Planning & Building Department

Land Development Code Revision

TITLE: **AMENDMENT TO THE PHOENIX LAND DEVELOPMENT CODE REGARDING THE ADDITION OF STANDARDS FOR OUTDOOR LIGHTING, AMENDING CHAPTER 3.**

FILE NUMBER: LDC 14-11

APPLICANT: City of Phoenix

STAFF REPORT: Available December 1, 2014 at the City of Phoenix, 112 West 2nd Street, Phoenix, Oregon 97535, M-F, 8:00am – 5:00pm, or on the Planning & Building Department website (http://www.phoenixoregon.gov/Page.asp?NavID=43).

DATE OF PLANNING COMMISSION HEARING: December 8, 2014

STAFF RECOMMENDATION: Staff recommends that the Planning Commission accept the findings of this report and forward the proposed amendment to the City Council for its review of the amendment at a duly noticed and conducted public hearing and subsequent approval.

Note: Text excerpted from the PLDC appears below in italics.

I. PROJECT INFORMATION: The Planning Commission of the City of Phoenix has discussed problems related to outdoor lighting during several work sessions. The negative effects of "light pollution" have been well-documented since the 1970s, but the issue more recently came to the City's attention after new outdoor lighting was installed at the new gas station at the corner of Fern Valley Road and OR-99. City staff received complaints from areas residents and the Jackson County fire department concerning glare and the overall intensity of illumination. According to some accounts, light from the gas station is plainly visible from two miles away.

Light pollution is, of course, not a local phenomenon. Many communities have struggled to resolve the challenge of providing well-lighted, safe low-light environments and the need to mitigate the following documented impacts:

- Unwanted spillage of light imposed on adjacent properties;
- visual irritation and impairment experienced by pedestrians and motorists;
- sky-glow and impairment of enjoyment of the natural night sky;
- degradation of local community character;
- inefficient, wasteful, and unnecessary consumption of energy, the depletion of nonrewable natural resources used to produce energy, and the resulting atmospheric pollution by gaseous emissions (most notably carbon dioxide, carbon monoxide, sulfur dioxide, and nitrous oxide)

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- negative impacts on the natural behavior of activities of plant and animal species.

In the case of Phoenix, specifically, unnecessary and excessive outdoor lighting undermines the community's small-town atmosphere that many of its residents hold so dear. Furthermore, the safest low-light environments are those occupied by people. By making parts of the City inhospitable and unattractive, light pollution achieves exactly the opposite effect of providing well lighted places: it discourages positive sentiment about a place and repels people.

Neither the City's Municipal, nor its Land Development Code, provides specific standards for outdoor lighting. A few, vague standards are included in sections of the PLDC that delineate special design requirements for properties within certain land use districts. Section 2.4.4, which discusses architectural guidelines within CH land use district, mentions outdoor lighting twice:

> *B. Lighting. Project lighting shall be provided for security reasons. Fixture types shall be down mounted or shielded when located adjacent to residential development.*
>
> *F. Parking lot lighting. Parking lot lighting shall be provided for parking lots containing more than 10 spaces. The light fixtures shall be designed to light the parking area using down-mounted, low profile light fixtures. Parking lots with more than 10 vehicle parking spaces shall also include low profile lighting of pedestrian walkways and bicycle parking areas.*

There are no design standards for "down mounted or shielded", nor are there any minimum illumination requirements or limits on the maximum amount of illumination. Lighting design standardsfor Industrial land use districts in Section 2.5.9 provide a slightly greater degree of explanation:

> *E. Outdoor Lighting. Building-mounted lighting and aerial-mounted floodlighting shall be shielded from above in such a manner that the bottom edge of the shield shall be below the light source. Ground-mounted floodlighting or light projection above the horizontal plane is prohibited between midnight and sunrise. All lighting shall be shielded so that the direct illumination shall be confined to the property boundaries of the light source.*

These standards require "100% cutoff" lights (known as luminaires within the lighting industry), but fail again to provide standards for minimum and maximum levels of illumination. Lighting is only mentioned within site design standards in sections 3.2.3 and 3.6.3:

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3.2.3.A.4. Pathways shall have adequate lighting for safety purposes. The City may require lighting as a condition of development review.

3.6.3.C.2. Glare reduction. No sign may be illuminated or use lighting where such lighting is directed at any portion of a traveled street or will otherwise cause glare or impair the vision of the driver of a motor vehicle or otherwise interfere with the operation thereof.

While the language addressing glare is helpful, methods for determining whether or not a particular light fixture complies with this specification are not discussed anywhere within the site design review standards. This ambiguity leaves an otherwise objective determination open to subjective observation and individual discretion. The PLDC does not address unusual or complex lighting configurations like those found at outdoor athletic and recreational facilities. Nor does it provide any standards for lighting in residential or environmentally sensitive areas.

Effective outdoor lighting regulation can achieve both goals of limiting light pollution to the greatest extent possible while creating safe outdoor spaces in low light conditions. To do so, specifications need to be established that allow for levels of illumination sufficient for particular types of land uses and activities. Standards of review and comprehensible methods for achieving compliance should also be included so that lighting contractors and designers can work with a high degree of certainty and City staff is empowered to make the best decisions on behalf of the greater community. Finally, implementation and enforcement should also be addressed so that standards are applied fairly, consistently, and are taken seriously.

II. PROPOSED AMENDMENTS: see Exhibit A in the attached draft Planning Commission Recommendation.

III. COMPLIANCE WITH DEVELOPMENT CODE PROVISIONS: Amendments to the Phoenix Land Development Code must comply with Section 4.7.2 of the Phoenix Land Development Code, which states that legislative amendments are policy decisions made by City Council. They are reviewed using the Type IV Procedure in Chapter 4.1.6 – Type IV Procedure (Legislative) and shall conform to Section 4.7.2.B and 4.7.6, as applicable.

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Demonstration of compliance with section 4.7.2.

1. The proposed amendment is consistent with the purpose of the subject section and article.

FINDING: The proposed amendment addresses an important site design element and is consistent with the scope and application of other sections within Chapter 3. Placing the proposed additions to the PLDC within this Chapter should provide for ease of use. Someone searching for design specifications for outdoor lighting would likely expect to find that information within this Chapter. **Proposed amendment is consistent with the purpose of the subject section and article.**

2. The proposed amendment is consistent with other Provisions of this Code.

FINDING: The proposed amendment is supportive of other provisions within the PLDC, particularly Chapter 2. Chapter 2 primarily addresses the orderly and systematic development of land within the City. An important goal of the land development process is the promotion of the livability and stability of neighborhoods within the City, and the efficient and effective development of land. As mentioned above in the Project Information section of this report, the PLDC currently addresses outdoor lighting. For the reasons discussed above, those regulations have not been very effective due to substantial deficiencies. **Proposed amendment is consistent with other Provisions of this Code.**

FINDING: According to Section 4.1.6.D – *Notice of Hearing*, amendments to the PLDC must undergo a public hearing before the Planning Commission and the City Council. The Planning Commission will conduct a public hearing on the proposed amendment on December 8, 2014. If the Planning Commission affirmatively recommends the amendment to the City Council, a subsequent public hearing will be conducted in early 2015. **Proposed amendment is consistent with other Provisions of this Code.**

FINDING: According to Section 4.1.6.D.2, all Type IV decisions must be noticed in the following manner: 1) DLCD shall be notice at least 35 days before the 1st evidentiary hearing; 2) notices mailed to certain recipients at least 20 days and no more than 40 days before the 1st evidentiary hearing; 3) notice shall be posted on the City's website, at City Hall, and in other locations as deemed appropriate. All of these notice requirements have been met (or were not applicable given the nature of this action), and an affidavit of notice has been included in the official record.

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Demonstration of compliance with Section 4.7.6 – *Transportation Planning Rule Compliance*.

FINDING: subsection 4.7.6.B states "Amendments […] land use standards which significantly affect a transportation facility shall assure that allowed land uses are consistent with the function, capacity, and level of service of the facility identified in the Transportation System Plan." The proposed amendment is not anticipated to "significantly affect a transportation facility". **Standard is not applicable to the land use action under consideration.**

3. The proposed amendment is consistent with the goals and policies of the Comprehensive Plan, and most effectively carries out those goals and policies of all alternatives considered.

FINDING: Goal #2 of the Energy Conservation element states that "The City will consider the possibility of additional landscaping provisions in the subdivision ordinance and appropriate sections of the zoning ordinance to help ensure energy-efficient development and to ensure attractive and usable open space, particularly in higher density residential developments" (p. 11). While the goal does not specifically mention energy efficient lighting measures, such measures would certainly be consistent with this goal. The proposed amendment is based on model ordinance language drafted the Illuminating Engineering Society and International Dark Sky Association. Energy conservation and other objectives were carefully balanced with public safety concerns in developing standards intended to eliminate unnecessarily high levels of illumination and the energy consumption. **Proposed amendment is consistent with the Comprehensive Plan.**

FINDING: State Planning Goal #5, which is incorporated into the Comprehensive Plan Natural Resources element by reference, charges cities with responsibility to "provide programs that will […] protect scenic and historic areas and natural resources for future generations, and (3) promote healthy and visually attractive environments in harmony with the natural landscape character" (p.1). The chapter further discusses wildlife habitat that is found throughout the City, especially the Bear Creek corridor (p. 5). Thoughtful control of outdoor lighting is essential to mitigate the negative effects of unnatural lighting conditions on nocturnal animals and other species of plants and animals whose behavior and activity patterns are related to cyclical variations found in natural lighting. Light pollution has been shown to negatively affect migratory patterns for birds and insects and can disrupt natural reproductive cycles for a broad range of species. The proposed amendment, the first of its kind in the ecologically significant Bear Creek Valley, is designed to substantially mitigate these impacts. **Proposed amendment is consistent with the Comprehensive Plan.**

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FINDING: The proposed amendment to the PLDC has been designed to provide clear guidelines to enable the greatest degree of compliance possible. This includes three (3) separate methods by which outdoor lighting measures can be engineered to provide adequate lighting that meets the other objectives of the amendment. It is reasonable, therefore, to conclude that this amendment most effectively attempts to achieve the goals of the Comprehensive Plan. **Proposed amendment is consistent with the Comprehensive Plan.**

III. STAFF RECOMMENDATION: Staff recommends that the Planning Commission accept these findings and, upon closure of the public hearing and after all due deliberation, move to approve the attached Planning Commission Recommendation, and forward the matter to the Phoenix City Council for review and ratification.

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Planning & Building

Department

CITY OF PHOENIX
STATE OF OREGON

IN THE MATTER OF AN AMENDMENT	**)**	**PLANNING COMMISSION**
TO THE PHOENIX LAND DEVELOPMENT	**)**	**RECOMMENDATION**
CODE PERTAINING TO OUTDOOR	**)**	
LIGHTING REGULATIONS, AMENDING	**)**	
CHAPTER 3 BY ADDING SECTION 3.11	**)**	
	)	
FILE # LDC 14-11	**)**	

WHEREAS, it has been brought to the attention of the Planning Commission and Planning Department staff that outdoor lighting installed at certain recent developments within the City of Phoenix is responsible for light pollution and glare; and

WHEREAS, Planning Department staff have further researched the problem of light pollution and outdoor site lighting and presented to the Planning Commission the following negative effects caused by light pollution:

- unwanted, spillage of light imposed on adjacent properties;
- visual irritation and impairment experienced by pedestrians and motorists;
- sky-glow and impairment of enjoyment of the natural night sky;
- degradation of local community character;
- inefficient, wasteful, and unnecessary consumption of energy, the depletion of nonrewable natural resources used to produce energy, and the resulting atmospheric pollution by gaseous emissions (most notably carbon dioxide, carbon monoxide, sulfur dioxide, and nitrous oxide); and

WHEREAS, Planning Department staff have discovered deficiencies with current outdoor lighting design standards set forth by the Phoenix Land Development Code that render current design standards inadequate to address these effects; and

WHEREAS, the Planning Commission and Planning Department staff have researched and discussed alternative outdoor lighting design standards; and

WHEREAS, on December 8, 2014, the Planning Commission conducted a duly notice public hearing to receive public testimony, consider Findings of Fact, and deliberate on proposed amendments to the Phoenix Land Development Code,

Now Therefore, the Phoenix Planning Commission concludes that:

1. The Findings of Fact presented within the Staff Report dated December 1, 2014 are hereby affirmed.
2. The proposed amendment of the Phoenix Land Development code complies with the provisions of the Land Development Code and Phoenix Comprehensive Plan.

3. The proposed amendment of the Phoenix Land Development code is in the public interest and should be ratified by the Phoenix City Council after a duly noticed public hearing has been conducted.

Signed this 8th day of December, 2014.

Micki Summerhays, Chair	David Lewin, Commissioner
Jason Couch, Commissioner	George Eisenhauer, Commissioner
Priscilla Atkin, Commissioner	

Chapter 2.3.5 is amended as follows:

D. Open Space Design

1. Common open spaces shall include at least two of the following improvements:
   a. benches for seating;
   b. public art such as a statue;
   c. a water feature such as a fountain;
   d. a children's play structure;
   e. a gazebo;
   f. picnic tables;
   g. gardens;
   h. an indoor or outdoor sports court for one or more of the following: tennis, basketball, volleyball, badminton, racquetball, and handball/paddleball
2. Residential developments that may house children shall provide at least one common open space with a children's play structure.
3. For security purposes, all common open spaces shall be adequately illuminated in accordance with Chapter 3.11 – Outdoor Lighting ~~and shielded during hours of darkness~~. Landscaping shall be designed and maintained to avoid security risks.

Chapter 2.4.4 is amended as follows:

2.4.4 – Architectural Guidelines and Standards

A. Architectural Continuity and Quality. New and remodeled buildings may have their own architectural style but there must be some architectural continuity with the other structures located within the area. All building designs located within the Commercial Highway District must be of a high architectural quality and shall incorporate the following:

1. Continuous building walls of greater than 50 feet shall be avoided. Breaks in the wall plane shall be incorporated into the building design.
2. Entrances to the buildings shall be clearly defined architecturally. Entrances shall include decorative pavement treatments in order to tie into the parking lot pedestrian circulation systems.

3. Exterior building materials shall be of high quality and shall be selected based upon their weathering properties. Generally, materials such as stucco, brick, or masonry block should be used for exterior walls.

4. When the building is part of a larger complex, continuity of materials and design shall be required.

B. Lighting. Project lighting shall be provided for in order to create safe low-light conditions. ~~security reasons. Fixture types shall be down mounted or shielded when located adjacent to residential development~~ and in accordance with Chapter 3.11 – Outdoor Lighting.

C. Roof-mounted equipment. Roof-mounted mechanical equipment is not allowed unless completely screened within an equipment well or screened by a parapet wall.

D. Detailing. Architectural detailing shall be consistent on all elevations.

E. Trash Enclosures. Trash enclosures shall be constructed of 6-foot high masonry walls with solid metal gates. The floor of the enclosure shall be constructed of concrete with a 6-foot by 10-foot concrete apron placed in front of the enclosure. The masonry materials used shall be selected to match the materials used in the building or buildings that it serves. Trash enclosures shall not be located within 25 feet of a public entrance or a required pedestrian walkway.

F. Parking lot lighting. Parking lot lighting shall be provided for parking lots containing more than 10 spaces. ~~The light fixtures shall be designed to light the parking area using down-mounted, low profile light fixtures.~~ Parking lots with more than 10 vehicle parking spaces shall also include ~~low profile~~ pedestrian scale lighting of pedestrian walkways and bicycle parking areas. All outdoor lighting shall comply with Chapter 3.11

G. Bicycle Parking. Bicycle parking shall be integrated into the design for development within the C-H zone district. The location of the spaces must be coordinated with the location and orientation of vehicle parking, bicycle lanes, and pedestrian walkways. Enclosed bicycle parking shall be designed to be architecturally compatible with the design of the building or buildings located on the site. (See the Parking chapter of this development code for other bicycle parking requirements.)

H. Pedestrian Circulation. Projects that require more than 50 vehicle parking spaces shall also be required to provide the following separate pedestrian circulation improvements:

1. Covered walkways, a trellis structure planted with vines or other solution that is designed to provide pedestrians with shade and protection from the weather.

2. All pedestrian circulation areas must be lighted with pedestrian scale light fixtures.

3. Transit stops, on-site connections to transit stops, or designated passenger pick up areas shall be required if deemed appropriate by the Planning Department based upon the size of the project and input from the Rogue Valley Transit District (RVTD) or if requested by RVTD.
4. Driveway Improvements. Parking lots over three acres in size shall provide street improvements, including curbs, sidewalks, and street trees, in compliance with the local street standards in Table 3.5.2.

Chapter 2.4.5 is amended as follows:

F. Vehicle, Truck, Boat, Motorcycle, or RV Sales. These uses may be approved if it has been shown that the use incorporates the following:

1. Sales lots must include a minimum of a 20-foot landscape setback between the back of sidewalk and the edge of the vehicle parking, display area, or building.
2. No vehicle display will be allowed in the required landscape setback area.
3. Vehicle display areas shall not encroach upon the required customer and employee parking spaces.
4. ~~Outside project lighting must be designed to minimize light spillage onto adjacent properties.~~ Pole lighting must not be higher than 15 feet and must be shielded from the surrounding public streets <u>and from I-5 and shall comply with Chapter 3.11 – Outdoor Lighting</u>.
5. All repair and detailing activities must be conducted within an enclosed building.

G. Self-Storage Facilities. These uses may be approved if it has been shown that the following design requirements have been provided:

1. Architectural Standards:
   a. Exterior materials used in the construction of the storage units shall be concrete masonry block with a decorative finish such as split-faced or fluted block.
   b. Long exterior walls shall be broken up with masonry pilasters or insets or pop outs in the wall plane at a minimum of 30 feet on center.
   c. The roof material may be metal but it shall have a non-glaring finish.
   d. The roof eaves shall be finished and shall incorporate rain gutters and down spouts.
   e. Security fencing shall be provided. The fencing shall be decorative wrought iron or other decorative metal. Chain link fencing is not permitted.

Site Development Standards:

a. The following minimum building setbacks shall apply:
   i. Front: 20 feet
   ii. Side and rear: 0, except when adjacent to another street frontage in which case the minimum would be 15 feet or in the case where the development would be adjacent to a residential land use, in which case the minimum setback would be 5 feet.

b. Landscaping: A dense landscape screen must be included on all elevations that abut a street frontage or abut residential land uses. The landscape treatment must include a combination of trees, shrubs, and ground cover. The area must be served by an automatic underground irrigation system. All landscaping shall meet the requirements of Chapter 3.3 – Landscaping, Street Trees, Fences, and Walls.

c. Project Lighting: All project lighting shall ~~be designed not to spill onto adjacent properties~~ comply with Chapter 3.11 – Outdoor Lighting.

Chapter 2.5.9 is amended as follows:

E. Outdoor Lighting. ~~Building-mounted~~ Outdoor lighting ~~and aerial-mounted floodlighting~~ shall ~~be shielded from above in such a manner that the bottom edge of the shield shall be below the light source. Ground-mounted floodlighting or light projection above the horizontal plane is prohibited between midnight and sunrise. All lighting shall be shielded so that the direct illumination shall be confined to the property boundaries of the light source~~ shall comply with Chapter 3.11 – Outdoor Lighting.

Chapter 2.6.9 is amended as follows:

E. Outdoor Lighting. ~~Building-mounted~~ Outdoor lighting ~~and aerial-mounted floodlighting~~ shall ~~be shielded from above in such a manner that the bottom edge of the shield shall be below the light source. Ground-mounted floodlighting or light projection above the horizontal plane is prohibited between midnight and sunrise. All lighting shall be shielded so that the direct illumination shall be confined to the property boundaries of the light source~~ shall comply with Chapter 3.11 – Outdoor Lighting.

Chapter 3 is amended by adding Section 3.11 – *Outdoor Lighting* as follows:

Chapter 3.11 – Outdoor Lighting

Sections

3.11.1 – Purpose
3.11.2 – Definitions
3.11.3 – Lighting area classifications
3.11.4 – Applicability
3.11.5 – Exemptions
3.11.6 – Standards for non-residential lighting
3.11.7 – Standards for residential lighting.

3.11.1 – Purpose

The purpose of this Ordinance is to provide regulations for outdoor 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; minimize adverse offsite impacts of lighting such as light trespass, and obtrusive light; curtail light pollution, reduce skyglow and improve the nighttime environment for astronomy; help protect the natural environment from the adverse effects of night lighting from gas or electric sources; and conserve energy and resources to the greatest extent possible.

3.11.2 – Definitions

A. Absolute Photometry. Photometric measurements (usually of a solid-state luminaire) that directly measures the footprint of the luminaire. Reference Standard IES LM-79.
B. Lighting designed to reveal architectural beauty, shape and/or form for which lighting for any other purpose is in incidental.
C. Authority. The adopting municipality, agency or other governing body.
D. Astronomic Time Switch. An automatic lighting control device that switches outdoor lighting relative to time of solar day with time of year correction.
E. Backlight. For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the luminaire. For luminaires with symmetric distribution, backlight will be the same as front light.
F. BUG. A luminaire classification system that classifies backlight (B), Uplight (U), and Glare (G).
G. Canopy. 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.)

H. Common Outdoor Areas. One or more of the following: a parking lot; a parking structure or voered vehicular entrance; a common entrance or public space shared by all occuparnts of a site.
I. Curfew. A time defined by the authority when outdoor lighting is reduced or extinguished.
J. Cutoff or 100% Cutoff. See definition for "Fully Shielded Luminaire" in this Section.
K. 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.
L. Footcandle. The unit of measure expressing the quantity of light received on a surface. One footcandle is the illuminance produced by a candle on a surface one foot square from a distance of one foot.
M. Forward Light. For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the direction of the intended orientation of the luminaire.
N. Fully Shielded Luminaire. A luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the lamp r a diffusing element, or indirectly by reflection or refraction from any part of the luminaire, is projected below the horizontal plane through the luminaire's lowest light-emitting part.
O. Glare. Lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.
P. Hardscape Area. The area measured in square feet of all hardscape. It is used to calculate the Total Site Lumen Limitin both the Presecriptive and Performance Method I methods. See Chapter 1.3 of the PLDC for a definition of hardscape.
Q. Hardscape Perimeter. The perimeter measured in linear feet is used to calculate the Total Site Lumen Limit in the Performance Method. See Chapter 1.3 of the PLDC for a definition of hardscape.
R. IDA. International Dark-Sky Association.
S. IESNA. Illuminating Engineering Society of North America.
T. Industry Standard Lighting Software. Lighting software that calculates point-by-point illuminance that includes reflected light using either ray-tracing or radiosity methods.
U. 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), low pressure sodium (LPS), light-emitting diode (LED), metal halide (MH), and induction.

3.11.3 – Lighting area classifications

Different types of land uses, activities, and operations require different levels of ambient lighting. Lighting zones are hereby determined according to the land use district in which a particular property is located. Table 3.11.3 defines lighting area classifications

by land use district map designation and describes each lighting zone in terms of its purpose and suitability for certain types and intensities of outdoor lighting.

Greenway	R-1	R-2	R-3	CC	C-H	GI	LI	PUD
LZ-1	LZ-1	LZ-1	LZ-2	LZ-2	LZ-3	LZ-3	LZ-3	Varies

Table 3.11.3 Lighting Area Classifications.

3.11.4 – Applicability

Except as described below, all outdoor lighting installed after the date of effect of this section shall comply with these requirements. This includes, but is not limited to, new lighting, replacement lighting, or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party. Where the provisions of this chapter conflict with other sections of the Land Development Code or other municipal codes, the more restrictive regulation shall control.

3.11.5 – Exemptions

The following types of lighting applications and operational procedures are explicitly exempt from the requirements of this chapter.

A. Lighting within public right-of-way or easement for the principal purpose of illuminating streets or roads. No exemption shall apply to any lighting within the public right of way or easement when the purpose of the luminaire is to illuminate areas outside the public right of way or easement, unless regulated with a streetlighting ordinance;

B. Lighting for public monuments and statuary;

C. Lighting solely for signs (lighting for signs is regulated by the Sign Ordinance);

D. Repairs to existing luminaires not exceeding 25% of total installed luminaires.

E. Temporary lighting for theatrical, television, performance areas and construction sites;

F. Underwater lighting in swimming pools and other water features;

G. Temporary lighting and seasonal lighting provided that individual lamps are less than 10 watts and 70 lumens;

H. Lighting that is only used under emergency conditions;

I. In lighting zones 2, 3 and 4, low voltage landscape lighting controlled by an automatic device that is set to turn the lights off at one hour after the site is closed to the public or at a time established by the City.

J. Lighting specified or identified in a specific use permit;

K. Lighting required by federal, state, territorial, commonwealth or provincial laws or regulations.

3.11.6 – Standards for non-residential lighting

A. Prescriptive Method. An outdoor lighting installation complies with this section if it meets the requirements of subsections 1, 2, 3 below.

1. Total 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 limit shall be determined using either the Parking Space Method (Table A) or the Hardscape Area Method (Table B). Only one method shall be used per permit application, and for sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens. The total installed initial luminaire lumens is calculated as the sum of the initial luminaire lumens for all luminaires.

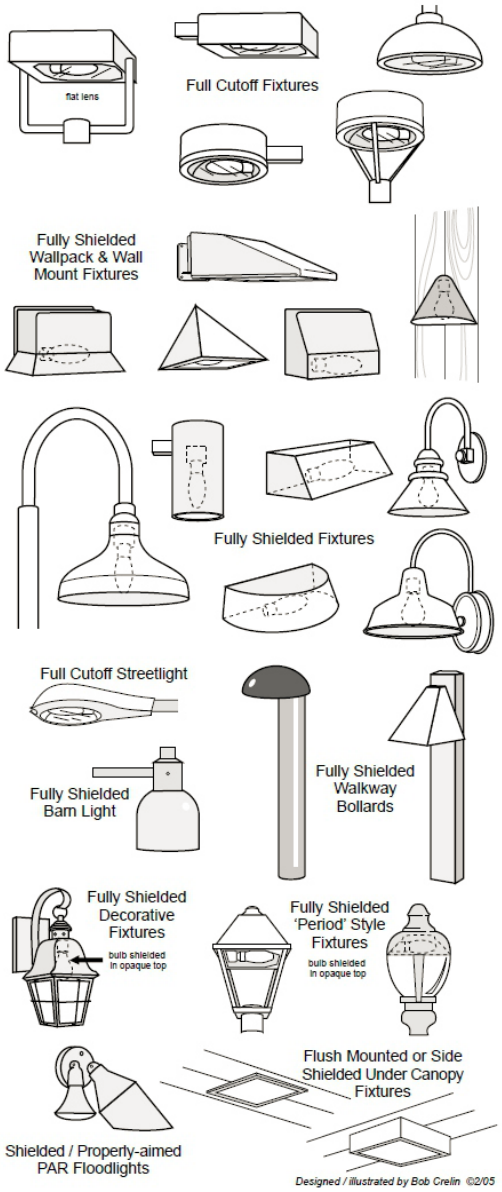
2. Limits of offsite impacts. All luminaires shall be rated and installed according to Table C.

3. Full or 100% cutoff lighting. All lighting shall be full cutoff and shall not emit light above 90 degrees.

4. Exceptions. Ornamental parking lighting shall be permitted by special permit only, and shall meet the requirements of Table C-1 for Backlight, Table C-2 for Uplight, and Table C-3 for Glare, without the need for external field-added modifications.

B. Performance Method I. An outdoor lighting installation complies with this section if it meets the requirements of subsections 1 and 2 below.

1. Total Site Lumen Limit. The total installed initial luminaire lumens of all lighting systems on the site shall not exceed the allowed total initial site lumens. The allowed total initial site lumens shall be determined using Tables D and E. For sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens. The total installed initial luminaire lumens of all is calculated as the sum of the initial luminaire lumens for all luminaires.



2. Limits to Off Site Impacts. All luminaires shall be rated and installed using either Option A or Option B. Only one option may be used per permit application.
   a. Option A: All luminaires shall be rated and installed according to Table C.
   b. Option B: The entire outdoor lighting design shall be analyzed using industry standard lighting software including interreflections in the following manner:
      i. Input data shall describe the lighting system including luminaire locations, mounting heights, aiming directions, and employing photometric data tested in accordance with IES guidelines. Buildings or other physical objects on the site within three object heights of the property line must be included in the calculations.
      ii. Analysis shall utilize an enclosure comprised of calculation planes with zero reflectance values around the perimeter of the site. The top of the enclosure shall be no less than 33 feet (10 meters) above the tallest luminaire. Calculations shall include total lumens upon the inside surfaces of the box top and vertical sides and maximum vertical illuminance (footcandles and/or lux) on the sides of the enclosure.
      iii. The proposed design complies if the total lumens on the inside surfaces of the virtual enclosure are less than 15% of the total site lumen limit; and the maximum vertical illuminance on any vertical surface is less than the allowed maximum illuminance per Table F.

C. Performance Method II. Sites under 1 acre that are within the LZ-2 and LZ-3 lighitng area classes may demonstrate compliance with this Chapter by meeting the following requirements:

1. Full or 100% cutoff lighting. All lighting shall be full cutoff and shall not emit light above 90 degrees.
2. Photometric plan required. A photometric plan shall be submitted for review that accurately depicts the locations and types of lighting measures and illuminance in footcandles or lumens at final grade throughout the entire site and ten (10) feet beyond the perimeter of the site.
3. Maximum and minimum luminance. Illumination levels shall comply with those listed in the following Table 3.11.6.C:

Area/Activity Type	Min. Illuminance (FC)	Max. Illuminance (FC)
Building entrances/Exits	5	10
Parking Areas	1	5
Parking Structure	5	10
Loading Areas and Platforms	10	15
Under canopies	5	15
Heavy Equipment Operation	10	25

Table 3.11.6 Illumination Levels.

4. Maximum illuminance at property line. Maximum illuminance at any point in the vertical plane of the property line shall be less than 0.2 foot-candles.

3.11.7 – Standards for residential lighting.

A. General Requirements. For residential properties including multiple family residential properties not having common areas, all outdoor luminaires shall be fully shielded, 100% cutoff and shall not exceed the allowed lumen output in Table G, row 2.

B. Exceptions.

1. One partly shielded or unshielded luminaire at the main entry, not exceeding the allowed lumen output in Table G row 2.
2. Any other partly shielded or unshielded luminaires not exceeding the allowed lumen output in Table G row 3.
3. Low voltage landscape lighting aimed away from adjacent properties and not exceeding the allowed lumen output in Table G row 4.
4. Shielded directional flood lighting aimed so that direct glare is not visible from adjacent properties and public and private streets and pedestrian ways and not exceeding the allowed lumen output in Table G row 5.
5. Open flame gas lamps.
6. Lighting installed with a vacancy sensor, where the sensor extinguishes the lights no more than 15 minutes after the area is vacated, provided that the luminaire is shielded, 100% cutoff.
7. Lighting exempt per Section III (B.).

C. Requirements for Residential Landscape Lighting.

1. Shall comply with Table G.
2. Shall not be aimed onto adjacent properties.

3.11.8 – Lighting by special permit

A. High Intensity and Special Purpose Lighting. The following lighting systems are prohibited from being installed or used except by special use permit:

1. Temporary lighting in which any single luminaire exceeds 20,000 initial luminaire lumens or the total lighting load exceeds 160,000 lumens.
2. Aerial Lasers.
3. Searchlights.

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

B. Upon special permit issued by the Department, lighting not complying with the technical requirements of this ordinance but consistent with its intent may be installed for complex sites or uses or special uses including, but not limited to, the following applications:

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 of bridges, public monuments, statuary and public buildings.
7. Theme and amusement parks.
8. Correctional facilities.

C. Standards for approval of special permit for lighting

1. Has sustained every reasonable effort to mitigate the effects of light on the environment and surrounding properties, supported by a signed statement describing the mitigation measures. Such statement shall be accompanied by the calculations required for the Performance Method.
2. Employs lighting controls to reduce lighting at a Project Specific Curfew ("Curfew") time to be established in the Permit.
3. Complies with the Performance Method after Curfew.
4. The Authority shall review each such application. A permit may be granted if, upon review, the Authority believes that the proposed lighting will not create unwarranted glare, sky glow, or light trespass.

3.11.8 – Existing Lighting. Lighting installed prior to the effective date of this ordinance shall comply with the following standards.

A. Amortization. On or before January 1, 2029, all outdoor lighting shall comply with this Code.

B. New Uses or Structures, or Change of Use. Whenever there is a new use of a property (zoning or variance change) or the use or occupancy category as defined by the applicable building code is changed, all outdoor lighting on the property shall

be brought into compliance with this Ordinance before the new or changed use or occupancy commences.

C. Additions or Alterations

1. Major additions. If a major addition occurs on a property, lighting for the entire property shall comply with the requirements of this Code. For purposes of this section, the following are considered to be major additions:
   a. Additions of 25 percent or more in terms of additional dwelling units, gross floor area, seating capacity, or parking spaces, either with a single addition or with cumulative additions after the effective date of this Ordinance.
   b. Single or cumulative additions, modification or replacement of 25 percent or more of installed outdoor lighting luminaires existing as of the effective date of this Ordinance.
2. Minor modifications, additions, or new lighting fixtures for non-residential and multifamily dwellings. For non-residential and multifamily dwellings, all additions, modifications, or replacement of more than 25 percent of outdoor lighting fixtures existing as of the effective date of this Ordinance shall require the submission of a complete inventory and site plan detailing all existing and any proposed new outdoor lighting. Any new lighting shall meet the requirements of this Ordinance.
3. Resumption of Use after Abandonment. If a property with non-conforming lighting is not occupied for a period of six months or more, then all outdoor lighting shall be brought into compliance with this Ordinance before any further use of the property occurs.

3.11.8 – Violations and Enforcement.

Outdoor lighting installed or maintained in violoation of any provision of this section, or other applicable provisions of the Phoenix Land Development Code (PLDC), shall be subject to the provisions of Chapter 1.4 – Enforcement of the PLDC.

3.11.9 Tables

Table A - Allowed Total Initial Luminaire Lumens per Site for Non-residential Outdoor Lighting, Per Parking Space Method. May only be applied to properties up to 10 parking spaces (including handicapped accessible spaces).

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
350 lms/space	490 lms/space	630 lms/space	840 lms/space	1,050 lms/space

Table B - Allowed Total Initial Lumens per Site for Nonresidential. Outdoor Lighting, Hardscape Area Method. May be used for any project. When lighting intersections of site drives and public streets or road, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting.

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4

Base Allowance				
0.5 lumens per SF of Hardscape	1.25 lumens per SF of Hardscape	2.5 lumens per SF of Hardscape	5.0 lumens per SF of Hardscape	7.5 lumens per SF of Hardscape

Table B - *Lumen Allowances, in Addition to Base Allowance*

	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Additional allowances for sales and service facilities. No more than two additional allowances per site, Use it or Lose it.					
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 2 mounting heights of sales lot area.	0	4 lumens per square foot	8 lumens per square foot	16 lumens per square foot	16 lumens per square foot
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	0	0	1,000 per LF	1,500 per LF	2,000 per LF
Drive Up Windows. In order to use this allowance, luminaires must be within 20 feet horizontal distance of the center of the window.	0	2,000 lumens per drive-up window	4,000 lumens per drive-up window	8,000 lumens per drive-up window	8,000 lumens per drive-up window
Vehicle Service Station. This allowance is lumens per installed fuel pump.	0	4,000 lumens per pump (based on 5 fc horiz)	8,000 lumens per pump (based on 10 fc horiz)	16,000 lumens per pump (based on 20 fc horiz)	24,000 lumens per pump (based on 20 fc horiz)

Table C - Maximum Allowable Backlight, Uplight and Glare (BUG) Ratings. May be used for any project. A luminaire may be used if it is rated for the lighting zone of the site or lower in number for all ratings B, U and G. Luminaires equipped with adjustable mounting devices permitting alteration of luminaire aiming in the field shall not be permitted.

	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Allowed Backlight Rating*					
Greater than 2 mounting heights from property line	B1	B3	B4	B5	B5
1 to less than 2 mounting heights from property line and ideally oriented**	B1	B2	B3	B4	B4
0.5 to 1 mounting heights from property line and ideally oriented**	B0	B1	B2	B3r	B3r
Less than 0.5 mounting height to property line and properly oriented**	B0	B0	B0	B1	B2

*For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section. NOTE: This adjustment is relative to Table C-1 and C-3 only and shall not be used to increase the lighting area of the site.

** To be considered 'ideally oriented', the luminaire must be mounted with the backlight portion of the light output oriented perpendicular and towards the property line of concern.

Table C - 2 Maximum Allowable Uplight (BUG) Ratings - Continued

Table C-2	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Allowed Uplight Rating	U0	U1	U2	U3	U4
Allowed % light emission above 90º for street or Area lighting	0%	0%	0%	0%	0%

Table C - 3 Maximum Allowable Glare (BUG) Ratings – Continued

Table C-3	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Allowed Glare Rating	G0	G1	G2	G3	G4
Any luminaire not ideally oriented*** with 1 to less than 2 mounting heights to any property line of concern	G0	G0	G1	G1	G2
Any luminaire not ideally oriented*** with 0.5 to 1 mounting heights to any property line of concern	G0	G0	G0	G1	G1
Any luminaire not ideally oriented*** with less than 0.5 mounting heights to any property line of concern	G0	G0	G0	G0	G1

*** Any luminaire that cannot be mounted with its backlight perpendicular to any property line within 2X the mounting heights of the luminaire location shall meet the reduced Allowed Glare Rating in Table C-3.

Table D Performance Method Allowed Total Initial Site Lumens *May be used on any project.*

Lighting Zone	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Allowed Lumens Per SF	0.5	1.25	2.5	5	7.5

Allowed Base Lumens Per Site	0	3500	7000	14000	21000

Table E Performance Method Additional Initial Luminaire Lumen Allowances. All of the following are "use it or lose it" allowances. All area and distance measurements in plan view unless otherwise noted.

Lighting Application	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Additional Lumens Allowances for All Buildings except service stations and outdoor sales facilities. A MAXIMUM OF THREE (3) ALLOWANCES ARE PERMITTED. THESE ALLOWANCES ARE "USE IT OR LOSE IT".					
Building Entrances or Exits. This allowance is per door. In order to use this allowance, luminaires must be within 20 feet of the door.	**400**	**1000**	2000	4000	6000
Building Facades. This allowance is lumens per unit area of building façade that are illuminated. To use this allowance, luminaires must be aimed at the façade and capable of illuminating it without obstruction.	0	0	8/SF	16/SF	24/SF
Sales or Non-sales Canopies. This allowance is lumens per unit area for the total area within the drip line of the canopy. In order to qualify for this allowance, luminaires must be located under the canopy.	0	3/SF	6/SF	12/SF	18/SF
Guard Stations. This allowance is lumens per unit area of guardhouse plus 2000 sf per vehicle lane. In order to use this allowance, luminaires must be within 2 mounting heights of a vehicle lane or the guardhouse.	0	6/SF	12/SF	24/SF	36/SF
Outdoor Dining. This allowance is lumens per unit area for the total illuminated hardscape of outdoor dining. In order to use this allowance, luminaires must be within 2 mounting heights of the hardscape area of outdoor dining	0	1/SF	5/SF	10/SF	15/SF
Drive Up Windows. This allowance is lumens per window. In order to use this allowance, luminaires must be within 20 feet of the center of the window.	0	2,000 lumens per drive-up window	4,000 lumens per drive-up window	8,000 lumens per drive-up window	8,000 lumens per drive-up window
Additional Lumens Allowances for Service Stations only. Service stations may not use any other additional allowances.					
Vehicle Service Station Hardscape. This allowance is lumens per unit area for the total illuminated hardscape area less area of buildings, area under canopies, area off property, or areas obstructed by signs or structures. In order to use this allowance, luminaires must be illuminating the hardscape area and must not be within a building, below a canopy, beyond property lines, or obstructed by a sign or other structure.	0	4/SF	8/SF	16/SF	24/SF

Additional Lumens Allowances for Outdoor Sales facilities only. Outdoor Sales facilities may not use any other additional allowances. **NOTICE:** lighting permitted by these allowances shall employ controls extinguishing this lighting after a curfew time to be determined by the Authority.					
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 and shall not exceed 25% of the total hardscape area. To use this allowance, Luminaires must be within 2 mounting heights of the sales lot area.	0	4/SF	8/SF	12/SF	18/SF
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	0	0	1,000/LF	1,500/LF	2,000/LF

Table E - Performance Method Additional Initial Lumen Allowances (cont.)

Lighting Application	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Vehicle Service Station Canopies. This allowance is lumens per unit area for the total area within the drip line of the canopy. In order to use this allowance, luminaires must be located under the canopy.	**0**	**8/SF**	16/SF	32/SF	32/SF
Additional Lumens Allowances for Outdoor Sales facilities only. Outdoor Sales facilities may not use any other additional allowances. **NOTICE:** lighting permitted by these allowances shall employ controls extinguishing this lighting after a curfew time to be determined by the Authority.					
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 and shall not exceed 25% of the total hardscape area. To use this allowance, Luminaires must be within 2 mounting heights of the sales lot area.	0	3/SF	6/SF	12/SF	18/SF
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	0	0	1000/LF	1500/LF	2000/LF

Table F Maximum Vertical Illuminance at any point in the plane of the property line

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
0.05 FC or 0.5 LUX	0.1 FC or 1.0 LUX	0.3 FC or 3.0 LUX	0.8 FC or 8.0 LUX	1.5 FC or 15.0 LUX

Table G - Residential Lighting Limits

Lighting Application	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Row 1 Maximum Allowed Luminaire Lumens* for Unshielded Luminaires at one entry only	Not permitted	420 lms	630 lms	630 lms	630 lms
Row 2 Maximum Allowed Luminaire Lumens* for each Fully Shielded Luminaire	630 lms	1,260 lms	1,260 lms	1,260 lms	1,260 lms
Row 3 Maximum Allowed Luminaire Lumens* for each Unshielded Luminaire excluding main entry	Not permitted	315 lms	315 lms	315 lms	315 lms
Row 4 Maximum Allowed Luminaire Lumens* for each Landscape Lighting	Not permitted	Not permitted	1,050 lms	2,100 lms	2,100 lms
Row 5 Maximum Allowed Luminaire Lumens* for each Shielded Directional Flood Lighting	Not permitted	Not permitted	1,260 lms	2,100 lms	2,100 lms
Row 6 Maximum Allowed Luminaire Lumens* for each Low Voltage Landscape Lighting	Not permitted	Not permitted	525 lms	525 lms	525 lms

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