



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

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Community Development

To: Planning Board
From: CDD Staff
Date: July 9, 2013
Re: **Teague, et al. Zoning Petition (Lighting Standards)**

Based on comments and suggestions made at the Board's June 18 hearing, we have prepared a modified zoning text for this petition. The modifications respond to the Planning Board's concerns and were developed after reviewing other cities' lighting codes and other relevant documents.

This has been presented in the form of a DRAFT Planning Board recommendation, so that the Board may review, comment on, and approve a final recommendation to the City Council.

Staff will be present at the July 16 meeting to answer any questions and to discuss any changes to the recommendation.



CITY OF CAMBRIDGE, MASSACHUSETTS

P L A N N I N G B O A R D

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

Date:	DRAFT – FOR PLANNING BOARD REVIEW
Subject:	Teague, et al. Zoning Petition
Recommendation:	DRAFT – The Planning Board recommends ADOPTION of the petition, with suggested MODIFICATIONS (attached)

To the Honorable, the City Council,

The Planning Board supports the effort to protect residents from excessive lighting and glare caused by adjacent properties. The public, the Board and the Community Development Department have noted instances where offensive outdoor lighting has not been adequately addressed by application of the current zoning regulations. Moreover, the City has an interest in promoting efficient use of lighting for broader environmental reasons.

In recent years, many other local jurisdictions have revised their lighting regulations (through zoning or other ordinances) to address concerns about light trespass, glare, light pollution or energy conservation. Public testimony on this matter has also indicated that there is a strong public health interest in having effective lighting controls. The Board believes that it is an appropriate time to update the lighting regulations for Cambridge.

However, there are some concerns with the proposed zoning text, which the Board has enumerated below. At some point, it may be appropriate for the City to engage the assistance of a lighting specialist to develop a more comprehensive set of regulations, as other jurisdictions have done. For now, the Board has suggested some modifications that are intended to maintain the overall spirit and objective of the petition while addressing the Board's specific concerns.

Concerns

- Scope of Regulations. The proposed zoning text would establish a citywide ban on any light for which the light source is visible to an observer from a nearby property or street. No exceptions are provided, and therefore a very large number of properties around the city may be affected. Many different types of lighting, including small porch lights, historic fixtures, and some city street lighting or park lighting may become nonconforming under this definition. Even when neighbors do not object, there could be legal and sometimes financial implications to having a zoning nonconformity on one's property.

- Enforcement. The proposed text and the petitioner’s testimony suggest that a daytime photograph of a light source is sufficient to prove whether a zoning violation has occurred. While it is important to provide opportunities for neighbors to report violations, this standard could lead to a proliferation of complaints and no clear method for resolving them. Although the regulation is intended to be “complaint driven,” the Inspectional Services Department would be forced to exercise a wide degree of discretion in dealing with complaints, which may lead to uncertain results or protracted disputes without any clear resolution.
- Unintended Consequences. Despite the apparent simplicity of the zoning text, the results could be very open-ended. It would affect virtually any new project from a large office building to a small home renovation, and could potentially affect every type of lighting whether it is indoor or outdoor, temporary or permanent. Therefore it is difficult to predict the full range of impacts it will have, and it could result in over-regulation of lighting that the petition does not intend to impact. While it is always impossible to prevent every unforeseen effect of a zoning change, the concern can be mitigated by providing some more detail on what the rules mean, where they will apply and how they will be enforced.

Proposed Modifications

The Board’s recommended changes address the concerns above in a few ways while remaining as close as possible to the intent of the proposed regulations as characterized by the petitioner at the Board’s hearing. This modified text was developed after consulting lighting ordinances used by other cities, “model ordinances” provided by organizations with expertise in lighting regulation, and other relevant documents, which are referenced further below.

- Applicability. The modified text clarifies that the regulations apply to outdoor lighting, which, based on testimony, appears to be the target of the proposed regulation. It also provides some exceptions to limit the scope to avoid unnecessary impacts. For instance, all public lighting is exempted to avoid potential conflicts where the public may desire a particular degree of lighting in its spaces for security or other reasons. Such exceptions are present in other lighting ordinances that were consulted.

The scope is also clarified to ensure that whenever zoning compliance is triggered, any outdoor lighting must also comply with the regulations. Although zoning does not have the power to require replacement of existing nonconforming fixtures, it can ensure that all new lighting and all new development adheres to the standards.

- Regulations. An important but subtle modification is the change from simply restricting “direct light” to specifying that outdoor luminaires must be shielded and positioned so that all direct light is pointed downward and confined to the property. That way, it is not the light itself but the light fixture that would be deemed conforming or nonconforming, which allows for more straightforward enforcement. There are also proposed standards by which a property owner could prove that the lighting is not offensive, either because neighbors have given permission (a provision included in Netwon’s lighting code) or because the lighting falls below certain intensity standards.

- Enforcement. Most zoning enforcement occurs at the stage of issuing permits for construction or occupancy of a building. Although impacted neighbors may submit requests for zoning enforcement, resolving disputes after a building has been constructed can often be lengthy and complicated. Given the nature of the proposed regulations and the suggestion of the petitioner that neighbors could participate in the enforcement process by photographing and reporting violations, the Board feels it would be beneficial to spell out a process for submitting complaints and allowing property owners to respond before legal avenues of zoning enforcement action are pursued.

References

The following ordinances and other documents were consulted in preparing the modified text. Most of these ordinances are much more extensive and detailed than the proposed zoning change, and only certain parts that are related to the subject of the petition were selected and adapted for inclusion into the recommended text. It is worth noting that, in many cities, the regulations are not included within zoning or other land use ordinances but within general city ordinances.

- American Planning Association, *Zoning Practice Issue 12: Practice Energy Efficiency*, December, 2012.
- International Dark Sky Association and Illuminating Engineering Society (IDA/IES), *Model Lighting Ordinance*, June 15, 2011. <http://www.darksky.org/outdoorlighting/mlo>
- Boulder, Colorado Outdoor Lighting Code (Section 9-9-16 of Boulder Revised Code). http://www.colocode.com/boulder2/chapter9-9.htm#section9_9_16
- Cottonwood, Arizona Outdoor Lighting Code (Section 408). <http://cottonwoodaz.gov/planning/ZoningOrd/Outdoor%20Lighting%20Requirements.pdf>
- Newton, Massachusetts Light Trespass Ordinance (Chapter 20, Sections 23-28 of Newton City Ordinances). <http://www.newtonma.gov/civicax/filebank/documents/44022>
- City of Tucson/Pima County, Arizona Outdoor Lighting Code, 2012. http://cms3.tucsonaz.gov/files/dsd/Codes-Ordinances/2012_outdoor_lighting_code_.pdf

DRAFT – FOR PLANNING BOARD REVIEW

Proposed Amendments to the Zoning Ordinance are indicated by underline for additions or creations, ~~strikeout~~ for deletions.

Suggested modifications to the Teague, et al. Petition are indicated by zigzags for additions, ~~highlighted strikeouts~~ for deletions.

I. Create the Following New Definitions in Article 2.000:

Lamp. The source of optical radiation (i.e., “light”), often called a “bulb” or “tube”. Examples include incandescent, fluorescent, high-intensity discharge (HID) lamps, and low pressure sodium (LPS) lamps, as well as light-emitting diode (LED) modules and arrays.

Luminaire. The complete lighting unit (fixture), consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light (reflector, lens, diffuser), to position and protect the lamps, and to connect the lamps to the power supply. Temporary holiday lighting in use for not longer than a four week period in the calendar year shall not be considered a luminaire. Internally illuminated signs ~~that have current and valid sign permits, as defined in this Ordinance~~ shall not be considered a luminaire.

Light, Direct. Direct Light shall mean and include any lighting ~~entering the eye~~ emitted directly from a luminaire or reflecting from any part of that luminaire, but not reflected from other surfaces such as the ground or building faces. ~~For enforcement purposes, a luminaire shall be considered to be causing direct light if any part of the lamp or any of the parts designed to distribute the light (reflector, lens, diffuser) are visible to any person. Further, a daytime photograph of the luminaire is sufficient to prove that it is the source of direct light even when said luminaire is not in operation.~~

Lumen Rating, Initial. The Initial Lumen Rating of a luminaire shall mean the quantity of lumens emitted upon its initial operation, as expressed by the manufacturer. The lumen is the standard unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire.

Illuminance. The measurement of light cast by a luminaire or other light source at a specified position relative to that light source after astronomical twilight, which may be determined by photometric calculations or by direct measurement. The foot candle or lumen per square foot, which are equivalent quantities, shall be the standard unit of measure for illuminance.

The definitions of *lamp* and *luminaire* are mostly unchanged from the petition, but it is recommended that they be included in Article 2.000, the section on general definitions, rather than Article 7.000.

The definition of *luminaire* is slightly modified because “current and valid sign permit” is not a well defined term and may result in ambiguous interpretations.

The definition of *direct light* is altered for a few reasons:

- “Entering the eye” may be an ambiguous term.
- The note excluding reflection from buildings is added for clarification (*text adapted from the lighting ordinance for Cottonwood, AZ*).
- Enforcement provisions are more appropriately included in the Article 7.000 regulations.

Definitions are added for Initial Lumen Rating and illuminance, which are applied in Article 7.000 (*text adapted from the IDA/IES Model Lighting Ordinance and Newton, MA lighting code, respectively*)

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II. Add to and Modify the Provisions of Section 7.20 in the following ways:

7.20 ILLUMINATION

7.21 Applicability

7.21.1 Except where otherwise specified further below, the regulations of this Section 7.20 shall apply to all outdoor illuminating devices (i.e., luminaires, as defined in Article 2.000 of this Ordinance), which shall include but not be limited to freestanding luminaires, luminaires attached to building exteriors, and luminaires installed within structures that are wholly or partially open to the air, such as roofed porches or carports.

7.21.2 The regulations of this Section 7.20 shall not apply to the following:

- (a) Illuminating devices installed and maintained by the City of Cambridge or other government entity for the purpose of lighting roadways or other transportation facilities, including pedestrian and bicycle pathways, as well as public parks, recreation areas and monuments
- (b) Light sources which are located entirely within a fully enclosed building
- (c) Internally illuminated signs, which are regulated by Section 7.10 of this Zoning Ordinance
- (d) Temporary lighting for theatrical, television, performance areas and construction sites
- (e) Seasonal lighting in use for not longer than a four week period in any calendar year
- (f) Lighting that is only used under emergency conditions
- (g) Lighting that is required by federal, state or local laws, but only to the extent that such lighting is reasonably necessary to meet minimum safety requirements

7.21.3 Any new outdoor luminaire that is installed on a lot, and any luminaire installed to replace an existing luminaire, shall conform to the requirements of this Section 7.20.

7.21.4 Where a new building is constructed on a lot, or an existing building or structure is enlarged or altered where the same would amount to reconstruction, or the use or uses on a lot are changed, all outdoor luminaires on the lot shall be brought into compliance with the requirements of this Section 7.20.

The applicability text, which is typical in other sections of the zoning ordinance, defines the types of structures or installations covered by the regulations. This intends to address the Planning Board's concern about regulations that may be overreaching in their scope.

Some exemptions are included so that the regulations do not impede lighting that serves a public purpose, indoor lighting, temporary lighting, and required safety or emergency lighting. *(Text is adapted from portions of the IDA/IES Model Lighting Ordinance, the Newton lighting code, and existing provisions in the Cambridge Zoning Ordinance.)*

The intent of the text is for the regulations to be applied in all cases where zoning is applied, as established in Article 8.000 of the zoning ordinance.

The abandonment provision (*next page*) is intended to resolve issues where existing light fixtures that have been extinguished for some time may create a nuisance if illuminated again. *(Text adapted from lighting ordinance of Cottonwood, AZ.)*

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7.21.5 A luminaire that does not comply with the requirements of this Section 7.20 and has not been in operation for a period of six months or more shall be considered abandoned, and shall not be considered legally nonconforming, notwithstanding any provision in Article 8.000 of this Ordinance.

7.22 Lighting Restrictions for the City of Cambridge

~~No Direct Light shall be allowed on any abutting property, on any property abutting an abutting property, on any property across the street from those properties, on any property within 300 feet of the luminaire, and on any street. A property shall explicitly include any buildings on said property with the intent of prohibiting said direct light from entering windows or any other opening.~~

Outdoor luminaires, including security lighting, shall be aimed or shielded so that the Direct Light emitted is confined to the property boundaries of the source, and so that all Direct Light is projected downward below the horizontal plane through the luminaire's lowest light-emitting part (i.e., fully shielded on the top and sides), except where at least one of the following is true:

- (a) The installer has demonstrated that all owners of property upon which Direct Light is cast by a luminaire has granted permission for that luminaire at the time it was installed, or
- (b) the luminaire has an Initial Lumen Rating of less than 900 lumens and is located at least ten (10) feet from any lot line, or
- (c) the installer has demonstrated, through photometric studies or direct measurement performed by a registered engineer, that the illuminance created by all outdoor luminaries on the lot does not exceed one half (0.50) of a foot candle at any point beyond the property boundaries.

7.23 Lighting Restrictions for Residential Districts

In Residence A, B, C, and C-1 districts no outdoor floodlighting or decorative lighting, except lighting primarily designed to illuminate walks, driveways, outdoor living areas, or outdoor recreational facilities, and except temporary holiday lighting in use for not longer than a four week period in any calendar year, shall be permitted. Any permanent lighting permitted by the preceding sentence shall be continuous, indirect, and installed in a manner that will prevent direct light from shining onto any street or adjacent property, and shall conform to the requirements of Section 7.22 above.

The new text in 7.22 is a rewording of the petition text with the intent of having the same effect. It is helpful to specify that luminaires are the target of the regulations rather than direct light itself. In zoning enforcement, it is more effective when regulations target a fixed object rather than a variable concept such as light. This change is intended to help address the Board's concern about unintended consequences. *(Adapted from IDA/IES Model Lighting Ordinance and Cottonwood, AZ lighting ordinance.)*

The proposed exceptions are intended to avoid situations where innocuous lighting might create unnecessary nonconformities:

- Permission of abutters *(adapted in the Newton, MA code)*.
- Lighting of 900 lumens (about equivalent to a 60-watt incandescent bulb) or less *(standard applied in the Boulder, CO code)*.
- Low illuminance outside of the lot *(applied in most other lighting codes, with standards in the neighborhood of ½ foot candle)*.

The existing text regarding lighting in residential districts is retained, as in the petition, with a clarifying reference.

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7.24 Enforcement

7.24.1 Any application for a Building Permit or Certificate of Occupancy for a new use on a lot shall include plans and specifications detailing the location, design and Initial Lumen Rating of all outdoor luminaires existing and proposed on the lot, which shall be reviewed for compliance with the requirements of this Section 7.20.

7.24.2 The owner of any property who contends that the requirements of this Section 7.20 have been violated by a luminaire on a lot no more than three hundred (300) feet distant may register a complaint, in accordance with the provisions of Section 9.15 of this Zoning Ordinance, by submitting to the Superintendent of Buildings a description including the address, location and approximate installation date of the luminaire and daytime and/or nighttime photographs taken from the complainant's property evincing that the luminaire is not properly directed as per the requirements of Section 7.22. After verifying that the luminaire is in apparent violation of this Section, the Superintendent of Buildings shall provide written notification to the owner of the property containing the luminaire, who shall respond within thirty (30) days by submitting either or both of the following information to the Superintendent of Buildings:

- (a) Documented evidence that the luminaire conforms to the requirements of this Section 7.20 (such as manufacturer specifications and/or photometric studies) or is legally nonconforming.
- (b) Plans and specifications for the replacement or modification of all violating luminaires such that they will conform to the requirements of this Section 7.20. Such replacement or modification shall be completed within sixty (60) days of certification by the Superintendent of Buildings that the proposal will conform to the requirements of this Section 7.20.

7.24.3 Each luminaire that violates the requirements of this Section 7.20 shall constitute a separate violation of this Zoning Ordinance. Failure of a property owner to respond to notification of an apparent violation within the allotted thirty (30) day period shall constitute a zoning violation for each luminaire cited in the notification.

The new text specifies that lighting is to be reviewed as part of new development. This will help to address potential lighting issues before they occur.

Also, a process for addressing abutter complaints is established. The same "daytime photograph" recourse is used as recommended in the petition (*see deleted text on page 1*).

However, experience has shown that resolving violations through communication can be more effective than taking immediate enforcement action.

The Planning Board's suggested way of resolving apparent violations is to allow neighbors to visually demonstrate that an outdoor lighting fixture is not shielded from their vantage point, and then to provide the respondent with an opportunity to correct the situation or to prove that the light fixture meets the allowed standards. If the owner fails to respond, then zoning enforcement action may be taken.

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III. NO CHANGE to Signage Regulations in Section 7.10 (provided for reference only)

[...]

7.13.3 Illumination:

- A. Natural - natural or ambient light.
- B. External - artificial illumination from a light source which provides light directly onto the sign face, or portions of the sign face, or its background, which light is then reflected back to the viewer.
- C. Internal - artificial illumination from a light source located behind the sign face and which transmits light through the sign face or portions of the sign face to the viewer. Exposed neon tubing and similar lighting shall be considered internal illumination.
- D. Indirect - placement of the artificial light device such that the source of light cannot be seen from a public way.

[...]

7.15 General Limitations for All Signs Permitted in the City of Cambridge

- A. Signs shall be stationary and may not contain any visible moving or moveable parts.
- B. All lighting shall be indirect, continuous, and installed in a manner that will prevent direct light from shining onto any street or adjacent property. Flashing or intermittent light creating flashing, moving, changing or animated graphics is prohibited, except that a warning sign, a device intended to tell the time and temperature, or official traffic and directional signs may have intermittent illumination.
- C. No illumination shall be permitted after 11 P.M. in any Residence A, B, C, or C-1 district.
- D. No sign, portion of a sign, or structural support for such sign may extend above the lowest point of the roof of a building, except that for one-story buildings having a continuous parapet above the lowest point of the roof, signs may be placed below the highest point of such parapet rather than below the lowest point of the roof.
- E. Except as may be provided elsewhere in this ordinance for temporary signs, all signs shall be permanently mounted on a building or structure or permanently implanted in the ground. All graphic images on a sign shall be of durable material.

The existing text regarding signage is unchanged, as in the petition. However, where the term “direct light” is used, it is now defined in Article 2.000.

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IV. Modify the Provisions of Section 6.40 (Design and Maintenance of Off-Street Parking Facilities) in the following ways:

6.41 *Purpose.* The regulations governing the design and maintenance of off street parking facilities are intended to protect the health, safety and welfare of the users of the parking facility and of abutting properties, including pedestrians and motorists. Therefore, the regulations herein provide for internal and perimeter landscaping, planting, walls, fences and other improvements to reduce noise, Direct Light glare or reflection from autos, Direct Light lights, fumes and the like, and minimum standards for parking space and aisle dimensions to ensure safe traffic circulation within the parking facility and from entrances and exits.

[...]

6.46 *Lighting.* Off street parking facilities which are used at night shall be provided with adequate lighting installed and maintained in such a manner so as not to reflect or cause Direct Light glare on abutting or facing residential premises nor to cause reflection nor Direct Light glare which adversely affects safe vision of operators of vehicles moving on nearby streets. A recommended standard for lighting is a minimum intensity of one (1) foot candle on the entire surface of the parking facility; however, all lighting must also conform to the requirements in Section 7.20 of this Zoning Ordinance.

As in the petition, the only change to regulations on parking is to replace the terms “glare” and “lights” with the newly defined term “Direct Light.”

However, a reference is added to clarify that the additional illumination requirements in Section 7.20 apply to parking facilities as well.