GUIDELINES FOR STREET LIGHTING

- ASSUMPTIONS FOR DESIGN:
  - The majority of street lights and poles in Ankeny are installed, owned and maintained by the current electric utility providers (MidAmerican Energy and Consumers Energy). TYPICAL: For design purposes, the luminaires selected in the design must be based on the currently available and provided luminaires that the electric utility service providers offer.
  - EXCEPTION: Alternative luminaires will be considered if the design intends to utilize City provided, installed and maintained street lights and poles.

- ILLUMINATION AND UNIFORMITY DESIGN CRITERIA:
  - Use the current version of the SUDAS Design Manual, Chapter 11 – Street Lighting.
  - Design criteria shall be the average foot candle and uniformity guidelines of SUDAS Design Manual - Table 11C-1.01: Illuminance Method.
  - Intersections – follow the guidelines provided in the current version of ANSI/IESNA RP-8.

- LIGHT SOURCE:
  - Light emitting diode (LED) luminaires shall be the standard light source used.
  - Typical street lighting luminaires utilized by street classification:
    - Local-residential 100 Watt HPS equivalent LED
    - Collector-residential 100 Watt HPS equivalent LED
    - Collector-non-residential 150 Watt HPS equivalent LED
    - Arterial 250 Watt HPS equivalent LED
    - For traffic signal/street light combination pole assemblies, use 250W HPS equivalent LED.

- LUMINAIRE LIGHT DISTRIBUTION:
  - Ankeny's standard street lighting shall be Type II distribution.
  - DISTRIBUTION TYPE EXCEPTION: Type III and V distribution luminaires may be used in difficult to illuminate locations, like cul-de-sac bulbs and wide intersections. Use of luminaires other than Type II distribution is at the discretion and approval of the City. Use of the non-Type II distribution luminaires is also dependent on the willingness or ability of the utility service provider to supply these fixtures.

- LUMINAIRE MOUNTING HEIGHT:
    - The actual mounting height is dictated by the pole and mast arm offerings provided by the utility service providers as their standard light pole assemblies. The typical mounting heights tend to range from 28 ft. to 34 ft.
    - Post top decorative lighting: use the actual mounting height – typically less than 30 ft. (e.g. 20 ft. or 24 ft.).
    - Traffic signal/street light combination poles have a typical luminaire mounting height of:
        - 40 ft. for installations where an Iowa D.O.T. jurisdiction corridor is included in the intersection unless other is requested by Iowa D.O.T.
        - 35 ft. for full City jurisdiction intersections. Luminaires on City owned traffic signal poles will be owned and maintained by the City and will be metered.

- MAST OR LUMINAIRE ARMS:
    - The standard mast or luminaire arm lengths shall be 6 ft. for all street classifications.
    - The use of mast arms other than 6 ft. will be considered on a case by case basis.
    - Luminaire arms on traffic signal/street light combination poles are 15 ft. (typical). Luminaire arms may be longer than 15 ft. where the combination pole base is significantly set back from the back of curb.

- LIGHT POLE SPACING AND LOCATION:
    - Spacing shall be determined by photometric analysis.
    - Critical placement elements:
        - Locate at least 1 street light at all intersections. Place the street light at the end of return when installing at a curb with a horizontal radius.
        - Use the sum of the recommended lighting values for each continuously lighted intersecting street to determine the needed light levels for the intersection. Use the lighting values for each continuously lighted street by its classification (local, collector, arterial) and its pedestrian conflict area. The resulting needed lighting level for the intersection will likely require more than 1 light at or very near the intersection.
        - Pedestrian crosswalks are to meet or exceed the minimum lighting levels of the continuously lighted street (classification and conflicts). Additional lighting and/or strategic light placement may be need at the crosswalks.
        - For roundabouts, the determination of minimum lighting levels is that same as regular intersections.
        - Locate street lights at common lot lines/corners (where applicable).
        - Locate a street light in each cul-de-sac bulb.
        - Typical 2 lane streets: locate all street lights on one side of the street. Locate the street lights on the opposite side of the street from the water main.
        - Multi-lane and median corridor configurations may require staggered street light placements. Median placement of street lights may be considered.

- Setback:
    - 6 ft. from back-of-curb is Ankeny's standard pole base setback.
    - For roadways with posted speed limits of 45 MPH and above, a 10 ft. minimum setback from back-of-curb is standard.
    - A shorter setback is allowed if breakaway bases are used. However, the breakaway bases are typically more expensive to install. The use of breakaway bases for shorted setback shall be subject to City approval.
    - If the roadway has no curb, breakaway base poles shall be used.

- ENERGY SOURCE:
    - All new street lights installed shall be energized by underground electric conductors.
    - The street light layout shall minimize the use of public rights of way for the underground electric conductors. Use of public utility easements (PUE's) and dedicated private utility easements is the preferred method of installing the underground electric conductors to the street lights.
    - Exceptions are allowed for overhead power to a street light if the street light is attached to an existing wood utility pole. Permission to use an existing wood utility pole for street light attachment must be cleared with the pole owner prior to plan approval.

- POLE TYPE:
    - Standard street light poles shall be galvanized metal poles with 6 ft. round tubular mast or luminaire arms with the pole installed by direct embed method. Longer mast arms may be used per electric service provider availability and City approval.
    - The standard luminaire housing shall be gray.
    - Breakaway light pole bases may be necessary. Refer to the above pole setback requirements.
    - Decorative pole options will be considered on a case by case basis.
    - Current electric service providers are offering black clad street light poles and luminaire housings as an option. City will approve the use of black clad poles and luminaire housings on a case by case basis.
    - No new wood utility poles shall be installed for the sole purpose of mounting new street light fixtures.

- DECORATIVE STREET LIGHTS AND POLES:
    - The City has allowed post top decorative street lighting to be incorporated into new subdivisions in the past. The post top decorative street light options available are controlled by the supplying utility service provider or the City.
    - Through experience, the City discourages the use of post top decorative street lighting luminaires due to the increased cost of installation and maintenance. Often, the post top decorative luminaires must be spaced closer together than standard street light luminaires to meet the required illuminance criteria. This increases the number and cost of street lights to install on a project compared with standard lighting. Furthermore, many of the post top decorative fixtures fail to provide adequate illuminance and uniformity for street lighting.

- The inclusion of post top decorative lighting will be considered and approved by the City on a case by case basis for aesthetics or for sidewalk and pedestrian trail lighting. Post top decorative lights will no longer be allowed to replace standard street lights.

- PRAIRIE TRAIL – SPECIAL DECORATIVE STREET LIGHTING:
  - The following are the standard street light assemblies that are approved for use in the Prairie Trail development:
    - Collector and arterial streets: standard 150 Watt & 250 Watt HPS equivalent LED light fixture on 30 ft. (mounting height) black clad metal poles. All 2 lane streets less than 31 ft. in width and with no median shall use 6' black clad tubular mast arms. All streets 31 ft. wide or wider and all street with medians shall use 6 ft. black clad tubular mast arms. The luminaire housing shall be black.
    - Local service streets: standard 100 Watt HPS equivalent LED light fixture on 30 ft. (mounting height) black clad metal poles. Use 6 ft. black clad tubular mast arms. The luminaire housing shall be black.
    - Typically, the light poles shall be installed by direct embed method. If the light pole is intended to be used for banners, an anchor or screw in base is required. Scheduling and installing light poles for banner use will be determined on a case by case basis.
  - All lights shall be Type II distribution. Type V distribution lights may be used in difficult to light situations with the City's approval.
  - Setback: 6 ft. from back of curb shall be the standard setback.
  - The District at Prairie Trail: street lighting is City designed, installed, owned, maintained and is metered.

- PROCESS FOR DESIGN, REVIEW, AND APPROVAL:
  - Design a street light layout that is based on the criteria and guidelines provided in this document.

  - REVIEW AND APPROVAL PROCESS FOR PROJECTS WHERE A UTILITY SERVICE PROVIDER IS SUPPLYING AND INSTALLING THE STREET LIGHTS:
    1. The developer or design engineer will develop a street light layout plan and supporting street lighting calculations. The plan is to be submitted to the City for review/approval.
    2. Once the street light layout plan is reviewed and the City issues its approval, the developer or design engineer will request the utility service provider to develop and submit an electric distribution infrastructure and street light plan to the City for review.
    3. The utility service provider will work with the City and the developer or design engineer to determine an acceptable plan and resolve any conflicts or needed easements.

4. The City will issue a preliminary approval to the utility service provider for the electric distribution infrastructure and street light plan. Once the City issues its preliminary approval to the utility service provider, the utility, developer, or the design engineer shall obtain and record all needed easements to facilitate the plan. The City requires verification that all needed easements exist before it can proceed with its final review of the plan (proof of recording). NOTE: The utility service provider should not issue the formal proposal to the client (usually the developer) until the City has reviewed the plan/proposal and issued its preliminary approval.
5. Once all needed easements to facilitate the plan are resolved and recorded, the utility service provider shall submit the formal electric distribution and street light installation plan/proposal to the City for review. The submittal must be submitted in the form of a right of way permit request.
6. Upon a successful final review, the City will issue the formal approval and the work in public right of way permit packet to the utility service provider. A copy of the City approval and permit packet will be sent to the developer and/or the design engineer on request.

- REVIEW AND APPROVAL PROCESS FOR CITY FUNDED AND INSTALLED STREET LIGHTS:
  1. The design engineer will develop a street light layout plan and supporting street lighting calculations. The plan is to be submitted to the City for review/approval.
  2. Once the street light layout plan is reviewed and the City issues its approval, the design engineer may proceed with the final design – including any necessary source electric infrastructure.
  3. The design engineer and/or the City will work with the electric service provider to develop a plan for the source electric infrastructure if the electric service provider is expected to install it. If the electric source infrastructure is to be all City installed and owned, the design engineer is to develop the plan.
  4. Final review, approval and work in public right of way permit (if needed) for the street light plan and any associated electric source infrastructure will be included with the overall project plan final approval by the City.

- SUBMITTAL DETAILS FOR CITY REVIEW:
  - Submittals, photometric file selection questions, and other questions pertaining to your design are to be directed to: Melissa Zuspann, 515-963-3539, mzuspann@ankenyiowa.gov or Dana Conley, 515-963-3528, dconley@ankenyiowa.gov
  - Electronic submittals are acceptable and preferred.
  - Acceptable submittal formats and necessary supporting information:
    - Submittal shall include a plan view of the street light layout and supporting calculations.
    - Acceptable plan view formats for the street light layout may be:
      - Computer generated lighting model file (preferred – and in VISUAL compatible format).
      - CAD file.
      - Full size paper plan with light level contours shown.

- Supporting calculations shall include the average, minimum, and maximum foot-candles and uniformity ratio for each street segment or zone.
- Include the full description of the luminaires, poles and mast or luminaire arms to be used.
- Refer to right of way permit submittal requirements for additional information needed on final approval plans.

DESIGN TIPS:

- Use a light loss factor (LLF) of 0.85 for LED lighting, 0.81 for HPS lighting.
- Mounting height: to keep things simple, use 30 ft. The utility service providers offer street light pole assemblies with mounting heights that vary from 28 ft. to 34 ft., depending on the pole length, the mast arm length and arch of the mast arm. A default 30 ft. mounting height is acceptable for design purposes. A 2 ft. to 4 ft. variance in mounting height from 30 ft. does not make a significant difference in the calculations.
- Mounting height for combination traffic signal/light poles: Use a 35 ft. mounting height for City owned poles and a 40 ft. mounting height for IOWA D.O.T. poles.
- VISUAL software is used by the City of Ankeny for street light analysis and layout design. There are other street lighting software packages available. The VISUAL Roadway Tool (or similar tool) is acceptable to use for determining typical light spacing (a starting point) and for analysis of straight segments of roadway. VISUAL or an equivalent 3-D modeling package is recommended to model, analyze, and design the street lighting at intersections, for curved roadways, and for modeling situations that include existing and future street lighting.
- When setting up calculation zones in software, only calculate the roadway surface areas. The areas behind the curb or edge of roadway are not be included in the calculation zones unless specifically asked to so.
- Please provide separate calculation zones for each continuously lighted street within the project.
- Please provide separate calculation zones at all intersections and all pedestrian cross walks within the project.
- Type II distribution luminaires are Ankeny's standard. This is important to know when selecting the appropriate photometric files for computer modeling.
- Type III and/or V distribution luminaires may be acceptable in certain situations and will be reviewed and approved on a case by case basis.
- Information and specifications for the current LED luminaires offered on the MidAmerican Energy system can be found here: https://www.midamericanenergy.com/streetlight-specs

- For information, specifications, and selection of photometric files for the current LED luminaires offered on the Consumers Energy system, please contact them directly at 800-696-6552.