewed by drivers on adjacent streets, and so as to retain the intended character of the general vicinity of the site. This submission may also require the inclusion of initial vertical footcandle values at specific off-site venues, eq. bedroom windows of adjacent residential uses.
7. All outdoor sports and recreation lighting shall be extinguished between 9 p.m. and 7 a.m. on Sunday through Thursday nights and between 11 p.m. and 9 a.m. on Friday and Saturday nights and nights preceding Federal holidays. In addition, the performance area lighting shall be turned off no more than 30 minutes after the end of the event or use of the sports/recreational facility.

E. Plan Submission

1. Lighting plans shall be submitted to the municipality for review and approval for all proposed outdoor lighting, including but not limited to proposals that are part of a subdivision or land development plan and shall include:
 - a. a site plan, complete with all structures , parking spaces, building entrances, traffic areas (vehicular and pedestrian), vegetation that might interfere with lighting, and adjacent uses that might be adversely impacted by the lighting, containing a layout of all proposed fixtures by location and type.
 - b. Isofootcandle plots for individual fixtures installations, or 10' by 10' illuminance plots for multi-fixture installations, which demonstrate compliance with intensity and uniformity requirements as set forth in this ordinance. Larger grid spacing may be used if the scale of the plan is such that a 10' x 10' grid would be unreadable.
 - c. Description of the proposed equipment, including fixture catalog cuts, photometrics, glare reduction devices, lamps, on/off control devices, mounting heights, pole foundation details, and mounting methods.
2. When requested, applicant shall also submit a visual impact plan that demonstrates the steps that have been taken to mitigate on-site and off-site glare, and to retain the rural character of the municipality.
3. Post-approval alterations to lighting plans or intended substitutions for approved lighting equipment shall be submitted to the Township for review and approval.

F. Post Installation Inspection and Compliance Monitoring

