

Lighting Standards for the City of Greenville



STREET LIGHTING

Purpose: To provide adequate lighting for all pedestrians, bicyclists and motorized vehicles in the city.

Definitions: See Appendix

The standards and specifications found in this chapter are for the materials and construction of street lighting within the City of Greenville. Any deviation from this standard requires approval from the City Engineer and/or Greenville Utilities Commission.

SECTION 1 DESIGN AND CONSTRUCTION

All work performed and all materials used in connection with the installation of any public roadway lighting or appurtenances shall be in accordance with the requirements of the appropriate standards of the National Electric Manufacturers Association; Underwriters Laboratory approvals, and the American Association of the State Highway and Transportation Officials criteria, and as modified by the following:

SECTION 2 DESIGN

All lighting shall be designed in accordance with the latest requirements of the Illuminating Engineering Society of North America: "American National Standards Practice for Roadway Lighting" and the following criteria:

Street Illumination Requirements:

The following table provides a minimum design standard for illumination and uniformity ratio for all public and private streets.

*Road Classification	**Area Classification	Average Illuminance (foot-candles)	Uniformity Ratio (Average:Minimum)
Minor Thoroughfare or greater	Commercial/Industrial	1.2	3:1
	Residential	0.7	4:1
Collector	Commercial/Industrial	0.9	3:1
	Residential	0.5	4:1
Minor road or lesser	Commercial/Industrial	0.6	3:1
	Residential	0.3	6:1

* Refer to the *Greenville Manual of Standards and Design Details: Street Standards* for road classification definitions.

- ** Commercial/Industrial – The area of a municipality that has heavy vehicular and pedestrian traffic and heavy demand for parking during peak traffic periods or peak business hours. This includes densely developed apartment areas, hospitals, public libraries, and neighborhood recreational centers.
- Residential – A residential development, or a mixture of residential and commercial establishments, characterized by few pedestrians and a low parking demand or turnover at night. This includes single family homes, townhouses, small apartments, regional parks, cemeteries, and vacant lands.

**SECTION 3
POLES**

The lighting pole shall be designed in accordance with the "Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals", by the American Association of State Highway and Transportation Officials (AASHTO), latest edition. They shall meet wind load standards for NCDOT Wind Zone-2 (130 MPH).

1. All residential lighting shall be mounted on poles that are provided by the Greenville Utilities Commission.
2. All thoroughfare lighting shall be mounted on concrete or aluminum poles.
3. All poles shall be identical along an entire continuous street or throughout a subdivision with public roadways.

Please reference the Greenville Utilities Commission for available pole types that are in stock. Approval from the City Engineer and Greenville Utilities Commission is necessary for use of poles that are not stocked by the Greenville Utilities Commission.

**SECTION 4
FOUNDATION**

Aluminum or Steel Pole Foundation Location Requirements:

Pole locations in general should be kept as far away from the roadways as possible and shall be located behind existing barrier or guard rails where possible, or shall have foundations built into barrier or retaining wall where feasible.

Poles shall be located behind sidewalk, where applicable, unless otherwise approved by the City Engineer and/or Greenville Utilities Commission.

Minimum pole setback requirements from back of curb or edge of traveled pavement to the face of the pole shall be as follows:

Typical areas where barrier curb is used is in dense urban areas or on bridges

Pole Type	Behind Barrier Curb	Without Barrier Curb
Frangible	2 Ft.	12 Ft.
Non-Frangible	6 Ft.	17 Ft.

Decorative Ornamental Pole Direct Buried Location Requirements:

Direct bury poles shall be located two (2) feet behind the adjacent curb.

SECTION 5 LUMINAIRES

All luminaires shall have Type II distribution optics unless otherwise approved, conforming to the patterns specified in 2.3.2.1 of the American Standard Practice for Roadway Lighting. Such luminaires shall have medium distribution as specified in 2.2.2 and semi-cutoff as specified in 2.4.2 of the American Standard Practice for Roadway Lighting.

1. Standard light fixtures shall meet the following requirements:
 - a. All fixtures on residential streets shall be 8,500 to 14,000 lumen lamps (or the equivalent lumen output of 100 to 150 watt high pressure sodium bulb).
 - b. All fixtures along thoroughfares shall be 23,000 to 45,000 lumen lamps (or the equivalent lumen output of 250 to 400 watt high pressure sodium bulb). The 14,000 to 23,000 lumen (or the equivalent lumen output of 150 to 250 watt high pressure sodium bulb) fixtures shall be placed along thoroughfares in residential areas when spillover from the higher lumen fixtures would be excessive.
 - c. All fixtures on public and private streets shall be semi-cutoff with LED luminaires unless otherwise approved by the City Engineer and/or Greenville Utilities Commission.
 - d. Full-cut-off fixtures may be required by the City Engineer in areas such as public parks where light pollution may be a concern.
 - e. Please reference Greenville Utilities Commission for bulb types that are in stock.

Parking Lot Lighting Requirements – Private and Public Lots

1. Parking lots shall be illuminated to a minimum of 0.2 foot-candles and a maximum of 10.0 foot-candles at all points throughout parking lot.
2. All private and public parking lot lighting shall be mounted on any pole that does not exceed forty (40) feet in height
3. Any lighting used to illuminate off-street parking areas shall be directed away from adjacent properties and streets in such a way as not to create a nuisance. In no case shall such lighting exceed 0.5 foot-candles at any property line which is shared by a residentially zoned property, a property which has residential uses on the first floor, or a residential street. In no case shall such lighting exceed 2.5 foot-candles at any property line. The use of varying cutoff lighting fixtures and/or lighting shields may be used to meet this requirement. Non cutoff fixtures may not be used at any time.
4. All fixtures used for parking lot lighting shall be 8,500 to 45,000 lumen lamps (or the equivalent lumen output of 100 to 400 watt high pressure sodium bulb).
5. All parking lot lighting shall exceed a color rendering index (CRI) of 50.

SECTION 6

EXTERIOR LIGHTING

1. Exterior:
Light fixtures shall use full-cutoff lenses or hoods to prevent glare or spillover onto adjacent lands and streets.
2. Canopies:
No light source in a canopy structure shall extend downward farther than the lowest edge of the canopy ceiling.
3. Wall Pack Lighting:
Wall packs on buildings may be used at entrances to a building to light unsafe areas. They are not intended to bring attention to the building or provide general building or site lighting. All wall pack lighting shall be fully shielded and be directed downward. They shall also be low-wattage luminaires (100 watts or less) and shall not be visible beyond the property boundaries of the building.

Appendix: Definitions

Candela (cd) - The unit of luminous intensity. Formerly the term "candle" was used.

Color Rendering Index - A measure of a light source's ability to show object colors "realistically" or "naturally" compared to a familiar reference source, either incandescent light or daylight.

Foot-candle (fc) - The illumination on a surface one square foot in area on which there is uniformly distributed a light flux of one lumen. One footcandle equals 10.76 lux.

Illuminance - The density of the luminous flux incident on a surface. It is the quotient of luminous flux by area of the surface when the latter is uniformly illuminated.

Lamp - A generic term for a man-made source of light which is produced either by incandescence or luminescence.

Lumen (lm) - A unit of measure of the quantity of light. One lumen is the amount of light which falls on an area of one square foot every point of which is one foot from the source of one candela (candle). A light source of one candela emits a total of 12.57 lumens.

Luminaire - A complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.

Luminance (L) - The luminous intensity of a surface in a given direction per unit of projected area of the surface as viewed from that direction (measured in foot-lamberts).

Luminous Flux - the measure of the power of light as perceived by the human eye

Lux (lx) - The International System (SI) unit of illumination. It is defined as the amount of light on a surface of one square metre all points of which are one metre from a uniform source of one candela. One lux equals .0929 foot-candle.

Spacing - The distance between successive lighting units measured along the centerline of the roadway.

Uniformity Ratio - The ratio of the average footcandles (lux) of illumination on the pavement area to the footcandles (lux) at the point of minimum illuminance on the pavement. A uniformity ratio of 3:1 means the average footcandles (lux) value on the pavement is three times the footcandles (lux) value at the point of least illuminance on the pavement. A perfect uniformity ratio is 1:1.