

Lighting Regulations in New Hampshire Communities:

How Nine Towns are Working to Preserve Dark Skies

I. Overview

The New Hampshire Office of Energy and Planning (NHOEP) has long encouraged New Hampshire communities to include lighting regulations as part of zoning ordinances or site plan review and subdivision regulations administered by Planning Boards.

In its Technical Bulletin 16 in 2001, the NHOEP noted that careful planning of outdoor lighting and the use of up-to-date fixtures and lamp technology benefits communities by:

- Increasing pedestrian and vehicular safety;
- Preventing unsafe roadway glare and annoying “light trespass” across property boundaries;
- Saving energy;
- Enhancing the rural and historical character of New Hampshire towns;
- Preserving the beauty of dark night-time skies by preventing upward illumination that causes “skyglow” or light-pollution.

The Lakes Region in general enjoys exceptionally dark and starry skies, a quality that is now largely lost along the Eastern Seaboard.

Dark skies are a distinctive feature of the Lakes Region’s natural rural environment that merits preservation. This important natural asset is easy to lose as development accelerates – and easy to save with a few basic rules that Planning Boards may incorporate in their Site Plan Review and Subdivision Regulations, or that towns may include in Zoning Ordinances.

More than 30 New Hampshire communities have already done so.

NHOEP Technical Bulletin 16 summarizes issues and practical solutions for effective outdoor lighting that provides the benefits listed above, as well as two model regulations. This paper summarizes the main features of lighting regulations currently in force in a variety of small New Hampshire towns, and provides the full text of regulations from nine of them.

II. Summary of Zoning and Site Regulations on Lighting

Basic features:

1. **Statement of Purpose:** Town planning regulations usually include a statement of purpose or intent of regulations. Examples are:
 - *Chichester:* “The intent of this Ordinance is to improve visibility of the nighttime sky without impacting safety, by reducing lighting conditions including but not limited to, glare, light trespass and sky glow.”
 - *Francestown:* “The purpose of these standards is to reduce light trespass, glare and light pollution, and promote conservation of energy while maintaining nighttime aesthetics, safety, security, productivity and enjoyment for all Francestown residents.”
 - *Goffstown:* “ It is the intent of this section to maintain Goffstown’s character and to prevent further reduction of visibility of the night sky, to insure efficient use of lighting, and to reduce unsafe or annoying lighting conditions.”
 - *Shelburne:* “The purposes of the outdoor lighting regulations are to protect dark skies, to protect the general welfare by controlling spillover of light onto adjacent properties, and to protect the public safety by preventing glare from outdoor light sources.”
 - *Wilton:* “The purpose of this ordinance is to preserve the rural atmosphere and dark skies of the Town of Wilton. Natural dark skies are the nighttime aspect of rural character. Increasing light pollution and glare from inappropriate lighting degrades such rural character. This ordinance is intended to enhance public safety and welfare by providing for adequate and appropriate outdoor lighting, providing for lighting that will complement the character of the Town of Wilton, reduce glare, minimize light trespass, reduce the cost and waste of unnecessary energy consumption and prevent the degradation of the night sky.”

2. **Prohibition of Upward Illumination:** The key provision in all lighting regulations is to direct illumination downward, where it is needed, so as to make maximum use of energy and prevent sky-glow that washes out the stars. Regulations typically take one of two alternative approaches: (a) All new lighting fixtures (“luminaires”) must be fully shielded (also called “full-cutoff”) so as to emit zero light above a horizontal plane drawn through the lowest light-emitting

part of a fixture; or (b) no more than 3% of a fixture's light may be emitted above this plane ("cutoff.") A third approach, which avoids the implied need to measure light emissions, is simply to require that fixtures comply with standards of the Illuminating Engineering Society of North America (IESNA) for full-shielding.

3. **Exceptions:** Regulations generally exempt emergency lighting; temporary construction lighting permitted by zoning or planning authorities; seasonal decorative lighting; lighting outside the jurisdiction of towns, such as lighting of state highways or federal facilities. Some towns exempt lights emitting less than 1800 lumens, a measure of total light equivalent to the output of a 100-watt incandescent bulb. A few towns specifically exempt flag illumination and seasonal holiday lighting.
4. **Grandfathering Existing Installations:** Regulations generally apply only to new fixtures (whether or not the surrounding development is new) or fixtures that are to be moved or replaced, so that the regulation imposes no economic burden on owners of existing fixtures. Replacing or moving one fixture, however, usually triggers a requirement to make this or all fixtures on a property compliant.
5. **Lighting Plan Required:** Where lighting requirements are part of Planning Board regulations, it is common to require an applicant to submit a lighting plan showing compliance with the regulations.

Additional Features:

The following features are found in a number of town zoning ordinances or site-regulations, but not the majority.

1. **Height Limitations:** Some towns impose an absolute limit on lighting fixture height of 25 feet, to prevent light trespass across property lines. Other towns set this height limit and also apply a formula for height that diminishes with proximity to a property line, so that height equals $3 + (D/3) = \text{Fixture Height}$ where D = Distance in feet from the property line.
2. **Illumination of Signs:** Towns commonly but not uniformly require that signs be illuminated only by downward-directed lights, to prevent glare and sky-glow. Moving, blinking or moving message signs are prohibited by some towns as safety hazards. Regulations can also limit the brightness of internally illuminated signs, or ban them altogether.
3. **Preventing Excessive Illuminations:** In addition to requiring properly shielded lighting, some communities limit excessive lighting by applying the minimum lighting standards of the Illuminating Engineering Society of North

America (IESNA.) Designers and builders are expected to be familiar with these standards. Some towns simply require that lighting be of the lowest practical intensity.

4. **Limited Hours of Illumination:** Some communities require that lighting for parking lots and other flood illumination be turned off or reduced in intensity after 11 PM or midnight.
5. **Preservation of Rural Character:** Some regulations require or “strongly encourage” the selection of outdoor fixture designs that are consistent with, or enhance, the historical or rural character of a town. (This is particularly important for street lighting.)
6. **Prohibition of Mercury Vapor Lighting:** Some local New Hampshire and Maine regulations (and the state of Vermont) prohibit mercury vapor lights, which emit a powerful greenish-blue light, as they commonly cause glare and are the least energy-efficient form of illumination. These lamps also contain toxic mercury.
7. **Illumination of Gas Stations:** Some towns specifically require that gas station lighting be located under the pump canopy and be recessed in the ceiling.

III. Texts of Lighting Regulations from Nine NH Towns

Following are texts of lighting regulations in nine New Hampshire towns designed to preserved dark skies:

1. NH Office of Energy and Planning

Technical Bulletin 16 / 2001: Model Ordinance Based on Bethlehem NH:

In the interest of maintaining its historic character, and preventing further reduction of visibility of the night sky, insuring efficient use of lighting, and reducing unsafe or annoying lighting conditions, the Town of ____ has adopted the following lighting ordinance:

Any new outside lighting whether for area illumination, sign illumination, building illumination, or other purpose, will project no more than 3 percent of its light rays

above the horizon from the lamp, its lens structure or any associated reflector.

Exceptions:

- A. All temporary lighting required for construction projects, related to road construction and repair, installation of sewer and water facilities, and other public infrastructure.
- B. All temporary emergency lighting needed by the police or fire departments or other emergency services, as well as all vehicular luminaires, shall be exempt from the requirements of this article.
- C. All hazard warning luminaires required by Federal regulatory agencies are exempt from the requirements of this article, except that all luminaires used must be red and must be shown to be as close as possible to the Federally required minimum lumen output requirement for the specific task.
- D. Seasonal/decorative lighting displays using multiple low wattage bulbs are exempted from this ordinance.

New signs or newly lit signs may be illuminated only by continuous indirect white light, with illumination from above, and with light sources shielded so that they will not constitute a nuisance or hazard caused by glare to neighbors, pedestrians, or drivers. An exception to overhead sign lighting can be made if the illumination is confined to the area of the sign.

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2. Tufonboro (Carroll County)

Site Plan Review Regulations:

6.8 ILLUMINATION

It is the intent of these Regulations to preserve, protect and enhance the lawful nighttime use and enjoyment of any and all property through the use of appropriate lighting practices and systems. Light pollution, a term describing the cumulative effects of inappropriate outdoor lighting, results in Glare, skyglow, wasted energy, and, if not controlled, it can alter the rural character of Tufonboro. Appropriately designed and properly installed outdoor lighting contributes to the safety and welfare of residents and visitors alike.

Individual fixtures and lighting systems shall be designed, constructed and installed so as to: control Glare and light trespass, minimize obtrusive light, conserve energy and

resources while maintaining safety, security and productivity, and curtail the degradation of the nighttime visual environment.

6.8.1 Definitions

Cut-off Angle (of a Luminaire): The angle, measured up from the nadir, between the vertical axis and the first line of sight at which the bare source is not visible.

Fixture: The assembly that houses the lamp or lamps and it can include all or some of the following parts: a housing, a mounting bracket, or pole socket, a lamp holder, a ballast, a reflector or mirror and or a refractor lens.

Footcandle: A unit of Illuminance amounting to one Lumen per square foot.

Flood or Spot Light: Any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.

Fully Shielded: A fully shielded Luminaire is a Luminaire constructed or shielded in such a manner that all light emitted by the Luminaire, either directly from the lamp or indirectly from the Luminaire, is projected below the horizontal plane through the Luminaire's lowest light emitting part as determined by photometric test or certified by the manufacturer.

Glare: The sensation produced by luminance (within the visual field) that is sufficiently greater than the luminance to which the eyes are adapted and causes annoyance, discomfort, or loss in visual performance and visibility. Glare is excessive brightness that makes it difficult to see or that causes discomfort.

Illuminance: The quantity of light, or luminous flux, arriving at a surface divided by the area of the illuminated surface, measured in Lux or Footcandles.

Indirect Light: Direct light that has been reflected or has scattered off other surfaces.

Light Trespass: Light emitted by a lighting installation which falls outside the boundaries of the property on which the installation is sited.

Lumen: A unit of luminous flux. One Footcandle is one Lumen per square foot. For the purposes of these regulations, the Lumen output values shall be the initial Lumen output ratings of a lamp.

Luminance: The physical quantity corresponding to the brightness of a surface (e.g. a lamp, Luminaire, sky or reflecting material) in a specified direction. It is the luminous intensity of an area of the surface divided by that area. The unit is candela per square meter.

Luminaire: A complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.

Lux (lx): the SI unit of Illuminance. One Lux is one Lumen per square meter.

Obtrusive Light: Spill light which, because of a quantitative, directional or spectral context, gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information.

Outdoor Lighting: The night time illumination of an outside area or object by any man made device that produces light by any means.

Spill light: Light emitted by a lighting installation that falls outside the boundaries of the property on which the installation is sited.

6.8.2 Outdoor Lighting Design Factors

- A** Any Luminaire with a lamp or lamps rated at a total of more than 1800 Lumens and all flood or spot lights with a lamp or lamps rated at a total of more than 900 Lumens shall not emit any direct light above a horizontal plane through the lowest direct light emitting part of the Luminaire.
- B** Any Luminaire with a lamp or lamps rated at a total of more than 1800 Lumens and all flood or spot lights with a lamp or lamps rated at a total of more than 900 Lumens shall be mounted at a height equal to or less than the value $3 + (D/3)$ where D is the distance in feet to the nearest property boundary. The maximum height of the Luminaire shall not exceed 20 feet.
- C** Any Luminaire with a lamp or lamps rated at 1800 Lumens or less and all flood or spot lights with a lamp or lamps rated at 900 Lumens or less may be used without restriction to light distribution or mounting height except that if any flood or spot light is aimed, directed or focused such as to cause direct light from the Luminaire to be directed toward residential buildings on adjacent or nearby land or to create Glare perceptible to pedestrians or persons operating motor vehicles on public ways, the Luminaire shall be redirected or its light output controlled as necessary to eliminate such conditions.
- D** All hazard warning luminaires required by State or Federal regulatory agencies are exempt from these requirements except that all such luminaires used must be red and must be shown to be as close as possible to the State or Federally required minimum Lumen for the specific task.
- E** New outdoor lighting installations and expansions to outdoor lighting installations (including expansion of luminance) shall be designed to avoid harsh contrasts in color and/or lighting levels.

- F** Electrical service to outdoor lighting fixtures shall be underground unless the fixtures are mounted directly to utility poles.
- G** Outdoor lighting shall be kept to the minimum required for sign illumination and safety and security of the property. Whenever practicable, outdoor lighting installations shall include timers, dimmers, and/or sensors to reduce the overall energy consumption and eliminate unneeded lighting.
- H** All light sources shall be shielded so that they will not create a nuisance or hazard caused by Glare to neighbors, pedestrians, or drivers.
- I** Moving, fluttering, blinking, or flashing lights or signs shall not be permitted, except as temporary seasonal holiday decorations. Signs may be illuminated only by continuous white light with illumination confined to the area of the sign.

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3. Chester NH (Rockingham County):

Zoning Ordinance:

ARTICLE 4.4.3.4: No neon, tubular, flashing, internally lighted, revolving or changeable copy signs shall be permitted in any district. Signs may be lighted externally. Such lighting shall be shielded so as not to present a hazard to automotive traffic. Signs shall be lighted only during the hours when the associated establishment is open for business.

ARTICLE 15 LIGHTING REQUIREMENTS

15.1 Purpose

This Article is intended to: reduce the problems created by improperly designed and installed outdoor lighting; eliminate problems of glare, minimize light trespass, help reduce the energy and financial costs of outdoor lighting; limit the area that certain kinds of outdoor lighting fixtures can illuminate; require the use of high-efficiency lamps in public areas, and limit the total allowable illumination of lots located in the Town of Chester.

All public and private outdoor lighting installed in the Town of Chester shall be in conformance with the requirements as specified below.

15.2 Definitions

15.2.1 Direct Light - Light emitted directly from the lamp, off of the reflector or reflector diffuser, or through the refractor or diffuser lens, of a luminaire.

15.2.2 Fixture - The assembly that houses the lamp or lamps and can include all or

some of the following parts: a housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and/or a refractor or lens.

15.2.3 Flood or Spotlight - Any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.

15.2.4 Glare - Light emitting from a luminaire with intensity great enough to reduce a viewer's ability to see and, in extreme cases, causing momentary blindness.

15.2.5 Height of Luminaire - The height of a luminaire shall be the vertical distance from the ground directly below the centerline of the luminaire to the lowest direct-light-emitting part of the luminaire.

15.2.6 IESNA - Illuminating Engineering Society of North America.

15.2.7 Indirect Light - Direct light that has been reflected or has scattered off of other surfaces.

15.2.8 Lamp - The component of a luminaire that produces the actual light.

15.2.9 Light Trespass - The shining of light produced by a luminaire beyond the boundaries of the property on which it is located.

15.2.10 Lumen - A unit of luminous flux. One foot candle is one lumen per square foot. For the purposes of this Ordinance, the lumen-output values shall be the INITIAL lumen output rating of a lamp.

15.2.11 Luminaire - This is a complete lighting system and includes a lamp or lamps and a fixture.

15.2.12 Outdoor Lighting - The night-time illumination of an outside area or object by any manmade device located outdoors that produces light by any means.

15.2.13 Temporary Outdoor Lighting - The specific illumination of an outside area or object by any manmade device located outdoors that produces light by any means for a period of less than 7 days with at least 180 days passing before being used again.

15.3 Luminaire Design Factors

15.3.1 Any luminaire with a lamp or lamps rated at a total of MORE than 1,800 lumens and all flood or spot luminaires with a lamp or lamps rated at a total of MORE than 900 lumens shall not emit any direct light above a horizontal plane through the lowest direct-light-emitting part of the luminaire.

15.3.2 Any luminaire with a lamp or lamps rated at a total of MORE than 1,800 lumens and all flood or spot luminaires with a lamp or lamps rated at a total of MORE than 900 lumens shall be mounted at a height equal to or less than the value $3 + (D/3)$, where D is the distance in feet to the nearest property boundary. The maximum height of the luminaire may not exceed 25 feet.

15.3.3 Any luminaire used to illuminate a public area such as a street or walkway will utilize any energy efficient lamp such as low pressure sodium lamp, high pressure sodium lamp or metal halide lamp. Mercury vapor lamps shall not be used due to their inefficiency and high operating costs.

Luminaires used in public areas such as roadway lighting shall be designed to provide the minimum illumination recommended by IESNA in the most current edition of the IESNA Lighting Handbook.

15.4 Exceptions

15.4.1 Any luminaire with a lamp or lamps rated at a total of 1,800 lumens or LESS, and all flood or spot luminaires with a lamp or lamps rated at 900 lumens or LESS, may be used without restriction to light distribution or mounting height, except that if any spot of flood luminaire rated 900 lumens or LESS is aimed, directed or focused such as to cause direct light from the luminaire to be directed toward residential buildings on adjacent or nearby land or to create glare perceptible to persons operating motor vehicles on public ways, the luminaire shall be redirected or its light output controlled as necessary to eliminate such conditions.

15.4.2 Luminaires used for public-roadway illumination may be installed at a maximum height of 25 feet and may be positioned at that height up to the edge of any bordering property.

15.4.3 All temporary emergency lighting need by the Police or Fire Department or other emergency services, as well as all vehicular luminaires, shall be exempt from the requirements of this Article.

15.4.4 All hazard warning luminaires required by Federal regulatory agencies are exempt from the requirements of this Article, except that all luminaires used must be red and must be shown to be as close as possible to the federally required minimum lumen output requirement for the specific task.

15.4.5 Luminaires used primarily for signal illumination may be mounted at any height to a maximum of 25 feet, regardless of lumen rating.

15.5 Temporary Outdoor Lighting

15.5.1 Any temporary outdoor lighting that conforms to the requirements of this Article shall be allowed. Non-conforming temporary outdoor lighting may be permitted by the Planning Board after considering:

- a) The public and/or private benefits that will result from the temporary lighting;
- b) Any annoyance or safety problems that may result from the use of the temporary lighting; and
- c) The duration of the temporary non-conforming lighting.

The Applicant shall submit a detailed description of the proposed temporary non-conforming lighting to the Planning Board, who shall consider the request at a duly called meeting. Prior notice of the meeting of the Planning Board shall be given to the Applicant. The Planning Board shall render its decision on the temporary lighting request within two weeks of the date of the meeting. A failure by the Planning Board to act on a request within the time allowed shall constitute an approval of the request.

15.6 Authorization for Installation of Public Area and Roadway Lighting

15.6.1 Installation of any new public area and roadway lighting fixtures other than for traffic control shall be specifically approved by the Chester Planning Board.

15.6.2 All requests for new public area and roadway lighting fixtures shall be made in writing to the Chester Planning Board.

15.6.3 Before any proposal for new public roadway lighting luminaires shall be decided, the Planning Board shall hold a public hearing to describe the proposal and to provide an opportunity for public comment. Notice of the hearing shall be printed in a newspaper of general circulation not less than two (2) week prior to the date of the hearing and shall be posted for a period of at least two (2) week before the meeting.

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4. Chichester NH (Merrimack County):

Zoning Ordinance (March 2006):

R. OUTDOOR LIGHTING (Revised March 14, 2006)

1. Purpose. The intent of this Ordinance is to improve visibility of the nighttime sky without impacting safety, by reducing lighting conditions including but not limited to, glare, light trespass and sky glow.

2. Definitions.

Luminaire: a lighting fixture that includes a lamp or lamps.

Foot-candle: illumination produced by one lumen uniformly distributed over one square foot of a surface.

Fully-shielded lighting: lighting in which the light rays emitted by the fixture are only projected below the horizontal plane that passes through the lowest part of the luminaire.

Glare: light emitted by a lamp in direct line-of-sight contact with the viewer.

Light trespass light produced by a luminaire or luminaires beyond the property line on which they are located.

Sky glow: light from a luminaire that is emitted above the horizontal plane that passes through the lowest part of the luminaire.

3. Regulations.

A. Application. This Ordinance applies to the Commercial-Industrial / Multifamily Zone and the Village District, and to home occupations and businesses in all 32 zones.

B. General Lighting Restrictions.

- (i) All luminaires shall be fully shielded and shall not cause sky glow.
- (ii) Light trespass greater than two-tenths (0.2) of a foot candle at the line of any abutting property, not including public roadways, is prohibited.
- (iii) No luminaire shall emit glare beyond a property line.
- (iv) Total illumination shall be the lowest intensity possible for the intended use.
- (v) It is recommended that lighting be reduced after a business closes and that motion detector lighting is used.

C. Gas Station-Type Canopies. Luminaires mounted on a canopy shall be recessed in the ceiling of the canopy so that the lens cover is recessed or mounted flush with the ceiling of the canopy and fully shielded. Luminaires shall not be mounted on the sides or top of the canopy, and the sides or facias of the canopy shall not be illuminated.

D. Lighted Advertising Signs.

- (i) Moving, fluttering, blinking, or flashing lights or signs and electronic message signs are prohibited.
- (ii) The outdoor operation of searchlights, lasers, or other high-intensity beams for advertising purposes, is prohibited.

E. Pre-existing Outdoor Lighting.

- (i) Any luminaire that replaces a non-conforming, pre-existing luminaire, or any luminaire that is moved, shall meet the standards of this Ordinance.

(ii) Pre-existing luminaires that cause glare on any public roadways shall fully comply with this Ordinance immediately.

(iii) All pre-existing luminaires shall be in compliance with this Ordinance by January 1, 2011.

7. Exceptions. The following are exempt from this Ordinance:

(i) Temporary luminaires required for construction projects (not to exceed 30 days),

(ii) Luminaires related to police, fire, or other emergency services,

(iii) Hazard warning luminaries required by federal regulatory agencies, and

(iv) Low intensity temporary seasonal lighting

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5. Frankestown NH (Hillsborough County):

Site Plan Review Regulations:

Section V. / H. LIGHTING. Outdoor lighting shall be used only as necessary for directional signage, advertising, security and safety. Lighting shall not glare on abutting properties or on public streets. Indirect lighting shall be used on signs advertising goods or services offered on premises. Moving, fluttering, blinking or flashing lights or signs are not permitted. All lighting shall comply with the requirements of the Town Zoning Ordinance.

Zoning Ordinance (March 2005):

3.15 Outdoor Lighting Regulations. All public and private outdoor lighting installed in the Town of Frankestown shall be in conformance with the following standards. The purpose of these standards is to reduce light trespass, glare and light pollution, and promote conservation of energy while maintaining nighttime aesthetics, safety, security, productivity and enjoyment for all Frankestown residents.

a. Lighting shall be designed to adequately illuminate a site and parking areas without causing glare or excessive illumination on neighboring properties or streets. Any lighting fixture with a lamp or lamps rated at a total of more than 1800 lumens shall not emit any direct light above a horizontal plane passing through the light source(s).

NOTE: Most light bulbs come with a tested lumen rating; a typical 100 watt incandescent bulb delivers approximately 1700 lumens. Actual lumen output depends on the bulb manufacturer and operating conditions.

b. Acceptable light sources are incandescent, fluorescent and metal halide. All other light sources including any flickering or pulsing light are prohibited.

c. Outdoor lighting shall be turned off or reduced in intensity by 11 p.m. unless an activity being lighted extends beyond that time. Any business, school, or institutional lighting used after work hours shall be security lighting only, reduced from the level of full illumination lighting. Similarly, lighting of parking lots shall either be turned off or noticeably reduced to security levels after the closing of business. The intention of this requirement is to reduce after-hours illumination to the greatest extent while recognizing the need for security lighting.

d. The following are exempt from the lighting and glare standards described above:

i) Installations existing prior to the enactment of this ordinance (on March 13, 2001) are exempt from its requirements. However, any changes to the existing lighting system, fixture replacements, or any grandfathered lighting system that is moved, must meet these standards.

ii) Fixtures of 1800 lumens or less, approximately the equivalent of a 100-watt or less incandescent light bulb, except that if any such spotlight or floodlight is aimed, directed, or focused such as to cause direct light to shine toward residential buildings on adjacent or nearby land, or to create glare perceptible to persons operating motor vehicles on public ways, the lighting system shall be redirected or its light output controlled as necessary to eliminate such conditions.

iii) Lighting of the American Flag.

iv) Historic monuments and statues, including the Francestown Academy (Town Hall) Building and The Old Meeting House.

v) Municipal street lighting.

vi) Emergency safety lighting.

e. Recreational Facilities. Any light source permitted in (b.) above may be used for lighting of outdoor recreational facilities (public or private), such as, but not limited to, tennis courts, soccer fields, baseball fields, or show areas, provided all of the following conditions are met:

i) All fixtures used for event lighting shall be fully shielded so that no direct light

is projected above a horizontal plane passing through the light sources, and be designed or provided with sharp cut-off capability, so as to minimize up-light, spill-light, and glare.

ii) All events shall be scheduled so as to complete all activity before or as near to 10:30 p.m. as practical, but under no circumstances shall any illumination of the playing field, court, or track be permitted after 11:00 p.m. except to conclude a scheduled event that was in progress before 11:00 p.m. and circumstances prevented concluding before 11:00 p.m.

f. Law Governing Conflicts. Where any provision of federal, state, county, or town statutes, codes, or laws conflicts with any provision of these lighting standards, the most restrictive shall govern unless otherwise regulated by law.

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6. Goffstown NH (Hillsborough County):

Zoning Ordinance:

Section 8 - Outdoor Lighting

8.1 Purpose - It is the intent of this section to maintain Goffstown's character and to prevent further reduction of visibility of the night sky, to insure efficient use of lighting, and to reduce unsafe or annoying lighting conditions.

8.2 Location and Height - Any new outside lighting whether for area illumination, sign illumination, building illumination, or other purpose, shall be mounted at a height equal to or less than the value $3 + (D/3)$, where D is the distance in feet to the nearest property boundary. The maximum height of the light source shall not exceed 25 feet.

8.3 Light Projection - Any new outside lighting, whether for area illumination, sign illumination, building illumination, or other purpose, shall project no more than 3% of its light rays above the horizon from the lamp, its lens structure or any associated reflector. In addition, any new lighting greater than 20 foot-candles on the ground requires the submission of a detailed engineering lighting plan.

8.4 Exceptions - Exceptions include all temporary lighting required for public or private construction projects, all temporary emergency lighting related to police, fire or other emergency services, all hazard warning luminaries required by Federal regulatory agencies, to the degree and extent required, and all seasonal, decorative lighting displays using multiple low wattage bulbs. The Planning Board may grant exceptions for outdoor recreational facilities and for historic purposes by Conditional Use Permit.

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7. New Hampton (Belknap County):

Zoning Ordinance (Amended March 2006):

Statement of need and purpose:

The benefits of good outdoor lighting are increased safety, energy efficiency, enhancement of the Town's evening character, and improved security. New technologies have created extremely powerful lights, which can inadvertently lead to excessive glare, light trespass, and higher energy use. Concerns resulting from excessive glare and light trespass include safety issues, loss of privacy and increased energy costs for everyone. The goal of this lighting ordinance is to recognize the benefits of outdoor lighting and provide clear guidelines for its installation. Appropriately regulated and properly installed outdoor lighting will maintain and complement the Town's character and contribute to the safety and welfare of the residents of the town.

The intent of this regulation is to reduce the problems created by improperly designed and installed outdoor lighting by establishing regulations which limit the area that certain outdoor lighting luminaires can illuminate and by limiting the total allowable illumination of lots located in the Town of New Hampton.

1. Definitions: For the purposes of this section, terms used shall be defined as follows:

Direct Light: Light emitted directly from the lamp, off of the reflector or reflector diffuser, or through the refractor or diffuser lens, of a luminaire.

Fixture: The assembly that houses the lamp or lamps and can include all or some of the following parts: a housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and/or a refractor or lens.

Flood or Spot Light: Any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.

Glare: Light emitting from a luminaire with intensity great enough to reduce a viewer's ability to see, and in extreme cases causing momentary blindness.

Height of Luminaire: The height of a luminaire shall be the vertical distance from the ground directly below the centerline of the luminaire to the lowest direct-light-emitting part of the luminaire.

Indirect Light: Direct light that has been reflected or has scattered off of other

surfaces.

Lamp: The component of a luminaire that produces the actual light.

Light Trespass: The shining of light produced by a luminaire beyond the boundaries of the property on which it is located.

Lumen: (A unit of luminous Flux.) One foot-candle is one lumen per square foot. For the purposes of this Ordinance, the lumen output values shall be the INITIAL lumen output ratings of a lamp.

Luminaire: This is a complete lighting system, and includes a lamp or lamps and a fixture.

Outdoor Lighting: The nighttime illumination of an outside area or object by any man-made device located outdoors that produces light by any means.

Temporary Outdoor Lighting: The specific illumination of an outside area or object by any man-made device located outdoors that produces light by any means for a period of less than 30 days, with at least 180 days passing before being used again.

2. Regulations: All public and private outdoor lighting installed in the Town of New Hampton shall be in conformance with the requirements established by this section.

3. Control of Glare – Luminaire Design Factors: Any luminaire with a lamp or lamps rated at a total of MORE than 1800 lumens, and all flood or spot luminaires with a lamp or lamps rated at a total of MORE than 900 lumens, shall not emit more than 3% direct light above a horizontal plane through the lowest direct-light-emitting part of the luminaire.

Exceptions:

- i. If any spot or flood luminaire is aimed, directed, or focused so as to cause direct light from the luminaire to be directed towards residential buildings on adjacent or nearby land, or to create glare perceptible to persons operating motor vehicles on public ways, the luminaire shall be redirected or its light output controlled as necessary to eliminate such conditions.
- ii. Luminaires used for public roadway illumination may be installed at a maximum height of 25 feet and may be positioned at that height up to the edge of any bordering property.
- iii. All temporary lighting required for construction projects, related to road construction and repair, installation of sewer and water facilities, and

other public infrastructure.

iv. All temporary emergency lighting needed by the police or fire departments or other emergency services, as well as all vehicular luminaires, shall be exempt from the requirements of this article.

v. All hazard warning luminaires required by Federal regulatory agencies are exempt from the requirements of this article, except that all luminaires used must be red and must be shown to be as close as possible to the federally required minimum lumen output requirement for the specific task.

vi. Luminaires used primarily for sign illumination may be mounted at any height to a maximum of 20 feet, regardless of lumen rating.

4. **Temporary Outdoor Lighting:** Any temporary outdoor lighting that conforms to the requirement of this section shall be allowed. Nonconforming temporary outdoor lighting may be permitted by the Board of Selectmen after considering the following: the public and/or private benefits that will result from the temporary lighting; any annoyance or safety problems that may result from the use of the temporary lighting; and the duration of the temporary nonconforming lighting. The applicant shall submit a detailed description of the proposed temporary nonconforming light to the Board of Selectmen, who shall consider the request at a duly call meeting of the Board of Selectmen. Prior notice of the meeting of the Board of Selectmen shall be given to the applicant. The Board of Selectmen shall render its decision on the temporary lighting request within two weeks of the date of the meeting. A failure by the Board of Selectmen to act on a request within the time allowed shall constitute a denial of the request.

5. Effective Date and Grandfathering of Non-Conforming Luminaires:

i. This ordinance shall take effect immediately upon approval by voters of the Town of New Hampton and shall supersede and replace all previous ordinances pertaining to outdoor lighting.

ii. Except for those causing a public safety hazard or public or private nuisance, all luminaires lawfully in place prior to the date of the section shall be grand-fathered. However, any luminaire that replaces a grandfathered luminaire, or any grand-fathered luminaire that is moved, must meet the standards of this section.

6. Notification Requirements:

i. The Town of New Hampton building permit shall include a statement asking whether the planned project will include any outdoor light.

ii. Within 30 days of the enactment of this ordinance, the Board of

Selectmen or designated agent(s) shall send a copy of the Outdoor

Lighting Ordinance, with cover letter, to all local electricians and local electric utility (including at least those in the surrounding towns as listed in the Yellow pages).

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8. Shelburne NH (Coos County):

- I. **Purpose:** The purposes of the outdoor lighting regulations are to protect dark skies, to protect the general welfare by controlling spillover of light onto adjacent properties, and to protect the public safety by preventing glare from outdoor light sources.
- II. **Requirements:** These requirements pertain to all new outdoor lighting applications:
 - A. All outdoor lighting shall be controlled to minimize the spillover of light onto adjacent properties. All outdoor area (non-decorative) lighting shall be aimed below the horizontal plane except for non-directional residential lighting such as porch, driveway and walkway lights.
- III. **Exemptions:** All outdoor lighting lawfully in place prior to the date of this ordinance shall be grandfathered. [Note: Additional lighting regulations pertain to sign standards.]

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9. Wilton NH (Hillsborough County)

Zoning Ordinance:

16A.1 Purpose and Intent: The purpose of this ordinance is to preserve the rural atmosphere and dark skies of the Town of Wilton. Natural dark skies are the nighttime aspect of rural character. Increasing light pollution and glare from inappropriate lighting degrades such rural character. This ordinance is intended to enhance public safety and welfare by providing for adequate and appropriate outdoor lighting, providing for lighting that will complement the character of the Town of Wilton, reduce glare, minimize light trespass, reduce the cost and waste of unnecessary energy consumption and prevent the degradation of the night sky.

16A.2 Applicability.

- a. In addition to the General Standards found in [Section 16A.3](#) below, detailed lighting requirements shall be set forth in the Town of Wilton Site Plan Review Regulations and shall apply to all outdoor lighting in nonresidential developments in the Town of Wilton requiring site plan approval from the Planning Board, as well as all new and replacement outdoor lighting in nonresidential properties. Home Occupations requiring Planning Board site plan review are required to comply with this Section.
- b. Though they are not subject to permitting through this ordinance, residential developers and homeowners are encouraged to use full cutoff energy efficient lighting fixtures and prevent light trespass onto neighboring properties.
- c. The Illuminating Engineering Society of North America (IESNA) standards shall apply to those non-residential uses not specifically addressed in this ordinance or by the Site Plan Review Regulations.

16A.3 General Standards.

Non-residential lighting and lights from vehicular traffic associated with a non-residential use shall be shielded or [buffered](#) to prevent off-site glare, sky-glow and light trespass. Full cut-off or partial cut-off fixtures, when approved, are to be used, except that low-level lighting (Globe style, non-cut-off types) for walkways and landscape lighting may be approved when an acceptable design meeting the Purpose and Intent ([Section 16A.1](#)) of this ordinance is submitted.

Wherever outside lighting is proposed in a site plan review, it shall be accompanied by a formal lighting plan, prepared to scale. The lighting plan shall require Planning Board approval. Home Occupations are exempt from a formal plan but are subject to Site Plan Review Regulations. When any site plan proposes installed street, common or public area outdoor lighting, the final plan shall contain a statement certifying that the applicable provisions of this ordinance and associated regulations shall be adhered to. Lights not required for safety or security shall be turned off within a reasonable time of when a business or activity closes or ceases, as set forth in Site Plan Review Regulations.

This paragraph shall not apply to temporary decorative lighting, which may include colored lamps, such as holiday lighting. Commercial lighting shall meet minimum IESNA illumination levels while not exceeding IESNA uniformity ratios and average illumination recommendations.

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