Ordinance comments received from Carol Lynn Albert, Charles Teague, David Chilinski, Kenneth E. Taylor, Thomas Stohlman, and Kelly Beatty on 10.28.2015

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). [RPI Color Research Center]

D. Emergency lighting means lighting that is only activated during an emergency; for instance, 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, and 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.
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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.

**Commented [CA2]:** If the argument for keeping in this definition and that of Low Pressure Sodium is that these terms are mentioned in another definition, then definitions must also be provided for Light Emitting Diodes, Kelvin, illuminance, footcandle, monochromatic, and several other terms.

**ADD DEFINITION FOR “ILLUMINANCE” USED IN DEFINITION FOR VERTICAL ILLUMINANCE.** Illuminance or light level means the intensity of visible light hitting or passing through a defined area on a two-dimensional plane, usually measured in lumens per square meter or lux.

**ADD DEFINITION FOR “INITIAL LUMENS” (USED IN PRESCRIPTIVE TABLE): OR, BETTER, CHANGE COLUMN HEADING IN PRESCRIPTIVE TABLE TO SAY MAXIMUM ALLOWED LUMENS (INSTEAD OF MAXIMUM INITIAL LUMENS)**

Initial lumens means the amount of light output from a lamp when it is new.
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L.H. Lamp means a source of optical radiation, often called a “bulb” or “tube,” such as, but not limited to incandescent, fluorescent lamps, high-intensity discharge (“HID”) lamps, and low pressure sodium (“LPS”) lamps, and as well as light-emitting diode (“LED”) modules and arrays.

J.I. Landscape lighting means lighting of trees, shrubs, or other plant material as well as ponds and other landscape features. Lighting which is positioned and aimed to illuminate foliage, yards, gardens, sculptures, driveways, walkways, patios, decks, and other exterior areas.

K.J. Light bulb. See “Lamp.”

L.K. 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 lamp 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.L. Light trespass means lighting that falls beyond the boundaries of the property it is intended to illuminate.

N.M. Lighting means electric, man-made, or artificial lighting. See lighting equipment.

O.N. 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.O. 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 positions and uses of abutting properties and properties located directly across a street, any relevant project site conditions, vertical illuminance calculations at the property boundaries, and any additional information required to demonstrate compliance with applicable standards.

Q.P. 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.Q. Lighting Zone ("LZ") means an overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.

S.R. 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
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“tube source” and is monochromatic light.

Commented [CA9]: See comment on HID definition.
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**T.S. 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.T. 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.Y. Lux** means the unit of measure used to quantify illuminance, the intensity of visible light hitting or passing through a defined area on a two-dimensional plane, the SI unit of illuminance. One lux is equal to one lumen per square meter and is \(1 \text{ Lux} = \frac{1}{10} \text{ footcandle}\). One lux equals approximately 1/10 footcandle.

**W.Y. New lighting** means lighting for areas not previously illuminated, or newly installed lighting of any type, except for replacement lighting or lighting repairs.

**X.W. 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.X. Partly shielded light fixture** means a light fixture with opaque top and translucent or perforated sides, designed to emit most light downward.

**Z.Y. Replacement lighting** means lighting installed in order to replace existing lighting.

**AA.Z. Seasonal lighting** means holiday lighting in use for not longer than a four week period in any calendar year.

**AA Shielded directional light fixture** means a 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.

**Add definition for "Public ways"**

**BB. 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.

**CC. Temporary lighting** means lighting not covered under an electrical permit issued by the City’s Inspectional Services Department and installed and operated for periods up to 30 days, and thereafter, completely removed and not operated again for a period of at least 360 days.

**Commented [CA10]:** no one knows what SI means. This rewrite is in alignment with the definition for lumen, above.

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**Commented [CA11]:** This is wrong. It’s not needed, but it should say .1 footcandle.

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**Commented [CA12]:** This phrase doesn’t make any sense here.

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**Commented [CA13]:** Add definition for Public Ways. BTW, in Zoning Ordinance, “streets” are defined as including both public and private ways.

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**Commented [CA14]:** This is a circular definition. We need more. At what point does replacement lighting become new lighting? Not clear.

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**Commented [CA15]:** We might as well just put the same wording as the Zoning Ordinance here.

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**Commented [CA16]:** This needs to be in here.

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**Commented [CA17]:** Why do we even need this “Temporary Lighting” definition in here? The only place in the Ordinance where the term “temporary lighting” occurs is in the Exemptions Section, where it is in any case excluded.

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**Commented [CA18]:** This would limit it to four rather than 6 months a year.
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Additional restrictions may apply in zoning districts specified in Article 7, Section 7.20 of the Cambridge Zoning Ordinance.

Commented [CA19]: Why is this here? This is just a list of definitions, not rules about lighting in the city.

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

**EE. 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. Provisions in the Cambridge Zoning Ordinance Article 7.20 regarding lighting in residential zones A, B, C, and D shall remain in force alongside provisions in this Ordinance. Provisions in the Cambridge Zoning Ordinance Articles 6.41, 6.46, and 6.93 regarding lighting parking areas and loading bays remain in force alongside provisions in this ordinance. Nothing in this Ordinance shall be construed to override provisions in the Cambridge Zoning Ordinance Article 7.0 on Signs and Illumination.

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.

a) **Lighting Zones.** Accompanying this Ordinance is a map of the City defining an two overlay lighting zones, LZ2 and LZ3, corresponding to internationally-accepted lighting zones codified by the Illuminating Engineering Society, the International Dark Sky Association, and the Green Building Council. LZ2 includes predominantly residential zones of the City and LZ3 includes more densely developed and predominantly commercial zones. In this Ordinance, some standards and requirements vary according to these lighting zone designations.

b) **Prescriptive and General Performance Standards in LZ2 and LZ3.**

1) In LZ2, all new or significantly rehabilitated properties of 10,000 square feet gross floor area (GFA) or greater must meet the Performance Standards set out in this Ordinance. Existing properties of any size may of this size or greater must conform to either the Performance Standards or the Prescriptive Standards for LZ2.

2) In LZ3, all new or significantly rehabilitated properties of 10,000 square feet gross floor area (GFA) or greater must meet the Performance Standards set out in this Ordinance. In this Ordinance, some standards and requirements vary according to these lighting zone designations.

3) In both LZ2 and LZ3, all new or significantly rehabilitated properties of less than 10,000 square feet gross floor area (GFA) or properties receiving a pre-certification under LEED for Existing Buildings may choose to comply with the Performance Standards or the Prescriptive Standards for either LZ2 or LZ3.

4) In both LZ2 and LZ3, all new or significantly rehabilitated properties of less than 10,000 square feet gross floor area (GFA) or properties receiving a pre-certification under LEED for Existing Buildings may choose to comply with the Performance Standards or the Prescriptive Standards for either LZ2 or LZ3.

5) In both LZ2 and LZ3, all new or significantly rehabilitated properties of less than 10,000 square feet gross floor area (GFA) or properties receiving a pre-certification under LEED for Existing Buildings may choose to comply with the Performance Standards or the Prescriptive Standards for either LZ2 or LZ3.

6) In both LZ2 and LZ3, all new or significantly rehabilitated properties of less than 10,000 square feet gross floor area (GFA) or properties receiving a pre-certification under LEED for Existing Buildings may choose to comply with the Performance Standards or the Prescriptive Standards for either LZ2 or LZ3.
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2) In LZ3, all new or significantly rehabilitated properties of 25,000 square feet GFA or greater must meet the Performance Standards set out in this Ordinance. All other existing properties of this size or greater must may conform to either the Performance Standards or to the Prescriptive Standards.

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 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 initial lumen standards or vertical illuminance 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. Any change-out of 25% or more of existing outdoor light fixtures shall trigger change-out of all existing outdoor light fixtures.

4) Interim Modifications. Within six months of the effective date of this Ordinance, property owners shall make improvements where possible 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 lumen standards of this Ordinance, and/or (2) changing the direction of an existing fixture to be directed downward or away from abutting properties.

5) Light Color.
   a) Correlated color temperature of any outdoor light source shall not exceed 3500 Kelvins.
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6) Prescriptive Standards. Exterior lighting that meets the standards set forth in the table below shall be permitted in the City; however, if the development or significant rehabilitation of at least twenty-five thousand (25,000) square feet of Gross Floor Area occurs on a property after the effective date of this Ordinance, then that property shall be required to meet the Performance Standards set forth in this Ordinance. Any other lighting that does not meet the standards set forth in the table below may be permitted in the City only if it voluntarily meets the Performance Standards set forth in this Ordinance.

<table>
<thead>
<tr>
<th>Outdoor Lighting</th>
<th>Maximum Initial Allowed Lumens Per Light Fixture</th>
<th>Maximum Height</th>
<th>Shielding and Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unshielded or partly shielded light fixture for entries, work areas, or walkways, placed not less than 4 feet apart</td>
<td>315</td>
<td>12 feet above the surface of the area to be illuminated</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Unshielded or partly shielded light fixtures located in a front yard between the building and street in one main entry area, placed not</td>
<td>630</td>
<td>12 feet above the surface of the area to be illuminated</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Fully shielded or shielded directional light fixtures for entries and walkways, placed not less than 4 feet apart, open spaces, or buildings</td>
<td>1,050</td>
<td>12 feet above the surface of the area to be illuminated</td>
<td>All light fixtures shall be located, aimed, and shielded so as to minimize light pollution and light trespass across property boundaries. In LZ2, light trespass of more than 1 lux of vertical luminance shall not be allowed. Must be fully shielded or directed away from all properties that are abutting or located directly across a street</td>
</tr>
</tbody>
</table>
### 6. Performance Standards

An outdoor lighting installation may only exceed the limitations set forth in the Prescriptive Standards in this Ordinance if the lighting complies with the Performance Standards in this Ordinance. As set forth above, **adherence to Performance Standards is required in LZ3 if the development or significant rehabilitation of at least twenty-five thousand (25,000) square feet of Gross Floor Area is to take place on a property after the effective date of this Ordinance, and adherence to Performance Standards is required in LZ2 if the development or significant rehabilitation of at least ten thousand (10,000) square feet of Gross Floor Area is to take place after the effective date of this Ordinance.** Existing properties in either Lighting Zone have five years to conform with this requirement, although they will still need to comply with provisions 3 ("replacement of light fixtures and light bulbs") and 4 ("interim modifications").
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.

2. Application Requirements. In order to apply the Alternative 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 Alternative Performance Standards set forth in this Ordinance. The Alternative 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 LPC 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.

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 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 to be accessible to the general public, however, it will be requested and expected that these entities shall make their best efforts to install and maintain such lighting in a manner that conforms with this Ordinance.

3. Lighting for public monuments, statuary, or the national flag.

4. Architectural lighting that has received a Certificate of...
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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.

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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 hardships 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.

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, and will be given the necessary resources to do so, including light meters with sensitivity to .01 lux.

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
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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.