

Chapter 15.22

Outdoor

Lighting

Section 15.22.010 Short Title. This Ordinance may be cited as the “Outdoor Lighting Ordinance” of the City of Cambridge (the “City”).

Section 15.22.020 Purpose. The purpose of this Outdoor Lighting Ordinance is to regulate outdoor lighting, as defined in this Ordinance, in the City, the intent being to permit an amount of outdoor lighting that is appropriate to allow for the safe use and enjoyment of outdoor areas, while also mitigating potential nuisance in the form of light trespass and glare to abutters and the public at large, reducing light pollution, and promoting energy conservation.

Section 15.22.030 Definitions.

- A. **Architectural lighting** means lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is secondary.
- B. **Building envelope** means the separator between the interior and exterior of a building. Components of the envelope are typically: walls, floors, roofs, fenestrations and doors.
- C. **Correlated color temperature (“CCT”)** means a specification of the color appearance of the light emitted by a lamp, relating its color to the color of light from a reference source when heated to a particular temperature, measured in Kelvin (K).
- D. **Emergency lighting** means lighting that is only activated during an emergency; lighting for illuminating the path of egress solely during a fire or other emergency situation or, lighting for security purposes used solely during an alarm.
- E. **Fully shielded light fixture** means a light fixture constructed, installed and maintained in such a manner that all light emitted by the light fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the light fixture, is projected below the horizontal plane through the light fixture's lowest light-emitting part.
- F. **Glare** means lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

- G. High Intensity Discharge (“HID”)** means a discharge lamp where the emitted energy (light) is produced by the passage of an electric current through a gas. HID includes mercury, metal halide, and high pressure sodium (“HPS”) lamps.
- H. Illuminance** means the density of the luminous flux incident on a surface; it is the quotient of the luminous flux by the area of the surface when the latter is uniformly illuminated.
- I. Lamp means** a source of optical radiation, often called a “bulb” or “tube,” such as incandescent, fluorescent lamps, high-intensity discharge (“HID”) lamps, and low pressure sodium (“LPS”) lamps, as well as light-emitting diode (“LED”) modules and arrays.
- J. Landscape lighting** means lighting of trees, shrubs, or other plant material as well as ponds and other landscape features.
- K. Light bulb. See “Lamp.”**
- L. Light fixture See “Luminaire”** means a complete lighting unit consisting of one or more light bulbs together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply. Sometimes this includes ballasts or drivers, and photocells. For the purpose of this Ordinance, light fixture shall be synonymous with luminaire.
- M. Light trespass** means lighting that falls beyond the boundaries of the property it is intended to illuminate.
- N. Lighting** means electric, man-made, or artificial lighting. See lighting equipment.
- O. Lighting equipment** means equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(es), electrical wiring, and related structures or other necessary or auxiliary components.
- P. Lighting plan** means a site plan depicting the property lines of all properties for which lighting is proposed, the location and specification of all exterior light fixtures to be installed within the property, their lumen values, mounting heights, shielding and directionality, controls and the location of all adjacent streets, the uses of abutting properties and properties located directly across a street, any relevant project site conditions, vertical illuminance calculations, [lighting boundaries](#), and any additional information required to demonstrate compliance with applicable standards.
- Q. Lighting pollution** means adverse effects of lighting, as defined in this Ordinance, including, but, not limited to, glare, light trespass, sky glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

- R. Lighting Zone (“LZ”)** means an area or district within which particular lighting standards apply as set forth in this Ordinance. Lighting Zones are delineated by reference to the districts established with the Zoning Map of the City of Cambridge. **Lighting Zone 3 includes the following applicable zoning districts:** Residence C-3, C-3A or C-3B; Office 2, 2A or 3; Business B or C; Industry B, B-1, B-2 or C; Special Districts 1, 3, 4, 4A, 5, 6, 7, 8, 11, 15 and any other Special District whose general zoning limitations derive from one of the previously listed base zoning districts; Mixed-Use Development District: Kendall Square (MXD) and Cambridgeport Revitalization Development District (CRDD); all Planned Unit Development (PUD) districts and Alewife Overlay Districts (AOD). **Lighting Zone 2 includes the zoning districts not listed under Lighting Zone 3.**
- S. Low-Pressure Sodium (“LPS”)** means a discharge lamp where the light is produced by radiation from sodium vapor at a relatively low partial pressure (about 0.001 torr). LPS is a “tube source” and is monochromatic light.
- T. Lumen** means the unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire or light fixture (as distinct from “watt” or other measure of a lamp’s power consumption).
- U. Luminaire See “Light Fixture.”** means a complete lighting fixture, consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light from the fixture (i.e., reflector, lens, diffuser), to position and protect the fixture, and to connect the fixture to the power supply.
- V. Lux** means the SI (International System of Units) unit of illuminance. One lux equals one lumen per square meter and is approximately equal to 1/10 of a foot candle.
- W. New lighting** means lighting for areas not previously illuminated, or newly installed lighting of any type, except for replacement lighting or lighting repairs.
- X. Outdoor or exterior lighting** means lighting equipment installed within the property line and outside the building envelope of a subject property, whether attached to poles, building structures, the earth, or any other location, and any associated lighting control equipment.
- Y. Partly shielded light fixture** means a light fixture with opaque top and translucent or perforated sides, designed and maintained to emit most light downward.
- Z. PUBLIC WAY**
- AA. Replacement lighting** means lighting installed in order to replace existing lighting
- BB. Seasonal lighting** means holiday lighting in use for not longer than a six week period in any

Commented [BC1]: CLA requested a definition for Public Way. The Law Department will include, if necessary.

Commented [L2]: CLA Clarify with Legal

calendar year.

CC. Shielded directional light fixture means a fixed or adjustable light fixture ~~that includes an adjustable mounting device allowing aiming in more than one direction and~~ that also contains a shield, hood, cowl, louver, or baffle to reduce direct view of the lamp.

Commented [BC3]: Proposed change to definition to specify lighting condition in Prescriptive Standard.

DD. Substantial renovation ~~rehabilitation~~ means work area defined in construction documents is 50% or more of the gross floor area of the building or 50% of the gross façade of a building.

Commented [BC4]: Ranjit is comfortable with this definition but reviewing for final determination.

EE. Sky glow means the brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere, caused by light directed or reflected upwards or sideways, and which reduces ability to view the night sky.

FF. Unshielded light fixture means a light fixture capable of emitting light in any direction.

GG. Vertical illuminance means illuminance measured or calculated in a plane perpendicular to the property boundary or property line of a subject property.

Section 15.22.040 Effective Date This Ordinance shall take effect on three (3) months from the date of enactment.

Section 15.22.050 General Requirements.

- 1) **Conformance with all Applicable Codes.** Except as otherwise provided in this Ordinance, all outdoor lighting, as defined in this Ordinance, shall be installed and maintained in conformance with all applicable federal, state, and local laws, rules, and regulations, including, but not limited to, applicable sections of the Massachusetts Building Code, the Cambridge Zoning Ordinance, and the Cambridge Municipal Code.
- 2) **Applicability.** Except as set forth in this Ordinance, all outdoor lighting installed after the effective date of this Ordinance shall comply with the requirements of this Ordinance. This includes, but is not limited to, new lighting, replacement lighting, or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party that receives an electrical permit from the City’s Inspectional Services Department. Except as otherwise provided in this Ordinance, all outdoor lighting installed prior to the effective date of this Ordinance shall be altered or replaced so as to comply with these requirements within five (5) years of the effective date of this Ordinance.
- 3) **Replacement of Light Fixtures and Light Bulbs.** When any outdoor light fixture is replaced, the replacement light fixture shall comply with this Ordinance. Where a light bulb is replaced within an existing non-compliant light fixture, and the light fixture itself is not

Commented [BC5]: No additional reference is necessary to invoke the Zoning Ordinance. Each ordinance will stand on its own merit.

replaced or repaired aside from the replacement of the light bulb, the light fixture may remain provided that the replacement light bulb is compliant with the applicable [Standards](#) set forth in this Ordinance, and provided that the light fixture is not otherwise altered to be in greater non-compliance with the requirements of this Ordinance.

4) **Interim Modifications.** Within six months of the effective date of this Ordinance, property owners shall make improvements to eliminate or substantially ameliorate light trespass onto adjacent lots by: (1) replacing a light bulb within an existing light fixture to be in conformance with the Standards of this Ordinance, and/or (2) changing the direction of an existing fixture to be directed downward or away from abutting properties. ~~They may also choose to replace the light fixture to achieve compliance.~~

5) **Light Color Standard.** Correlated color temperature of any outdoor light source shall not exceed 3500 Kelvins.

6) **Substantial Renovation.** If any substantial renovation of an existing building or property occur after the effective date of this Ordinance, then that property shall be required to meet either the Prescriptive or Performance Standards set forth in this Ordinance.

7) **Prescriptive Standards and Performance Standards.**

As set forth below, all outdoor lighting must comply with one of the two following standards, the Prescriptive Standard or the Performance Standard, as well as the Light Color Standard.

Prescriptive Standards

Outdoor Lighting Category	Maximum -Allowed Lumens Per Light Fixture	Maximum Height	Shielding and Direction
Unshielded or partly shielded light fixture placed not less than 4 feet apart	315	12 feet above the surface of the area to be illuminated	Not applicable

Commented [BC6]: The proposed addition by CLA is not necessary in this section since it would not be considered an interim modification but a compliant replacement.

Commented [BC7]: Concern was raised by Consultant that the LEED Light Pollution Reduction Credit does not have a color temperature restriction. The Task Force did not address this concern.

Commented [BC8]: Proposal by CLA to simplify the trigger for existing buildings to comply with ordinance. Ranjit is comfortable with this addition but will review for a final determination.

I have a concern that this will force property owners to replace light fixtures that do not impact neighboring properties and have not received a complaint. This deviates from a complaint-driven system.

Lisa has concerns that this will force property owners to replace perfectly good fixtures that don't offend neighbors.

Commented [BC9]: Proposal by CLA to allow any property owner to choose to comply with either the Prescriptive Standard or the Performance Standard. The TFMs agreed with this proposal.

Up to two unshielded or partly shielded light fixtures located at a main entry, placed not less than 4 feet apart.	630	12 feet above the surface of the area to be illuminated	Not applicable
Shielded directional light fixtures for entries, walkways, and architectural lighting, placed not less than 4 feet apart.	1,050	12 feet above the surface of the area to be illuminated	All light fixtures shall be located, aimed, and shielded so as to prevent direct light trespass and greatly minimize reflective light pollution and light trespass across property boundaries.
Shielded directional light fixtures for parking areas, driveways, or outdoor loading bays.	1260	14 feet above the surface of the parking area, driveway or loading bay	All light fixtures shall be located, aimed, and shielded so as to prevent direct light trespass and greatly minimize reflective light pollution and light trespass across property boundaries.

Commented [BC10]: Suggestion by some TFMs to strengthen language but not require zero light trespass.

Commented [BC11]: Suggestion by some TFMs to strengthen language but not require zero light trespass

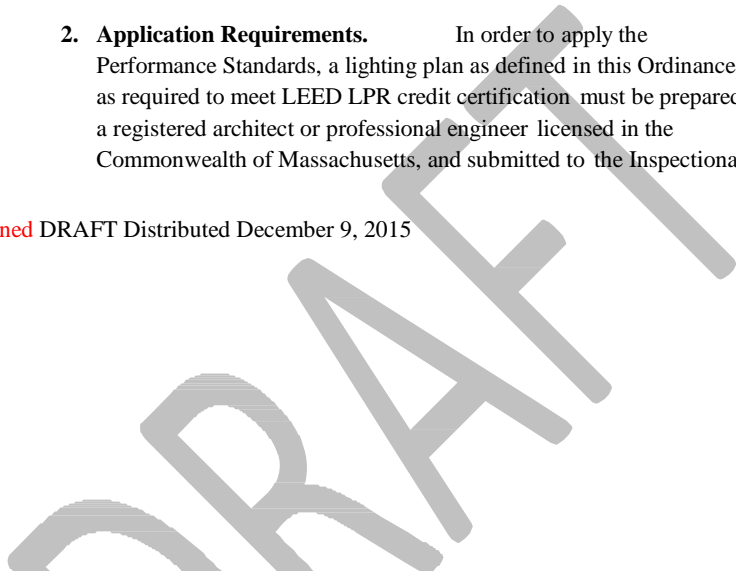
Performance Standards.

1. Standards.

The project must meet the requirements of the Light Pollution Reduction credit of the U.S. Green Building Council’s LEED v4 BD+C rating system,

Commented [BC12]: CLA proposed inclusion of light trespass limitations but the LEED Light Pollution Reduction Credit already requires that applicants meet uplight and light trespass requirements following either the BUG rating method or the calculation method.

2. Application Requirements. In order to apply the Performance Standards, a lighting plan as defined in this Ordinance or as required to meet LEED LPR credit certification must be prepared by a registered architect or professional engineer licensed in the Commonwealth of Massachusetts, and submitted to the Inspectional



Services Department with accompanying calculations certifying that the lighting depicted in the lighting plan shall conform to the Performance Standards set forth in this Ordinance. The Performance Standards shall not be applied unless such a lighting plan has been approved by the Commissioner of Inspectional Services or her/his designee. Nevertheless, should the lighting as installed and maintained fail to meet the minimum LEED v4 BD+C LPR credit requirements and be determined to be in violation of the light trespass protections afforded in the LEED LPR system, then that lighting shall be considered in violation of this Ordinance.

Commented [BC13]: Peter Caulkins raised concern that this will be interpreted that building owners will automatically be considered out of compliance if a lighting plan is not submitted after 5 years to prove the building is in compliance, even if a complaint has not been raised.

H. Exemptions from Applicability.

1. Lighting within public ways for the principal purpose of illuminating public ways. No exemption shall apply to any lighting within a public way when the purpose of the luminaire or light fixture is to illuminate areas outside the public way, other than as provided in this Ordinance.
2. Lighting for public parks or public art that is accessible to the general public and is commissioned, owned, or operated by a city, state, or federal entity, or that is required by the City, by special permit, or otherwise by law.
3. Lighting for public monuments, statuary, or the national flag in cases where compliance with the Standards of this Ordinance are specifically prohibited by law or conflicting with superseding requirements.
4. Architectural lighting that has received a Certificate of Appropriateness from the Cambridge Historical Commission or neighborhood conservation district commission.
5. Architectural lighting of structures or buildings listed on the National Register of Historical Places.
6. Lighting solely for signs as regulated under Article 7 of the Cambridge Zoning Ordinance.
7. Lighting for theatrical or television production; or performance areas, if an electrical permit has been received from the City's Inspectional Services Department.
8. Lighting for work areas at construction sites, if an electrical permit has been received from the City's Inspectional Services Department.
9. Underwater lighting in swimming pools and other water features.
10. Seasonal lighting as defined in this Ordinance.
11. Lighting for hospital emergency departments, including associated helipads.

Commented [BC14]: TFMs proposed the move of this qualifying segment directly after "public parks or public art".

Commented [L15]: This is subjective and can't be included in an ordinance. CB is looking into national flag lighting standards

Commented [BC16]: Representatives from Mt. Auburn Hospital and Cambridge Hospital did not have a problem removing this exemption. They follow NFPA or Health Care Facilities Code.

~~12.11.~~ Lighting that is only used under emergency conditions.

~~12.~~ Lighting required by federal, state, or local laws, rules or regulations ~~to be in non-conformance with this Ordinance.~~

~~13.~~ Lighting for sports facilities, including but not limited to unconditioned rinks, open courts, fields, and stadiums, except if aimed and directed in a way that causes unnecessary light trespass and sky glow. Lighting for the playing surfaces must be turned off after the activities have ceased or 11:00 PM, whichever is earlier.

Commented [BC17]: CLA proposed including this qualifying text however we do not have the authority to stipulate conditions to how federal, state, or local laws, rules or regulations are applied.

Commented [BC18]: Addition of an exemption for sports facilities with curfew. Reviewing if additional requirement to minimize light trespass and sky glow is too subjective.

Commented [BC19]: CLA proposed additional language that limited the amount of time and Administrative Exemption was in force. After further discussion, the TFMs agreed that the Commissioner should have the power to repeal or alter the exemption after two years.

Section 15.22.060 Administrative Exemption. ~~The Commissioner of Inspectional Services shall have the authority to grant a partial or complete waiver of the requirements of this Ordinance where the property owner has submitted an Application for Administrative Exemption demonstrating that: 1) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would constitute a demonstrably unreasonable hardship on the applicant, as balanced against the potential impacts on abutters and others affected by the lighting; or 2) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would result in conditions that are detrimental to public health, safety, or welfare. The property owner seeking the administrative exemption shall file the Application for Administrative Exemption with the Inspectional Services Department demonstrating one of the two requirements for an administrative exemption listed above. The ISD shall give fair notice to abutters and others affected by the lighting and provide an opportunity for them to state their case. All decisions on administrative exemptions shall state the reasons clearly and be available as public records. The Administrative Exemption can be reviewed, adjusted or repealed by the Commissioner of Inspectional Services, if appropriate, after two years.~~

1. The Commissioner of Inspectional Services (ISD) shall have the authority to grant a partial or complete waiver of the requirements of this Ordinance where the property owner has submitted an Application for Administrative Exemption.

2. Any person seeking an exemption to this Ordinance shall file an application with ISD. The Application for Administrative Exemption must demonstrate that: a) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would constitute a demonstrably unreasonable hardship on the applicant, as balanced against the potential impacts on abutters and others affected by the lighting; or b) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would result in conditions that are detrimental to public health, safety, or welfare. The property owner seeking the administrative exemption shall file the Application for Administrative Exemption with the Inspectional Services Department demonstrating one of the two requirements for an administrative exemption listed above.

3. ISD shall then give fair notice to abutters. Any individual who claims to be adversely affected by allowance of the exemption may file a statement with ISD containing any information to support his/her claim.

4. In determining whether to grant or deny the application, the Commissioner of Inspectional Services shall balance the hardship to the applicant and the community, of not granting the exemption, against the adverse impact on the health, safety, and welfare of persons affected, the adverse impact on property affected, and any other adverse impacts of

granting the special exemption. Applicants for exemption and other persons contesting exemption may be required to submit any information the Commissioner of Inspectional Services may reasonably require. In granting or denying an application, the Commissioner shall place on public file a copy of the decision and the reasons for denying the exemption.

5. Exemptions shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. The exemption shall not become effective until all conditions are agreed to by the applicant. Noncompliance with any condition of the exemption shall terminate it and subject the person holding it to those provisions of this Ordinance.

6. The Administrative Exemption may be reviewed, adjusted, or repealed by the Commissioner of Inspectional Services, if appropriate, after two years.

7. The Commissioner of Inspection Services may issue guidelines defining the procedures to be followed in applying for a special variance and the criteria to be considered in deciding whether to grant a special variance.

Section 15.22.070 Enforcement.

A. Enforcement Officials. The Commissioner of Inspectional Services or her/his designee shall be the authorized enforcement personnel charged with the enforcement of the provisions of this Ordinance.

B. Violations. Authorized enforcement personnel may order and specify remedial actions to be taken by a violator of this Ordinance to achieve compliance, or issue citations, pursuant to G. L. c. 40, § 21D, for violations of these provisions, assessing fines of three hundred dollars for each such violation. Each day such a violation continues shall constitute a separate offense. Additionally, any person found to be in violation of any of the provisions of this Ordinance may be prosecuted for a misdemeanor and upon conviction thereof shall be fined three hundred dollars for each such misdemeanor.

C. Injunction. As an additional remedy, any outdoor lighting installed or maintained in violation of any provision of this Ordinance may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

D. Suspension or Revocation of Permit. As an additional remedy, any enforcement official hereunder may summarily suspend, and after a hearing may revoke, any license or permit, including a building, demolition, or electrical permit.