

8. Lighting

Section 1. Purpose and Applicability

Purpose

The purpose of this Element is to provide regulations for outdoor lighting (also referred to in this Element as exterior lighting) that will:

- Permit the use of outdoor lighting that does not exceed the minimum levels specified in IES recommended practices for night-time safety, utility, security, productivity, enjoyment and commerce.
- Reduce adverse offsite impacts of lighting such as light trespass and obtrusive light.
- Curtail light pollution and reduce sky glow.
- Help protect the environment from the adverse effects of night lighting from gas or electric sources.
- Conserve energy and resources to the greatest extent reasonably practicable.

Applicability

Except as otherwise provided, the standards in this Element apply to all exterior lighting in Chatham Park in developments requiring approval of a site plan.

Section 2. Lighting Plan

Each site plan submitted for approval by the Town shall include an exterior lighting plan that addresses all of the following:

1. Specifications for the lighting fixtures such as: type of unit (for example, cutoff classification, BUG rating, glare shields, etc.); lamps (wattage, etc.); electrical load requirements; utility company involved; method of wiring; routing/location of lines; number and location of lights; and mounting heights.
2. A horizontal point photometric grid that indicates foot-candle levels measured at grade across the site. The plan shall include information with respect to maximum, average, and minimum site foot-candles, uniformity ratio (average/minimum), and depreciation factors. Foot-candle levels must be shown as of the time of installation.
3. Plan certification by (i) a licensed lighting professional holding the PE, LC or CLEP certification or similar certification that indicates proficiency in the design of outdoor lighting, (ii) a lighting manufacturer, or (iii) the local electric utility. The certification must verify that the plans meet applicable design requirements and illumination standards of this Element.

Section 3. Lighting Zones

The Lighting Zone shall determine the limitations for lighting as specified in this Element. The Lighting Zones shall be as follows:

LZ0: No ambient lighting

No ambient lighting is allowed in areas of undeveloped open space where the natural environment will be seriously and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and/or detracting from human enjoyment and appreciation of the natural environment. Human activity is subordinate in importance to nature. The vision of human residents and users is adapted to the darkness in such areas, and they expect to see little or no lighting. When not needed, lighting should be extinguished.

LZ1: Low ambient lighting

Low ambient lighting is allowed in areas of rural or low density (i.e. less than 3 residential units per gross acre) residential uses where lighting might adversely affect flora and fauna or disturb the character of the area. The vision of human residents and users is adapted to low light levels in such areas. Lighting may be used for safety and convenience but it is not necessarily uniform or continuous. After dark, most lighting should be extinguished or reduced as activity levels decline.

LZ2: Moderate ambient lighting

Moderate ambient lighting is allowed in areas of medium to high density (i.e. more than 3 residential units per gross acre) residential uses outside of Activity Centers and Section 7.1. The vision of human residents and users is adapted to moderate light levels in such areas. Lighting may typically be used for safety and convenience but it is not necessarily uniform or continuous. After dark, lighting may be extinguished or reduced as activity levels decline.

LZ3: Moderately high ambient lighting

Moderately high ambient lighting is allowed in non-residential areas, mixed-use areas, Activity Centers, and Section 7.1, and in medium to high density (i.e. more than 3 residential units per gross acre) in non-residential areas, mixed-use areas, Activity Centers, and Section 7.1. The vision of human residents and users is adapted to moderately high light levels in such areas. Lighting is generally desired for safety, security and/or convenience and it is often uniform and/or continuous. After dark, lighting may be extinguished or reduced in most areas as activity levels decline.

LZ4: High ambient lighting

High ambient lighting is allowed in manufacturing and industrial areas. The vision of human residents and users is adapted to high light levels in such areas. Lighting is generally considered necessary for safety, security and/or convenience and it is mostly uniform and/or continuous. After dark, lighting may be extinguished or reduced in some areas as activity levels decline.

Section 4. Illumination Standards

The tables below set forth standards for lighting intensity based upon the lighting zone and associated land use or activity involved. All light levels are measured at ground level. The specified minimum (Min.) FC value outlined in the following tables means that the lowest light level point or location in the applicable Land Use (Table 4.1) or applicable Location (Table 4.2) must not fall below the minimum (Min.) stated FC value or exceed the highest (Max.) FC value if a range is specified. An average to minimum uniformity of 4:1 means that the average FC to minimum (Min.) FC ratio cannot be worse (higher) than 4:1. The minimum (Min.) FC plus the uniformity ratio limits the highest amount of light allowed. Values must be calculated using the levels found within the lighted area; for example, a parking lot must be calculated using the levels found within the curb to curb or paved parking area only.

Table 4.1 Lighting Standards for General Parking with Pedestrian Areas (foot-candles)

Lighting Zone	Land Use	Maintained Foot-candles	Uniformity Ratio (Average/minimum)
LZ4	-High intensity - Manufacturing & Industrial	0.2 Min. to 1.0 Max.	4/1
LZ3	- Non-residential, Mixed-Use, Activity Centers, and Section 7.1 - Retail - Office - Educational - Cultural, civic, and recreational - Church or place of worship - Medium to high density (i.e. more than 3 residential units per gross acre) residential uses	0.2 Min. to 0.9 Max.	4/1
LZ2	- Medium to high density (i.e. more than 3 residential units per gross acre) residential uses outside of Activity Centers and Section 7.1.	0.2 Min. to 0.5 Max.	4/1
LZ1	- Rural or low density (i.e. less than 3 residential units per gross acre) residential uses	0.1 Min. to 0.5 Max.	4/1
LZ0	- Undeveloped open space	Not Applicable	Not Applicable

Notes:

1. Illumination levels are horizontal on the task, e.g. pavement or area surface
2. Uniformity ratios dictate that average illuminance values shall not exceed minimum values by more than the product of the minimum value and the specified ratio. For example, for LZ2, the average maintained foot-candles shall not be in excess of 2.0 (0.5 x 4).

Table 4.2 Other Exterior Lighting Standards (foot candles)

Location	Maintained Foot-candles	Uniformity Ratio (Average/Minimum)
*Vital locations (entry/exit doors, service areas, ATMs, etc.)	0.2 Min. to 1.25 Max.	4/1
Sidewalks (outside of public or private street rights-of-way)	0.2 Min. to .5 Max.	4/1
Storage yards	0.2 Min. to 1.0 Max.	4/1
Loading/unloading docks and platforms	0.2 Min. to 3.75 Max.	4/1
Auto sales yard/enclosed outdoor display	0.2 Min. to 1.25 Max.	8/1
General recreational areas (fields, playgrounds, courts, Pools, greenways)	0.2 Min. to 2.5 Max.	4/1

**Maintained foot-candles for vital locations shall be generally based on an area 10 feet by 10 feet or the limits of the specific area.*

*** A vehicular use area, or “VUA”, is an area, other than a public street, where motor vehicles are either parked, stored, or driven, including private driveways, private streets, parking lots, motor vehicle display lots, and motor vehicle rental depots, but not including alleyways, parking structures or buildings, underground areas, or areas which are used exclusively as loading areas or service areas.*

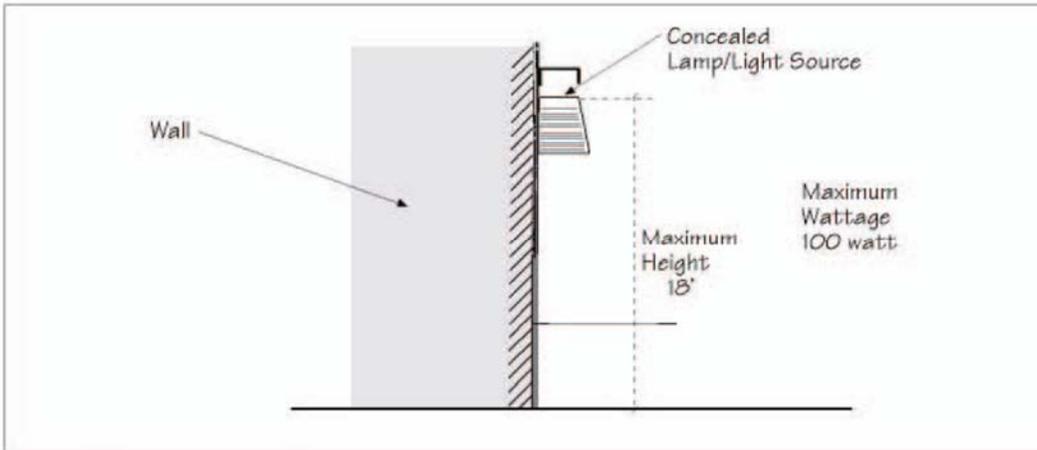
Section 5. Design Requirements

Exterior lighting, such as that used in and around buildings, recreation areas, parking lots, and signs, shall be designed to prevent the excessive spillover of light onto adjacent properties. It shall also be designed to protect against glare onto public and private streets and private driveways that would impair the vision of motorists and adversely impact adjoining properties. The impact of exterior lighting on adjacent properties shall be reduced by one or more of the following: existing vegetation, thick evergreen vegetated buffers, berms, walls, or fences, and/or the use of directional lighting, lighting shields, special fixtures, timing devices, appropriate light intensities, luminaries, and mountings at appropriate heights. External and/or internal shields are required on all lights in vehicular use areas and lights mounted to buildings where they are immediately adjacent to residential uses (such as along the edges of parking lots or mounted to the rear of buildings close to residential uses). All outdoor lighting shall conform to the following design standards:

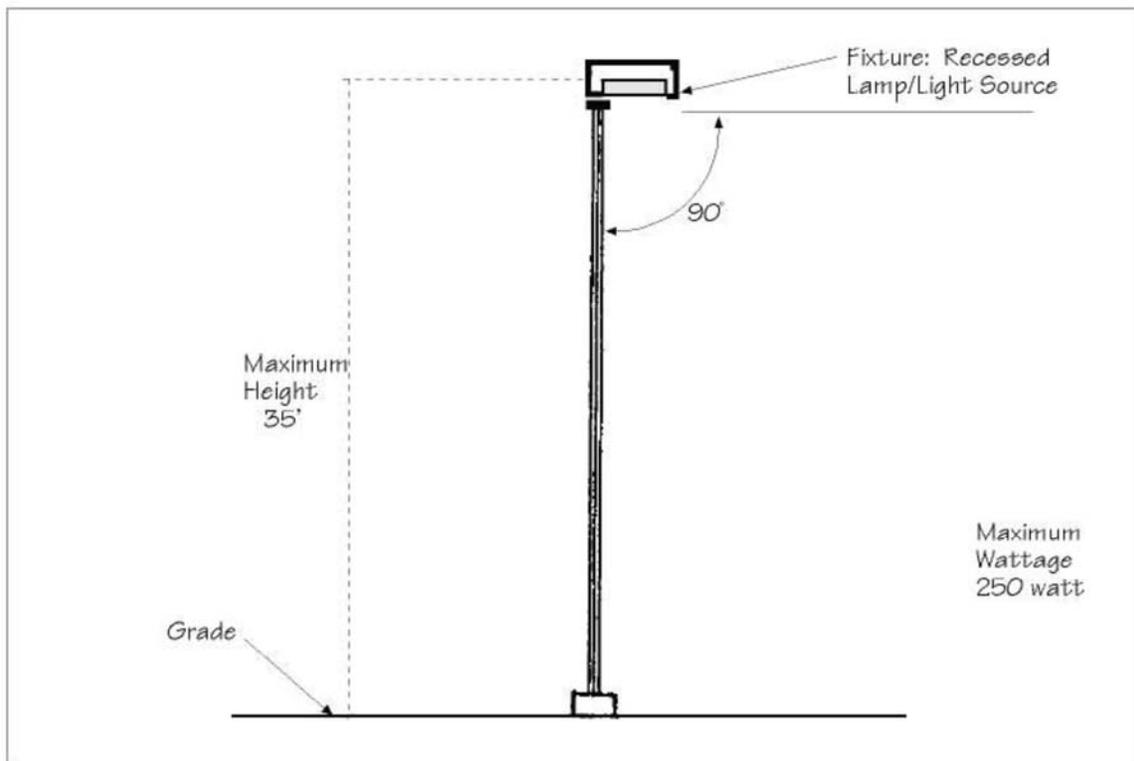
A. Mounting Heights

Outdoor lighting fixtures shall be designed, located and mounted at heights shown to be appropriate, but in no case shall be greater than:

1. 35 feet above grade for *cutoff* lights (see Sec. 4(D)(3)).
2. Mounting height is measured from the finished grade or surface and includes the total height of the fixture, pole, and any base or other supporting structure required to mount the light(s).



WALL-PACK LIGHT FIXTURES

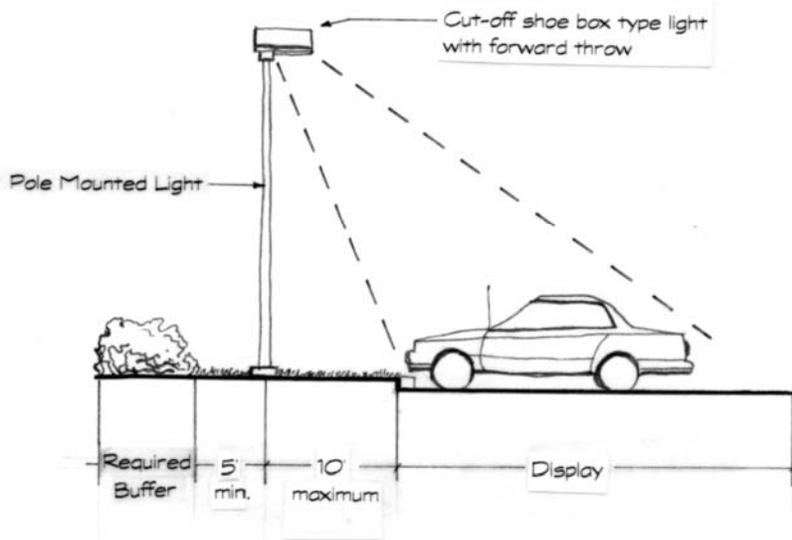
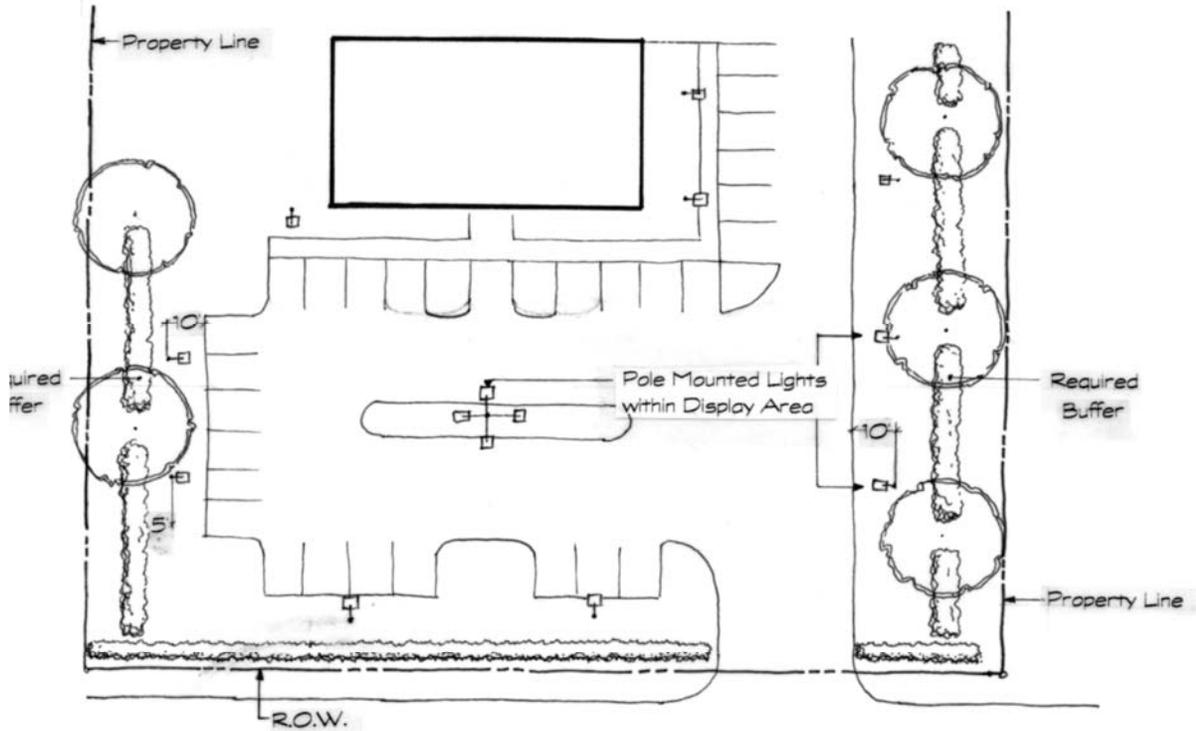


CUTOFF LIGHT FIXTURE

B. Location

1. All outdoor lighting fixtures shall be located a minimum of 5 feet from a property or street right-of-way line, and should be kept out of and at least 2 feet away from any required perimeter or streetscape buffer, and Tree Coverage Area (as defined in the Tree Protection Additional Element).

2. The layout of lighting shall be designed so that poles do not interfere with other elements of the approved site such as trees, landscaping, and parking. In general, poles should be kept at least 20 feet away from the trunk of any canopy tree and at least 10 feet away from the trunk of any understory tree.
3. Lighting for outdoor display areas, such as auto dealerships, must be located inside the illuminated area or no more than 10 feet away from the outside edge of the illuminated area so that the amount of direct glare and the visual field of view does not present a safety hazard to the passing motorist.



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C. Architectural/Site Compatibility

Lighting fixtures shall be of a design and size compatible with the principal building of a development and adjacent areas, and shall be designed to be an integral part of the entire development site. Light fixtures and poles will be considered neutral elements of the site and must be finished in black, gray, dark brown, or architectural bronze. All light fixtures/poles on site including building mounted lighting shall be the same color throughout the development. White and other bright colors are prohibited.

D. Spillover Light and Glare Control

1. All outdoor lighting shall be designed and located such that the maximum illumination at the time of installation measured in foot-candles at the property line shall not exceed 0.5 onto adjacent residential sites and 1.0 onto adjacent non-residential sites, public and private streets, and private driveways.
2. Cutoff lights shall be *full* cutoff with no sag-type lenses;
3. Cutoff lights used along the perimeter of non-residential sites where they are immediately adjacent to adjoining residential properties must be fitted with externally mounted shields placed on the residential side. The shields must be appropriately sized to sufficiently limit visible glare from the light onto the residential properties. Additional internal shields or other devices may be required to direct the light away from residential properties.

E. Wattage

Lamps for cut-off fixtures shall not exceed 250 watts.

F. Color Temperature

Cooler light sources (e.g. 5,000 – 6,000 Kelvin) will be prohibited and warmer light sources (e.g. 3,000 – 4,000 Kelvin) shall be utilized.

G. Building, Ground Mounted Fixtures and Accent Lighting

Lighting shall not be mounted to buildings or used to illuminate buildings or other site features unless approved by the Planning Director as integral elements on the applicable development plan. Lighting will not be approved unless the light fixtures are located, aimed, and shielded so that light is directed only onto limited parts of the building façade, landscape, and site features, and spillover light is minimized (see also Secs. 4(C) Architectural/Site Compatibility, 4(D) Spillover Light and Glare Control, and 4(E) Wattage). Building, ground mounted fixtures, and accent lighting must meet the following criteria:

1. Lights must not be used to illuminate entire portions of building(s), landscape, or site features.
2. Building mounted lights such as wall-pack and goose-neck type fixtures shall be fully shielded, true cutoff type fixtures (concealed lamp/light source). The lighting must be directed downward, and the wattage must not exceed 100 watts.

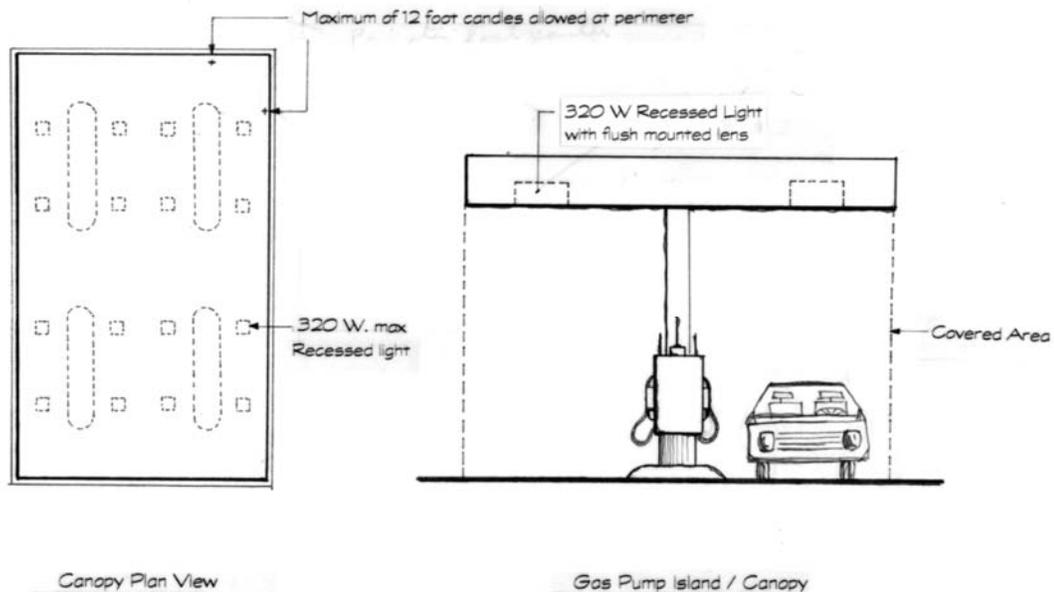
3. Accent lights must be low-wattage or low-voltage and the maximum illumination on any surface shall not exceed 5.0 average foot-candles at the time of installation.
4. Awnings and canopies used for building accents over doors, windows, and etc. shall not be internally lit (i.e., from underneath or behind). If lit from above, the lighting must be spaced sparingly so that only limited portions of awnings and canopies are accented.
5. Lights that flash, move, revolve, rotate, scintillate, blink, flicker, vary in intensity, or use intermittent electrical pulsation are prohibited.

H. Floodlights

Floodlights or similar types of directional lighting attached to light poles or buildings to illuminate large portions of the site and/or building(s) are prohibited unless approved by the Planning Director. The use of floodlights or similar types of directional lighting will only be considered for special approval for industrial type uses or where it can be demonstrated that site or design constraints warrant their use.

I. Lighting for Gas Station/Convenience Store Canopies

Lighting for canopies for service stations and similar uses shall be restricted to no more than two 320 watt recessed lighting fixtures (including lenses) mounted flush with the bottom of the canopy on each side of a gasoline pump island, or any other design that meets the standards of this Element. Lighting for canopies for service stations and other similar uses including, but not limited to, bank and pharmacy drive through, and large covered main entrance canopies shall not exceed a maximum level of 12 foot-candles at the time of installation as measured at ground level at the inside of the outside edge of the canopy and an average level of 25 foot-candles under the canopy at the time of installation.



J. Lighting Control Requirements

Subject to necessary technology being reasonably and locally available, outdoor lighting in non-residential development will have photoelectric switches or other controls.

K. Illuminated Tubing or Strings of Light

Illuminated tubing or strings of light on trees and landscaping or outlining property lines or open sales areas are allowed.

Section 6. Special Purpose Lighting

Lighting not complying with the technical requirements of this Element, but consistent with its intent, may be installed for the following applications, if approved as an Administrative Alternative by the Planning Director:

1. Sports facilities*, including but not limited to unconditioned rinks, open courts, fields, and stadiums.
2. Construction lighting.
3. Lighting for industrial sites having special requirements, such as petrochemical manufacturing or storage, shipping piers, etc.
4. Parking Structures.
5. Urban parks.
6. Ornamental and architectural lighting.
7. Theme and amusement parks.
8. Correctional facilities.
9. Other non-exempt lighting not specifically addressed in this Section.

*Sports and Athletic Field Lighting

Lighting for ball fields may need to exceed illumination standards for general recreational needs in order to meet higher standards required for tournament play. The Planning Director must approve any variance from the illumination standards; however, before any variance will be considered the sports lighting must meet these minimum standards:

1. Fixtures must not exceed 80 feet in mounting height (this includes bases and/or other mounting structures).
2. Fixtures must be fitted with the manufacturer's glare control package. If the manufacturer does not have a glare control package, the fixture specification must be changed to a manufacturer that offers a glare control package.
Fixtures must be designed and aimed so that their beams fall within the primary playing area and the immediate surroundings, so that direct illumination onto adjoining properties

3. Fixtures must be designed and aimed so that their beams fall within the primary playing area and the immediate surroundings, so that direct illumination onto adjoining properties, public and private streets, and private driveways is significantly restricted. Spillover levels at the property line must not exceed 0.5 foot-candles onto residential properties.
4. Lighting shall be extinguished no later than one hour after the event ends.

Section 7. Exemptions

The standards of this Element shall not apply to:

1. Individual residential lot and dwelling lighting, but these standards are applicable to outdoor recreational use lighting in residential subdivisions.
2. Lighting with General Temporary Signs under the Master Signage Plan Additional Element.
3. Sign illumination regulated by the Master Signage Additional Element.
4. Public and private streets and private driveways.
5. Property owned or operated by the Town or other governmental entity.
6. Lighting used for emergency conditions and/or public safety.

Section 8. Final Inspection

Before certificates of occupancy are issued, the parcel owner must supply the Town with a final letter of certification from (i) a licensed lighting professional holding the PE, LC or CLEP certification or similar certification that indicates proficiency in the design of outdoor lighting, (ii) a lighting manufacturer, or (iii) the local electric utility, verifying that all site lighting is installed according to the standards of this Element, the approved development plans, and any applicable conditions. The certification must include a report indicating that all site and exterior mounted building lighting was inspected and the light levels measured and recorded (including spillover lighting).

Section 9. Definitions

NOTE: The following definitions are applicable in this Lighting Element, whether or not the first letter in the word or words is capitalized.

Ambient Lighting – the light surrounding an environment or subject.

Architectural Lighting – Lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is incidental.

BUG – a light fixture classification system that classifies backlight (B), uplight (U), and glare (G).

Canopy – In the context of lighting (not trees), is a covered, unconditioned structure with at least one side open for pedestrian and/or vehicular access. An unconditioned structure is one that may be open to the elements and has no heat or air conditioning.

Emergency Conditions – Generally, lighting that is only energized during an emergency; lighting fed from a backup power source; or 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.

Foot-candle – The unit of measure expressing the quantity of light received on a surface. One foot-candle is the illuminance produced by a candle on a surface one foot square from a distance of one foot.

Glare – Lighting entering the eye directly from a light source or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

IESNA or IES – Illuminating Engineering Society of North America.

Lamp – A generic term for a 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.

LED – Light Emitting Diode.

Light Pollution – Any adverse effect of artificial light including, but not limited to, glare, light trespass, sky-glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

Light Trespass – Light that falls beyond the property it is intended to illuminate.

Lighting – “Electric” or “man-made” or “artificial” lighting. See “lighting equipment”.

Lighting Equipment – Equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), ballast(s), poles, posts, lens(s), and related structures, electrical wiring, and other necessary or auxiliary components.

Lighting Zone – An overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.

Object – A permanent structure located on a site. Objects may include statues or artwork, garages or canopies, outbuildings, etc.

Ornamental lighting – Lighting that does not impact the function and safety of an area but is purely decorative, or used to illuminate architecture and/or landscaping, and installed for aesthetic effect. With respect to public and private streets and private driveways, ornamental lighting is lighting that serves a decorative function in addition to providing optics that effectively deliver street lighting, has a historical period appearance or decorative appearance, and has the following design characteristics:

- Designed to mount on a pole using an arm, pendant, or vertical tenon;
- Opaque or translucent top and/or sides;
- An optical aperture that is either open or enclosed with a flat, sag or drop lens;
- Mounted in a fixed position; and
- With its photometric output measured using Type C photometry per IESNA LM-75-01.

Outdoor Lighting – Lighting equipment installed within the property line and outside the building envelopes, whether attached to poles, building structures, the earth, or any other location; and any associated lighting control equipment.

Photoelectric Switch – A control device employing a photocell or photodiode to detect daylight and automatically switch lights off when sufficient daylight is available.

Property Line – The edges of the legally-defined extent of privately owned property.

Sales area – Uncovered area used for sales of retail goods and materials, including but not limited to automobiles, boats, tractors and other farm equipment, building supplies, and gardening and nursery products.

Sky Glow – The brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere. Sky glow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the night sky.

Translucent – Allowing light to pass through, diffusing it so that objects beyond cannot be seen clearly (not transparent or clear).