



MEMORANDUM

Town of Nags Head

Planning & Development Department

To: Board of Commissioners
From: Holly B. White, Principal Planner
Michael Zehner, Director of Planning & Development
Date: January 26, 2021
Subject: Report on Review of Town Outdoor Lighting Regulations

BACKGROUND

At their October 7, 2020 meeting, the Board of Commissioners requested that Staff conduct a study of the Town's outdoor lighting regulations, including as they pertain to signage, with consideration of best practices related to both technical aspects and aesthetics. Specifically, the Board of Commissioners are concerned that evolving and new lighting technologies have rendered our current regulations (now over 30 years old) obsolete, and result in increased potential for glare, light trespass onto adjacent properties, and more intense lighting visible at greater distances. The Board reiterated the Town's long-standing values for a dark night sky. Staff confirmed that the Board wished Staff to conduct this review with the input of the Planning Board and return conclusions and recommendations to the Board at a future meeting.

Staff presented information contained in this memorandum to the Planning Board at meetings on November 17, 2020 and December 15, 2020. Generally, the Board was supportive of the observations, conclusions, and recommendations identified by Staff. Specific items referenced by the Board included:

- Support for the idea of businesses turning off or dimming lights during off hours.
- An indication that security lighting is important but should be done in a way that does not create glare or negative impacts to the environment or property owners.
- A suggestion that there needed to be a clearer definition as to what constitutes security lighting.
- The potential for incentives for existing development to modify lighting and requirements for the types of fixtures used for public street lighting.
- Support for the concept of "light zones" for different areas of the Town with different lighting needs.
- The need of gaining public input on potential changes regarding lighting.

In response to the last point noted above, in early January, Staff created and shared an online survey to learn more about community perspectives. The survey went live on January 8, 2021 and is open through January 31, 2021. As of January 26, 274 responses have been received. Staff has provided a summary of the survey responses as an attachment. Generally, survey responses confirmed conclusions and recommendations made in this memo, and responses can inform potential regulatory changes.

EXISTING OUTDOOR LIGHTING REGULATIONS

The Town currently regulates outdoor lighting specifically in Article 10. Performance Standards, Part IV. Outdoor Lighting, of the UDO ([LINK](#)), with the general purpose of preserving the visual integrity of the nighttime environment. These standards apply to commercial development that requires a site plan approval, or the alteration of existing lighting on a commercial site. There are no specific standards that apply to single-family and duplex development, and the regulations specifically indicate that they are not intended to regulate single-family and duplex security lighting.

Beyond the Outdoor Lighting ordinance contained in Article 10, certain aspects of lighting and lighting conditions are regulated in other articles and sections of the UDO; most notably this includes lighting limitations for specific uses contained in Article 7, Supplemental Regulations, lighting limits specific to certain zoning districts contained in Article 8, District Development Standards, and Article 9, the Village at Nags Head SPD-C Zoning Ordinance, standards for street lighting contained in the Town's Subdivision Regulations, and within the Town's Commercial Design Standards. Within the Town's General Code, there are miscellaneous references to lighting, so with references to specific regulations contained in the UDO.

Current regulations address [prohibited lighting](#), [general provisions for all commercial lighting](#), [lighting plan requirements](#), performance standards, and [specific lighting application standards](#) (i.e. parking lots, recreational facilities, signage, etc.). The regulations require lighting plans for commercial development in order to review fixture types, photometry, and overall lighting layout. The focus of the lighting plans is to limit lighting levels by regulating foot-candles at their source and at property boundaries. As noted above, there are lighting regulations for specific uses, as contained in [Article 7. Supplemental Regulations](#); there are certain situations where the regulations in Article 7 are more restrictive than those lighting standards contained in the Outdoor Lighting ordinance. The regulations generally contained in the Outdoor Lighting section utilize and rely on fixture types, location, and photometric readings (i.e. footcandles) to determine compliance with the standards.

Additionally, current regulations address the potential for light pollution along the Town's ocean and sound shorelines, but not necessarily in an objective manner. These regulations are for aesthetic reasons, but also to limit disturbance to wildlife, including sea turtle and shorebirds that nest and feed on the town's beaches. More information on the effect of light pollution on sea turtle nesting and solutions for addressing this issue is detailed in the Florida Fish and Wildlife Research Institute Technical Report, *Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches* ([LINK](#)).

The Town's signage regulations are contained in Article 10. Performance Standards, Part III Sign Regulations ([LINK](#)); however, requirements for the illumination of signs are contained in [10.37.6. Illuminated Signs](#), of the Outdoor Lighting ordinance; these provisions specify standards for signs lit using fluorescent tubes, as well as standards for the external illumination of signs. The Town's Sign Regulations ordinance does prohibit certain types of lighted signs, such as signs with moving lights, signs with exposed tube lighting (i.e. neon), and digital signs.

With the exception of the review of permits or inspections of development projects, enforcement of the Town's various lighting regulations is largely reliant on complaints. The majority of complaints received over the last four (4) years have been related to commercial lighting; however, there have been increases in residential lighting complaints, and increases in both residential and commercial complaints associated with LED lighting (see attached spreadsheet).

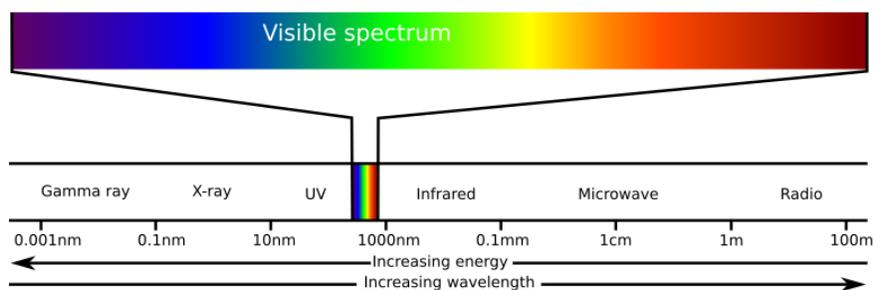
As previously noted for the Board, Staff reached out to Bob Parks with the Smart Outdoor Lighting Alliance, who was willing to perform a cursory assessment of the Town's Outdoor Lighting ordinance (Mr. Parks' bio may be found at the bottom of the page at the following [LINK](#)). A mark-up of the Town's ordinance with comments from Mr. Parks has been attached.

BEST PRACTICES

Most relevant resources advocate for regulations in favor of a dark night sky, or, specific to coastal locations, protective of sea turtle nesting, and recommend the following guidelines and best management practices:

- Keep It Low:
 - Be no brighter than necessary.
 - Reduce the wattage of problem lighting. For a given lamp type, reducing the wattage of the luminaire will reduce the amount of light emitted. When changing lamp types or fixture styles, the manufacturer's data on luminance (typically given in lumens) should be consulted.
 - Use lower pole-mounted luminaires or low-mounted luminaires (such as louvered, bollard-type fixtures or path-light fixtures) as a substitute for pole-mounted lighting. Low-mounted luminaires better focus light where it is most needed; the lower a light source is mounted, the smaller the area it will illuminate. In addition, lighting mounted lower will tend to have a greater degree of shielding from the beach by objects on the dune (vegetation, buildings, etc.).
 - Only keep lights on when needed.
 - Only light areas that need lighting.
- Keep it Shielded:
 - Replace unshielded fixtures with full-cutoff, fully-shielded luminaires to focus light where it is most needed.
 - Replace higher-wattage multidirectional luminaires with lower-wattage directional luminaires.

- Recess luminaires into the underside of architectural features of the roof such as a beam, arch, ceiling, or vault, where available. Recessed sources will be more directional and, if directed downward, will be less visible.
- Minimize lighting from indoor sources onto the beach and estuarine shorelines by turning off lights in rooms not being used at night, tinting or applying window treatments to windows visible from the beach, and closing opaque curtains or blinds after dark.
- Keep it Long:
 - Monochromatic long-wavelength light sources such as amber or red LEDs that produce light at 560 nm or longer are less likely to impact sea turtles.
 - Minimize blue light emissions. Shorter-wavelength light, such as blue and purple, can penetrate more deeply into the water column.



Additionally, in his review, Mr. Parks references use of the BUG rating, which stands for backlight, uplight, and glare. The BUG rating system was developed in partnership between the [Illuminating Engineering Society \(IES\)](#) and [The International Dark Sky Association](#) to better explain how light from specific luminaires can be measured. The purpose of the BUG rating is to create a luminaire classification system that replaces existing cutoff and full cutoff terminology to more comprehensively address light pollution from all directions, not just up into the night sky.

In addition to those general best practices and guidelines, Staff found the following information and resources helpful:

- Guidelines for Good Exterior Lighting Plans - Prepared by [The Dark Sky Society](#) (see attached)
- [Model Lighting Ordinance](#) - International Dark Sky Association
- [Chapter 11 Lighting](#) - Town of Knightdale, NC
- [Section 16G. Outdoor Lighting](#) - Town of Wellesley, MA
- [Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches](#) - Florida Fish and Wildlife Research Institute Technical Report

Staff believes that the Town of Knightdale Lighting ordinance is a good representation of these best practices, guidelines, and technical guidance being applied in a community in North Carolina. In some respects, Staff believes this ordinance could serve as a model for any update to the Town's ordinance.

POLICY CONSIDERATIONS

The [2017 Comprehensive Plan](#) addresses lighting within the Land Use Section (3.2) under Site Development Characteristics (Section 3.2.4.; page 3-26); some observations of note included in this Section are as follows:

- The Town has held a longstanding commitment of being a dark sky community.
- The town should evaluate and modernize the lighting ordinance in the future with revisions to reflect best practices in being a dark sky community. The town may even consider applying to the IDA for the Dark Sky designation.
- It should be noted that there are no lighting regulations that currently apply to residential properties. The town may wish to consider minimum regulations that limit nuisance lighting and glare to adjacent properties or to town rights-of-way.
- The town has always regulated light pollution along the shorelines including the ocean and sound waters. This is for aesthetic reasons and to limit disturbance to habitats including marine turtle species that nest on the town's beaches. The town should continue this practice and evaluate future ordinance revisions to strengthen and clarify these regulations.

The Land Use Section describes the desired characteristics of preferable development in Nags Head for the future; this section of the Plan not only addresses the physical characteristics of buildings, but the broader context of community character. Included in this description (page 3-5), are the following references to lighting and signage:

“A visible and dark night sky maintained by lighting that is minimal and carefully designed. Signage that provides adequate communication but does not dominate the landscape.”

In addition, the following policies and actions support the review and update of the lighting ordinance as well as preservation of the dark night sky.

LU-16 Preserve the dark night sky through implementation and enforcement of quality lighting fixtures and codes, dark sky education, and citizen support.

LU-16a: Evaluate and modernize the lighting ordinance to reflect best practices for being a dark sky community.

LU-16b: Research and consider applying to the IDA for the Dark Sky designation.

LU-16c: Explore the feasibility of minimum regulations for residential properties that limit nuisance lighting to adjacent properties or town rights-of-way associated with glare or light trespass.

LU-16d: Explore efficient low-level lighting along multi-use pathways and at crosswalks to promote safety while preserving the night sky. The town should resist proposals to provide overhead lighting along roadway corridors.

LU-17 Maintain current regulations which prohibit lighting of the ocean beach or estuarine waters to protect marine species and limit unnecessary intrusions into natural areas.

CONCLUSIONS

Based upon the above, steps that the Town can take to address glare and light trespass can include one or more of the following options:

- Lighting Assessment:
 - Conduct a lighting assessment to determine areas within the Town where glare and light trespass may be a problem.
 - Assess and document problematic lighting that is inconstant with the overall goal of maintaining a dark night sky.
 - Work with property owners to correct violations.
 - Utilize this information to inform development of future regulations or amendments.
- Update the Ordinance to:
 - Regulate lighting through lighting zones that are appropriate to specific areas of the town. Areas along the corridor and commercial areas would be regulated with more leniency than areas closer to ocean and estuarine shorelines that are more environmentally sensitive. See the [Model Lighting Ordinance](#) from the International Dark Sky Association (page 5).
 - Specify appropriate regulations and measurements to address lighting intensity, illuminance, color, glare, and fixture classification. This may include but is not limited to:
 - a. Luminance - the intensity of light emitted from a surface per unit area in a given direction;
 - b. Lux - a unit that measures light illumination on a surface or area that is one meter from a uniform point source;
 - c. Light Trespass - the shining or spillage of direct light produced by a luminaire behind the boundaries of the parcel on which the luminaire is located; and
 - d. Glare - light emitted from a luminaire with an intensity great enough to produce annoyance, discomfort, or reduction in a viewer's ability to see.
 - Consider minimum regulations for outdoor residential lighting; this may include regulations to address lighting levels of floodlights, angle of floodlighting, color temperature, and/or prohibited lighting types.
 - Develop separate standards for new development; this will allow flexibility for existing development. See [ordinance language](#) from Atlantic Beach, FL.

- Utilize *best practices* when updating the ordinance; see best management practices outlined above, reference Bob Park's mark-up of the existing ordinance (attached), and the [Town of Knightdale Lighting Ordinance](#). This may include the update of definitions and terminology as well as the inclusion of graphics to better visualize regulations.
- Review and assess the number and size of allowed signage and the manner in which signs are allowed to be lit. For example, while exposed neon tubing and the like are prohibited (except in limited instances), and the use of fluorescents is regulated, internally illuminated signage is generally allowed; depending on the number and size of signs, internally illuminated signs can appear to be excessively lit. Staff would recommend consideration of requirements, with limits, for external illumination of signage in some instances, the requirement for reverse back-lit signage (aka halo lit signage), and/or a prohibition on the internal illumination of signs of a certain size or beyond a certain number.
- Education and Outreach:
 - Develop outreach and education that promotes desirable lighting, the Town's values for a dark night sky, and the negative side effects of lighting the ocean and estuarine shorelines.
 - Partner with [NEST](#), Jennette's Pier, Sea Grant, Coastal Studies Institute, and the Outer Banks Visitors Bureau to develop/distribute educational materials.
 - Include lighting related education with other Town distributed property owner and visitor information. Publicize the impact of light trespass on the beach to sea turtle and shorebird breeding and feeding; encourage the installation of timers and that residents and visitors to turn off lights in upper floors of rental homes with direct view of the beach.
 - Work with Dominion Power to ensure that they are aware of the Town's policies, expectations, and regulations pertaining to lighting; develop specifications for street and parking lot lights.

STAFF RECOMMENDATION

Staff welcomes feedback and direction from the Board with respect this report and the conclusions, and specifically with respect to lighting issues that they perceive in the community, regulations that require improvement, and presented best practices and recommendations.

Staff would recommend that the following best practices and recommendations be prioritized as the Board considers options for moving forward:

- Conduct a lighting assessment to document problematic lighting in violation of the lighting ordinance and work with property owners to correct violations.

- Develop educational materials about lighting regulations and best practices; work with partners to distribute and educate homeowners and visitors.
- At a minimum, update the UDO to address changes in lighting technology (i.e. LED technologies) that address lighting intensity, illuminance, color, and glare as described above.
- Consider development of specific standards for lighting along the ocean and estuarine shorelines, due to their environmental sensitivity and/or specific standards that apply to residential structures or apply geographically to certain areas of the Town (i.e. lighting zones as described above).
- Consider limiting lighting during non-business hours for commercial sites and signage.
- Consider limits on lighting of signs of certain sizes and/or limiting the number of lit signs; consider requiring or prohibiting certain lighting styles.
- Develop common technical specifications for streetlight fixtures and work with Dominion Power to install and retrofit fixtures that are consistent with Town ordinances.

Staff anticipates that the feedback from the Board of Commissioners will be utilized to prepare draft amendments to the UDO.

Attachments:

1. Perspectives on Outdoor Lighting Survey - Summary of Responses
2. Guidelines for Good Exterior Lighting Plans - Prepared by [The Dark Sky Society](#)
3. Town of Knightdale Lighting Ordinance
4. Summary Report Lighting Violations 2016-2020
5. Existing Town Outdoor Lighting Ordinance with comments from Bob Parks