

AzAC Model Outdoor Lighting Code

Arizona Astronomy Consortium

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Note: ***Bold italics*** indicate terms defined in Section 17.

Note to jurisdictions with no Astronomical Resource Zones: Text highlighted in light gray can be removed.

Section 1. Purpose and Intent.

It is the purpose of this Code to define practical and effective measures by which the obtrusive aspects of outdoor light usage can be minimized, while preserving safety, security, and the nighttime use and enjoyment of property. These measures are intended to curtail **light trespass**, glare, energy and resource waste, and to preserve the dark skies relied upon by Arizona’s world-class astronomical facilities by encouraging lighting practices that direct the appropriate amount of light where and when it is needed, managing spectral characteristics to minimize spectrum coverage and sky glow while maximizing visual effectiveness, and decreasing wasted light from overlighting and poorly shielded or inappropriately directed lighting fixtures.

It is further recognized that naturally dark landscapes and star-filled skies are valued by many and that poor practices in outdoor lighting hamper the reasonable use and enjoyment of property and can endanger the public welfare by producing unnecessary glare.

Section 2. Conformance with Applicable Codes.

All **outdoor lighting fixtures** shall be **installed** in conformance with the provisions of this Code, the Building Code, the Electrical Code, the Sign Code and all other applicable laws and regulations of the jurisdiction.

Section 3. Establishment of Lighting and Astronomical Resource Zones

3.1. Establishment of Lighting Zones. Three Lighting Zones (LZ) are established, with varying development standards specific to their location within [jurisdiction]. The Lighting Zones are shown in the Lighting Zone Map, and generally defined as follows:

- A. LZ1 – rural areas
- B. LZ2 – suburban areas
- C. LZ3 – urban areas

3.2. Establishment of Astronomical Resource Zones. Critical and buffer Astronomical Resource Zones (ARZ) are established as shown on the Lighting Zone Map and generally defined as follows:

Name	Center Location (degrees)		ARZ radius (miles)	
	Latitude	Longitude	critical	buffer
Kitt Peak ARZ	31.9640	-111.6000	15	35
Mount Hopkins ARZ	31.6888	-110.8851	12.5	25
Anderson Mesa ARZ	35.0970	-111.5368	2.5	7
Happy Jack ARZ	34.7443	-111.4225	2.5	7

United States Naval Observatory ARZ	35.1840	-111.7405	2.5	7
Mount Lemmon ARZ	32.4428	-110.7887	15	75
Mount Graham ARZ	32.7014	-109.8891	15	75

Section 4. Applicability.

- 4.1. New Uses and Major Modifications. All outdoor lighting for new uses, developments or structures, and major modifications to outdoor lighting, for which a permit or other approval is issued or given after the effective date of this Code, shall meet the requirements of this Code. Cumulative modification or replacement of outdoor lighting constituting fifty (50) percent or more of the **lumens** permitted by this Code for the parcel, regardless of the actual amount of lighting already on a non-conforming site, shall be deemed a major modification for purposes of this section.
- 4.2. Minor Additions. Alterations, additions or modifications to outdoor lighting of less than fifty (50) percent in the value or **total outdoor light output**, and that require a permit, shall require the submission of a complete inventory and site plan detailing all existing and any proposed new outdoor lighting. Any new lighting on the site shall meet the requirements of this Code with regard to shielding and lamp type; the **total outdoor light output** after the modifications are complete shall not exceed that on the site before the modification, or that permitted by this Code, whichever is larger.
- 4.3. Nonconforming **Outdoor Light Fixtures**; Nonconforming Uses. If a use, building or structure loses its nonconforming status, or if **outdoor light fixtures** are modified in excess of fifty (50) percent of their value, or **total outdoor light output**, whether all at once, or in a series of cumulative changes, then all outdoor lighting must be brought into conformance with the requirements of this Code.
- 4.4. Resumption of Use after Abandonment. If a use, building or structure is **abandoned** then all outdoor lighting shall be brought into compliance with this Code before the use is resumed.
- 4.5. Public Roadways. Lighting for public roadways shall comply with this Code.
- 4.6. Alteration of Non-conforming Use. All **light fixtures** may be maintained as provided in Section ____ of the Zoning Ordinance, but shall not be re-erected, relocated, modified, or replaced unless brought into compliance with this Code. Nothing in this Code shall affect existing property or the right to its continued use for the purpose used at the time the Code takes effect, nor to make any reasonable repairs to **light fixtures**, property, or uses for such legal existing purposes.

Section 5. Outdoor Lighting Standards.

5.1. Shielding Standards. All nonexempt **outdoor light fixtures** shall comply with the shielding standards in Table 5.1; outdoor **luminous tube** lighting may be **unshielded** but total output from all **unshielded** lighting is subject to the limits in Section 5.2.

Use Codes:

A = all types of fixtures allowed; **fully shielded** recommended

F = only **fully shielded fixtures** allowed

X = not allowed

Table 5.1 SHIELDING STANDARDS

Land Use and Lamp Output	Shielding		Notes
	distance from fixture to nearest Residential property line ¹		
	< 50'	≥ 50'	
Commercial, Industrial and Multi-Family Residential			
Initial lamp output ≥ 2,000 lumens	F	F	
Initial lamp output < 2,000 lumens	F	A	2,3
Roadways (all outputs)	F	F	
Residential Lighting			
Initial lamp output ≥ 1,000 lumens	F	F	
Initial lamp output < 1,000 lumens	F	A	2,3,4,5

Notes to Table 5.1

1. The distance to the nearest parcel with any kind of residential use including multi-family housing.
2. **Spot** and **flood lamps** must be aimed no higher than 45 degrees above straight down (half-way between straight down and straight to the side) when the lamp is visible from any off-site residential property or public roadway (Figure 4.1).

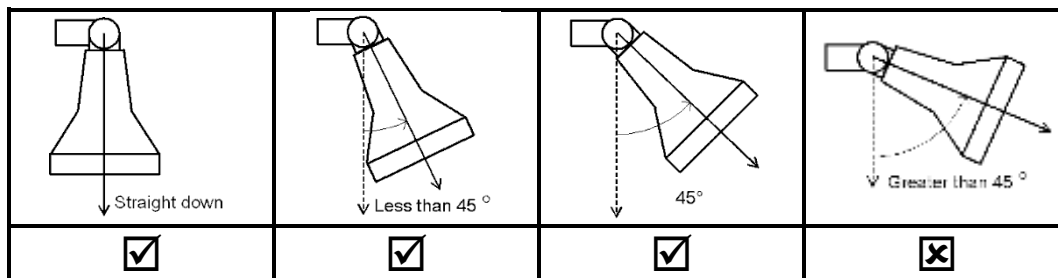


Figure 5.1. Spot light aiming

2. The maximum amount of **unshielded** lighting is limited in Section 5.2.

3. Seasonal decorations using typical **unshielded** low-wattage lamps shall be permitted from November 15 through January 15.
4. Examples of lamp types of 2,000 and 1,000 **lumens** and below (the acceptability of a particular light is determined by initial **lumen** output, not wattage; values listed are approximate; check manufacturer's specifications).

Lamp Type	2000 lumens	1000 lumens
Standard incandescent	100 watt and less	60 watt and less
Tungsten-halogen (quartz)	100 watt and less	60 watt and less
Fluorescent	25 watt and less	15 watt and less
Compact Fluorescent	26 watt and less	13 watt and less
Metal Halide	40 watt and less	N/A
High-pressure sodium	N/A	N/A
Low-pressure sodium	10 watt and less	N/A

5.2. **Total Outdoor Light Output Standards.** **Total outdoor light output** for all outdoor lighting, excepting that used for illumination of public rights-of-way, shall not exceed the limits in Table 5.2.

Table 5.2 MAXIMUM **TOTAL OUTDOOR LIGHT OUTPUT** STANDARDS

Land Use and Fixture Shielding	Lighting Zone			Astronomical Resource Zone		Notes
	LZ 1	LZ 2	LZ 3	critical	buffer	
Commercial, Industrial, Multi-family Residential (lumens per net acre)						
total (fully shielded + unshielded)	50,000	100,000	150,000	12,500	25,000	
non- LPS component	50,000	100,000	150,000	1,250	2,500	1
non-amber component	5,000	10,000	15,000	0	0	2
unshielded component	5,000	5,000	5,000	0	0	
Residential (lumens per residence)						
total (fully shielded + unshielded)	20,000	20,000	20,000	10,000	20,000	3
unshielded component	5,000	5,000	5,000	0	5,000	

Notes to Table 5.2

1. Non-**LPS** includes all lamp types except **low-pressure sodium** and **narrow-spectrum amber LED**.
2. Non-amber includes all lamp types except **low-pressure sodium, high-pressure sodium, narrow-spectrum amber LED, and PC amber LED**.
3. Each residential single-family detached home or duplex is allowed up to 5,500 **lumens** of **unshielded** lighting per residence, or the lighting provided in this Table based on the parcel's acreage, whichever is larger, provided Table 5.1

allows the fixture(s) to be **unshielded**. Spot or flood lamps are to be aimed no higher than 45 degrees above straight down (see Note 1 to Table 5.1).

5.3. Non-Amber Lamp **CCT** Standards. All non-amber lamps (including all lamp types except **low-pressure sodium, high-pressure sodium, narrow-spectrum amber LED** and **PC amber LED**) used on commercial, industrial and multi-family residential developments, except lamps used for **decorative lighting**, must conform to the **CCT** limits listed in Table 5.3.

Table 5.3 MAXIMUM **NON-AMBER LAMP CCT**

Lighting Zone			Astronomical resource zone	
LZ 1	LZ 2	LZ 3	critical	buffer
3000K	3000K	3000K	2700K	2700K

5.4. Roadway Lighting Standards. All light fixtures used to illuminate public rights-of-way shall be **fully shielded** and utilize the lamp types indicated in Table 5.4.

Table 5.4. ROADWAY LIGHTING LAMP TYPES

Lighting Zone			Astronomical resource zone	
LZ 1	LZ 2	LZ 3	critical	buffer
LPS, HPS, narrow-spectrum amber LED, PC amber LED			LPS, narrow-spectrum amber LED	

5.5. “House Side” Shielding Standard. Beyond the shielding requirements of Section 5.1, any privately or publicly owned **outdoor light fixture** with a lamp of initial output over 10,000 **lumens** located within 50 feet of any residential (including multi-family residential) property or public right-of-way shall utilize an internal or external “house-side” shield, with the light fixture and shield oriented to minimize **light trespass** over the adjacent property or right-of-way line (Figure 5.5). The surface of any external shield must have a black or bronze finish on the side facing the lamp to minimize reflection.

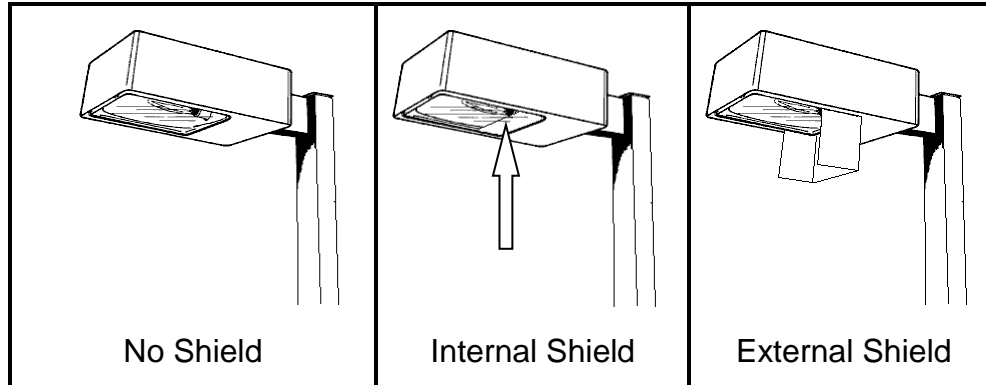


Figure 5.5. House-side shield configurations

5.6. **Effective Shielding Standard.** All light fixtures that are required to be **fully shielded** shall be **installed** and maintained in such a manner that the shielding is effective as described in the definition for **fully shielded** fixtures.

5.7. **Curfews**

- A. **Decorative lighting** shall be extinguished between 10:00pm, or when the business closes (whichever is later), and the time the business re-opens.
- B. **Area lighting** located 75 feet or more from the nearest building, **display area** or storage area, except lighting for public roadways and lighting required to meet egress illumination standards, shall be extinguished between 10:00pm, or within sixty (60) minutes of the business closing (whichever is later), and the time the business re-opens.
- C. All lighting subject to curfews in Section 5.7.A and 5.7.B shall be controlled by automatic time switches.

Section 6. Outdoor Advertising Sign Lighting Standards.¹

6.1. **Externally Illuminated Sign** Lighting Standards. External lighting for signs, including **billboards**, shall conform to the provisions of this Code, including but not limited to the lamp source, shielding and **total outdoor light output** standards of Section 5 (except as provided in Section A below).

- A. Upward-directed sign lighting is prohibited.
- B. Lighting for externally illuminated **billboards** is allowed up to a maximum of 200 initial lamp **lumens** per square foot of illuminated sign face, even

¹ Some jurisdictions include all sign standards, including those related to lighting, in a separate sign code.

when the **total outdoor light output** standards in Section 5.2 would not otherwise permit such lighting.

6.2. **Internally Illuminated Sign, Neon Sign, Multicolor Fixed-Copy LED Sign and Single-Color LED Sign** Lighting Standards.

- A. Outdoor **internally illuminated signs** must either be constructed with an **opaque** background and translucent text and symbols, or with a colored background (Figure 6.2.A); backgrounds shall not be white, off-white, light grey, cream, or yellow. Lamps used for internal illumination of such signs shall not be counted toward the **total outdoor light output** standards in Section 5.2.




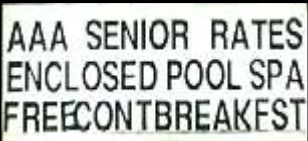





Light Background <input type="checkbox"/>	Colored Background <input checked="" type="checkbox"/>	Opaque Background <input checked="" type="checkbox"/>
		
		
		

Figure 6.2.A **Internally illuminated sign** styles

- B. **Neon signs, multicolor fixed-copy LED Signs and single-color LED signs** (Figure 6.2.B) shall be treated as internally illuminated signs for the purposes of this Code, and shall not have their luminous outputs counted toward the **total outdoor light output** standards in Section 5.2. Any lighting extending beyond the area considered to be the sign area (as defined in the Sign Code of this jurisdiction) shall be considered **decorative lighting**, and shall be subject to the standards applicable for such lighting, including but not limited to the lamp source, shielding and **total outdoor light output** standards of Section 5.



Figure 6.2.B *Neon, multicolor fixed-copy LED and single-color LED signs*

C. Other internally-illuminated panels or decorations not considered to be signage according to the sign code of this jurisdiction (such as illuminated canopy margins or building faces), shall be considered **decorative lighting**, and shall be subject to the standards applicable for such lighting, including but not limited to the lamp source, shielding and **total outdoor light output** standards of Section 5.

6.3. **Multicolor Changeable-Copy LED Sign** Lighting Standards. Lighting for **multicolor changeable-copy LED signs** must meet the following:

A. **Multicolor changeable-copy LED signs** must include photocell technology to control and vary the intensity of lighting depending on the amount of ambient light that is present to prevent overly bright **luminance** at night: automatic controls must limit night luminance to a maximum of 100 **nits** when the display is set to show maximum brightness white (100% full white mode). The applicant shall provide a written certification from the sign manufacturer that the nighttime light intensity has been factory pre-set not to exceed this level, and that this setting is protected from end-user modification by password-protected software or other method as deemed appropriate by the Planning Director.



Figure 6.3.A *Multicolor changeable-copy LED sign*

6.4. Curfews. Illumination for all **on-site advertising signs** except **billboards**, both externally and internally illuminated, shall be turned off at the curfew times listed in Table 6.4 or when the business closes, whichever is later. Signs subject to curfews are required to have functioning and properly adjusted automatic shut-off timers. Light background (white, off-white, light gray, cream or yellow) **internally illuminated signs, installed** legally before enactment of this code [enter date], may continue to be used and illuminated but must conform to the curfews as indicated.

Table 6.4 ILLUMINATED SIGN CURFEWS

Land Use Zoning and Sign Type	Curfew
Commercial and Industrial zoning	
Opaque Background	10pm
Colored Background	10pm
Light Background	8pm
All residential and mixed-use zoning	
Opaque Background	9pm
Colored Background	9pm
Light Background	6pm

Note to Table 6.4

Land Use Zoning refers to the predominant use of land by area within 1,000 feet of the parcel on which the sign is located.

Section 7: Special Uses.

7.1. Recreational Facilities.

A. Class of Play. Fields designed primarily for use by municipal or amateur leagues, training, recreational or social levels, shall be considered **Sports Class IV** as defined by the Illuminating Engineering Society of North America (IESNA). Fields designed primarily for college, semiprofessional, professional or national levels shall be considered **Sports Class I, Sports Class II** or **Sports Class III** as defined by IESNA.

B. Lighting Amount.

1. In critical **Astronomical Resource Zones**: Lighting for outdoor athletic fields, courts or tracks shall be included in the **total outdoor light output** standards of Section 5.2.

2. In all other **Lighting** and **Astronomical Resource Zones**: Lighting for outdoor athletic fields, courts or tracks shall be exempt from the **total outdoor light output** standards of Section 5.2.
- C. Shielding. Fixtures used to illuminate fields shall have the following shielding characteristics:
3. **Sports Class III** and **Sports Class IV** levels of play: **fully shielded** lighting is required.
 4. **Sports Class I** and **Sports Class II** levels of play: **luminaires** with minimal uplight consistent with the illumination constraints of the design are required. Where **fully shielded** fixtures are not utilized, acceptable **luminaires** shall include those which are provided with internal and/or external glare control louvers and **installed** so as to minimize uplight, as determined by the Planning Director.
- D. **Illuminance**. All lighting installations shall be designed to achieve no greater than 110% of the minimal **illumination** levels for the activity as recommended by the Illuminating Engineering Society of North America (IESNA) for the **Sports Class** as described in Section 7.1.A.
- E. Off-site spill. The installation shall limit off-site spill (off the parcel containing the sports facility) to the maximum extent possible consistent with the illumination constraints of the design, as determined by the Planning Director.
- F. Certification. Every such lighting system design and installation shall be certified by a registered engineer, architect or landscape architect as conforming to the approved plans.
- G. Curfew. All events shall be scheduled so as to complete all activity before 11pm. Illumination of the playing field, court or track shall be permitted after the curfew only to conclude a scheduled event that did not conclude before the curfew due to unusual circumstances.
- 7.2. **Frontage Row of Vehicle Display Areas.**
- A. Shielding. All **frontage row vehicle display area** lighting shall utilize **fully shielded luminaires** that are **installed** in a fashion that maintains the **fully shielded** characteristics.
- B. **Lumen** Limit.
1. In critical **Astronomical Resource Zones**: **Total outdoor light output** for the **frontage row of vehicle display areas** is not

exempt from the standards of Section 5.2, and shall not exceed sixty (20) **lumens** per square foot.

2. In all other **Lighting** and **Astronomical Resource Zones**: **Total outdoor light output** for the **frontage row of vehicle display areas** is exempt from the standards of Section 5.2, but shall not exceed sixty (60) **lumens** per square foot.

- C. Curfew. The **frontage row of vehicle display area** lighting exceeding the **total outdoor light output** standard of Section 5.2 shall be turned off at the curfew listed in Section 7.1 or within sixty (60) minutes after closing of the business, whichever is later.

7.3. Service Station Canopies.

- A. Shielding. All **luminaires** mounted on or recessed into the lower surface of service station canopies shall be **fully shielded** and utilize flat lenses.

- B. Total Under-Canopy Output. The total light output used for illuminating service station canopies, defined as the sum of all under-canopy initial bare-lamp outputs in **lumens**, shall not exceed twenty (20) **lumens** per square foot of canopy in critical **Astronomical Resource Zones**, or sixty (60) **lumens** per square foot of canopy in any other **Lighting** or **Astronomical Resource Zone**. All lighting mounted under the canopy, including but not limited to **luminaires** mounted on the lower surface or recessed into the lower surface of the canopy and any lighting within signage or illuminated panels over the pumps, is to be included toward the total at full initial **lumen** output.

1. The lumen output of lamps mounted on or within the lower surface of a canopy is included toward the standards in Section 5.2 according to the method defined for total outdoor light output. Other lighting located under a canopy but not mounted on or within the lower surface is included toward the standards in Section 4.2 at full initial output.

- ### 7.4. Other Lighting on Parcels with Special Uses.
- All lighting not directly associated with the special use areas above shall conform to the lighting standards described in this Code at all times, including but not limited to the shielding standards of Section 5.1, the **total outdoor light output** standards of Section 5.2 and the lamp CCT standards of Section 5.3. The **net acreage** for the determination of compliance with Section 5.2 shall not include the area of the athletic field or **frontage row of vehicle display area**; the area of any service station canopy shall be included in the **net acreage**.

Section 8. Submission of Plans and Evidence of Compliance with Code, Subdivision Plats.

- 8.1. **Submission Contents.** The applicant for any permit required by any provision of the laws of this jurisdiction in connection with proposed work involving **outdoor lighting fixtures** shall submit (as part of the application for permit) evidence that the proposed work will comply with this Code. Even should no other such permit be required, the installation or modification of any exterior lighting (except for routine servicing and same-type lamp replacement) shall require submission of the information described below. The submission shall contain but shall not necessarily be limited to the following, all or part of which may be part of or in addition to the information required elsewhere in the laws of this jurisdiction upon application for the required permit:
- A. plans indicating the total number and location on the premises of all **outdoor lighting fixtures**, both proposed and any already existing on the site;
 - B. description of all **outdoor lighting fixtures**, both proposed and existing. The description may include, but is not limited to, catalog cuts and illustrations by manufacturers (including sections where required); lamp types, wattages and initial **lumen** outputs;
- 8.2. **Additional Submission.** The above required plans, descriptions and data shall be sufficiently complete to enable the designated official to readily determine whether compliance with the requirements of this Code will be secured. If such plans, descriptions and data are not sufficient, the applicant shall submit such additional evidence as reasonably requested by the jurisdiction, including certified reports of tests performed and certified by a recognized testing laboratory.
- 8.3. **Subdivision Plats.** If any subdivision proposes to have **installed** street or other common or public area outdoor lighting, submission of the information as described in Section 8.1 shall be required for all such lighting.
- 8.4. **Lamp or Fixture Substitution.** Should any **outdoor light fixture** or the type of light source therein be changed after the permit has been issued, a change request must be submitted to the designated official for approval, together with adequate information to assure compliance with this Code. Approval must be received prior to substitution.
- 8.5. **Plan Approval.** If the designated official determines that the proposed lighting does not comply with this Code, the permit shall not be issued or the plan approved.

- 8.6. Certification of Installation. For all projects where the **total outdoor light output** of the proposed lighting equals or exceeds 300,000 **lumens**, certification that the lighting, as **installed**, conforms to the approved plans shall be provided by a registered engineer, architect or landscape architect before the certificate of occupancy is issued.

Section 9. Approved Materials and Methods of Construction or Installation/Operation.

- 9.1. Light Fixture Information. All fixtures, as installed, must have information including but not limited to fixture manufacturer, catalog number, lamp type, CCT (for LED), and wattage, visible without undue difficulty to allow simple visual confirmation by an observer on the site that the fixture conforms to the item approved in the lighting permit. Such information must be provided and affixed to each fixture by the fixture manufacturer, and typically includes fixture manufacturer, catalog number, lamp type, CCT (for LED), and wattage.
- 9.2. Approval of Alternatives. The provisions of this Code are not intended to prevent the use of any design, material, or method of installation or operation not specifically prescribed by this Code, provided any such alternate has been approved by the designated official. The designated official may approve any such proposed alternate providing he/she finds that it:
- A. provides at least approximate equivalence to that applicable specific requirements of this Code, and
 - B. is otherwise satisfactory and complies with the intent of this Code.

Section 10. Prohibitions.

- 10.1. Laser Source Light. The use of laser source light or any similar high intensity light for outdoor advertising or entertainment, when projected above the horizontal, is prohibited.
- 10.2. **Searchlights**. The operation of **searchlights** for advertising purposes is prohibited.
- 10.3. Mercury Vapor. The use of mercury vapor lights is prohibited. (ARS 49-1104).

Section 11. Temporary Exemption.

- 11.1. Request; Renewal; Information Required. Any person may submit, on a form prepared by the jurisdiction, to the designated official, a temporary exemption request. The request shall contain the following information:

- A. specific Code exemption(s) requested;
- B. purpose of proposed lighting;
- C. duration of requested exemption(s);
- D. information for each luminaire and lamp combination as required in section 8.1;
- E. proposed location on premises of the proposed outdoor light fixture(s);
- F. previous temporary exemptions, if any, and addresses of premises hereunder;
- G. such other data and information as may be required by the designated official.

11.2. Approval; Duration. The designated official shall, within five (5) business days from the date of submission of the request for temporary exemption, approve or delay the request in writing. If approved, the exemption shall be valid for not more than thirty (30) days from the date of issuance of the approval. The approval shall be renewable upon further written request, at the discretion of the designated official, for a maximum of one (1) additional thirty (30) day period. The designated official is not authorized to grant more than one (1) temporary permit and one (1) renewal for a thirty (30) day period for the same property within one (1) calendar year.

11.3. Disapproval; Appeal. If the request for temporary exemption or its extension is disapproved, the applicant may appeal as provided in Section 13.

Section 12. Other Exemptions.

12.1. Nonconformance. All **outdoor light fixtures** lawfully **installed** prior to and operable on the effective date of this Code are exempt from all requirements of this Code. There shall be no change in use or lamp type, or any replacement (except for same-type and same-output lamp replacement) or structural alteration or fixture relocation made, without conforming to all applicable requirements of this Code. If the property is **abandoned**, or if there is a change in use of the property, the provisions of this Code will apply when the abandonment ceases or the new use commences.

12.2. State and Federal Facilities. Compliance with the intent and standards of this Code at all State and Federal facilities is encouraged.

12.3. Emergency Lighting. Emergency lighting, used by police, firefighting, or medical personnel, or at their direction, is exempt from the requirements of this Code, for as long as the emergency exists.

12.4. Swimming Pool and Fountain Lighting. Underwater lighting used for the illumination of swimming pools and fountains is exempt from the lamp type and shielding standards of Section 5.1, though it must conform to all other provisions of this code.

Section 13. Appeals.

Any person substantially aggrieved by any decision of the designated official made in administration of the Code may appeal that decision to the Advisory/Appeals Board of this jurisdiction.

Section 14. Law Governing Conflicts.

Where any provision of federal, state, county, township or city statutes, codes, or laws conflicts with any provision of this Code, the most restrictive shall govern unless otherwise regulated by law.

Section 15. Violation and Penalty.

It shall be a civil infraction for any person to violate any of the provisions of this Code. Each and every day or night during which the violation continues shall constitute a separate offense. A fine shall be imposed of not less than fifty dollars nor more than seven hundred dollars for any individual or not less than 100 nor more than ten thousand dollars for any corporation, association, or other legal entity for each offense. The imposition of a fine under this Code shall not be suspended.

Section 16. Severability.

If any of the provisions of this Code or the application thereof is held invalid, such invalidity shall not affect other provisions or applications of this Code which can be given effect, and to this end, the provisions of this Code are declared to be severable.

Section 17. Definitions.

As used in this Code, unless the context clearly indicates otherwise, certain words and phrases shall mean the following:

- 17.1. **Abandoned.** Abandonment shall be determined as provided in Section _____ of the City/Town's Zoning Ordinance.
- 17.2. **Area Lighting.** All outdoor lighting used for, but not limited to, illumination for walkways, roadways, equipment yards, parking lots, outdoor security, outdoor sales or eating areas, assembly or repair areas, advertising and other signs, and recreational facilities where GENERAL ILLUMINATION for utility, safety or security of the grounds is the primary concern.

- 17.3. **Astronomical Resource Zone.** Areas surrounding major astronomical research observatories, where sky glow and spectrum of outdoor lighting have the greatest impact on astronomical research due to proximity.
- 17.4. **Billboard.** Any sign designed for use with changeable advertising copy and which is normally used for the advertisement of goods produced or services rendered at locations other than the premises on which the sign is located.
- 17.5. **CCT.** See **Correlated Color Temperature.**
- 17.6. **Correlated Color Temperature.** (of a light source) The temperature (in Kelvins, abbreviated K) of a black-body radiator (e.g. the tungsten filament in an incandescent lamp) that radiates light of comparable hue to a light source. Higher CCT sources appear bluer or “cooler,” lower CCT sources appear yellower or “warmer.”
- 17.7. **Decorative Lighting.** Any outdoor lighting used for, but not limited to, architectural illumination, flag and monument lighting, and illumination of trees, bushes, etc.
- 17.8. **Development Project.** Any residential, commercial, industrial or mixed use subdivision plan or development plan which is submitted to the City for approval.
- 17.9. **Direct Illumination. Illumination** resulting from light emitted directly from a lamp or **luminaire**, not light diffused through translucent signs or reflected from other surfaces such as the ground or building faces.
- 17.10. **Directly Visible.** Allowing a direct line-of-sight to the light source or lamp.
- 17.11. **Display Area.** Outdoor areas where active nighttime sales activity occurs AND where accurate color perception of merchandise by customers is required. Recognized **display area** uses include automobile and recreational vehicle sales, boat sales, tractor sales, building supply sales, gardening or nursery sales, swap meets. Uses not listed here must be approved as display lot uses by the Planning Director.
- 17.12. **Frontage Row of Vehicle Display Area.** That portion of a **display area** used for vehicles located adjacent to the parcel frontage. Includes only the front row of vehicles adjacent to the parcel frontage; does not include the driving area located behind the parked vehicles or the remainder of the **display area** not adjacent to the frontage. (Figure 17.12)

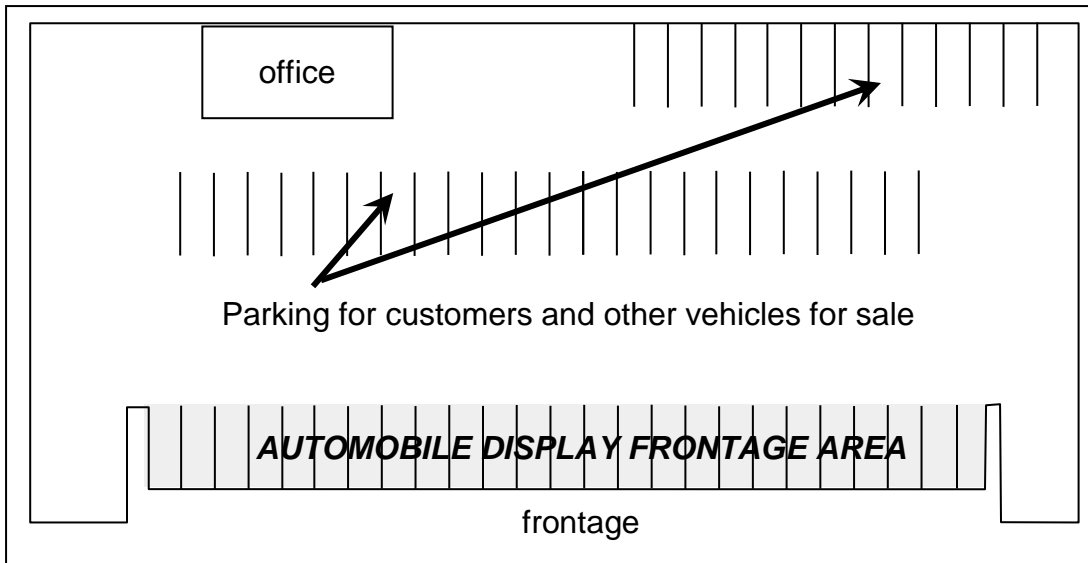


Figure 17.12. *Frontage Row of Vehicle Display Area*

17.13. **Flood Lamp.** See **Spot Lamp.**

17.14. **Footcandle.** The standard imperial unit used to measure **illuminance**, or the amount of light falling onto a surface, such as a roadway or athletic field. One **footcandle** equals one **lumen** per square foot. One **footcandle** equals approximately 10 **lux**.

17.15. **Fully Shielded (Light Fixture).** A lighting fixture constructed in such a manner that all light emitted by the fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the **luminaire**, is projected below the horizontal. Any structural part of the light fixture providing this shielding must be permanently affixed and part of the fixture, not part of any surrounding building or architectural elements.

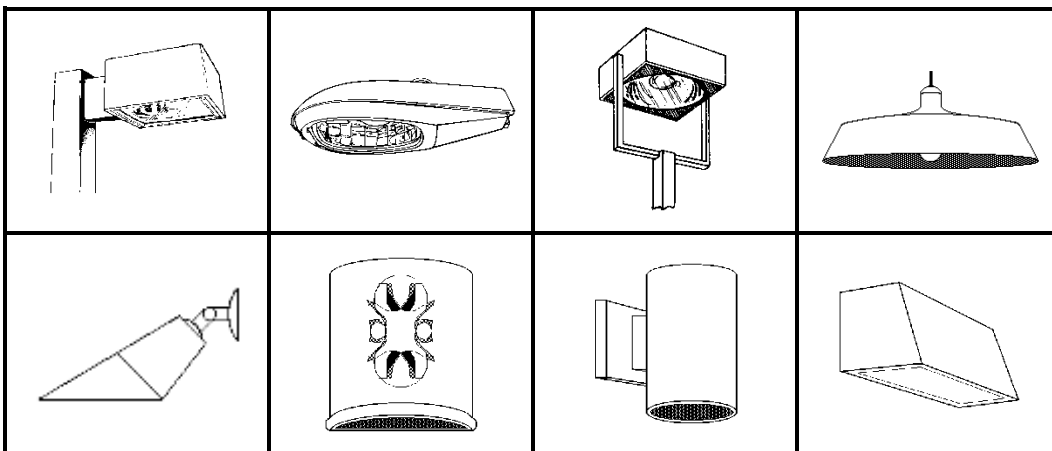


Figure 17.15a. Examples of fully shielded fixtures.

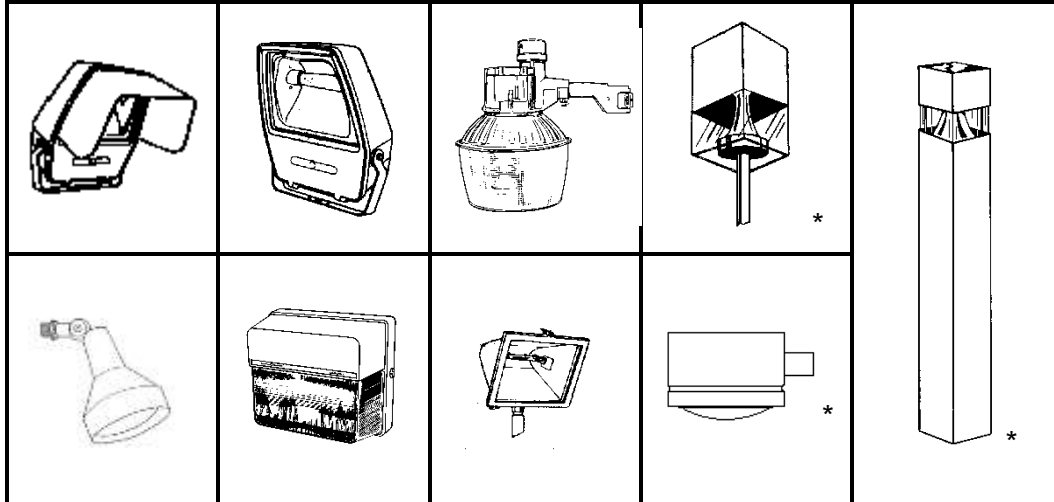


Figure 17.15b. Examples of fixtures that are NOT **fully shielded** (*even though the lamp in these fixtures is shielded from direct view when viewed from the side or above, reflective surfaces and/or lens covers are directly visible from the side).

17.16. **High-Pressure Sodium.** A gas-discharge lamp that uses sodium (among other elements) in a tube under high pressure to produce light.

17.17. **HPS. High-pressure Sodium.**

17.18. **Illuminance.** The amount of light falling onto a unit area of surface (luminous flux per unit area) - measured in **footcandles** or **lux**.

17.19. **Installed.** The attachment, or assembly fixed in place, whether or not connected to a power source, of any **outdoor light fixture**.

17.20. **Lamp, non-Amber.** Any lamp type except **low-pressure sodium, narrow spectrum amber LED, high-pressure sodium, and PC amber LED**. Includes but is not limited to fluorescent, **metal halide**, white **LED** and incandescent.

17.21. **LED.** Light emitting diode.

17.22. **LED, PC Amber.** A “phosphor converted” light emitting diode with a spectrum similar to that shown in Figure 17.22, and more specifically with radiant intensity at any wavelength outside of the range of 535 to 695 nanometers being 10% or less of the intensity at the peak, and a **scotopic to photopic ratio** of 0.70 or less.

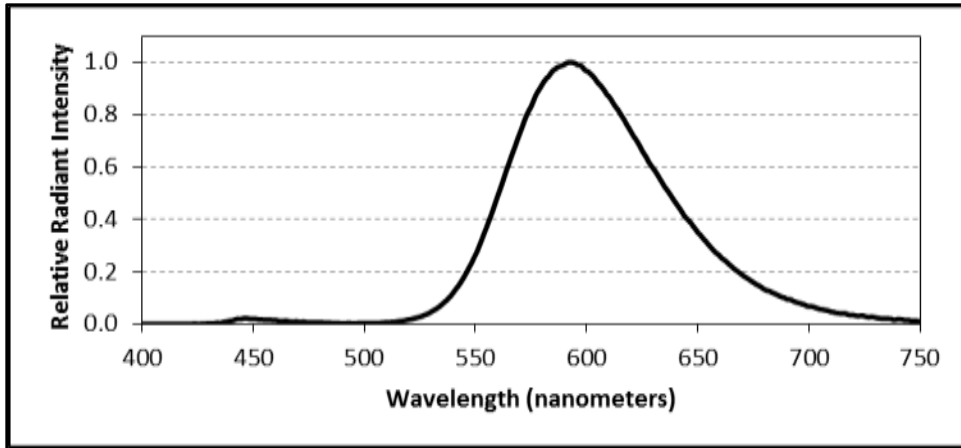


Figure 17.22. Representative **PC Amber LED** spectrum.

17.23. **LED, Narrow-Spectrum Amber.** A light emitting diode with a spectrum similar to that shown in Figure 17.23, and more specifically with peak radiant intensity between a wavelength of 585 and 595 nanometers, and radiant intensity at any wavelength outside of the range of 570 to 615 nanometers being 10% or less of the intensity at the peak.

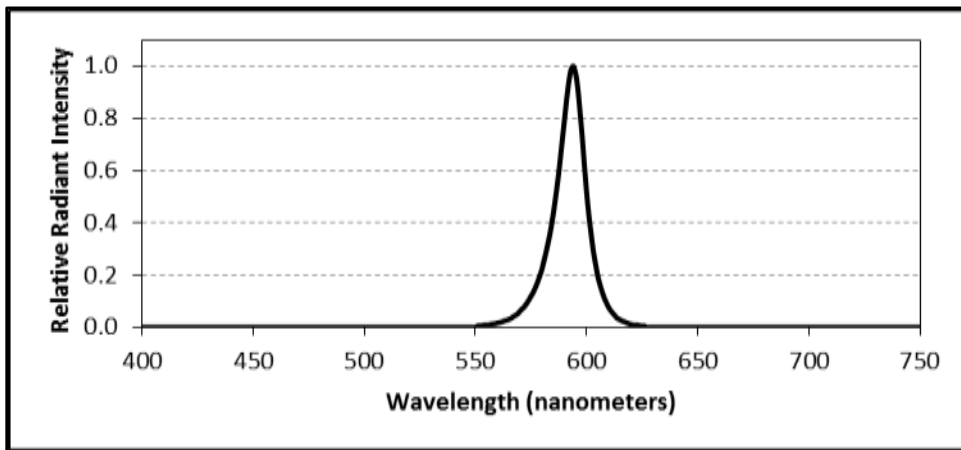


Figure 17.23. Representative **Narrow-Spectrum Amber LED** spectrum.

17.24. **Light Fixture.** See **Luminaire.**

17.25. **Light Trespass.** Light falling across property boundaries, on property not containing the originating light source.

17.26. **Lighting Zones.** The three **lighting zones** are defined on the Lighting Zone Map, by this reference made a part of this Code. Guidelines used to guide the delineation of the **lighting zones** are:

A. **Lighting Zone LZ 1.** This Zone includes rural areas, undeveloped or primarily residential, with typically small commercial centers surrounded by low density residential uses or open space.

B. **Lighting Zone LZ 2.** This Zone includes predominantly suburban residential areas, including neighborhood commercial or industrial areas mostly surrounded by residential areas, and urban areas in cities and towns.

C. **Lighting Zone LZ 3.** This Zone includes urban areas in large cities with primary land uses for commercial, business and industrial activity, including multi-family residential areas mostly surrounded by commercial areas.

17.27. **Low-Pressure Sodium.** A gas-discharge lamp that uses sodium in a tube under low pressure to produce light.

17.28. **LPS. Low-pressure sodium.**

17.29. **Lumen.** Unit of **luminous flux**; used to measure the amount of visible light emitted by lamps.

17.30. **Luminaire.** A complete lighting assembly (including the lamp, housing, reflectors, lenses and shields), less the support assembly (e.g. pole, mounting bracket or support arm); a **light fixture**. Includes **luminous tubes**, lamps or similar devices, permanently **installed** or portable, used for illumination, decoration, or advertisement. Such devices shall include, but are not limited to lights used for:

- A. parking lot or **parking garage** lighting;
- B. roadway and driveway lighting;
- C. pedestrian or walkway lighting;
- D. entryway lighting;
- E. buildings and structures;
- F. recreational areas;
- G. landscape lighting;
- H. **billboards** and other signs (advertising or other);
- I. product **display area** lighting;
- J. building or structure decoration;
- K. building overhangs and open canopies.

For purposes of determining **total outdoor light output** from a **luminaire** (see Table 5.2), lighting assemblies which include multiple lamps within a single **luminaire** or on a single pole or standard shall be considered as a single unit (Figure 17.30).

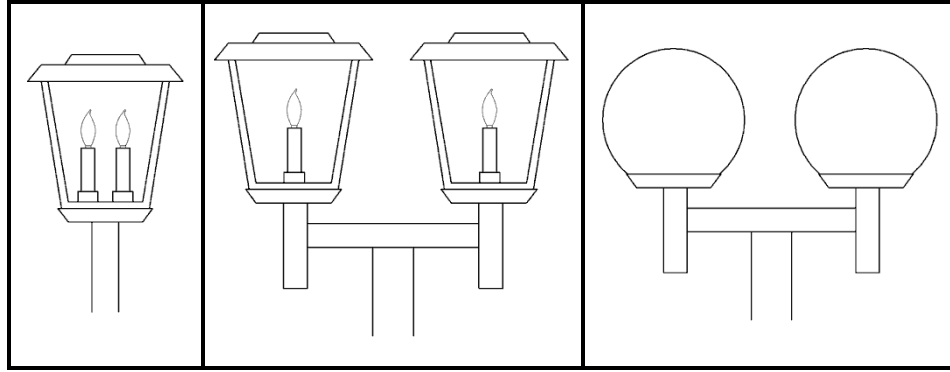


Figure 17.30. **Light fixtures** with multiple lamps in a single fixture (left) and on a single pole (center, right)

- 17.31. **Luminance.** The intensity of light reflected or emitted from a unit area of surface, such as a sign face - measured in **nits**.
- 17.32. **Luminous Flux.** The radiant power of visible light energy emitted from a light source; visible light. Measured in Lumens.
- 17.33. **Luminous Tube.** A glass tube filled with a gas or gas mixture (including neon, argon, mercury or other gasses), usually of small diameter (10-15 millimeters), caused to emit light by the passage of an electric current, and commonly bent into various forms for use as decoration or signs. A "neon" tube. Does not include common fluorescent tubes.
- 17.34. **Lux.** The standard metric unit used to measure **illuminance**, or the amount of light falling onto a surface, such as a roadway or athletic field. One **lux** equals one **lumen** per square meter. One **lux** equals approximately 0.1 **footcandles**.
- 17.35. **Metal Halide.** A gas-discharge lamp that uses mercury and a variety of metal halides to produce light.
- 17.36. **Neon Tube.** See **Luminous Tube**.
- 17.37. **Net Acreage.** The remaining area after deleting all portions for proposed and existing streets and any **Frontage Row of Vehicle Display Area(s)** within a parcel, subdivision, or multiple contiguous parcels proposed for development.
- 17.38. **Nit.** The standard unit used to measure the **luminance** of a surface, such as of a sign. Equivalent to candela per square meter.
- 17.39. **Opaque.** **Opaque** means that a material does not transmit light from an internal illumination source. Applied to sign backgrounds, means that the area

surrounding any letters or symbols on the sign allows no light from any internal source to shine through it.

17.40. **Outdoor Light Fixture.** See **Luminaire.**

17.41. **Outdoor Light Output, Total.** The initial total amount of light, measured in **lumens**, from all **outdoor light fixtures**, with adjustments as described herein. Includes all lights and **luminous tubes** used for **area** and **decorative lighting**, and lights used for external illumination of signs, but does not include lights used within **internally illuminated signs**, **luminous tubes** used in neon signs, or seasonal lighting from typical low-output lamps permitted between November 15th and January 15th. For all lamp types, the initial output, as defined by the manufacturer, is the value to be considered. For non-**LED** lights (e.g. **high-pressure sodium**, **low-pressure sodium**, **metal halide**, fluorescent), the initial **lumen** output of the lamp as listed by the lamp manufacturer is used; for **LED** lights, the initial **lumen** output of the fixture as listed by the fixture manufacturer, multiplied by 1.4, is used. For determining compliance with Section 5.2 [**Total Outdoor Light Output**] of this Code, the light from non-**LED** lamps, **LED** fixtures, and **luminous tubes** is to be included in the total output as follows:

A. **outdoor light fixtures** and **luminous tubes installed** on poles (such as parking lot **luminaires**) and light fixtures **installed** on the sides of buildings or other structures, when not shielded from above by the structure itself as defined in parts B, C or D below, are to be included in the **total outdoor light output** by simply adding the initial **lumen** outputs of the lamps and tubes;

B. **outdoor light fixtures** and **luminous tubes installed** under canopies, buildings (including **parking garage** decks), overhangs or roof eaves where all parts of the lamp, tube or **luminaire** are located at least five (5) feet but less than ten (10) feet from the nearest edge of the canopy, building edge or overhang are to be included in the **total outdoor light output** as though they produced only one-quarter (0.25) of the lamp's or tube's rated initial **lumen** output;

C. **outdoor light fixtures** and **luminous tubes installed** under canopies, buildings (including **parking garage** decks), overhangs or roof eaves where all parts of the lamp, tube or **luminaire** are located at least ten (10) feet but less than thirty (30) feet from the nearest edge of the canopy, building edge or overhang are to be included in the **total outdoor light output** as though they produced only one-tenth (0.10) of the lamp's or tube's rated initial **lumen** output.

D. **outdoor light fixtures installed** under canopies, buildings (including **parking garage** decks), overhangs or roof eaves where all parts of the lamp, tube or **luminaire** are located thirty (30) or more feet from the nearest edge of

the canopy, building edge or overhang are not to be included in the **total outdoor light output**. Such lamps must however conform to the lamp source and shielding requirements of Section 5.

- 17.42. **Parking Garage.** A multi-level or covered structure for parking that is open to the outside air. Includes parking facilities under buildings when the area is open to the outside at more locations than just the automobile entries and exits.
- 17.43. **Person.** Any individual, tenant, lessee, owner, or any commercial entity including but not limited to firm, business, partnership, joint venture, or corporation.
- 17.44. **Scotopic to Photopic Ratio.** The ratio of the dark-adapted (scotopic) to light-adapted (photopic) luminous flux of a lamp source. This ratio is determined by the lamp spectrum, and supplied by manufacturer of the lamp. Typical values for several lamp types are shown in Table 17.44.

Table 17.44. Scotopic to Photopic Ratios for Selected Lamps

Lamp type	Scotopic to Photopic Ratio
Low-pressure sodium	0.2
Narrow-spectrum Amber LED	0.2
PC Amber LED	0.4
High-pressure Sodium	0.6

- 17.45. **Searchlight.** A lighting assembly designed to direct the output of a contained lamp in a specific tightly focused direction (a beam) with a reflector located external to the lamp, and with a swiveled or gimballed mount to allow the assembly to be easily redirected. Such lights are used commonly to sweep the sky for advertisement purposes.
- 17.46. **Sign, Externally Illuminated.** A sign illuminated by light sources from the outside.
- 17.47. **Sign, Internally Illuminated.** A sign illuminated by light sources enclosed entirely within the sign cabinet and not directly visible from outside the sign.
- 17.48. **Sign, Multicolor Changeable-Copy LED.** A sign composed of **LEDs** of more than one color and programmable to allow changing displays.
- 17.49. **Sign, Multicolor Fixed-Copy LED.** A sign composed of **LEDs** of more than one color with a fixed (not changeable or programmable) copy display.
- 17.50. **Sign, Neon.** A sign including **luminous tubes** formed into text, symbols or decorative elements and directly visible from outside the sign cabinet.

- 17.51. **Sign, On-Site Advertising.** A sign used primarily to advertise goods or services offered on the same parcel on which the sign is located. Such a sign may include incidental non-advertising information (for example time and temperature; does not include publicly owned signs providing general interest information exclusively (such as road names or highway conditions).
- 17.52. **Sign, Single-Color LED.** A sign composed of single-color **LEDs**, including signs with fixed and changeable copy.
- 17.53. **Sports Class I / II / III / IV.** Level of sports play as defined by the Illuminating Engineering Society of North America. This level is primarily determined by the number and distance of spectators; the higher recommended illumination levels facilitate the spectator's ability to view the action. **Sports Class IV** is the most common level, and is typical of municipal and amateur league and social level sports, with minimal accommodations for spectators, typically including bleachers located close to the field. **Sports Class III** includes increased accommodation for spectators. **Sports Class II** and **Sports Class I** apply to large sports facilities where thousands of spectators may be located hundreds of feet from the field, and television broadcasting may be a consideration.
- 17.54. **Spot Lamp.** A specific form of lamp designed to direct its output in a specific direction (a beam) with a reflector formed from the glass envelope of the lamp itself. Such lamps are so designated by the manufacturers and are often used in residential outdoor area lighting (Figure 17.54).

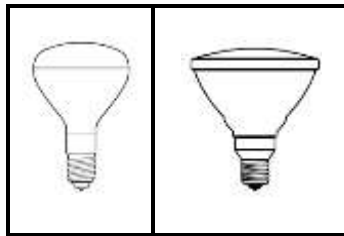
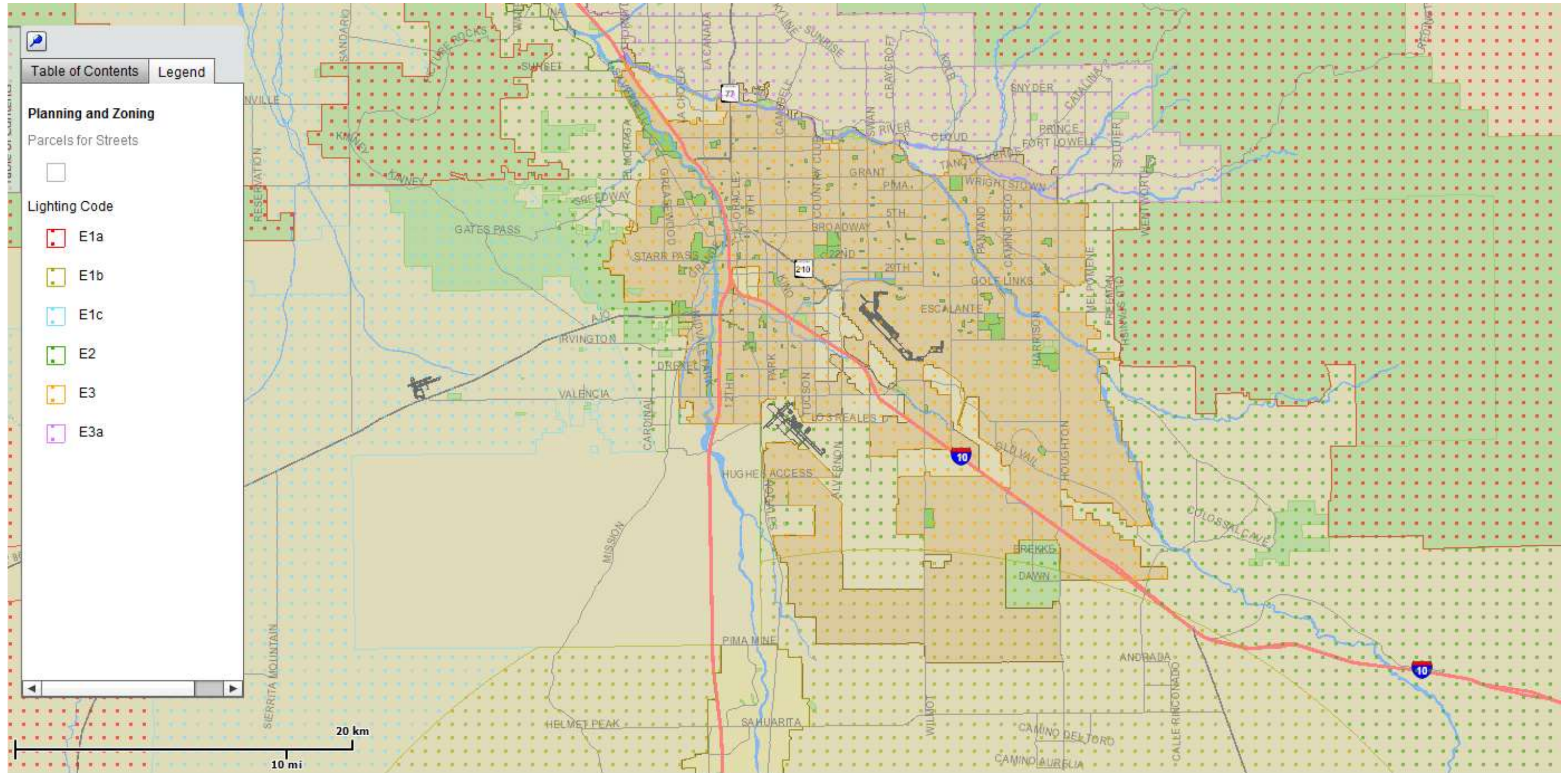


Figure 17.54. **Spot lamps**

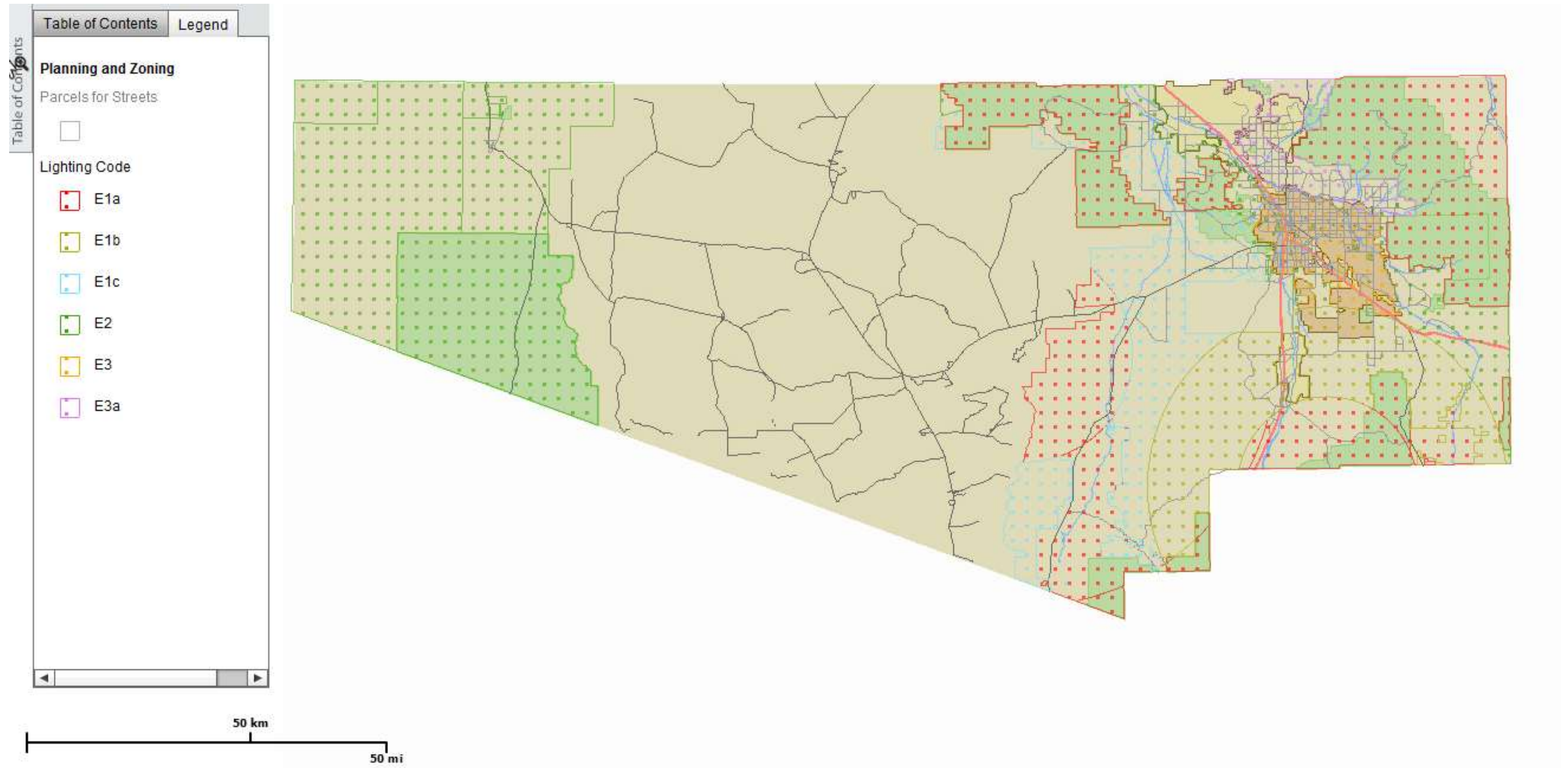
- 17.55. **Temporary Lighting.** Lighting which does not conform to the provisions of this Code and which will not be used for more than one thirty (30) day period within a calendar year, with one thirty (30) day extension. Temporary lighting is intended for uses which by their nature are of limited duration; for example holiday decorations, civic events, or construction projects.
- 17.56. **Unshielded (Light Fixture or Luminous Tube).** A **lighting fixture** or **luminous tube** constructed or installed in such a manner that a fraction of the light emitted by the lamp or tube, either directly from the lamp, tube or a diffusing element, or (in the case of a lamp in a **fixture**) indirectly by reflection

or refraction from any part of a ***luminaire***, is projected above the horizontal (see Figure 17.15b).

Lighting Zone Map [example Tucson]



Lighting Zone Map [example Pima County]



Lighting Zone Map [example Flagstaff]

