

3.2.4 Exterior Site Lighting

- (A) **Purpose.** The purpose of this Section is to ensure adequate exterior lighting for the safety, security, enjoyment and function of the proposed land use; conserve energy and resources; reduce light trespass, glare, artificial night glow, and obtrusive light; protect the local natural ecosystem from damaging effects of artificial lighting; and encourage quality lighting design and fixtures.
- (B) **General Standard.** All development that includes proposed artificial outdoor lighting, except for development on single-family detached residential lots, single-family attached residential lots, and two-family dwelling residential lots for which an application is submitted after **[Insert Effective Date of Ordinance]**, subject to below Subsection 3.2.4(D), shall submit for review and approval a proposed lighting plan that complies with the standards in this Section 3.2.4 and meets the functional needs of the proposed land use without adversely affecting adjacent properties or the community.
- (C) **Design Standards.** The lighting plan shall meet the following requirements and all other applicable requirements set forth in this Section 3.2.4:
- (1) Provide a comprehensive plan that clearly calculates the lumens of all exterior lighting being proposed and demonstrates compliance with impacts to adjacent properties, as outlined in subsections (I) and (J) below.
 - (2) Design different use areas considering nighttime safety, utility, security, enjoyment, and commerce.
 - (3) Reinforce and extend the style and character of the architecture and land use proposed within the site.
 - (4) Demonstrate no light trespass onto Natural Areas, Natural Habitat Buffer Zones or River Landscape Buffers as defined in Section 4.16(E)(5)(b)(1)(a).
 - (5) All lighting shall have a nominal correlated color temperature (CCT) of no greater than 3000 Kelvin. Consider high color fidelity lamps relative to the lighting application.
 - (6) Light poles shall be anodized (or otherwise coated) to minimize glare from the light source.
- (D) **Existing Lighting.** Existing lighting shall mean lighting installed or approved prior to **[Insert Effective Date of Ordinance]**.

- (1) The addition of three (3) or more new fixtures in excess of the existing number of fixtures, updating or replacement of three (3) or more existing fixtures or the updating or replacement of between ten (10) and fifty (50) percent of the existing fixtures requires an approved minor amendment pursuant to Section 2.2.10. Such minor amendment review is limited to meeting Section 3.2.4(A), *Purpose*, Section 3.2.4(C), *Design Standards*, and Section 3.2.4(I), *Limits to Offsite Impacts*.
- (2) The addition of less than three (3) new fixtures in excess of the existing number of fixtures, or updating or replacement of less than three (3) existing fixtures, or the update or the replacement of less than ten (10) percent of the existing fixtures requires Director review and approval. The review shall be limited to meeting Section 3.2.4(A), *Purpose*, Section 3.2.4(C), *Design Standards*, and Section 3.2.4(I), *Limits to Offsite Impacts*. The Director may impose conditions of approval to ensure lighting meets the purpose and intent of code requirements. The applicant may appeal the Director's decision in the same manner as a basic development review or minor subdivision decision as set forth in Land Use Code Section 2.18.3(L).
- (3) Should the addition of fixtures in excess of the existing number of fixtures or update or replacement of existing fixtures occur incrementally, and the cumulative changes exceed three (3) new fixtures or replacement of between ten (10) and fifty (50) percent of the existing fixtures, whichever is greater, within a ten (10) year period, the addition or update that exceeds such threshold must be approved through a minor amendment pursuant to Section 2.2.10. Such minor amendment will review the cumulative changes or updates and be limited to meeting Section 3.2.4(A), *Purpose*, Section 3.2.4(C), *Design Standards*, and Section 3.2.4(I), *Limits to Offsite Impacts*.
- (4) Applicants for minor amendments and changes of use pursuant to Land Use Code Section 2.2.10(A) that result in the replacement or upgrade of fifty (50) percent or more of the existing outdoor lighting fixtures at one time or incrementally within a ten (10) year period shall submit a lighting plan for the entire development site that meets the requirements of this Section 3.2.4 and, if necessary to meet such requirements, complete a site lighting retrofit of the entire development site.
- (5) Applicants for major amendments and changes of use pursuant to 2.2.10(B) shall submit a lighting plan for the entire development site that meets the requirements of this Section 3.2.4 and, if necessary to meet such requirements, complete a site lighting retrofit for the entire development site.

- (E) ***Conformance with All Applicable Codes.*** All outdoor lighting shall be installed in conformance with this Section 3.2.4 and applicable sections of Chapter 5 of the Code of the City of Fort Collins.
- (F) ***Exceptions.*** The following are not subject to the requirements set forth in this Section 3.2.4:
- (1) Temporary lighting for construction sites, special events, holidays, and other events requiring lighting.
 - (2) Festoon lights installed for less than thirty (30) consecutive days.
 - (3) Lighting within the public right-of-way. Such lighting is regulated under the Larimer County Urban Area Street Standards.
 - (4) Lighting for single family residential housing and duplexes. Such lighting is regulated by the adopted building codes and amendments.
- (G) ***Prohibited Lighting.*** The following lighting is prohibited:
- (1) Site lighting that may be confused with warning, emergency or traffic signals.
 - (2) Mercury vapor lamps.
- (H) ***Lighting Context Areas.*** The applicable Lighting Context Area shall determine the limitations for exterior artificial lighting. The Lighting Context Areas are described as follows:
- (1) LC0 – No ambient lighting. Areas 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 nighttime environment. The vision of human residents and users is adapted to the darkness, and they expect to see little or no lighting.
 - (2) LC1 – Low ambient lighting. The vision of human residents and users is adapted to low light levels. Lighting may be used for safety and convenience, but it is not necessarily uniform or continuous. Typical locations include low and medium density residential areas, commercial or industrial areas with limited nighttime activity, and the developed areas in parks and other natural settings.
 - (3) LC2 – Moderate ambient lighting. Areas of human activity where the vision of human residents and users is adapted to moderate light levels. Lighting may typically be used for safety and convenience, but it is not necessarily

uniform or continuous. Typical locations include high density residential areas, shopping and commercial districts, industrial parks and districts, City playfields and major institutional uses, and mixed-use districts.

- (4) LC3 – Moderately high ambient lighting. Lighting is generally desired for safety, security, convenience, and unique site conditions. Lighting is often uniform and/or continuous. Typical locations include select areas in the Downtown Zone District and 24-hour emergency medical sites.

Lighting Context Areas generally correspond to zone districts as provided in Table 3.2.4-1, Lighting Context Areas, although the assigned Lighting Context Area may vary from Table 3.2.4-1 if necessary to accomplish the purposes and intent of this Section 3.2.4. The location of the Lighting Context Areas are shown on the “Lighting Context Area Map” on file at the City Clerk’s office.

Table 3.2.4-1 Lighting Context Area		
Lighting Context Area	Land Use	Corresponding Zone Districts
LC0	Natural Area/Conservation Easement	P-O-L (City Natural Areas)
LC1	Single Family/Multi-Family/Light Industrial/Employment/ Portions of Harmony District	P-O-L (City Parks); R-U-L; U-E, R-F; N-C-L; R-C; L-M-N; M-M-N; I; E; T
LC2	Commercial/Industrial/ Portions of Harmony District/High Density Residential	C-N; C-C; C-C-N; C-C-R; C-G; C-L; H-C; I-, R-D-R, D, H-M-N
LC3	Portions of Downtown,24-Hour Emergency Medical Sites	D, M-M-N

- (I) **Limits to Off-Site Impacts.** All luminaires shall be rated and installed according to Table 3.2.4-2, Table 3.2.4-3, and Table 3.2.4-4, which outline maximum BUG (Backlight-Uplight-Glare) ratings (see Figure B below) for all individual luminaires installed in a given Lighting Context Area. Luminaires equipped with adjustable mounting devices shall not be permitted unless the total lumen output is one hundred fifty (150) lumens or less.

For property boundaries that abut public rights-of-way, private streets, private drives, public alleys, and public and private parking lots, the backlight rating, glare rating and illuminance values provided in Tables 3.2.4-2, 3.2.4-4 and 3.2.4-5 respectively, shall be measured ten (10) feet from the property boundary. For all other property boundaries, values shall be measured at the property boundary.

For tables 3.2.4-2 and 3.2.4-4 below, to be considered ideally oriented, the luminaire must be mounted with the backlight portion of the light output oriented perpendicular to and towards the property line of concern (see Figure A below).

Figure A. Ideally Oriented Luminaire and Mounting Conditions

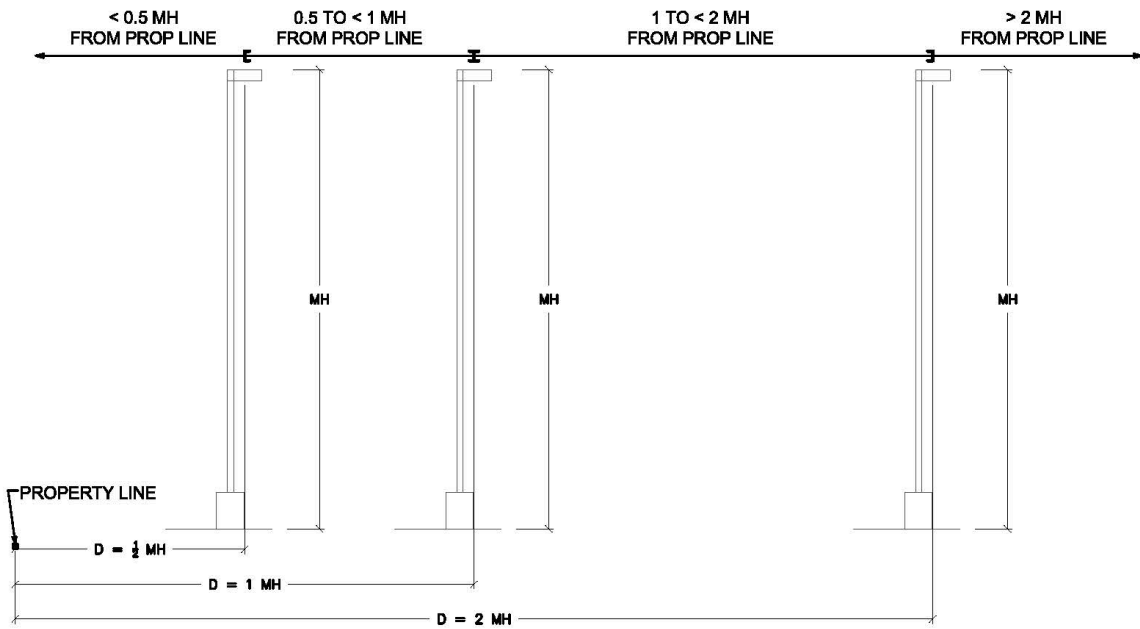


Figure B. Backlight, Uplight and Glare

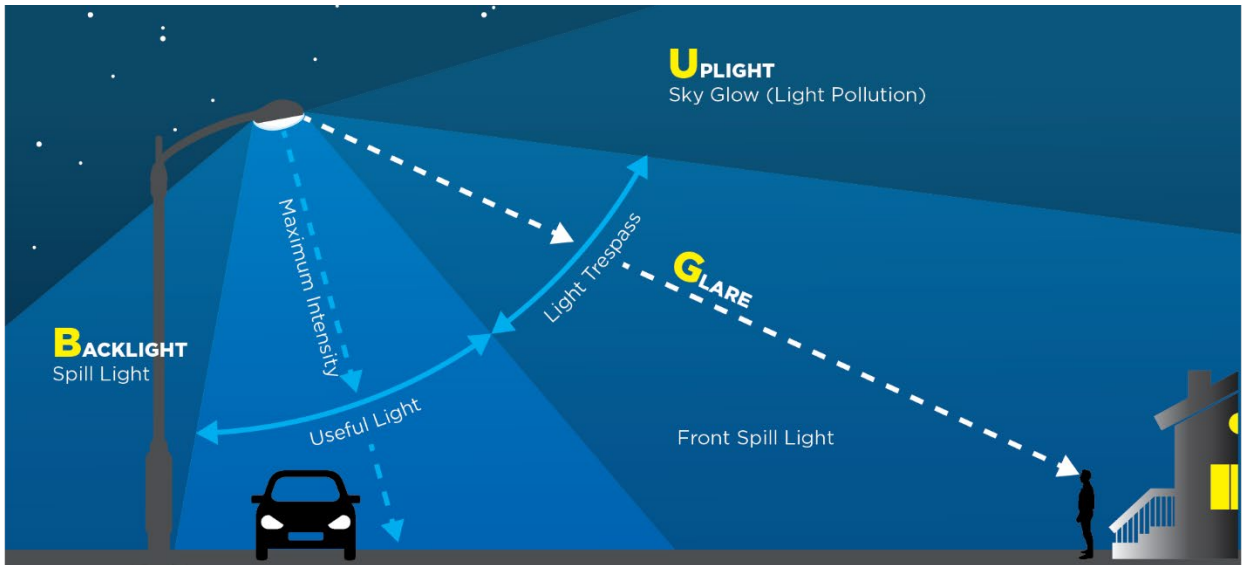


Table 3.2.4-2 Maximum Allowable Backlight Ratings.

Mounting Condition	LC0	LC1	LC2	LC3
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Greater than 2 mounting heights from the property line or not ideally oriented	B1	B3	B4	B5
1 to less than 2 mounting heights from the property line and ideally oriented	B1	B2	B3	B4
0.5 to less than 1 mounting heights from the property line and ideally oriented	B0	B1	B2	B3
Less than 0.5 mounting heights from the property line and ideally oriented	B0	B0	B0	B1

Table 3.2.4-3 Maximum Allowable Uplight Ratings.				
	LC0	LC1	LC2	LC3
Allowed Uplight Rating	U0	U0	U1	U2
Allowed light emission above 90 degrees for street or area lighting	0%			

Table 3.2.4-4 Maximum Allowable Glare Ratings.				
Mounting Condition	LC0	LC1	LC2	LC3
Greater than 2 mounting heights from the property line	G0	G1	G1	G2
2 or less mounting heights from the property line and ideally oriented				
1 to less than 2 mounting heights from the property line and not ideally oriented	G0	G0	G1	G1
0.5 to less than 1 mounting heights from the property line and not ideally oriented	G0	G0	G0	G1
Less than 0.5 mounting heights from the property line and not ideally oriented	G0	G0	G0	G0

Light Trespass Limitations. The illuminance levels provided in Table 3.2.4-4 shall be used for enforcement, should concerns of obtrusive lighting or question of compliance arise. Lighting plans shall show horizontal illuminance along all lot lines with calculation points spaced no further than ten (10) feet apart. This provision shall apply to all exterior lighting.

Table 3.2.4-5 Light Trespass Limitations	
Lighting Context Area	Maximum Horizontal Illuminance (fc)

Natural Habitat Buffer Zones and River District Landscape Buffers	0.0
LC0	0.0
LC1	0.1
LC2	0.3
LC3	0.8

- (J) **Site lumen limit.** The total installed initial luminaire lumens of all outdoor lighting shall not exceed the total site lumen limit. The total site lumen shall be determined using either the Parking Space Method (Table 3.2.4-5) or the Hardscape Area Method (Table 3.2.4-6). Only one method shall be used per permit application and the applicable method shall be determined by the applicant. For sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens. The total installed initial luminaire lumens are calculated as the sum of the initial luminaire lumens for all luminaires. Sign lighting shall be exempt from the calculation of total installed lumens.

Table 3.2.4-6 Allowed Total Initial Luminaire Lumens per Site for Non-Residential Outdoor Lighting, per Parking Space Method.			
May only be applied to properties up to ten parking spaces (including handicapped accessible spaces).			
LC0	LC1	LC2	LC3
350 lumens per space	490 lumens per space	630 lumens per space	840 lumens per space

Table 3.2.4-7 Allowed Total Initial Lumens per Site for Non-Residential Outdoor Lighting, Hardscape Area Method.				
May be used for any project. When lighting intersections of site drives and public streets or roads, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting. Top level, exterior parking garage decks are included as Hardscape Areas.				
	LC0	LC1	LC2	LC3
Base Allowance	0.5 lumens per square foot of hardscape	1.25 lumens per square foot of hardscape	2.5 lumens per square foot of hardscape	5 lumens per square foot of hardscape
Additional allowances for sales and service facilities. No more than two additional allowances per site. Allowance may only be used to light the specific sales or service area selected and may not be used to light other areas of the site.				

Building Façades. This allowance is lumen per unit area of building façade that are illuminated. To use this allowance, luminaires must be aimed at the façade.	0		8 lumens per square foot	16 lumens per square foot
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non-sales areas. To use this allowance, luminaires must be within 0.5 mounting heights of the sales lot area.	0	4 lumens per square foot	8 lumens per square foot	16 lumens per square foot
Outdoor Dining. This allowance is lumen per unit area for the total illuminated hardscape of outdoor dining. In order to use this allowance, luminaires must be within 0.5 mounting heights of the hardscape area of outdoor dining. This allowance includes rooftop dining.	0	1 lumen per square foot	5 lumens per square foot	10 lumens per square foot
Gasoline Station. This allowance is lumens per installed fuel pump. Both sides of a two-sided pump qualify as one allowance.	0	4,000 lumens per pump	8,000 lumens per pump	8,000 lumens per pump

(L) ***Athletic and Recreational Fields.*** The lighting for athletic and recreational fields are exempted from the lumen, BUG and color temperature requirements in this section and shall meet the following requirements:

- (1) Lighting shall have a nominal correlated color temperature (CCT) of no greater than 5700 Kelvin.
- (2) Off-site impacts shall be limited to the maximum extent practical.
- (3) Lighting controls shall provide the following functions:
 - (a) Lighting shall be dimmable to ten (10) percent to adjust illuminance levels for relative activity (maintenance vs active play).
 - (b) Local or remote manual control with at least two (2) preset illuminance levels.
 - (c) Lights shall be automatically extinguished by one (1) hour after the end of play.

(d) Field lighting aimed upward shall be controlled separately from downward-directed field lighting.

(M) **Alternative Compliance.** Upon request by an applicant, the decision maker may approve an alternative lighting plan that may be substituted in whole or in part for a plan meeting the standards of this Section.

(1) **Procedure.** Alternative compliance lighting plans shall be prepared and submitted in accordance with submittal requirements for lighting plans as set forth in this Section. The plan shall clearly identify and discuss the modifications and alternatives proposed and the ways in which the plan will better accomplish the purpose of this Section than would a plan which complies with the standards of this Section.

(2) **Review Criteria.** To approve an alternative plan, the decision maker must first find that the proposed alternative plan accomplishes the purposes of this Section equally well or better than would a lighting plan which complies with the standards of this Section.

In reviewing the proposed alternative plan, the decision maker shall consider the extent to which the proposed design meets the functional safety and security needs, protects natural areas from light intrusion, enhances neighborhood continuity and connectivity, fosters nonvehicular access, and demonstrates innovative design and use of fixtures or other elements.

Section 3. That Section 5.1.2 of the Land Use Code is hereby amended by the addition of the following new definitions which read in their entirety as follows:

5.1.2 Definitions.

...

BUG (Backlight, Uplight, Glare) Rating shall mean the quantity of light within various beam angles, consisting of:

(1) *Backlight* – the percent lamp lumens (non-LED luminaires) or the luminaire initial lumens (LED luminaires) distributed behind a luminaire between zero (0) degrees vertical (nadir) and ninety (90) degrees vertical.

(2) *Uplight* – the percent lamp lumens (non-LED luminaires) or the luminaire initial lumens (LED luminaires) distributed above a luminaire between ninety (90) and one hundred eighty (180) degrees vertical.

(3) *Glare* – the percent lamp lumens (non-LED luminaires) or the luminaire initial lumens distributed sixty (60) and ninety (90) degrees vertical.

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Candela (see luminous intensity), (cd) shall mean the unit of luminous intensity.

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Correlated color temperature (CCT) shall mean the absolute temperature of a blackbody whose chromaticity most nearly resembles that of the light source.

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Festoon lighting shall mean electric lighting with individual bulbs suspended along a string that incorporates power wiring and is suspended between two (2) or more points.

Glare shall mean the sensation produced by luminances within the visual field that are sufficiently greater than the luminance to which the eyes are adapted that causes annoyance, discomfort, or loss in visual performance or visibility.

Hardscape shall mean any non-living horizontal site element, including but not limited to patios, decks, walkways, sidewalks, driveways, and steps.

Ideally oriented luminaire shall mean a luminaire mounted with the backlight portion of the light output oriented perpendicular to and towards the property line of concern.

Illuminance shall mean the incidental light falling on a surface as measured in footcandles (fc). Total illuminance at a point is a combination of all light sources that contribute.

...

Light loss factor (LLF) shall mean a depreciation factor that describes the drop in light output over the life of the system. The total LLF is determined by a combination of factors, such as lumen depreciation and luminaire dirt depreciation. Light Loss Factors = 1.0 for evaluating compliance with Section 3.2.4.

...

Lumen (lm) shall mean the luminous flux emitted within a unit solid angle by a point source (one steradian) having a uniform luminous intensity of one candela (cd). See luminous flux.

Luminaire shall mean a complete lighting device consisting of the light source, lens, reflector, refractor, driver, housing and such support as is integral with the housing. If the driver is located within the housing, it is considered integral and therefore part of the luminaire. The pole, posts, and bracket or mast arm are not considered to be part of the luminaire.

Luminance (candelas per square meter, cd/m^2 or nits) shall mean the luminous intensity of any surface in a given direction per unit of projected area of the surface as viewed from that direction; i.e., the apparent brightness of a surface.

Luminous flux (lumen, lm) shall mean a unit of measure of the quantity of light. One lumen is the amount of light that falls on an area of one square meter, every point of which is one meter from a source of one candela. A light source of one candela emits a total of 12.57 lumens. Light sources are rated in terms of luminous flux. Lumens are used for evaluating compliance with Section 3.2.4.

Luminous intensity (candela, cd) shall mean the basic unit of light quantity as measured in candelas. The candela can be thought of as the number of photons per second emitted by the light source.

...

Mounting height (MH) shall mean the vertical distance between the finish grade and the center of the apparent light source of the luminaire.

...

Visibility shall mean the quality or state of being perceivable by the eye. Visibility may be defined in terms of the distance at which an object can be just perceived by the eye or it may be defined in terms of the contrast or size of a standard test object, observed under standardized view-conditions, having the same threshold as the given object.