



County of Fairfax, Virginia

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Outdoor Lighting Summary of Draft Approach to the Zoning Ordinance Amendment September 3, 2019

The proposed Zoning Ordinance amendment is intended to provide a review and update to the outdoor lighting performance standards currently contained in the Zoning Ordinance. Based on the review and outreach on this topic, staff proposes to add a correlated color temperature standard, address the specific items on the Zoning Ordinance Amendment Work Program, and make additional revisions to improve existing regulations.

Scope and Timeline

As further described below, the proposed amendment is largely limited to the topics included in the Zoning Ordinance Amendment Work Program, but also includes a color temperature standard and other revisions. This amendment is envisioned as the first phase of revisions that could be scheduled for public hearings by the end of 2019 or the beginning of 2020. The next phase will include a rewrite of the outdoor lighting provisions as part of the Zoning Ordinance Modernization (zMOD) project where the text will be edited for clarity and reformatted with new graphics. During outreach, it was recommended by certain members of the work group that the County consider adopting an entirely new outdoor lighting ordinance based on the model lighting ordinance of the International Dark Sky Association. Staff does not recommend moving forward with a new lighting ordinance at this time, but it could be considered as a separate amendment topic as part of Phase II of the zMOD project at the discretion of the Board.

Background and Current Zoning Ordinance Provisions

The Zoning Ordinance Amendment Work Program calls for consideration of revisions to the lighting standards contained in Part 9 of Article 14 pertaining to:

- Architectural Review Board (ARB) review of sports illumination plans
- Outdoor sports facilities
- Motion-activated security lighting exemptions
- Single family residential exemptions

In addition, staff recommends adding a maximum correlated color temperature, similar to that recently adopted with the Public Facilities Manual (PFM). Other than color temperature, the topics that appear on the Work Program as needed minor revisions are based on recommendations by the Environmental Quality Advisory Committee (EQAC).



The current Zoning Ordinance performance standards for outdoor lighting were adopted in 2003 and represented a comprehensive update to the prior regulations that had been in effect since 1978. The 1978 regulations had focused on light trespass by limiting the illumination at a property line for a residential district to 0.5 footcandles; however, this standard was found to be inadequate in addressing glare. The 2003 rewrite deleted the light trespass standard and added the requirement for full cut-off fixtures that are mounted horizontal to the ground for most outdoor lighting, with certain exemptions. This was intended to address the impacts of glare due to poorly designed lighting. The current standards also address height and location for lighting fixtures, dimming of nonresidential parking lot lights after the close of business, photometric plans for certain commercial uses, and sports illumination plans.

Staff's Proposed Approach to the Amendment

Currently Proposed Revisions:

Correlated Color Temperature:

Consistent with the recently adopted PFM amendment for street lights and the recommendations of the International Dark Sky Association (IDA) and the American Medical Association, staff recommends adding a maximum color temperature of 3,000K (Kelvin). This would apply to all light fixtures, including residential, with an exception for sports fields and courts of up to 5,700K, consistent with recent Fairfax County Park Authority installations and IDA recommendations. A maximum of 3,000K, which is slightly higher than the color temperature of an incandescent bulb at approximately 2,600K, would reduce energy usage, glare, and impacts on human health and wildlife, as compared to higher color temperatures. Among other impacts, the "whiter" lighting associated with higher color temperatures can result in harsh glare, potentially damaging the eye and affecting safety, and can impact human circadian rhythm.

Exemptions for Single Family Dwellings:

On lots developed with single family dwellings, lighting that does not exceed 2,000 lumens (approximately equivalent to a 100 watt incandescent bulb) is exempt from the requirements of Par. 2 of Sect. 14-902, which includes the requirements for fixtures to be full cut-off and mounted horizontal to the ground, for spotlighting of landscaping or other features to be shielded and aimed toward the object intended, and the locational or shielding requirements for lights abutting residential. There is no limit to the number, location, or orientation of lights that are under 2,000 lumens, sometimes resulting in unwanted glare and excessive lighting. For lighting to be exempt, it is recommended that the maximum initial light output be reduced to 1,500 lumens, similar to a 75 watt light bulb. In addition, the exemption should be revised to only apply to Paragraphs 2A and 2E of Sect. 14-902, which include the requirement for lights to be full cut-off and mounted horizontal to the ground and the locational/shielding provisions. Compliance with other requirements, such as directing spotlights toward the flag or landscaping intended to be illuminated and the new color temperature standard should also apply.

Exemptions for Motion-activated Security Lights:

Currently, motion-activated lights on lots developed with single family dwellings are exempt from all requirements (except they may not cause disability glare) if: a) the fixtures are limited to 6,000 lumens, b) turn off within five minutes of the motion ceasing, and c) are aimed so that the bulb is not visible at five feet above the property line. Staff believes that 6,000 lumens, which is the average light output of a 300 watt bulb or a pair of 150 watt bulbs, is too high. A more reasonable limit may be a maximum of 4,000 lumens per fixture, which is the equivalent of one 200 watt bulb or two 100 watt bulbs.¹ This would provide adequate illumination for security lighting. The standard that the bulb is not visible at five feet above the property line does not allow for security lighting in many circumstances and may still result in unwanted glare. The amendment proposes to replace this with a general standard that the light be aimed and directed within the property.

On lots developed with uses other than single family dwellings, the current standard for exemptions that the bulb is not visible at five feet above the property line is recommended to be replaced with the requirement for the illumination to be directed within the property.

Sports Illumination Plans (SIP):

Hours for Residential Outdoor Playing Field/Court Lighting:

Concerns have been raised that 11:00 p.m. may be too late to allow lighted outdoor playing fields or courts on residentially zoned and developed properties. It is recommended that the hours be revised to 10:00 p.m. to better conform to the hours specified in the Noise Ordinance. This revision would apply to private outdoor facilities, and would not affect Park Authority fields or community fields sponsored by youth organizations such as the Southwestern Youth Association (SYA).

Perimeter Areas for Sports Illumination Plans:

The Zoning Ordinance requires a SIP to include the location and limits of the playing field or court and a perimeter area. The size of the perimeter area is based on the type of field. Revisions to the perimeter areas are proposed based on the recommendations of the FCPA, and to clarify that the perimeter area must be located on the subject property.

ARB Review of Sports Illumination Plans:

The ARB currently reviews SIPs as part of zoning applications and site plan submissions for properties located within a Historic Overlay District. However, in cases where a SIP is a stand-alone submission, the ARB is not given the opportunity for review. As lighting is an important component of review, staff recommends that all SIPs within a Historic Overlay District be referred to the ARB.

¹ The amendment would be advertised with a range of 3,000 to 6,000 lumens.

zMOD Revisions and Timeline:

The timeline for the preparation of the draft standards as part of the zMOD project overlaps with the work on this amendment, but the earliest adoption of the new Zoning Ordinance with zMOD is not anticipated until summer of 2020 and will have a delayed effective date. Therefore, bringing forward the first phase of the proposed outdoor lighting amendment for the Board's consideration would allow for the color temperature and other revisions to become effective sooner. The revisions to the outdoor lighting standards with zMOD will include reorganizing, reformatting, and editing all text for understandability ("plain English"), new and integrated graphics, and may include other minor revisions. All substantive revisions that are proposed with zMOD will be highlighted as part of that process.

Potential Future Revisions:

Photometric Plans:

Although not included in the draft text, staff recommends future consideration of adding maximum lighting levels for other additional uses. Currently, a photometric plan is required to be submitted for lighting associated with service stations, service station/mini-marts, and vehicle sale, rental and ancillary service establishments to demonstrate that the maintained lighting level does not exceed 30 footcandles. Other uses, such as drive-throughs, may also have excess illumination.

Model Lighting Ordinance:

The IDA and the Illuminating Engineering Society prepared a model lighting ordinance (MLO) in 2011. As with the County's current requirements, the MLO requires the use of shielded light fixtures to direct light downward. The MLO also addresses light pollution by establishing the maximum allowed lumens for residential light fixtures according to type, and total site lumens for nonresidential uses. The standards for allowed lumens and BUG (backlight, uplight, glare) ratings for fixtures vary according to lighting overlay zones. Staff does not recommend a comprehensive amendment of the lighting performance standards at this time, and based on our research, it does not appear that nearby counties have adopted lighting regulations based on the MLO. Furthermore, the proposed revisions outlined above would serve to further reduce unwanted lighting; however, as lighting continues to change in terms of technology, it is appropriate to conduct a periodic review, to include the possible adoption of limits on lighting levels as included in the MLO.

Private Streets:

During research on the amendment, a concern was identified that there are no standards to prevent excessive lighting on private streets. The lights are required to be full cut-off, mounted horizontal, and have a maximum height of 40 feet, but the Zoning Ordinance does not provide further guidance on the design of the fixtures, nor are they subject to the Public Facilities Manual (PFM). Staff with DPWES have received complaints from residents due to excessive lighting and lights directed in windows which could be resolved with appropriate location and shielding of the fixtures. Staff recommends considering requiring private streets to be subject to the light

source and light level requirements of public streets. Section 7-0804.2 of the PFM (Street Light Source) requires installation of LEDs unless otherwise approved by the Director of Land Development Services (LDS), and Section 7-0804.3 of the PFM (Light Level Requirements) references the design standards for lighting levels.

Draft Text for Discussion Purposes

1. **New Correlated Color Temperature (new Par. 4 of Sect. 14-902):**
Unless otherwise approved by the Director, all light sources must have a maximum Correlated Color Temperature (CCT) of 3,000K, except sports fields or courts that are subject to a sports illumination plan may have a maximum CCT of 5,700K.
2. **Exemptions for Single Family Dwellings (Par. 6 of Sect. 14-905):**
On lots developed with single family dwellings, outdoor lighting fixtures with initial light outputs of ~~2000~~ 1,500 lumens or less ~~shall~~ are not be subject to the provisions of Paragraphs 2A and 2E of Sect. 902 above.
3. **Exemptions for Motion-activated Security Lights (Par. 5 of Sect. 14-905):**
Motion activated light fixtures, which for this purpose includes single or multiple heads, located as follows:
 - A. On lots developed with single family dwellings, when such lighting fixtures: (1) emit initial cumulative lighting levels of ~~6000~~ 4000 lumens or less [advertise a range of 3000 to 6000 lumens]; (2) are extinguished within five (5) minutes upon cessation of motion; and (3) are aimed such that the illumination is directed within lamp or light bulb portion of the lighting fixture is not visible at five (5) feet above the property boundary.
 - B. On all other lots when such lighting fixtures are aimed such that the illumination is directed within lamp or light bulb portion of the lighting fixture is not directly visible at five (5) feet above the property boundary.
4. **Sports Illumination Plans:**
 - a. **Hours for Residential Outdoor Playing Field/Court Lighting (Par. 5 of Sect. 14-904):**
The use of outdoor playing field/court lighting ~~shall~~ is not be permitted between the hours of 10:00 PM and 7:00 AM on properties zoned and developed with a residential use, or 11:00 PM and 7:00 AM on all other properties, unless other hours are specifically approved by the BZA in conjunction with the approval of a special permit, or by the Board in conjunction with the approval of a special exception development plan or proffered rezoning.
 - b. **Perimeter Areas (Par. 2B of Sect. 14-904):**
Location and limits of playing fields/courts, to include a perimeter area which must be located entirely on the same lot. For baseball/softball fields, the perimeter area ~~shall~~ extends thirty (30) 40 feet in a direction perpendicular to the foul lines and away from the field. The perimeter area for rectangular playing fields, such as soccer, football, lacrosse, and field hockey, ~~shall~~ extends twenty (20) feet from the side lines and ~~thirty (30)~~ feet from the end lines. The perimeter area for tee boxes on golf courses and golf driving

ranges is 30 feet. The perimeter area for all other playing fields/courts shall extend ~~ten~~ ten (10) feet beyond the playing field/court boundary.

c. ARB Review (Paragraphs 1 and 2 of Sect. 7-204):

All applications for rezoning, special exception, special permit, variance, sign permits, building permits, as qualified below, and all site plans, sports illumination plans, subdivision plats, grading plans, and applications for any new utility distribution or transmission poles 50-feet or lower in height (“new utility or transmission poles”) and their associated facilities, as qualified below, must be referred to the ARB for its review and recommendation or decision in accordance with the provisions of this Part.

The ARB review and recommendation on applications for a rezoning, special exception, special permit, variance and for site plans, sports illumination plans, subdivision plats and grading plans shall include consideration of the potential impact of the proposal on the historical, architectural, or archaeological significance of the district and, but not limited to, the following:

8. Lumen Definition

A quantitative unit measuring the amount of light emitted from a light source. For the purpose of this Ordinance, when a light fixture contains two or more light bulbs (lamps), the lumen output measurement represents the cumulative total of all light emitted from the fixture.