and integrated with the colors, building materials and architectural character and design of the principal building(s) on the site.

21.07.140 EXTERIOR LIGHTING[109]

A. Purpose[110]

Exterior lighting, as a part of the urban infrastructure, is an urban design tool that helps to determine the safety, livability, and ambiance of Anchorage as northern climate community. The purpose of this section is to foster outdoor lighting for municipal, residential, commercial, industrial, and public/institutional developments that is adequate for safety and convenience; in scale with the activity to be illuminated and its surroundings; directed to the surface or activity to be illuminated; and designed to clearly render people and objects and contribute to a pleasant nighttime environment. Specific purposes are to require outdoor lighting that:

1. Provides safety and personal security as well as convenience and utility in areas of public use or traverse, for municipal, commercial, industrial, multifamily residential, and institutional uses where there is outdoor public activity during hours of darkness;

2. Controls glare and excessive brightness to improve visual performance, allow better visibility with relatively less light, and protect residents from nuisance and discomfort.

3. Controls trespass light onto neighboring properties to protect inhabitants from the consequences of stray light shining in inhabitants' eyes or onto neighboring properties;

4. Results in cost and energy savings to establishments by being carefully aimed and directed at the surface area or activity to be illuminated, using only the amount of light necessary;

5. Fits the needs and tolerances of the surrounding district, to provide adequate illumination levels in commercial districts while protecting residential areas and places of sleep from excessive light; and

6. Controls light pollution to minimize the negative effects of misdirected light and recapture views to the winter night sky.

B. Applicability

1. Outdoor Site Lighting

All outdoor lighting shall comply with the standards of this section, unless exempted in subsection 2. below.[111] In addition, in certain cases applicants for interior or exterior modifications or expansions of existing structures and

[109] NOTE: This section drafted by staff. Parking lot lighting is exempt from the requirements of this section and instead has to comply with separate lighting requirements in the parking section.

[110] NOTE: Intro paragraph is based in part on IESNA RP 33-99, as well as northern city design considerations. Bulleted specific purpose statements follow the format of other Chapter 7 sections in identifying specific issue areas of concern. Primary issues in Anchorage appear to be: safety and visual acuity, glare and misdirected light, and excessive illumination for some uses.

[111] NOTE: Low-intensity lighting for single-family and other residential uses is exempted in subsection C which follows. The lighting standards would only limit very bright or glaring lights in residential areas. It is intended to protect neighborhoods, homeowners, or residents in cases of unusually intense or glaring lights on neighboring properties.

uses may be required to comply with the following standards pursuant to subsection 21.10.010.H, *Expansion, Alteration, or Major Repair*.

2. Off-Street Parking and Loading Areas

Lighting in off-street parking and loading areas shall be exempt from the requirements of this Section 21.07.130 and instead shall comply with the lighting requirements set forth in subsection 21.07.090.G.13, *Lighting of Off-Street Parking and Loading Areas*.

3. Public Street and Right-of-Way Lighting

Public street and right-of-way lighting shall be exempt from the requirements of this section.

4. Attention-Getting Devices

Signs and other attention getting devices as defined in Section [x-ref], including any lighting of a specific architectural feature, name, or logo designed to act as advertising devices calling attention to the building owner or tenant, are subject to the sign illumination standards of section [x-ref].

C. Exempt Lighting

The following luminaires and lighting systems are exempt from the requirements of this section:

1. Single-Family Residential: Soffit or wall-mounted luminaires with a light output of less than 1000 lumens and permanently attached to residential dwellings, not to exceed the height of the eave;[112] (homeowners may use luminaries with a higher light output, but will then have to comply with section G. below.)

2. Temporary decorative seasonal lighting provided that individual lamps have a light output of 200 lumens or less;[113]

3. Temporary lighting for emergency or nighttime work and construction;

4. Temporary lighting for theatrical, television, and performance areas, or for special public events;

5. Lighting for a special district, street, or building that, according to an adopted municipal plan or ordinance, is determined to require special lighting aesthetics as part of its physical character; and

6. Lighting required and regulated by the Federal Aviation Administration.

[112] NOTE: This exemption is for single-family and other residential development with low impact lighting. The lumens figure provided is approximately the output of a 75 watt incandescent bulb. The provision would exempt a 60 watt incandescent bulb, for example. It is intended as a starting point for discussion on the most appropriate wattage or brightness level to be exempted.

[113] NOTE: This exemption allows for holiday season and "City of Lights" style decorative wintertime illumination. The lumens figure provided exempts typical hanging decorative lights consisting of 10 watt or even 15 watt incandescent bulbs.

D. Nonconformities[114]

In order to (1) amortize existing nonconforming lighting that may otherwise linger for years or decades, and (2) maximize fairness between both pre-existing and new establishments, there shall be a grace period for all outdoor lighting. Outdoor lighting shall be required to conform to the standards of this section within five years from the effective date of this Title. Project applications received prior to such conformance date may choose to conform or to postpone conformance until the five-year deadline.

E. Lighting Zones Established

Using Table 1 as a guide, the municipality shall determine and maintain three lighting zones to ensure that lighting standards fit the needs and tolerances of Anchorage's broad range of urban and rural, commercial and residential, and low versus high intensity use areas. Lighting zones are intended to allow for relatively higher illumination intensities in commercial districts, while protecting the more light-sensitive neighborhoods and residential areas from excessive or misdirected light.

The lighting zone of a site or project shall determine the standards for lighting as specified in this section. An increase of one LZ number may be granted to a specific site or project upon special approval through the variance process.

TABLE 21.07-14: LIGHTING ZONE CHARACTERISTICS

Lighting Zone	Ambient Light Level	Representative Locations	Zoning Districts
LZ-1	Relatively Low	Rural areas, low-density urban areas, natural open spaces.	W, R-1, R-2, R-5, R-6, R-9, R-10, OL, TA, AF, PLI [1], Girdwood [2].
LZ-2	Medium	Medium to high density residential neighborhoods.	R-3, R-4, RMX, NMU, PLI [1].
LZ-3	Relatively High	Medium to high intensity commercial and industrial districts.	C-2A, C-2B, C-2C, GC, I-1, AD RCMU, CCMU, MC, MI, I-2, PLI [1].
Additional Standards: [1] In the PLI District, lighting standards for development shall be that of the Lighting Zone that most closely matches the character of the setting surrounding the project site. [2] *Girdwood:* LZ-1 the default lighting zone for Girdwood zoning districts, except where stated otherwise in section 21.09.[x-ref].			

F. Standards for Safety, Personal Security, and Convenience.[115]

1. Illumination Levels and Locations

Sufficient lighting shall be provided in pedestrian use areas and in high-risk locations. Key locations and high-risk uses such as parking lots, transit stops, ATMs, and convenience stores shall be illuminated to facilitate nighttime use. Lighting should be designed to avoid excessive brightness or glare which reduces visibility and visual acuity, or the fish-bowl effect which allows users

[114] NOTE: Staff recommends amortizing lighting. A grace period for all old and new lighting is suggested as a starting point for community discussion. The issue of concern is that a lighting fixture can last for decades. There are numerous examples of old and fading mercury vapor parking lot lighting still in use around the community, as well as barnyard style non cut-off lights from the 1970s.

[115] NOTE: Public safety and convenience are community priorities in Anchorage. This section establishes the need for adequate lighting which avoids disability glare. It is intended to be further developed pending community review and discussion.

to be observed but makes it difficult for them to observe their surroundings. Parking lot lighting shall adhere to minimums required in subsection I.1 below. Pedestrian walkways leading to primary building entries, exterior stairways, and other pedestrian paths that are used after daylight hours shall be illuminated at least to minimum IESNA standards of Table 2 in DG-5-94, using a uniformity ratio not greater than 10:1 maximum to minimum, to avoid extreme contrasts between lighting levels.[116] Dedicated pedestrian lighting, building façade lighting, lit interior spaces with retail windows along sidewalks, and other pedestrian-oriented lighting sources are preferred.

2. Color Rendition[117]

White light sources improve nighttime vision and reduce reaction time to possible danger by providing superior color recognition, object identification, and peripheral vision detection. Nighttime environments become more visible, comfortable, and inviting at lower light levels with less disability glare. All fixtures for area lighting shall use white light sources that have a color rendering index (CRI) of 65 or greater, such as one of the following, without limitation: metal halide, induction, compact fluorescent, incandescent (including tungsten-halogen), or high-pressure sodium with a color rendering index of 65 or greater.

3. Maintenance, Repair and Replacement[118]

Poorly maintained luminaires may not provide adequate illuminances for safety and security. Lighting installations shall be maintained such that they continually provide acceptable illuminance levels and glare control required in this section. Damaged lighting fixtures and luminaires shall be promptly repaired or replaced. All light emitted by a fixture shall meet or exceed the specification given. All luminaires shall be permanently installed so as to maintain required shielding. Any structural part of the fixture providing this shielding must be permanently fixed.

G. Control of Glare and Light Trespass[119]

1. Shielding and Glare

a. *Generally Applicable Standard*

For outdoor area lighting on any residential, commercial, industrial, recreational, municipal, or institutional site, cutoff-type luminaires shall be used and shall be equipped with (or be capable of being retrofitted with) devices for redirecting light such as shields, visors, or hoods. Such lighting shall be so aimed, located, designed, fitted, and maintained. Directional luminaires such as floodlights, spotlights, and sign lights shall be so installed and aimed that they illuminate only the specific task and do not shine directly onto neighboring properties, roadways, or distribute excessive light skyward.

[116] NOTE: Uniformity ratio recommended by IESNA RP-33-99 as a starting point for public discussion.
[117] NOTE: NEMA recommends basing standards on a performance standard such as CRI, rather than just a list of product types. This better accommodates new technology such as LED or induction lamps. Need to define "area lighting" to carefully exempt aesthetic hardscape, façade or landscape lighting.
[118] NOTE: IESNA RP 33-99 recommends ordinance provisions for maintenance, repair, and replacement. This would address safety and maintenance issues that exist in Anchorage.
[119] NOTE: Suggested new section for glare control applicable to all lighting. This approach eliminates the need to provide glare control provisions for each type of lighting—parking, building, etc. It also eliminates potential loopholes in the code for light intensive uses like car sales lots.

b. ***District-Specific Shielding Standards***
Shielding requirements specific to the various districts shall be as shown in Table 2. Residential uses in the R-5, R-6, R-9, and R-10 districts, and full cut-off luminaires on collector or greater class streets shall be exempt from Table 2 standards.

TABLE 21.07-15: REQUIRED SHIELDING AND MAXIMUM LUMENS

Lighting Zone	Full Cut-off Luminaire	Cut-off Luminaire	Semi Cut-off Luminaire	Non Cut-off Luminaire
LZ-1	10,000	6,000	1,000	1,000
LZ-2	26,000	10,000	2,000	1,000
LZ-3	40,000	10,000	5,000	2,000

[Staff will illustrate the luminaire cut-off types here.]

c. ***Glare onto Neighboring Properties***
All lighting that emits more than 2,000 lumens shall be aimed, shielded, or located such that the source of illumination (bulb or direct bulb image) is not visible from any adjacent property, measured at the site's property line.

2. Light Trespass
Maximum light levels measured at the site's property line, at eye level in a plane perpendicular to line-of-sight, shall be as shown in Table 3:[120]

TABLE 21.07-16: MAXIMUM LIGHT TRESPASS

Lighting Zone of Neighboring Property	Maximum Light at the Property Line
LZ-1	.3 footcandles
LZ-2	.8 footcandles
LZ-3	1.5 footcandles

3. Horizontal Bulb Position[121]
A vertically mounted bulb in a light fixture introduces glare and reduces the effectiveness of shielding. If the bulb position within a fixture is vertical, any or all of the following may be required to ensure that the conformity to the shielding specifications in Table 2 is not compromised:

a. A high socket mount;

b. A translucent fixture lens;

c. An opaque coating or shield on a portion of the perimeter of the lens; or,

d. Other industry accepted measures.

[120] Suggested maximum light trespass figures in Table 3 are suggested by the IESNA as a starting point for community discussion for community lighting ordinances.
[121] NOTE: Suggested subsection is from Douglas County CO, and based on Nancy Clanton's observation that large retail establishments can, and often do, use the vertical bulb position to effectively circumvent cut-off luminaire standards. The resulting glare can reduce visibility in the parking lot. Recent large retail establishments in Anchorage have used the vertical bulb position.

4. Mounting Height

Mounting heights of lighting fixtures shall be limited to avoid defeating the purpose of cut-off style shielding, as follows:

a. ***Pole Mounted Lighting***

Lights mounted onto poles or any structures intended primarily for mounting of lighting shall not exceed a maximum mounting height according to the following table:

TABLE 21.07-17: MAXIMUM POLE MOUNTING HEIGHT (ft)

Lighting Zone	Parking Lots, Driveways, Exterior Sales and Display, Loading Areas.	Pedestrian Walkways and Areas
LZ-1	20	14
LZ-2	25	18
LZ-3	25 [1]	18

Additional Standards:
[1] The mounting height may be up to 35 feet where the fixture is located beyond 75' from the site's boundary, provided that for mounting heights in excess of 25 feet, the distance of the fixture to the site's boundary is not less than three times the mounting height.

b. ***Lighting Mounted to Buildings or Structures***

Light fixtures mounted to buildings or other structures shall not exceed the height of the roof or eave of the building or structure at the location of the light.

H. Timing Controls

Exterior lighting shall be timer-controlled. Simple dusk-to-dawn controls keep lights on for the maximum time during hours of sleep and inactivity, and waste energy. More appropriate timing controls shall be used, as follows:

a. All non-residential building, service and loading area lighting, except security lighting, shall be turned off one hour after business operations have ceased for the day and shall remain turned off until one hour before business operations resume on the next day.[122]

b. Security lighting shall be activated with motion sensors so that lights come on only when someone is in the immediate area, except where the applicant can demonstrate that motion-sensor lighting will cause unacceptable increased risk and continuous security lighting levels must be maintained. Maximum illumination levels for security lighting that is not motion activated shall be 1.5 footcandles.

I. Standards for Specific Types of Lighting

The additional standards in this subsection shall be in addition to the generally applicable standards. However, where there is a conflict, the more restrictive standard shall apply.

[122] NOTE: IESNA suggests lowering lighting levels. NEMA suggests lowering lighting levels only in certain areas.

1. Lighting of Service Canopies [123]

a. Service canopy lighting fixtures shall be fully recessed or full cut-off, as defined by the IESNA. However, indirect up light is permitted under a canopy provided that no lamp or vertical element of a lens or diffuser is visible from beyond the canopy and no direct up light is emitted beyond the canopy.

b. Lights shall not be mounted on the top or sides (fascias) of canopies, and the sides (fascias) of canopies shall not be externally illuminated, except as part of an internally illuminated sign.

2. Lighting of Building Façades

Building façade lighting may only be used to highlight important building entries or specific architectural features. Uniform floodlighting of building facades is discouraged and shall be permitted only by through a [design variance or administrative alternative compliance review process]. To the maximum extent feasible, lighting fixtures shall be located, aimed and shielded so that light is directed downward rather than upward, and only onto the building façade.

3. Hardscape and Landscape Lighting

Light fixtures used to illuminate flags, statues, or any other objects mounted on a pole, pedestal, or platform shall keep light beams entirely within the mass of the display by using shielding and luminaires with the correct beam spread. Luminaires should be located and aimed so that the source of light cannot be seen directly.

4. Lighting of Exterior Sports / Performance Facilities

a. ***Dual Lighting System***

The main lighting of the event or activity shall be turned off no more than forty-five (45) minutes after the end of the event or activity. A low level lighting system shall be installed to facilitate patrons leaving the facility, cleanup, nighttime maintenance, etc. The low level lighting system shall provide an average horizontal illumination level, at grade level, of no more than 3.0 fc with a uniformity ratio no greater than 10:1.

b. ***Lighting of Primary Playing or Activity Areas***

Where playing fields, ski slopes, or other special activity areas are to be illuminated, lighting fixtures may include spotlighting and floodlighting. Regardless, all fixtures shall be shielded, mounted, and aimed so that their beams fall within the primary playing area and immediate surroundings, and so that no direct illumination is directed off the site.

5. High Intensity, Special Purpose Lighting

The following lighting systems are prohibited from being installed or used except by special approval by variance, which shall not be granted for any use in LZ-1.

[123] NOTE: Need to move gas station canopy standards from 21.05.050.L.2.b.i.(B) here to be generally applicable, and consolidate it with canopy lighting provisions.

a. Aerial Lasers;

b. "Searchlight" or beacon style lights;

c. Blinking, flashing, or changing intensity lights except for temporary holiday displays;

d. Other very intense lighting, defined as having a light source exceeding 200,000 lumens or intensity in any direction of 2,000,000 candelas or more.

21.07.150 OPERATIONAL STANDARDS[124]

A. Purpose

The purpose of these operational standards is to prevent land or buildings within the Municipality from being used or occupied in any manner so as to create any dangerous, injurious, noxious, or otherwise objectionable condition that would create adverse impacts on the residents, employees, or visitors on the property itself or on nearby properties.

B. Applicability

The provisions of this Section 21.07.150 shall apply to all land within the Municipality.

C. Standards

1. Vibration
No vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments at or at any point beyond the lot line.

2. Air Pollution
There shall not be discharged into the atmosphere any contaminant for which threshold limit values are listed for working atmosphere by the American Conference of Governmental Industrial Hygienists in such quantity that the concentration of the contaminant at ground level at any point beyond the boundary of the property shall at any time exceed the threshold limit. Visible emissions of any kind at ground level past the lot line of the property on which the source of the emissions is located are prohibited.

3. Odors
Any condition or operation that results in the creation of odors, vapors, or gaseous emissions of such intensity and character as to be detrimental to the health and welfare of the public or that interferes unreasonably with the comfort of the public shall be removed, stopped, or so modified as to remove the odor.

4. Electromagnetic Radiation
It shall be unlawful to operate, or cause to be operated, any planned or intentional source of electromagnetic radiation for such purposes as

[124] NOTE: Suggested new section. These are relatively simple performance standards intended help protect adjacent properties from the impacts of intensive uses.