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Petition to the Chapel Hill Town Council
Regarding Exterior Lighting Standards at
Chancellor's View Subdivision

We the undersigned, live in close proximity to the proposed Chancellor's View development which will adjoin Old Lystra Road and Zapata Lane. **We ask the Council to apply high standards to the exterior lighting in this development in order to limit off-site light pollution.**

An important part of the rural character of our neighborhood is that it gets truly dark at night. Our neighborhood enjoys a night sky full of stars, and when the moon is up it is the brightest light we see. Due to the large lot sizes typical of this neighborhood we share the woods with a wide variety of species including owls, foxes, deer, raccoons, hawks, bats, and tree frogs. Some of these animals are able to live here rather than being forced farther from the urban boundary because we still have the natural nighttime darkness they depend on for their nocturnal routines.

We are concerned that the Chancellor's View development might compromise this. Being a cluster development, it will be an island of more urban character in a low density (less than one residence per acre) area. This may foster an urban style lighting environment which would be destructive to the character of the neighborhood.

Although no street lighting is planned in the initial development, there may eventually be street lighting. There will certainly be security lighting, exterior lighting and landscape lighting at the residences. All of this lighting has the potential to generate significant off-site light pollution if not done to high standards.

Both street lighting and exterior residential lighting can be done in ways that limit up-spreading (lighting the sky) and outward-spreading (lighting the woods) light pollution. Lighting manufacturers now offer a wide variety of fixtures that are "dark sky" compatible for both street lighting and exterior lighting. In addition, the use of motion-detectors for security lighting can significantly reduce light pollution.

The Orange County lighting ordinance covers the light pollution issue more comprehensively than the Chapel Hill ordinance does currently. However, The Orange County ordinance will not apply to Chancellor's View because the development, while on County land, is within Chapel Hill's urban service boundary.

Therefore, in order to ensure the continued benefits of a neighborhood largely free of urban light pollution, both to the eventual residents of Chancellor's View and to its neighbors, we ask that the council apply higher lighting standards to Chancellor's View than it would to a truly in-town development.

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We recommend to the Council two alternative approaches:

One approach would be to require that lighting in the development meet both the requirements of the Chapel Hill's lighting ordinance and also Orange County's lighting ordinance. A further stipulation would state that if there were any conflict between the two, the ordinance that is more restrictive of off-site light pollution would apply.

The second alternative would be to directly require that all exterior lighting, both in private and common areas of the development be held to a simple light pollution mitigating standard: All exterior lighting fixtures should be either of the "full cutoff" type (no light emitted upward), or should be controlled by a motion-sensor switch, which does not remain on longer than 12 minutes after activation.

Respectfully submitted this _____ day of September 2004:

<u>Name</u>	<u>Address</u>	<u>Signature</u>
J. Kohl	105 Zapata Ln	[Signature]
Lisa vanCapelle	201 Zapata Lane Chapel Hill 27517	Lisa vanCapelle
Mary Kahfaden	203 Zapata Lane Chapel Hill NC 27517	Mary Kahfaden
HENRY NOUNS	106 Zapata Lane, CH 27517	[Signature]
Robert Strauss	204 Zapata Ln Chapel Hill, NC	Robert Strauss
Elisa Schwartz	202 Zapata Lane	Elisa Schwartz
Paul Jottalston	200 ZAPATA LANE	Paul J. Jottalston
Fred Figuere	102 Zapata Ln	Fred Figuere
Judith Figuere	102 Zapata Ln.	Judith Figuere
Margaret Campion	101 Zapata Ln.	Margareth. Campion
Ed Campion	101 Zapata lane	Ed Campion

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Additional Signatures:

<u>Name</u>	<u>Address</u>	<u>Signature</u>
Rudolf Alvey	935 Old Lystra Rd Chapel Hill 27517	<i>Rudolf Alvey</i>
Rachel Alvey	- same -	<i>Rachel Alvey</i>
Janet McCauley	941 Old Lystra Rd	<i>Janet McCauley</i>
Margaret White	106 Old Lystra Road	<i>Margaret B. White</i>
Peter deLeeuw	1012 Old Lystra Rd	<i>Peter deLeeuw</i>

Summary of the Chapel Hill ordinance's features with respect to light pollution

The Chapel Hill Ordinance purpose statement makes reference to minimizing light spillover and respect for "normally accepted qualities and uses" of adjacent property. It reads in full:

"This Section provides standards for lighting that shall be designed to minimize spillover of light onto adjacent property, glare that could impair vision, and/or other conditions that deteriorate normally accepted qualities and uses of adjacent property."

Its particulars include:

- "Lighting sources shall be shielded or arranged so as not to constitute a nuisance to the occupants of adjacent properties." (Section 5.11.1).
- The 35 foot height limit on full cutoff fixtures is more generous than the 15 foot limit for non-cutoff fixtures. (Section 5.11.2)
- "Increases in illumination on off-site property shall not result in lighting levels in excess of 0.3 foot-candles, measured at ground level." (Section 5.11.4).

The purpose statement and the statement in the "Applicability" section (5.11.1) certainly show that the Chapel Hill Ordinance has the intent of controlling light pollution, but it has weaknesses, in that it only tackles horizontal spillover in quantifiable terms. As for light going up into the sky, it places no quantifiable limits.

Even for the horizontal spillover, I wonder how the undeveloped parts of the cluster development land would be considered. Are they off-site because they are beyond the property lines or are they on-site because they are held in common by the residents of the development?

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Summary of the Orange County ordinance's features with respect to light pollution

The Orange County purpose statement makes reference to curtailing the degradation of the nighttime visual environment, promoting energy conservation, and discouraging lighting unnecessary for safety or security.

Its particulars include:

- Motion-activated security lights are exempt from other requirements if they are "controlled by a motion-sensor switch, which do not remain on longer than 12 minutes after activation, and do not exceed 150 watts ." (Section 50-170)
- Mercury vapor lights for roadways are prohibited (Section 50-178) unless grandfathered in, and even then they must be replaced as they burn out. (Section 50-170)
- "Unless otherwise specified, the maximum light level shall be 0.5 foot-candle at any residential property line..." (Section 50-172). This is less restrictive than Chapel Hill's 0.3 foot-candles but defining the boundary as "residential property line" may be less ambiguous than the "off-site" wording used in Chapel Hill's ordinance.
- "Any facilities that require floodlighting may not arrange the light in such a way that it will shine towards roadways, onto adjacent residential property or into the night sky." (Section 50-172) This addresses upward pollution.
- "All wall pack fixtures shall be full cutoff fixtures. " (Section 50-172)
- "All lights shall be shielded in such a way as to direct light towards the earth's surface and away from reflective surfaces... " (Section 50-172)
- "Other than floodlights and flood lamps, all outdoor area and parking lot lighting fixtures shall be full cutoff fixtures." (Section 50-173)
- "Any light fixture must be placed in such a manner that no lamp surface is visible from any residential area or public/private roadway. " (Section 50-173)
- For the lighting of buildings and landscaping, "Lighting fixtures shall be selected, located, aimed, and shielded so that direct illumination is focused exclusively on the building facade, plantings, and away from adjoining properties, public or private rights-of-way, and the night sky." (Section 50-177)

The Chapel Hill lighting ordinance in full:

5.11 Lighting Standards

Purpose statement: This Section provides standards for lighting that shall be designed to minimize spillover of light onto adjacent property, glare that could impair vision, and/or other conditions that deteriorate normally accepted qualities and uses of adjacent property.

5.11.1 Applicability

The provisions of this Section apply to any outside lighting used around buildings, recreation areas, parking areas, walkways, drives, or signs.

Lighting sources shall be shielded or arranged so as not to produce within any public right-of-way glare that interferes with the safe use of such right-of-way and so as not to constitute a nuisance to the occupants of adjacent properties.

5.11.2 Mounting Heights

Outdoor lighting, except sports and athletic field lighting, shall be mounted at heights no greater than fifteen (15) feet for non-cutoff lights; and no greater than thirty-five (35) feet for full cutoff lights.

5.11.3 Sports Fields

Lighting for sports and athletic fields must include glare control features and must be designed so that primary illumination is directed onto the play area and ancillary areas such as bleachers, stands, and similar areas. All lighting fixtures for sports fields shall be equipped with a glare control package including louvers, shields, or similar devices). The fixtures must be aimed so that their beams are directed and fall within the primary playing or performance area.

5.11.4 Offsite Illumination

Increases in illumination on off-site property shall not result in lighting levels in excess of 0.3 foot-candles, measured at ground level. Where existing ambient off-site lighting levels are in excess of 0.3 foot-candles, no increase in measurable off-site lighting levels will be allowed as a result of outdoor lighting in the development.

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The Orange County lighting ordinance in full:

Sec. 50-167. Outdoor lighting standards.

Purpose and intent.

- (1) Outdoor lighting is provided for a variety of purposes to the benefit of modern society. For work or recreation, it enables people to see essential detail in order that they may undertake their activities at night. It facilitates the safety or security of persons or property, for example through lighting on roads and pathways. It may be used to emphasize features of architectural or historical significance, and to light parks and gardens. It is used for advertising or display to promote products or services, or to call attention to commercial premises by means of area lighting or signs.
- (2) It is the intent of this section to preserve, protect, and enhance the lawful nighttime use and enjoyment of any and all property through the use of appropriate lighting practices and systems. Such individual fixtures and lighting systems are designed, constructed, and installed to maintain safety, security and productivity, reduce glare, and curtail the degradation of the nighttime visual environment in addition to promoting conservation of energy. It is the intent of these regulations that lighting unnecessary for safety or security be discouraged.

(Amend. of 6-26-2003(2), §§ 6.31, 6.31.1)

Sec. 50-168. Same--Definitions.

AASHTO means American Association of State Highway and Transportation Officials.

Cutoff fixture means an outdoor lighting fixture shielded or constructed in such a manner that no more than 2 1/2 percent of the total light emitted by the fixture is projected above the horizontal plane of the fixture.

Direct light means light emitted directly from the lamp, off of the reflector diffuser, or through the refractor or diffuser lens, of a luminaire.

Fixture means the assembly that houses the lamp or lamps and can include all or some of the following parts: a housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and/or a refractor or lens.

Flood lamp means a form of lighting designed to direct its output in a specific direction with a reflector formed from the glass envelope of the lamp itself. Such lamps are so designated by the manufacturers and are typically used in residential outdoor area lighting.

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Floodlight means a form of lighting designated to direct its output in a diffuse, more or less specific direction, with reflecting or refracting elements located external to the lamp.

Footcandle (fc) means the amount of light falling onto a surface.

Full cutoff fixture means an outdoor lighting fixture shielded or constructed in such a manner that it emits no light above the horizontal plane of the fixture.

Glare means light emitting from a luminaire with an intensity great enough to reduce a viewer's ability to see or to cause annoyance, and, in extreme cases, causing momentary blindness.

Holiday decoration means holiday displays, decorations and greetings, which relate to any federally designated holiday, legal holiday or religious holiday.

Lamp means the source of electric light: the bulb. To be distinguished from fixture and luminaire.

Lumen means a unit of luminous flux. One foot-candle is one lumen per square foot. For the purposes of this section, the lumen-output values shall be the initial lumen output ratings of a lamp.

Luminaire means a complete lighting system that includes a lamp or lamps and a fixture.

Semi-cutoff fixture means an outdoor fixture shielded or constructed in such a manner that it emits no more than five percent of its light above the horizontal plane of the fixture, and no more than 20 percent of its light ten degrees below the horizontal plane of the fixture.

Upward means projection of light above the horizontal plane.

(Amend. of 6-26-2003(2), § 6.31.2)

Sec. 50-169. Same--Applicability.

(a) All outdoor lighting installed on public or private property shall comply with the outdoor lighting standards as contained in section 50-167 et seq., unless exempted in section 50-170.

(b) In the event of a conflict between the outdoor lighting standards as contained in section 50-167 et seq. and any other section of this article, the more stringent requirement shall apply.

(Amend. of 6-26-2003(2), § 6.31.3)

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Sec. 50-170. Same--Exemptions.

The following are exempt from the provisions of the outdoor lighting standards as contained in section 50-167 et seq.:

- (1) All outdoor lighting lawfully installed prior to the effective date of the outdoor lighting standards contained in section 50-167 et seq., except the replacement of mercury vapor luminaires. Mercury vapor luminaires, except for single-family residences, must be replaced in conformity with the outdoor lighting standards upon the earlier occurrence of the replacement of the fixture or the lamp.
- (2) Any outdoor lighting, including mercury vapor, used for an individual single-family residence, where the residence is constructed as of the effective date of the outdoor lighting standards contained in section 50-167 et seq.
- (3) Bona fide agricultural uses.
- (4) Traffic control signals and devices.
- (5) Temporary emergency lighting (i.e. fire, police, repair workers, highway maintenance and construction, etc.).
- (6) Moving vehicle lights.
- (7) Navigation lights (i.e. airports, heliports, radio/television towers, communication towers, etc.).
- (8) Holiday decorations using typical unshielded low-wattage incandescent lights, which are in place no longer than 60 days.
- (9) Security lights of any wattage that are controlled by a motion-sensor switch, which do not remain on longer than 12 minutes after activation, and do not exceed 150 watts (2200 lumens).
- (10) Roadway lighting, installed as of the effective date of the outdoor lighting standards, as contained in section 50-167 et seq., within state maintained rights-of-way provided that the standards of subsection 50-171(5) and subsection 50-172(i) are met, except for mercury vapor luminaires. Mercury vapor luminaires used for roadway lighting must be replaced in conformity with the outdoor lighting standards contained in section 50-167 et seq. upon the earlier occurrence of the replacement of the fixture or the lamp.

(Amend. of 6-26-2003(2), § 6.31.4)

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Sec. 50-171. Same--Submittal requirements.

A lighting plan shall be submitted with site plan or preliminary plan approval documents. The plan shall contain the following information:

- (1) Plans, drawn to scale, showing the location, type, and height of outdoor luminaires including both building, pole and ground fixtures;
- (2) A description of the luminaires, including lamps, poles or other supports and shielding devices, which may be provided as catalogue illustrations and product specifications from the manufacturer;
- (3) Photometric data, such as that furnished by the manufacturer, showing the angle of light emission and lumen output; and
- (4) Additional information as may be required by the planning department in order to determine compliance with section 50-167 et seq.
- (5) Roadway lighting installed on state maintained roads must meet ASSHTO requirements for light levels and uniformity. Roadway lighting submittal requirements can be obtained in the NCDOT publication titled "Policies and Procedures for Accommodating Utilities on Highway Rights-of-Way". 1

(Amend. of 6-26-2003(2), § 6.31.5)

Note: 1 The NCDOT's standard 2'-6" curb and gutter, defined as a 6" vertical face curb on page 47.2 of the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" does not act as a barrier curb at speeds greater than 25 mph. It is considered a mountable curb as defined in AASHTO "A Policy on Geometric Design on Highways and Streets, 2001". Therefore, the mountable curb and gutter section of the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" shall apply.

Sec. 50-172. Same--General standards for all areas.

- (a) Unless otherwise specified, the maximum light level shall be 0.5 foot-candle at any residential property line and 1.0 foot-candle at any nonresidential property line.
- (b) All floodlights shall be installed such that the fixture shall be aimed down at least 45 degrees from vertical, or the front of the fixture is shielded such that no portion of the light bulb extends below the bottom edge of an external shield.
- (c) Any facilities that require floodlighting may not arrange the light in such a way that it will shine towards roadways, onto adjacent residential property or into the night sky.

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- (d) All flood lamps emitting 1,000 or more lumens shall be aimed at least 60 degrees down from the horizontal, or shielded such that the main beam from the light source is not visible from adjacent properties or the public street right-of-way.
- (e) All wall pack fixtures shall be full cutoff fixtures.
- (f) All lights shall be shielded in such a way as to direct light towards the earth's surface and away from reflective surfaces, except as expressly exempted from the provisions of these regulations.
- (g) Any temporary outdoor lighting that conforms to the requirements of this section shall be allowed. Nonconforming temporary outdoor lighting may be permitted by the planning director after considering: 1) the public and/or private benefits that will result from the temporary lighting, 2) any annoyance or safety problems that may result from the use of the temporary lighting, and 3) the duration of the temporary nonconforming lighting.
- (h) If any subdivision proposes to have installed street or other common or public area outdoor lighting, the final plat shall contain a statement certifying that the applicable provisions of the outdoor lighting standards as contained in section 50-167 et seq. will be adhered to. The required lighting plan and associated documents shall be submitted and approved by the planning department prior to installation of any regulated lighting.
- (i) If any street will be taken over by NCDOT for maintenance, roadway lighting must meet AASHTO requirements, and must be installed and maintained according to the NCDOT publication titled "Policies and Procedures for Accommodating Utilities on Highway Rights-of-way". 2
- (j) Upward flagpole lighting is permitted for national and state flags provided that the maximum lumen output is 1300 lumens per flagpole.
- (k) Any interior-lighted signs may not be lit at night when the face of the sign is removed or damaged in such a way that the light may distract drivers or adjacent property owners.

(Amend. of 6-26-2003(2), § 6.31.6)

Note: 2 The NCDOT's standard 2'-6" curb and gutter, defined as a 6" vertical face curb on page 47.2 of the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" does not act as a barrier curb at speeds greater than 25 mph. It is considered a mountable curb as defined in AASHTO "A Policy on Geometric Design on Highways and Streets, 2001". Therefore, the mountable curb and gutter section of the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" shall apply.

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Sec. 50-173. Lighting in parking lots and outdoor areas.

- (a) Other than floodlights and flood lamps, all outdoor area and parking lot lighting fixtures shall be full cutoff fixtures.
- (b) The mounting height of all outdoor lighting, except outdoor sports field lighting and outdoor performance area lighting, shall not exceed 36 feet above finished grade.
- (c) Any light fixture must be placed in such a manner that no lamp surface is visible from any residential area or public/private roadway.

(Amend. of 6-26-2003(2), § 6.31.7)

Sec. 50-174. Lighting for vehicular canopies.

Areas under a vehicular canopy shall have a maximum point of horizontal illuminance of 24 maintained foot-candles (fc). Areas outside the vehicular canopy shall be regulated by section 50-172. Acceptable methods include one or more of the following:

- (1) Recessed fixture incorporating a lens cover that is either recessed or flush with the bottom surface (ceiling) of the vehicular canopy.
- (2) Light fixture incorporating shields, or shielded by the edge of the vehicular canopy itself so that light is restrained to five degrees or more below the horizontal plane.
- (3) Surface mounted fixture incorporating a flat glass that provides a semi-cutoff fixture or shielded light distribution.
- (4) Indirect lighting where light is beamed upward and then reflected down from the underside of the vehicular canopy. Such fixtures shall be shielded such that direct illumination is focused exclusively on the underside of the vehicular canopy.

(Amend. of 6-26-2003(2), § 6.31.8)

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Sec. 50-175. Outdoor sports field/outdoor performance area.

- (a) All outdoor sports field and outdoor performance area lighting fixtures shall be equipped with a glare control package (louvers, shields, or similar devices). The fixtures must be aimed so that their beams are directed and fall within the primary playing or performance area.
- (b) The hours of operation for the lighting system for any game or event shall be no later than 11:00 p.m., except to conclude a scheduled event that was in progress before 11:00 p.m. and circumstances prevented concluding before 11:00 p.m.

(Amend. of 6-26-2003(2), § 6.31.9)

Sec. 50-176. Lighting of outdoor display areas.

- (a) Top mounted fixtures are required for legally existing lighted signs. Lighting fixtures used to externally illuminate an outdoor advertising sign shall be mounted on the top of the sign structure. All such fixtures shall comply with the shielding requirements of this section. Bottom mounted outdoor advertising shall not be used. Notwithstanding this provision, the lighting or re-lighting of a nonconforming advertising sign will not be permitted if the light results in the expansion of the nonconforming use, pursuant to article XI.
- (b) Outdoor advertising signs of the type constructed of translucent materials and wholly illuminated from within do not require shielding. Dark backgrounds with light lettering or symbols are preferred, to minimize detrimental effects. Unless conforming to the above dark background preference, total lamp wattage per sign shall not exceed 41 watts.

(Amend. of 6-26-2003(2), § 6.31.10)

Sec. 50-177. Lighting of buildings and landscaping.

Lighting fixtures shall be selected, located, aimed, and shielded so that direct illumination is focused exclusively on the building facade, plantings, and away from adjoining properties, public or private rights-of-way, and the night sky.

(Amend. of 6-26-2003(2), § 6.31.11)

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Sec. 50-178. Prohibitions.

- (a) The use of laser source light or any similar high intensity light for outdoor advertising or entertainment, when projected above the horizon, is prohibited.
- (b) The operation of searchlights for advertising purposes is prohibited.
- (c) Electrical illumination of outdoor advertising off-site signs is prohibited.
- (d) Use of mercury vapor luminaires is prohibited.

(Amend. of 6-26-2003(2), § 6.31.12)