

I. STREET LIGHTS

The street lighting system shall consist of one or more control centers/controllers, the distribution system, street light poles, luminaires and any other appurtenances required to provide a complete, operable street lighting system. Components of the system shall conform to the City of Lenexa's technical specifications and standard details.

The street lighting design and layout for shall be based on the ILLUMINANCE criteria set forth in the American National Standard Practice for Roadway Lighting, RP-8-14, published by the Illuminating Engineering Society and shall include the use of Light Emitting Diodes (LEDs) for all roadway, area and pedestrian lighting. The table below identifies the average maintained illuminance values and uniformity ratios for the various roadway classifications for non-residential streets.

TABLE 6. Illuminance Criteria

Street and Area Classification	Average Maintained Illuminance Values (fc)	Average to Minimum Uniformity Ratio
Major Arterial / Intermediate	1.3	3.0:1
Minor Arterial / Intermediate	1.1	3.0:1
Collector / Intermediate	0.9	4.0:1
Collector / Low	0.6	4.0:1
City Center Arterial / High	1.7	3.0:1
City Center Collector / High	1.2	3.0:1
Light Loss Factor (LLF) = 0.90		
Values based on R2 and R3 pavement classification for asphalt		

During the preliminary design stages of a project, the designer shall contact the City in order to determine which street and area classification shall be used for the project, as per the City's determination. Design calculations, including the design pole spacing, etc., shall be submitted with supporting data to the City to verify that the proper light levels have been achieved. The use of alternate light sources such as High Pressure Sodium (HPS), metal halide, mercury vapor, induction and fluorescent light sources is unacceptable.

Cobrahead luminaires shall be classified and labeled accordingly on the plans as follows:

- Type Z – typically used on arterials; previously 400w+ HPS equivalent
- Type A – typically used on arterials and collectors; previously 400w HPS equivalent
- Type B – uncommon; not typically used; previously 310w HPS equivalent
- Type C – typically used arterials, collectors; previously 250w HPS equivalent
- Type D – typically used on collectors, in industrial areas, and business parks; previously 150w HPS equivalent
- Type E – typically used in industrial areas and business parks; previously 100w HPS equivalent
- Type F – used only in residential areas; previously 100w to 150w HPS equivalent

The standard spacings below for residential streets have been determined below. At locations where additional lighting may be beneficial such as around curves or at intersections, the pole spacings should be reduced to improve the lighting levels.

TABLE 7. Standard Luminaire Spacing for Residential Areas¹

STREET CLASSIFICATION	LOCATION	LUMINAIRE	POLE HEIGHT	POLE SPACING²
Residential – Local (22'-28')	Single Side	Type F	20'	200'
Residential – Collector (26'-36')	Single Side	Type F	20'	150'
Other Street Classification	As determined by a photometric analysis			
¹ Light Loss Factor (LLF) = 0.90 ² Typical maximum pole spacings				

Street lighting on arterials and collectors shall typically consist of LED cobrahead-style luminaires mounted to 40-foot or 30-foot round, tapered poles. The use of single member luminaire arms is required. The use of truss-style arm requires special approval by the City for its use. Single member arms range from 6' to 10' in length while truss-style arms are 12' and 15' in length.

Street lighting in residential areas shall consist of LED cobrahead-style luminaires mounted to 20-foot round, tapered poles. The luminaires and the poles shall have a dark bronze finish (poles shall be anodized dark bronze), as specified in the Technical Specifications. The use of post-top luminaires mounted to 14-foot poles is no longer the standard residential fixture and light pole and therefore, requires special approval by the City for its use.

At intersections where STOP or YIELD signs are to be installed and street light poles are to be located in this vicinity as well, place the STOP or YIELD sign and street name sign posts as close to the intersection as possible. If there is a light pole in advance of the sign post, place the light pole at least 20 feet from the sign post or shift the light pole around the radius so that it's oriented over the intersecting roadway instead.

When designing a street lighting system in a residential area, a street light pole shall be installed at the edge of the plat instead of a junction box with a pull string. This will enable the City to connect to the lighting circuit more easily when the adjacent plat is constructed. In addition, street light poles in residential areas shall be installed on the property lines or as close to the property line as possible in order to avoid conflicts with driveways and to minimize the amount of ambient street light shining into adjacent houses. Street lights shall be installed on the same side of the street as the sidewalk, unless otherwise approved by the City.

All street light poles shall have a minimum setback of 3.5 feet from the back of curb to the center of the pole. Street light poles placed in the median shall be located a minimum of 15 feet from the end of the median nose to the center of the pole. In addition, street light poles installed in or within 18 inches of a sidewalk must have concrete foundations. Screw-in foundations will NOT be accepted for street light poles installed in a sidewalk or within 18 inches of a sidewalk.

The distribution system shall be underground and installed in conduit. The distribution cable shall be sized so that the voltage drop does not exceed five percent (5%) at any point in the system. The Designer MUST submit voltage drop calculations to the City for review before the lighting plans can be approved.

Conductors for the distribution system shall be No. 4 AWG. The use of No. 2 AWG distribution cable requires special approval by the City for its use. Pole and bracket cable shall be No. 14 AWG, 3-conductor stranded copper conforming to IMSA Specification 19-1.

All street lighting circuits shall be 240 volts and shall be laid out in a way that maximizes the use of each control center. Each lighting circuit shall be contained in a separate conduit, except for the conduit run between the control center and the adjacent Type II junction box. In that case, one 3-inch conduit shall be installed from the control center to a Type II junction box that is installed adjacent to the cabinet. Distribution cable for each of the lighting circuits shall be routed through this conduit to the junction box.

Junction boxes shall be installed on each end of a roadway crossing. However, junction boxes are not needed on each end of a residential or commercial driveway. The installation of junction boxes in sidewalks should be avoided. The installation of boxes in streets, driveways and handicap ramps is unacceptable. Type II junction boxes shall be used where more than two conduits enter/exit the box. Type I junction boxes shall be used where one or two conduits enter/exit the box. Junction boxes shall be installed at least 2 feet from the back of curb to the center of the box and no closer than 2 feet to any street light pole.

Splices may be made inside a junction box with approval by the City. All splices in junction boxes shall be made with set screw connectors enclosed in a reusable gel-filled waterproof kit.

The electrical system shall conform to the requirements of the National Electrical Code, the National Electrical Safety Code and service standards issued by the utility which will be supplying power to the street lighting system. The Designer shall coordinate and verify the location of proposed feed points with the utility company to ensure availability of service. In cases where a proposed feed point requires the installation of a new transformer, the Designer may need to include the construction of a transformer pad and conduit as part of the project. Additionally, for projects within KCP&L's service area, the Designer shall include the conduit AND the service cable from the secondary service point to the meter on the controller in the plans as the Contractor is now required by KCP&L to install the cable and the conduit.

Control centers should be located adjacent to and behind the sidewalk or at least 5 feet from the back of curb to the center of the control center where no sidewalk exists. When the location of the control center has been finalized and power has been verified with the utility company, the City will provide the Designer with an address and an identification number for each proposed control center. The address and identification number shall be placed in the lower right corner of the street lighting plan sheet above the titleblock. In addition, luminaires shall be numbered using the identification number. For example, street lights on Circuit 1 on Controller AB should be labeled as AB 1-1, AB 1-2, AB 1-3, etc. If twin luminaires are mounted to the street light pole, the luminaires should be labeled as AB 1-1 and 1-2, AB 1-3 and 1-4, AB 1-5 and 1-6, etc.