

STAFF REPORT  
Town of Knightdale

To: Mayor & Town Council	Budget Amendment - #BA
From: Jeff Triezenberg, AICP, GISP; Senior Planner	Planning Director Signature – CAH
Subject: ZTA-9-13, Lighting Ordinance	
Date: November 20, 2013	Town Manager Signature –

**REPORT**

SEE ATTACHED

**REPORT RECOMMENDED ACTION**

Motion to adopt statement of plan consistency and reasonableness of action,  
to approve ZTA-9-13, and adopt ORD# 13-11-20-002.



# TOWN OF KNIGHTDALE

## PLANNING DEPARTMENT

[www.knightdalenc.gov](http://www.knightdalenc.gov)

950 Steeple Square Court  
Knightdale, NC 27545  
(v) 919.217.2241  
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## ZONING TEXT AMENDMENT ZTA-9-13

### Lighting Ordinance

### REPORT TO THE TOWN COUNCIL

Prepared by the Knightdale Planning Department

PUBLIC HEARING: November 4, 2013

LURB MEETING: November 12, 2013

COUNCIL MEETING: November 20, 2013

### I. REQUEST AND BACKGROUND

Application requesting a Zoning Text Amendment to amend Chapter 11 (Lighting) of the Unified Development Ordinance with revised regulations that define practical and effective measures by which the obtrusive aspects of outdoor light usage may be reduced while preserving safety, security, and the nighttime use and enjoyment of property; new standards for LED lighting; technical edits for consistency of language and referencing; clarifications of intent and interpretation; further definition of broad terms; addition of exemplary graphics and photos; and the removal of redundant text. The application includes the amendment of other remaining chapters of the Unified Development Ordinance that may be affected by the proposed amendments to Chapter 11; such as updating code section references and locations; the ordinance table of contents, index and use matrix; as well as adding/amending definitions in Chapter 19 for consistency. The applicant is identified as the Town of Knightdale Land Use Administrator. The specific text amendments as applied for are as follows:

*(See Attachment for full text of Chapter 11)*

#### 19.3 Definitions of Terms

**BUG (Backlight, Uplight and Glare) Rating:** A luminaire classification system that classifies backlight (B), uplight (U) and glare (G) ratings to evaluate luminaire optical performance related to light trespass, sky glow and high angle brightness control.

**Ballast:** A device used with an electric-discharge lamp to obtain the necessary circuit conditions (voltage, current and waveform) for starting and operating.

**Candela:** The metric unit luminous intensity (that is, power emitted by a light source in a particular direction, with wavelengths weighted by the luminosity function, a standardized model of the sensitivity of the human eye).

**Footcandles, Horizontal:** A quantity of illumination (footcandles) at a given point that is measured or calculated at a specific height in a plane parallel to the line of sight when looking at the brightest light source in the field of view.

**Footcandles, Vertical:** A quantity of illumination (footcandles) at a given point that is measured or calculated at a specified height in a plane perpendicular to the line of sight when looking at the brightest light source in the field of view.

**Fully Shielded:** A light fixture constructed, installed and maintained in such a manner that all light emitted from the fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the fixture, is projected below the horizontal plane through the fixture's lowest light emitting part.

**Glare:** ~~Light emitting from a luminaire with intensity great enough to reduce a viewer's ability to see, and in extreme cases causing momentary blindness.~~ The effect produced by a light source within the visual field that is sufficiently brighter than the level to which the eyes are adapted, to cause annoyance, discomfort or loss of visual performance and ability.

**Illuminance:** The amount of light (luminous flux incident) at a point on a surface (measured in lux or footcandles).

**Light Spillage Trespass:** The portion of light from a luminaire that illuminates areas beyond the boundaries of the property on which the luminaire is located and measures above the permissible level regulated at the boundary line.

**Low Luminosity Lighting:** Lighting fixtures whose lumen output does not exceed 2,000 lumens.

**Low Voltage Lighting:** Lighting systems powered through a transformer such as a cable conductor that lowers the voltage supplied to the luminaires to 25 volts or less.

**Lux:** A unit of illuminance. One (1) lux equals one (1) lumen per square meter. One (1) footcandle equals 10.76 lux (often rounded to 10 lux for ease of use).

**Nadir:** The point directly below the luminaire.

**Post-Mounted Fixtures:** Fixtures that are mounted on a post (typically an 18 foot mounting height or less) and decorative in style and appearance for the enhancement of the pedestrian experience.

**Seasonal Lighting:** Holiday/temporary lighting displays that are utilized less than a total of 60 days in any one year.

**Shield:** A device that is attached onto a fixture or inserted into a luminaire to alter the direction of light being emitted.

**Uplight:** The portion of luminous flux (light) from a luminaire emitted at angles above the horizontal.

## **II. JUSTIFICATION**

In 2012, the Town completed a comprehensive update of the 2005 Unified Development Ordinance. During that process, it was determined that the Town should hold off on updating Chapter 11: Lighting in order to have more time to evaluate the recent release of the "Model Lighting Ordinance" endorsed by the International Dark-Sky Association and the Illuminating Engineering Society of North America.

Since that time, Town staff have researched the Model Lighting Ordinance (MLO) and its many critics and supporters. Perhaps the most telling critique of the MLO was published in the April/May 2012 issue of *LEDs Magazine*. In that article, the authors, Wendy Norman and Michael Smolyansky, note that the two (2) light performance methods within the MLO yield a 25-40% difference in total lumen output for the same sample site. While one method is better at controlling the total lumens used on a site, it does not effectively control light trespass. Meanwhile, the second method is much more effective at controlling light trespass, but may result in either a site being too bright or not bright enough.

Consequently, Town staff has decided to keep the area illumination tables that the UDO currently employs as the method for controlling the total lumens on the site and maintaining and enhancing the methods by which the Town may regulate light trespass and glare, such as requiring full cutoff or fully shielded fixtures. However, in order to more effectively address LED lighting fixtures, this Chapter revision incorporates necessary elements of the BUG rating system (the system by which all LED lights are rated), and attempts to put forth lumen equivalents as LED lights are measured by the lumens delivered at the lit surface (initial delivered lumens) versus other lights which are measured by the lumens put out at the lamp or lamp lens (source lumens). Since there is no direct method of comparing the two lumen measurements, Town staff has relied on testing results from Duke Energy Progress that have determined which LED street light fixtures are most appropriate for the replacement of existing HPS (high pressure sodium) light fixtures.

Other sources consulted during the drafting of this Chapter revision include:

- *Guidelines for Good Exterior Lighting Plans*, The Dark Sky Society; 2009.
- *Recommended Lighting Levels for Exterior Lighting – Information Sheet 77*, International Dark-Sky Association; 1998.
- *LED Street Lighting: A Handbook for Small Communities*, American Public Power Association; 2013.
- *Pattern Outdoor Lighting Code (USA), v 2.0*; Christian B. Luginbuhl, U.S. Naval Observatory; 2010.
- *Municipal Outdoor Lighting Policy and Guidelines*, Town of Concord, Massachusetts; 2002.
- *Classifying Outdoor Luminaires: The Limits of BUG*; Ian Ashdown, PE, EIFS; Lighting Analysts, Inc.; 2012.
- *Municipal Code*, City of Medford, Oregon; 2013.
- *Municipal Code*, Village of Lombard, Illinois; 2013.
- *Municipal Code – Ordinance No. 4148*, City of Asheville, North Carolina; 2012.
- *Municipal Code – Ordinance #10963*, City of Tucson/Pima County, Arizona; 2012.
- *Municipal Code – Draft Chapter 39*, City of Las Cruces, New Mexico; 2011.
- *Municipal Code*, Town of Eagle, Colorado; 2012.
- *Municipal Code*, City of Flagstaff, Arizona; 2013.

### **III. PLANNING & ENGINEERING SUBCOMMITTEE**

The goals and objectives of this Chapter revision were discussed with the Subcommittee at their regular meeting of April 8, 2013, during which staff was directed by the attending membership to bring an amendment forward to the full Town Council for consideration that addressed the following:

- Reduction of glare;
- Control of trespass onto adjacent property;
- Reduction of lighting levels, including signs, when not necessary;
- Balance between the number of light poles and the permitted height of light poles;
- Control of the color temperature of white LED lights; and
- Reduction of the amount of uplight and sky glow.

### **IV. PUBLIC HEARING SUMMARY**

No one from the general public spoke on this matter. Following his presentation, Mr. Triezenberg confirmed for Council members that the new ordinance required LED fixtures for street lighting and that the maximum mounting height for pedestrian lighting remains at 18 feet.

### **V. LURB MEETING SUMMARY**

No one from the general public spoke on this matter. Apart from a couple of clarification questions, and grammatical fixes, the LURB did not propose any substantive changes.

## **VI. WRITTEN STATEMENT REGARDING CONSISTENCY WITH THE COMPREHENSIVE PLAN**

North Carolina General Statute 160A-383 requires the planning board to provide a written advisory statement and recommendation to the governing board that addresses plan consistency and other matters as deemed appropriate by the planning board.

On a unanimous vote, the LURB recommended approval of ZTA-9-13 to the Town Council based on the following advisory statement.

### ***WRITTEN ADVISORY STATEMENT FROM LURB:***

The proposed zoning text changes are reasonable in that they promote the objective of preserving the natural environment and encouraging conscientious development in regards to it by limiting upright and excessive glare from outdoor lighting while also ensuring minimum light levels that help sustain the additional objective of maintaining a high level of public safety and welfare and encouraging and/or requiring the use of new LED technology that helps to further the objective of maximizing fiscal efficiency. For the same reasons, the proposed changes are also consistent with the Comprehensive Plan's stated goal of providing balanced and responsible urban design, planning and development and protection of the Town's natural resources.

## **VII. CONSISTENCY WITH THE COMPREHENSIVE PLAN**

North Carolina General Statute 160A-383 requires that **prior to** adoption or rejecting any zoning amendment, the governing board shall adopt a statement describing whether its action is consistent with an adopted comprehensive plan and explaining why the board considers the action to be reasonable and in the public interest.

### ***PROPOSED STATEMENT REGARDING PLAN CONSISTENCY AND REASONABLENESS OF ACTION:***

The proposed zoning text changes are reasonable in that they promote the objective of preserving the natural environment and encouraging conscientious development in regards to it by limiting upright and excessive glare from outdoor lighting while also ensuring minimum light levels that help sustain the additional objective of maintaining a high level of public safety and welfare and encouraging and/or requiring the use of new LED technology that helps to further the objective of maximizing fiscal efficiency. For the same reasons, the proposed changes are also consistent with the Comprehensive Plan's stated goal of providing balanced and responsible urban design, planning and development and protection of the Town's natural resources.

## **VIII. PLANNING DEPARTMENT RECOMMENDATION**

The Planning Department recommends that the Town Council adopt the preceding statement identified in Section VII of this report, approve ZTA-9-13 and adopt ORD# 13-11-20-002.



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**ORD #13-11-20-002**  
**AN ORDINANCE TO AMEND THE UNIFIED DEVELOPMENT ORDINANCE**  
**OF THE TOWN OF KNIGHTDALE,**  
**REGARDING REVISIONS AND UPDATES TO THE RULES AND REGULATIONS FOR OUTDOOR**  
**LIGHTING**

WHEREAS, the Town of Knightdale has received a petition to amend Chapter 11 (Lighting) of the Unified Development Ordinance with revised regulations that define practical and effective measures by which the obtrusive aspects of outdoor light usage may be reduced while preserving safety, security, and the nighttime use and enjoyment of property; new standards for LED lighting; technical edits for consistency of language and referencing; clarifications of intent and interpretation; further definition of broad terms; addition of exemplary graphics and photos; and the removal of redundant text; and

WHEREAS, the application includes the amendment of other remaining chapters of the Unified Development Ordinance that may be affected by the proposed amendments to Chapter 11; such as updating code section references and locations; the ordinance table of contents, index and use matrix; as well as adding/amending definitions in Chapter 19 for consistency; and

WHEREAS, the Town of Knightdale Unified Development Ordinance Section 15.6B establishes uniform procedures for amending the text of the Ordinance;

WHEREAS, the proposed zoning text changes are reasonable in that they promote the objective of preserving the natural environment and encouraging conscientious development in regards to it by limiting upright and excessive glare from outdoor lighting while also ensuring minimum light levels that help sustain the additional objective of maintaining a high level of public safety and welfare and encouraging and/or requiring the use of new LED technology that helps to further the objective of maximizing fiscal efficiency; and

WHEREAS, the proposed zoning text changes are also consistent with the Comprehensive Plan's stated goal of providing balanced and responsible urban design, planning and development and protection of the Town's natural resources;

NOW, THEREFORE BE IT ORDAINED by the Town Council of the Town of Knightdale, North Carolina:

SECTION 1. That the Unified Development Ordinance of the Town of Knightdale Code be amended to read as follows *{editing notes in bracketed italics}*:

**Chapter 11. Lighting** *{See Attachment for full text of Chapter 11}*

### 19.3 Definitions of Terms

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SECTION 2. That all laws and clauses of law in conflict herewith are hereby repealed to the extent of said conflict.

SECTION 3. That if this ordinance or application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions of this ordinance which can be given separate effect and to the end the provisions of this ordinance are declared to be severable.

SECTION 4. That this ordinance has been adopted following a duly advertised public hearing of the Town Council and following review and recommendation by the Land Use Review Board.

SECTION 5. That this ordinance shall be enforced as provided in G.S. 160A-175 or as provided for in the Knightdale Town Code.

SECTION 6. That this ordinance shall become effective upon its adoption by Town Council.

Adopted this 20<sup>th</sup> day of November, 2013.

ATTEST:

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Russell B. Killen, Mayor

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Suzanne M. Yeatts, Town Clerk

APPROVED AS TO FORM:

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Clyde Holt, III; Town Attorney