

FORSYTHCOUNTY
BOARD OF COMMISSIONERS

MEETING DATE: February 14, 2019 **AGENDA ITEM NUMBER:** 1 A&B

SUBJECT:-

- A. Public Hearing on Zoning Text Amendment Proposed by Planning and Development Services to Amend Chapters A and B of the *Unified Development Ordinances* (UDO) to Change the Standards for Outdoor Lighting (UDO-286)
- B. Ordinance Revising Chapters A and B of the Unified Development Ordinances to Change the Standards for Outdoor Lighting

COUNTYMANAGER'S RECOMMENDATION OR COMMENTS:-

SUMMARY OF INFORMATION:-

See attached staff report

After consideration, the Planning Board recommended approval of the zoning text amendment.

ATTACHMENTS:- X YES NO

SIGNATURE: _____ **DATE:** February 12, 2019

UDO-286
AN ORDINANCE AMENDMENT PROPOSED BY
PLANNING AND DEVELOPMENT SERVICES STAFF REVISING
CHAPTERS A AND B OF THE *UNIFIED DEVELOPMENT ORDINANCES*
TO CHANGE THE STANDARDS FOR OUTDOOR LIGHTING

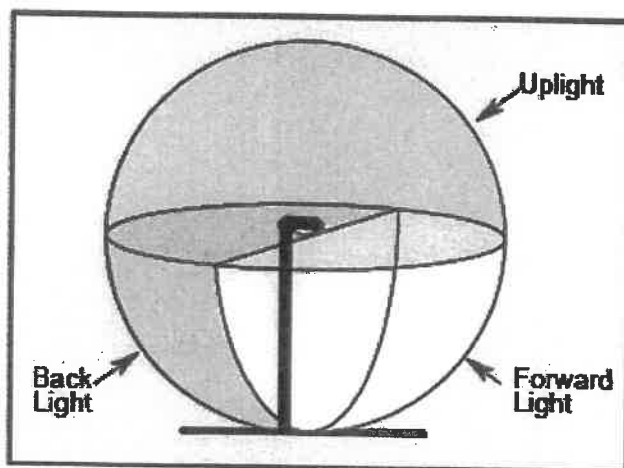
Be it ordained by the Board of Commissioners of Forsyth County, North Carolina, that the *Unified Development Ordinances (UDO)* is hereby amended as follows:

Section 1. Chapter A – Definitions Ordinance, Article II – Definitions, is amended as follows:

Chapter A

Article II – Definitions

Backlight. For an exterior light fixture, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the fixture. For fixtures with symmetric distribution, backlight will be the same as front or forward light.



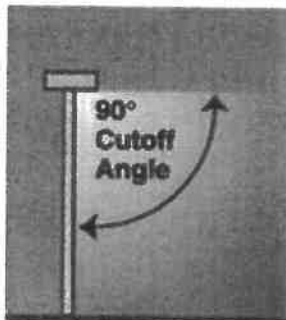
a diagram showing backlight, uplight, and forward light [to be included in UDO]

BUG. A light fixture classification system used by the lighting industry that rates a fixture's backlight (B), uplight (U) and glare (G).

Candela. A measure of light intensity which is useful in determining how much light is shining out of a fixture and in what direction.

Footcandle. The unit of measure 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.

Full Cutoff. A light fixture classification where no light intensity is emitted at or above a horizontal plane drawn through the bottom of the fixture and no more than 10% of the lamp's light intensity is emitted at or above an angle 10 degrees below that horizontal plane.



a diagram showing a full cutoff light fixture [to be included in UDO]

Glare. Light entering the eye directly from lighting fixtures or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

Temporary Lighting. Lighting installed and operated for periods not to exceed 60 days, completely removed and not operated again for at least 30 days.

Uplight. For an exterior light fixture, lumens emitted at or above the horizontal plane.

Section 2. Chapter B - Zoning Ordinance, Article III – Other Development Standards, is amended as follows:

Article III - Other Development Standards

3-11 - OTHER STANDARDS

3-11.1 - LIGHTING

~~Where a buffer yard is required pursuant to Section B.3-5, outdoor lighting shall be so shielded and oriented as to cast no direct light onto adjacent property.~~

(A) Applicability:

- (1) The standards of this section shall apply to lighting for principal buildings submitted for permitting after [the adoption date of this ordinance] on zoning lots that are adjacent to a public street or to residential zoning, or lighting for outdoor recreation uses and stadiums as described in Section 3-11.1 (C).
- (2) This Section shall not apply to:
 - (a) The uses Residential Building, Single Family; Residential Building, Duplex; Residential Building, Twin Home; and Residential Building, Townhouse;
 - (b) Street lights in the public right-of-way;
 - (c) Airport runway and aviation safety lights required by the FAA; or
 - (d) Temporary Lighting.
- (3) Where these standards conflict with the standards of the H (Historic) or HO (Historic Overlay) zoning districts, the standards for those districts shall take precedence.

NOTE: Items to be deleted are indicated with a ~~strikeout~~; items to be added are indicated with an underscore.
UDO-286 July 2018

(B) General Requirements

(1) Lighting Plan.

- (a) A lighting plan prepared by a Lighting Certified (LC) lighting professional or a professional engineer licensed in the state of North Carolina shall demonstrate that all exterior lighting is designed, located, and installed in such a manner that light levels measured at the residential property line and the public right-of-way do not exceed one-half (½) footcandle.
 - i. Light Level Measurement... Light levels are specified, calculated, and measured in footcandles. All values are initial footcandles. Measurements shall be made at ground level with the light-registering portion of the meter held horizontally pointing up.
 - (b) Prior to the issuance of a certificate of occupancy, the Lighting Certified (LC) lighting professional or professional engineer shall certify in writing that the lighting was installed per the approved plans.
- (2) Parking lot lighting shall utilize fixtures certified as a Full Cutoff or LED BUG-rated fixtures with an Uplight Rating of U0 and a maximum Glare Rating of G3.
 - (3) Lights mounted on poles shall have a maximum pole height of thirty (30) feet and shall not be mounted greater than thirty two (32) feet above grade including any base and/or mounting structure.
 - (4) Non-shielded wall packs and high-intensity light beams, such as outdoor searchlights, lasers, or strobe lights, are prohibited.
 - (5) Routine maintenance of existing lighting, including changing the lamp, ballast, starter, photo control, fixture housing, lens, and other required components, is allowed for all existing fixtures. A lighting plan is not required for such changes.

(C) Lighting for Outdoor Recreation Uses and Stadiums....

- (1) In addition to the standards above, the following shall apply to:
 - (a) The uses: Fishing, Fee Charged; Golf Driving Range; Recreation Services, Outdoor Recreation Facility, Public; and Stadium, Coliseum, or Exhibition Building, as well as new accessory athletic fields and courts submitted for permitting after [the adoption date of this ordinance];
 - (b) Lighting added to existing outdoor recreation uses, stadiums, and accessory athletic fields and courts that did not have lighting before [the adoption date of this ordinance].
- (2) Fixtures shall be fitted with the manufacturer's glare control package. If the manufacturer does not have a glare control package, the fixture specification shall be changed to a manufacturer that offers a glare control package.
- (3) Fixtures shall be designed with a sharp cutoff and aimed so that their beams fall within the primary playing area and immediate surroundings, so that off-site direct illumination and glare are significantly restricted.
- (4) The maximum pole height for a new outdoor recreation lighting source shall be eighty (80) feet unless approved by the Planning Board after being determined that the lighting will have no significant adverse effect on surrounding property. Existing poles for outdoor recreation lighting sources with a height greater than eighty (80) feet may be used for new lighting if approved by the Planning Board through the site plan review process (Planning Board Review) after being determined that the lighting will have no significant adverse effect on surrounding property.
- (5) The lighting plan shall demonstrate that the max candela per fixture does not exceed 7,500 candela at a distance of 150 feet from the edge of the playing field.

- (6) Except as otherwise approved by the Planning Board as set forth in subsection (4) above, new lighting fixtures for existing outdoor recreation uses, stadiums, and accessory athletic fields and courts installed after [the adoption date of this ordinance] shall follow the standards above only if they change from conventional lighting fixtures to LED fixtures.

Section 3. This ordinance shall be effective upon adoption.

UDO-286
AN ORDINANCE AMENDMENT PROPOSED BY
PLANNING AND DEVELOPMENT SERVICES STAFF REVISING
CHAPTERS A AND B OF THE *UNIFIED DEVELOPMENT ORDINANCES*
TO CHANGE THE STANDARDS FOR OUTDOOR LIGHTING

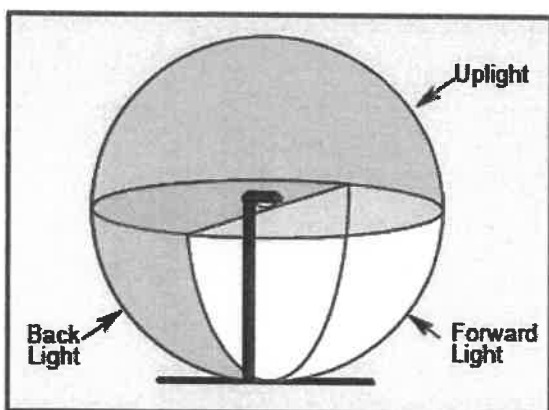
Be it ordained by the _____ that the *Unified Development Ordinances (UDO)* is hereby amended as follows:

Section 1. Chapter A – Definitions Ordinance, Article II – Definitions, is amended as follows:

Chapter A

Article II – Definitions

Backlight. For an exterior light fixture, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the fixture. For fixtures with symmetric distribution, backlight will be the same as front or forward light.



a diagram showing backlight, uplight, and forward light [to be included in UDO]

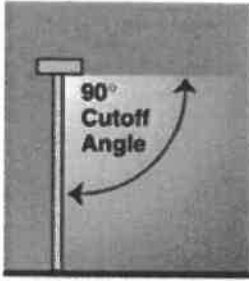
BUG. A light fixture classification system used by the lighting industry that rates a fixture's backlight (B), uplight (U) and glare (G).

Candela. A measure of light intensity which is useful in determining how much light is shining out of a fixture and in what direction.

Footcandle. The unit of measure 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.

NOTE: Items to be deleted are indicated with a ~~strikeout~~; items to be added are indicated with an underscore.
 UDO-286 July 2018

Full Cutoff. A light fixture classification where no light intensity is emitted at or above a horizontal plane drawn through the bottom of the fixture and no more than 10% of the lamp's light intensity is emitted at or above an angle 10 degrees below that horizontal plane.



a diagram showing a full cutoff light fixture [to be included in UDO]

Glare. Light entering the eye directly from lighting fixtures or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

Temporary Lighting. Lighting installed and operated for periods not to exceed 60 days, completely removed and not operated again for at least 30 days.

Uplight. For an exterior light fixture, lumens emitted at or above the horizontal plane.

Section 2. Chapter B - Zoning Ordinance, Article III – Other Development Standards, is amended as follows:

Article III - Other Development Standards

3-11 - OTHER STANDARDS

3-11.1 - LIGHTING

~~Where a bufferyard is required pursuant to Section B.3-5, outdoor lighting shall be so shielded and oriented as to cast no direct light onto adjacent property.~~

(A) Applicability:

- (1) The standards of this section shall apply to lighting for principal buildings submitted for permitting after [the adoption date of this ordinance] on zoning lots that are adjacent to a public street or to residential zoning, or lighting for outdoor recreation uses and stadiums as described in Section 3-11.1 (C).
- (2) This Section shall not apply to:
 - (a) The uses Residential Building, Single Family; Residential Building, Duplex; Residential Building, Twin Home; and Residential Building, Townhouse;
 - (b) Street lights in the public right-of-way;
 - (c) Airport runway and aviation safety lights required by the FAA; or
 - (d) Temporary Lighting.
- (3) Where these standards conflict with the standards of the H (Historic) or HO (Historic Overlay) zoning districts, the standards for those districts shall take precedence.

NOTE: Items to be deleted are indicated with a ~~strikeout~~; items to be added are indicated with an underscore.
UDO-286 July 2018

(B) General Requirements

(1) Lighting Plan.

- (a) A lighting plan prepared by a Lighting Certified (LC) lighting professional or a professional engineer licensed in the state of North Carolina shall demonstrate that all exterior lighting is designed, located, and installed in such a manner that light levels measured at the residential property line and the public right-of-way do not exceed one-half (½) footcandle.
 - i. Light Level Measurement... Light levels are specified, calculated, and measured in footcandles. All values are initial footcandles. Measurements shall be made at ground level with the light-registering portion of the meter held horizontally pointing up.
 - (b) Prior to the issuance of a certificate of occupancy, the Lighting Certified (LC) lighting professional or professional engineer shall certify in writing that the lighting was installed per the approved plans.
- (2) Parking lot lighting shall utilize fixtures certified as a Full Cutoff or LED BUG-rated fixtures with an Uplight Rating of U0 and a maximum Glare Rating of G3.
 - (3) Lights mounted on poles shall have a maximum pole height of thirty (30) feet and shall not be mounted greater than thirty two (32) feet above grade including any base and/or mounting structure.
 - (4) Non-shielded wall packs and high-intensity light beams, such as outdoor searchlights, lasers, or strobe lights, are prohibited.
 - (5) Routine maintenance of existing lighting, including changing the lamp, ballast, starter, photo control, fixture housing, lens, and other required components, is allowed for all existing fixtures. A lighting plan is not required for such changes.

(C) Lighting for Outdoor Recreation Uses and Stadiums....

- (1) In addition to the standards above, the following shall apply to:
 - (a) The uses: Fishing, Fee Charged; Golf Driving Range; Recreation Services, Outdoor; Recreation Facility, Public; and Stadium, Coliseum, or Exhibition Building, as well as new accessory athletic fields and courts submitted for permitting after [the adoption date of this ordinance];
 - (b) Lighting added to existing outdoor recreation uses, stadiums, and accessory athletic fields and courts that did not have lighting before [the adoption date of this ordinance].
- (2) (W) Fixtures shall be fitted with the manufacturer's glare control package. If the manufacturer does not have a glare control package, the fixture specification shall be changed to a manufacturer that offers a glare control package.
(F) Fixtures shall be fitted with the manufacturer's glare control package, except where the Planning Board determines the absence of glare control elements will not have a negative impact on surrounding property through the site plan review process (Planning Board Review). Where such a determination is made, the requirements of subsection (5) below shall not apply.
- (3) Fixtures shall be designed with a sharp cutoff and aimed so that their beams fall within the primary playing area and immediate surroundings, so that off-site direct illumination and glare are significantly restricted.
- (4) The maximum pole height for a new outdoor recreation lighting source shall be eighty (80) feet unless approved by the Planning Board after being determined that the lighting will have no significant adverse effect on surrounding property. Existing poles for outdoor recreation lighting sources with a height greater than eighty (80) feet may be used for new lighting if approved by the Planning Board through the site plan review

NOTE: Items to be deleted are indicated with a ~~strikeout~~; items to be added are indicated with an underscore.
UDO-286 July 2018

- process (Planning Board Review) after being determined that the lighting will have no significant adverse effect on surrounding property.
- (5) The lighting plan shall demonstrate that the max candela per fixture does not exceed 7,500 candela at a distance of 150 feet from the edge of the playing field.
 - (6) Except as otherwise approved by the Planning Board as set forth in subsection (4) above, new lighting fixtures for existing outdoor recreation uses, stadiums, and accessory athletic fields and courts installed after [the adoption date of this ordinance] shall follow the standards above only if they change from conventional lighting fixtures to LED fixtures.

Section 3. This ordinance shall be effective upon adoption.

NOTE: Items to be deleted are indicated with a ~~strikeout~~; items to be added are indicated with an underscore.
UDO-286 July 2018



Winston-Salem, Forsyth County
PLANNING & DEVELOPMENT SERVICES

Memorandum

Bryce A. Stuart Municipal Building
100 East First Street
P.O. Box 2511
Winston-Salem, NC 27102
CityLink 311 (336.727.8000)
www.cityofws.org/departments/planning-and-development-services

TO: Dudley Watts, County Manager, and Members of the Forsyth County Board of Commissioners
FROM: Aaron King, Director of Planning and Development Services
DATE: January 8, 2019
SUBJECT: UDO-286 (lighting ordinance)

As part of its 2017-18 work program, the City-County Planning Board asked staff to develop lighting standards for new development (UDO-286). Although basic lighting provisions currently exist in the UDO, they do not specify acceptable lighting levels or fixture types. While developing UDO-286, Planning staff reviewed the lighting ordinances of multiple peer communities and consulted lighting experts from Duke Energy and Musco Lighting. Before the Planning Board public hearing, a draft ordinance was shared with neighborhood organizations, stakeholder groups, and the wider community at two public meetings and through an online survey, which received 166 responses. Based on feedback received, staff made adjustments to the draft ordinance. The proposed text amendment would standardize outdoor lighting requirements for new development as well as for outdoor recreation uses and stadiums.

The Planning Board unanimously recommended UDO-286 to City Council and the County Commissioners at its July 12, 2018 public hearing. City Council adopted UDO-286 at its January 7, 2019 meeting. Planning and Development Services staff is available to present UDO-286 at the Board's convenience.

CityLink311

Call 311 or 336-727-8000
citylink@cityofws.org

City Council: Mayor Allen Joiner; Vivian H. Burke, Mayor Pro Tempore, Northeast Ward; Denise D. Adams, North Ward; Dan Besse, Southwest Ward; Robert C. Clark, West Ward; John C. Larson, South Ward; Jeff MacIntosh, Northwest Ward; Annette Scipio, East Ward; James Taylor, Jr., Southeast Ward; City Manager: Lee D. Garrity

County Commissioners: David R. Plyler, Chairman; Don Martin, Vice Chair, Fleming El-Amin; Ted Kaplan; Richard V. Linville; Tonya McDaniel; Gloria D. Whisenhunt; County Manager: Dudley Watts, Jr.

City-County Planning Board: Arnold G. King, Chair; Chris Leak, Vice-Chair; George M. Bryan, Jr.; Melynda Dunigan; Jason Grubbs; Tommy Hicks; Clarence R. Lambe, Jr.; Johnny Sigers; Brenda J. Smith

STAFF REPORT

DOCKET # UDO-286
STAFF: Kelly Bennett

REQUEST

This UDO text amendment is proposed by City-County Planning and Development Services staff at the request of the City-County Planning Board to amend Chapters A and B of the *Unified Development Ordinances* (UDO) to change the standards for outdoor lighting in Winston-Salem and Forsyth County.

BACKGROUND

Legacy 2030 highlights the benefits of mixing development types and locating residential development close to services to promote fiscal responsibility, livable design, and sustainable growth. However, the possibility of light pollution is a frequent concern when new development is proposed, especially when it is close to residential uses. Although there is currently a lighting provision in the UDO, it does not specify acceptable lighting levels or fixture types. Because of this, many Special-Use Zoning cases have included a specific lighting condition in recent years.

Several *Legacy 2030* policies and action items recommend limiting the effects of lighting on residential uses. To further these goals, a report that staff presented to the Planning Board in June 2017 recommended amending the UDO to create lighting standards that address the problems of light trespass and glare. The Planning Board directed staff to prepare a text amendment to implement these standards as part of its 2017-18 work program.

Current lighting requirements in the UDO only require that outdoor lighting for commercial, industrial, office, institutional, and multifamily development be shielded and oriented so that it does not cast light directly onto adjacent property where a bufferyard is required. This standard is difficult to enforce as no fixture types are specified in the UDO to manage glare and there is also no light measurement specified to gauge how much light is cast beyond the property line.

ANALYSIS

By creating measurable standards and specifying permitted lighting fixtures, UDO-286 would address the problems of light trespass and glare while also improving ordinance enforceability. The standards of UDO-286 are comparable to most of our peer cities' lighting ordinances (**Table 1**), with added standards for recreation uses (such as athletic fields and stadiums). The ordinance would only apply to new development (other than single-family, duplex/twin home, and townhouse development) and new LED lighting systems for recreation uses – it would not require retrofitting existing development. These standards would also not apply to street lighting.

UDO-286 would require a lighting plan prepared by a Lighting Certified lighting professional or a professional engineer licensed in the state of North Carolina be submitted for new development demonstrating that all exterior lighting is designed, located, and installed so that light levels measured at any residential zoning line and public right-of-way do not exceed ½ footcandle. A footcandle is the standard measure of light on a surface and is defined as the illuminance produced by a candle on a surface one foot square from a distance of one foot.

Light pole heights in parking lots would be limited to 30 feet, with a maximum mounting height of 32 feet including any base or mounting hardware. Full cut-off lighting fixtures or their LED-equivalent would be required. The 30-foot pole height gives developers enough flexibility to adequately light parking lots without adding significantly to the cost of lighting a site that a higher pole height would bring. Although many lighting ordinances also specify fixture types and pole heights for pedestrian-scale lighting or other pole-mounted lighting fixtures, staff does not recommend such a requirement as long as the developer can meet the ½-footcandle standard at their property line and the public right-of-way.

UDO-286 also includes unique lighting standards for outdoor recreation uses such as athletic fields and stadiums due to their frequent location in residential areas and their high potential for light trespass. For new outdoor recreation uses, and for lighting added to existing recreation uses that are not currently lighted, pole heights would be limited to 80 feet and fixtures would be required to be fitted with a glare control package. The maximum candela (a measure of light intensity) permitted at a distance of 150 feet from the edge of an athletic field would be 7,500, which is in line with professional lighting standards for limiting glare. Existing recreation uses would be allowed to replace their lighting systems with conventional fixtures, and would only be subject to the ordinance if they chose to install LED fixtures.

Staff believes the proposed standards would benefit the community by protecting neighborhood character and improving aesthetics. The proposed ordinance would still provide site and building design flexibility at a similar cost to current standards and reduce the need to use lighting conditions as part of Special-Use Zoning cases.

RECOMMENDATION

APPROVAL

UDO-286 Table 1. Comparison of Lighting Regulations for Peer Cities

Asheville	Cary	Charlotte	Durham	Greensboro	Raleigh	W
New development, new lighting, replacement of lighting	New Development and New Lighting	All lighting shielded to not illuminate residential or cause glare	New Development	All new lighting	New lighting, replacement of lighting, changes to fixture types or wattage	Ne De Ac
Yes (new SF)	No	No	No	No	Yes	Nr
Yes	No	No	No	No	No	Nr
Yes	Yes	No	Yes	Yes	Yes	Ye
Yes	Yes	No	Yes	Yes	Yes	Ye
.5 footcandle	.5 footcandle	N/A	.5 footcandle	1.0 footcandle	.5 footcandle	.5
Yes	Yes	No	Yes	No	Yes	Nr
37'	35'	N/A	30'	35'	30'	25
38'	18'	N/A	15'	N/A	15'	Nr
Maximum lumens specified or fixtures	N/A	N/A	Grandfathers lighting fixtures existing before June 2000	N/A	Maximum lumens for non-cutoff fixtures	Nr
80' height limit + glare control + limited hours of operation	Glare control + limited hours of operation	No	Light fixtures at least 100' from residential + limited hours of operation	Lighting design must minimize impacts	80' height limit + glare control	Nr

**CITY-COUNTY PLANNING BOARD
PUBLIC HEARING
MINUTES FOR UDO-286
JULY 12, 2018**

Kelly Bennett presented the staff report, including the more recent change to the stadium lighting standard that allows in some cases a change out in light fixtures to LED if no adverse impact can be demonstrated.

PUBLIC HEARING

FOR:

Priscilla Ivester, 2401 Rosewood Avenue, Winston-Salem, NC 27103

- I would like to thank the Planning Board for coming forward with this ordinance. I have been working to get lighting illumination education in our community for 15 years now.
- I do have a question that staff might be able to clarify on one of these issues under “Applicability.” First of all, it indicates what this does apply to, and then in Section II it says it shall not apply to the uses and residential buildings here. These look like these are smaller types of residential buildings. I would like to know how this wording would apply to larger apartment complexes and condominiums and that sort of thing.
- But all in all I think this ordinance is a wonderful start for our community. I would like to see it continue to address residential issues also.

AGAINST: None

WORK SESSION

Kelly Bennett explained that the Ordinance does apply to multifamily residential development just as it would apply to commercial or office development.

Concerning the revision to the stadium lighting language, the question was raised as to how folks who live nearby would have a chance to weigh in on this question of whether or not there is an adverse impact if they want to get an exception for the pole height.

Kelly explained that it would need to be demonstrated in the lighting plan. The means of “glare control” would need to be considered; that there isn’t light trespass from those poles. A lot of the higher poles are at places such as the Wake Forest Football stadium/tennis complex, which is surrounded by industrial uses.

Paul Norby explained evaluation of candela measuring "X" feet away from the stadium would be used to determine that the glare is not going to negatively affect the residential that may be nearby.

MOTION: Clarence Lamb removed approval of the ordinance amendment.

SECOND: Tommy Hicks

VOTE:

FOR: Melynda Dunigan, Jason Grubbs, Tommy Hicks, Arnold King, Clarence Lambe, Chris Leak

AGAINST: None

EXCUSED: None

Aaron King
Director of Planning and Development Services