

**PROPOSED AMENDMENTS TO THE
MUNICIPAL CODE
CITY OF CHAMPAIGN**

CHAPTER 37 (“Zoning”), ARTICLE XI

<http://www.ci.champaign.il.us/government/index.php>

OUTDOOR LIGHTING

Additions are in bold

DIVISION 4. LIGHTING

Sec. 37-597. Intent.

The intent of regulation for exterior lighting and glare is to:

- (a) Provide **adequate but** minimal lighting of public and private property for the safety, security, and convenience of occupants and the general public and;
- (b) To eliminate or reduce the nuisance and hazards of excessive light and glare.
- (c) **To preserve or enhance property values by maintaining a visually calm residential or commercial character and discouraging excessive nuisance lighting**
- (d) **To honor the sanctity of private property from nearby private, public, or commercial lighting sources.**
- (e) **To minimize glare and light trespass.**
- (f) **To minimize interference with the habitats and activity of native nocturnal animals, particularly birds during migration and especially when protected by the State of Illinois or the Federal government.**
- (g) **To minimize lighting utility costs to the municipality while ensuring adequate lighting for the general public.**

Sec. 37-598. ~~Parking lot lighting.~~ **Definition of terms**

Definitions for all terms and standards in this section shall be defined from the 1984 edition of the IESNA Lighting Handbook, reference volume, New York; Illuminating Engineering Society of North America.

Lighting, Outdoor. (See “OUTDOOR LIGHTING.”)

Lumen (Outdoor Lighting). (See “OUTDOOR LIGHTING.”)

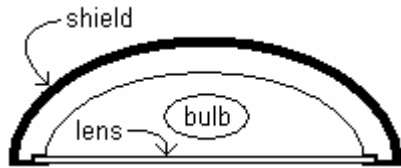
OUTDOOR LIGHTING.

Fixture (Outdoor Lighting). The light source, the lamp holder, the shields, and their housing in an assembly that may include other components, e.g., electrical devices. Including but not limited to: security, flood, spot, wall, fascia, back, advertising, landscape, foot path, accent, outline, swivel, directional, movable, portable, or yard.

Footcandle (Outdoor Lighting). The unit for measurement of illumination received by a surface located at a distance from a source of visible light. Typically calculated for a lighting plan and measured with a light meter.

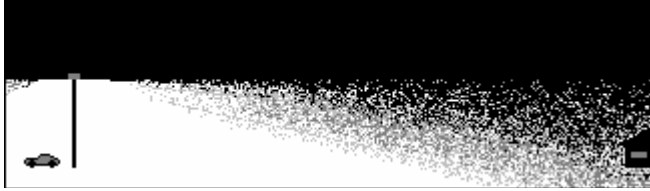
Full cut-off or full horizontal shielding (Outdoor Lighting). A design for a fixture that does not emit light above the horizontal plane running through the lowest point on the light source. Does not include a drop lens, sag lens, or convex lens if the lens extends below the shield. Sometimes called fully shielded by manufacturers of outdoor lighting. The following illustrations provide examples:

The bulb, reflectors, or lens do not extend below the shield:



Vertical cross section of fixture with full horizontal shielding

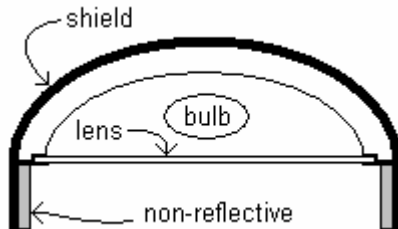
The illumination does not project above the fixture:



Street lighting from fixture with full cut-off

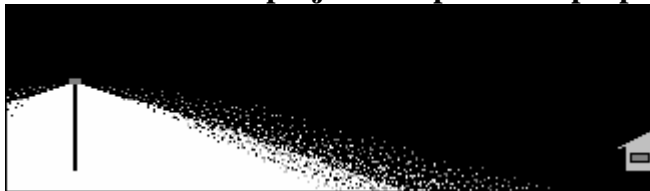
Full oblique shielding (Outdoor Lighting). A design for a fixture that does not emit light above the line of sight to the light source when viewed from protected property. The shield blocks direct illumination of protected property. The fixture completely conceals and recesses the light source from all viewing positions except those positions permitted to receive illumination. The following illustrations provide examples:

The interior surface of the shield below the lens has a dull and dark finish to prevent reflection of light.



Vertical cross section of fixture with full oblique shielding

The illumination does not project into protected property:



Area lighting from fixture with full oblique shielding

Observations along the sight line to an installed fixture can determine if the fixture has full oblique shielding. Sight lines exist along the oblique boundary between the illumination cone and the shielded area above it.



Sight line between observer and light source

An observer can establish a sight line at any location where the observer can see only a small part of the fixture's light source. By moving away from the fixture until the light source no longer appears, the observer will cross the sight line. Where the observer's eyes coincide with the sight line, the observer can project the sight line to the ground. The sight line coincides with the oblique line along the bottom of the shielding angle (see definition). If the sight line falls on protected property, then the fixture does not provide adequate full oblique shielding.

***Light source (Outdoor Lighting).* The medium producing the visible light or changing the direction of the light. Such media may include bulbs, lenses, refractors, reflectors, diffusers, or any emitter of visible light either directly from the material discharging the visible radiant energy or indirectly from material that redirects the illuminating light.**

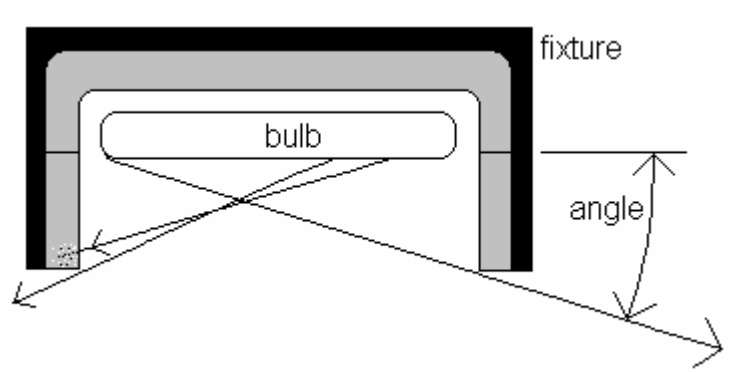
***Light trespass.* Light from an artificial light source that is intruding into an area where it is not wanted or does not belong.**

***Lumen (Outdoor Lighting).* The unit of measurement of the total visible light produced by a light source. Typically published in specifications by the manufacturer.**

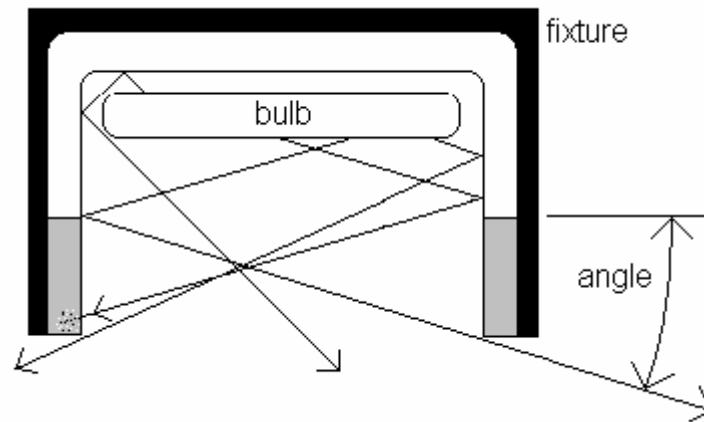
***Protected area (Outdoor Lighting).* An area intended for protection from outdoor lighting including any property: 1) in residential use, 2) in a residential zoning district that may develop into a residential use, 3) in a planned development zoning district that may develop into a residential use, or 4) in a public street right-of-way.**

***Shield (Outdoor Lighting).* The opaque barrier on the fixture to block the light from illuminating certain distant surfaces. No light escapes through a shield.**

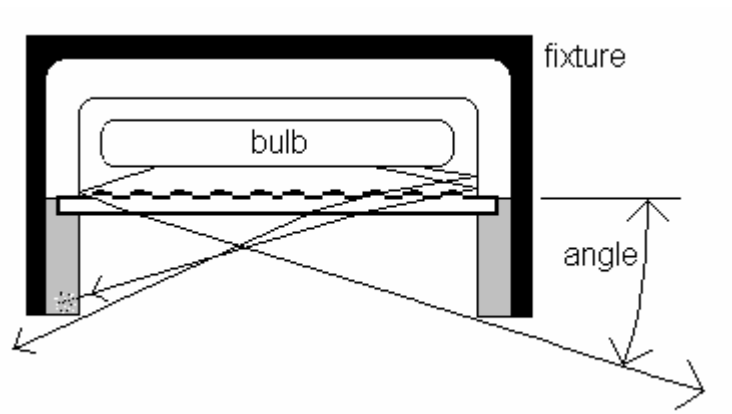
***Shielding Angle (Outdoor Lighting).* The opaque angle shielded below the horizontal plane that runs through the bottom of the light source in a fixture with full oblique shielding. The oblique line along the bottom of the angle coincides with the sight line (see definition of full oblique shielding) along the oblique boundary between the illumination cone and the shielded area above it. Lighting plans use the shielding angles in calculations to plot projections of the sight lines onto land areas. Manufacturers of fixtures can provide specifications with shielding angles or diagrams showing vertical cross sections of the fixtures. Also, direct measurements of actual fixtures can determine shielding angles. Shielding angle and sample light ray paths in vertical cross sections of fixtures appear in the following illustrations showing examples of how to determine a shielding angle:**



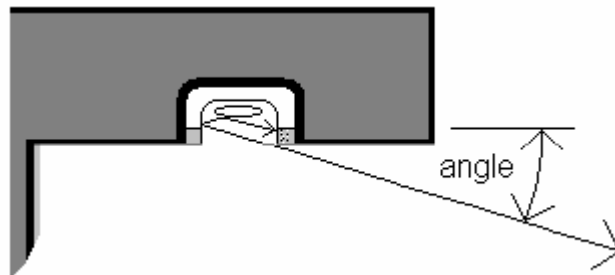
Simple shield blocking light rays above and around sides



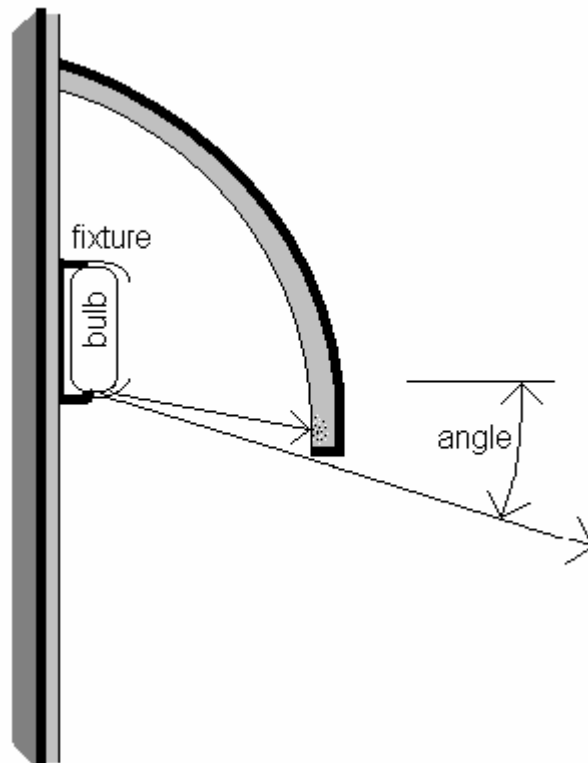
Reflectors redirecting light rays. Shield around bottom does not reflect



Lens diffusing or refracting, i.e., changing direction of light rays



Soffit shielding with recessed fixture



Opaque fabric canopy or fixed-awning shielding a hidden fixture

Sec. 37-599. **Lighting Design Standards.**

37-599.1 Parking Lot Lighting

37-599.1.2 All parking lots where the number of parking spaces exceed ten (10) spaces and are less than fifty (50) spaces, shall at a minimum provide at least one lighting fixture for every ten parking spaces. The fixture shall be mounted at least ten (10) feet above ground. ~~No fixture shall have a cut-off of greater than seventy-five (75) degrees.~~ **All fixtures shall be full cut-off. (see definitions).**

37-599.1.2 All parking lots with fifty (50) or more spaces shall submit a lighting plan which demonstrates that adequate illumination is provided to attain ~~minimum~~ **maximums complying with the National Energy Code** ~~of one footcandle per square foot of surface area.~~ Light fixtures shall operate from dusk until dawn or until the business closes for the night.

37-599.1.3 The owner shall maintain all lights. Lights shall be kept in working order and shall be operated as required. Failure to install, maintain, or operate the required lights, shall be considered a violation and shall be subject to enforcement action in Article XIV, Administration and Enforcement.

37-599.2 Fixture Height

37-599.2.1 Fixture height, measured from finished grade at ground level to the bottom of the light source, determines the vertical point from which the light projects downward. **Regardless of height limits, below, prevention of spill illumination may require lower heights according to calculations and plots in the Lighting Plan. Uplighting is prohibited.**

37-599.3 Limits

37-599.3.1. All light fixtures located within 50 feet of any another property that has an outdoor lighting protected area shall not exceed 16 feet in height.

37-599.3.2. All light fixtures located within 100 feet of any another property that has an outdoor lighting protected area shall not exceed 20 feet in height.

37-599.3.3. All other light fixtures elsewhere shall not exceed 35 feet in height.

(a) Maximum height for luminaries shall be in accordance with the following:

(1) ~~When light source or luminaire has no cutoff:~~

TABLE INSET:

District-	Height-
SF 1, SF 2, IT SF1, IT SF2, MF 1, MF 2, IT NC, IT MFD-	10'-

MF 3, IT MXD, CN-	15'-
CG, CB, IB, I 1, I 2-	20'-

(2) — When light source or luminaire has total cutoff of light at an angle of ninety (90) degrees or greater:

TABLE INSET:

District-	Height-
SF 1, SF 2, IT SF1, IT SF2, MF 1, MF 2, IT NC, IT MFD-	15'-
MF 3, IT MXD, CN-	25'-
CG, CB, IB, I 1, I 2-	35'-

(3) When light source or luminaire has total cutoff of light at an angle of less than ninety (90) degrees and is located so that the bare light bulb, lamp, or light source is completely shielded from the direct view of an observer five (5) feet above the ground at the point at which the cutoff angle intersects the ground:

TABLE INSET:

District	Height
SF-1, SF-2, IT-SF1, IT-SF2, MF-1, MF-2, IT-NC, IT-MFD	15'
MF-3, IT-MXD, CN	25'
CG, CB, IB, I-1, I-2	35'

(b) No luminaire shall be placed within the buffer yard abutting a residential district. Luminaries within twenty (20) feet of a residential district shall have a total cutoff of light at an angle of less than ninety (90) degrees, and is located so that the bare light bulb, or lamp is completely shielded from the direct view of an observer at a point, five feet above the ground at the point at which the cutoff angle intersects the ground. Such light shall face away from any residential district.

37-599.4 Controllers, Timers and Sensors

37-599.4.1 Lights shall not illuminate when not needed. Unnecessary light constitutes a nuisance and wastes municipal funds. Timers, light sensors,

switches, motion detectors, and occupancy sensors will prevent this nuisance and waste.

37-599.4.2 All electrical circuits for outdoor lighting shall have manually controlled switches conveniently located for manual operation.

37-599.4.3 Light sensors shall automatically turn off lights when they sense adequate daylight.

37-599.4.4 Where appropriate, timers shall automatically turn off and turn on lights when their clocks arrive at preset times corresponding to the times needing the lights. Alternatively, the controller may dim lights or allow fewer lights to remain on for security and safety.

37-599.4.5 Motion detectors and occupancy sensors are to be used to activate lights for timed durations when areas are in use or remain off when there is no need for illumination.

37-599.5 *Special Lights*

37-599.5.1 *Aerial Lights* No fixture shall aim light upward to search, sweep, or move through the sky.

37-599.5.2 *Accent Lights* Light used to accent architectural features, fascia, landscaping, art, or similar objects shall not directly illuminate outdoor lighting protected areas. All such light shall terminate so that glare does not affect an adjacent property.

37-599.5.3 *Canopy Lights* A fully opaque canopy, soffit, or overhang may serve as the required horizontal cut off and fixture shielding for lights fully recessed into the underside of the canopy. Such shielding shall appear as part of the Fixture Detail required on a Lighting Plan.

37-599.5.4 *Fascia Lights* Fascia on a canopy shall not include fixtures for outdoor lighting of the site or buildings. A sign on the fascia may include lights to illuminate the sign, but the illuminated area of the fascia shall count toward the maximum sign area permitted by sign regulations.

37-599.5.5 *Gas Pump, Convenience Business, Automatic Teller Machine, and other Required Security Lights* Whenever state or federal law requires certain intense illumination levels for security, then the location, intensity, quantity, height, shielding, and aim of such lights shall satisfy such requirement while still complying with these regulations, e.g., preventing direct illumination off-site, to the maximum extent possible.

37-599.5.6 *Outline Lights* Illuminated tubing, strings of lights, back-lighted objects, or similar fixtures that outline structures, sales areas, roofs, doors, windows, plants, or similar areas shall not light upward.

37-599.5.7 *Projection Lights* All projected light, laser or otherwise, shall terminate on an opaque surface and not shine above the horizontal.

37-599.5.8 *Required Lights* Whenever state or federal law requires certain illumination, e.g., safe access, then the location, intensity, quantity, height, shielding, and aim of such lights shall satisfy such requirements while still complying with these regulations, e.g., preventing direct illumination off-site, to the maximum extent possible.

37-599.5.9 *Stadium and Recreation Lights*

37-599.5.9.1 Whenever players in sporting events and recreational activities require certain intense illumination levels for safety, then the location, intensity, quantity, height, shielding, and aim of such lights shall satisfy such requirement while still complying with these regulations, e.g., preventing direct illumination off-site, to the maximum extent possible.

37-599.5.9.2 The illumination of outdoor recreational activities shall stop at 11:00 PM for the remainder of the night. An activity should not begin earlier if it will normally exceed this time limit. Regardless, an activity already in progress from an earlier starting time may continue with illumination until no later than 11:30 PM. Other lower level illumination may remain for safe spectator departure and security.

37-599.6 *Lighting Plan*

37-599.6.1 *Purpose* A lighting plan shall serve to prevent excessive lighting prior to installation of the fixtures and to avoid costly compliance remedies later.

37-599.6.2 *Submittal* A Lighting Plan shall accompany all applications for Final Site Plan approval of development and redevelopment of nonresidential projects, multi-family dwelling residential projects, and common improvements in other residential projects, e.g., recreational facilities. When these regulations require a Lighting Plan but the project does not require a Final Site Plan, then the plan shall accompany the application for a Building Permit for electrical fixtures. Lighting Plans shall provide enough information to determine that there exists no potential for direct illumination of outdoor lighting protected areas, spill illumination, and compliance with this Section for all lighting not exempted in Section 37-600 below.

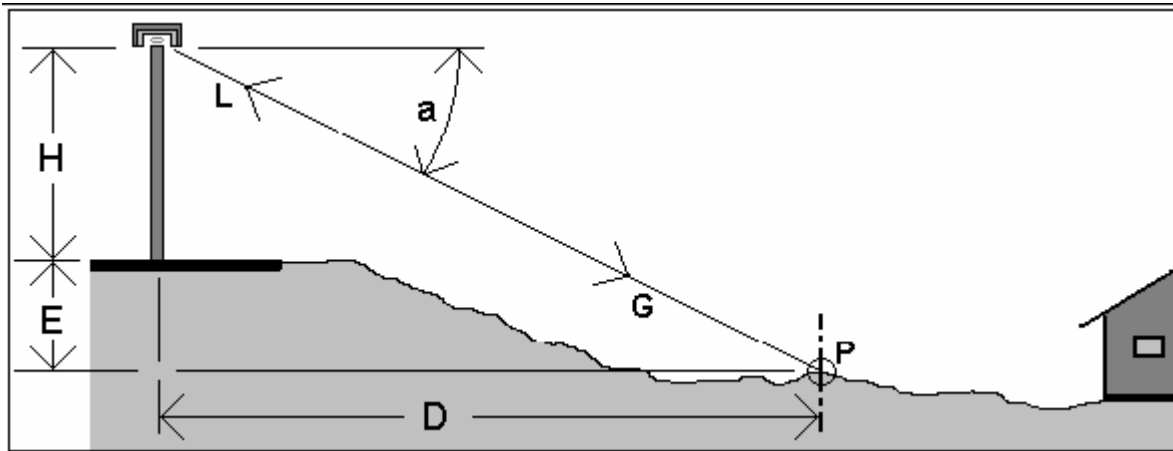
37-599.6.3 *Fixture Locations* A lighting plan shall show the horizontal position of the fixtures on the site.

37-599.6.4 *Fixture Detail* An inset drawing of a typical fixture shall show the directional controls, e.g., shields, reflectors, refractors, and lenses, that will

aim and limit the angle of illumination. The detail shall show the vertical angle of illumination that will determine the shielding angle.

37-599.6.5 Fixture Height and Mounts The plan shall show the height of the fixtures and describe the mounts, e.g., wall, pole, or canopy.

37-599.6.6 Direct Illumination Plots For each and every fixture, the lighting plan shall use the fixture shielding angle and fixture height in calculations to plot the edge of the projection of the expected direct illumination onto the areas, both on-site and off-site, shown on the plan. The calculations and horizontal plots for each and every fixture shall appear on the plan. The horizontal plotting shall result from the following calculations based on the following illustration:



Cross section in the vertical plane through a light fixture, pole, and grade

Legend for symbols in illustration and calculation:

- a shielding angle or cut-off of fixture
- LG line along the oblique boundary between the illumination cone and the shielded area above it, i.e., also the sight line between the light source and ground level at the edge of direct illumination
- P projection of the line LG onto the ground level, i.e., also the edge of direct illumination
- D distance horizontally from light source to P
- H height vertically from ground to bottom of light source
- E elevation difference vertically between ground level below light source and ground level at P
- / divided by
- tan trigonometric tangent function

Calculation of the distance to the edge of direct illumination:

$$D = (H + E) / \tan a$$

37-599.6.7 Photometric Diagram

37-599.6.7.1 Any of the following conditions require that the Lighting Plan shall also include a Photometric Diagram:

- a. A projection of direct illumination within 10 horizontal feet of the property line of outdoor lighting protected areas or a street.
- b. A fixture within 80 horizontal feet of the property line of outdoor lighting protected areas or a street.
- c. A fixture higher than 20 feet above ground level within 600 horizontal feet of the property line of outdoor lighting protected areas.

37-599.6.7.2 A lighting engineer shall prepare the diagram.

37-599.6.7.3 The diagram shall plot foot-candles of illumination calculated:

- a. For the direction of the most illumination from the light sources;
- b. For a height of five (5) feet above ground level;
- c. To the nearest tenth (0.1) foot-candle; and
- d. At horizontal grid intervals of ten (10) feet.

37-599.6.7.4 The diagram shall cover any part of the affected street or property of an outdoor lighting protected area. Such part shall include the area within the circle formed with the light fixture at the center and the radius extending one hundred (100) feet into the affected street right-of-way or property of the protected area.

37-599.6.7.5 The plotted levels of calculated illumination shall determine if the lighting will comply with the Measurable Spill Illumination Limits of this Section.

37-599.6.7.6 Building permits will not be issued if the Lighting Plan does not comply with this code.

37-599.7 Review

709.9.1. The City of Champaign Planning Department shall review the Lighting Plan and ensure compliance with this Section..

37-599.8 Inspection

37-599.8.1 The City of Champaign Planning Department shall inspect the installed lighting fixtures to ensure compliance with this Section and the approved Lighting Plan.

Sec. 37-600. Exempted uses.

The following uses shall be exempted from the lighting design standards:

- ~~(a) Ball diamonds, tennis courts, and playing fields.~~
- ~~(b) Streetlights and fixtures on utility poles.~~

- (a) Lighting for emergency safety repairs or disaster recovery**
- (b) Temporary construction lighting and light for road, utility repairs, or television**
- (c) Lighting for religious or national symbols and/or flags**
- (d) Interior lighting**
- (e) Temporary seasonal lighting provided the individual lamps are 10 watts or less.**

Sec. 37-601. Prohibited lights.

The following lighting is prohibited for all uses in all zoning districts:

- (a) Flickering or flashing lights.
- (b) Laser lights or holograms.

Secs. 37-602--37-630. Reserved.