

16520 – EXTERIOR LIGHTING

1 – GENERAL

1.01 – SECTION INCLUDES

- A. Design standards for new construction and major renovations.

1.02 – REFERENCES

- A. IESNA Guideline for Security Lighting for People, Property and Public Spaces IESNA G-1-03.
- B. IESNA Lighting Handbook Reference and Application, Ninth Edition; Roadway Lighting IESNA RP-8-00/2005.
- C. Electrical Power Supply and Distribution Army TM 5-811-1, Department of the Army and the Air Force, February 1995.
- D. Kutztown Lighting Report Outline; Standing Stone Consultants, 2009.
- E. International Dark-Sky Association.
- F. National Fire Protection Association (NFPA) 730: Guide for Premises Security (2008) Chapter 11 Educational Facilities.
- G. US Green Building Council (USGBC) LEED Certification Program.
- H. Kutztown University Lighting Guidelines Report; BIA, 2010.

1.03 – SUBMITTALS

- A. Designer shall provide a grid of points on all design plans to show conformance with the illuminance requirements below.
- B. Manufacturer's cut sheet for fixtures with completed manufacturer's ordering information.

1.04 – QUALITY ASSURANCE

- A. Illuminance - The recommended levels of illumination in the *Lighting Guideline* are minimum levels and shall be increased based on intensity of use and relationship to surrounding areas. To provide uniform coverage, the minimum Illuminance value is aimed to minimize the number of perceived dark areas. The average value shall be maintained as close as possible on all paved areas. Calculations are shown as foot candles.
- B. Uniformity – The uniformity of light over an area is the most important component to lighting design and layout. The greater the uniformity, the better the eye can adjust comfortably to the space and maximize visual perception. Some areas require better facial recognition, so their uniformity ratios are tighter. See the recommended uniformity in Table 2.1 Fixture Selection Chart.
- C. CRI – The color rendering throughout the campus shall be no less than 50. Some areas require better color recognition, so their values are set higher. See the recommended minimum CRI in Table 2.1 Fixture Selection Chart.
- D. CCT – Light color temperature shall be kept consistent across the campus. Light sources shall have a color temperature between 4000K and 7500K. LED lighting provides the rare opportunity to control color rendering. As a result, unless a special use area desires a specific color rendering; all areas shall be in the higher, true color range.

- E. LLF Light Loss Factor – Designer shall account for operating and environmental conditions (dirt build-up, tree growth, etc.) that interfere with the transmission of light and result in reduced lumens at its designated surface. When calculating uniformity, minimum and average illumination, the designer shall use a LLF of 0.81.

1.05 – DELIVERY, STORAGE & HANDLING – not used.

1.06 – COORDINATION

- A. Municipal requirements – Coordinate with the Zoning Ordinance and Subdivision and Land Development Ordinance of Maxatawny Township and/or Kutztown Borough, as appropriate.
- B. Adjacent Land Use Sensitivity – Coordinate with adjoining land uses.
- C. Coordinate with adjacent and connecting walkways, parking areas and driveways.

2 – PRODUCTS

2.01 – MANUFACTURERS – not used

2.02 – LUMINAIRES

A. Fixture Selection – General

- 1. Meet the effective lighting needs of area, yet provide the aesthetic character desired during the day.
- 2. Reinforce the landscape character of the campus by utilizing specified fixture styles by campus area.
- 3. Maintain continuity across the University campus.
- 4. Consider unique fixtures only for special use areas. Closely review style, material, finish and location in comparison to surrounding areas and the overall campus, so that they meet the functional needs of the special use space, but do not distract from the overall campus lighting scheme.

B. Fixture Selection – Specific

- 1. West Main Street corridor – Traditional, eight sided prismatic post top luminaire set on an ornamental post.
- 2. Pedestrian paths – Pendent style luminaire hung from a crooked arm.
- 3. Parking lots – Traditional shoebox luminaire set on a simple square pole.
- 4. Building mounted – Complementary to building architecture while meeting standard requirements.

C. Type

1. Post Top

- a. Luminaire: Arlington Series Post-top
- b. Pole: Winter Park, Cast Iron, Holophane
- c. Height: 11'
- d. Color: Black or green as appropriate
- e. Lamp: Pulse Start Metal Halide or LED

2. Shoebox (rectangular)

- a. Luminaire: Vision, Invue Cooper Lighting
- b. Pole: Square Straight Aluminum, Invue
- c. Height: 20-30'

- d. Color: Gray
- e. Lamp: Pulse Start Metal Halide or LED

3. Pendent

- a. Luminaire: Epic Modern, Invue Cooper Lighting
- b. Mid Section: Solid Rings
- c. Shade: Straight Wide
- d. Pole: Round Straight Aluminum, Invue
- e. Arm: Bishop Pole Mount Arm, Invue
- f. Height: 12'
- g. Color: Black
- h. Lamp: Pulse Start Metal Halide or LED

4. Cobrahead

- a. Luminaire: Evolaire, Hadco
- b. Pole: Round Straight Aluminum
- c. Arm: HFP1410 Single or Double Arm, Hadco
- d. Height: 20-30'
- e. Color: Gray
- f. Lamp: LED

5. Building-mounted

- a. Luminaire: Entri, InVue, Cooper Lighting
- b. Color: Black or color complementary to the building
- c. Lamp: LED

2.03 – CONTROL UNITS

The BAS shall monitor the status of an existing photocell that controls exterior lighting on campus. The BAS polls the photocell for ambient light levels and engages or disengages a lighting control contactor. A Square D or equivalent contactor shall provide power to the exterior lighting circuits.

2.04 – LAMPS

- A. Lamp Source Selection – Lamp selection cannot compromise Illuminance, uniformity and CRI. Recommended lamp types are noted in 2.02(C), however if the designer can substantiate a variation on the lamp selection, the University may evaluate on a case by case basis. Lamp source must also provide for the response needed when operated.

2.05 – POLES/LUMINAIRE FINISH

- A. Cast Aluminum.
- B. Finish – Varies per application.
- C. Finish – Building-mounted may coordinate with or complement building materials and color.

3 – EXECUTION

3.01 – INSTALLATION

- A. Height – Pedestrian area lighting shall be no less than 10 feet and no more than 20 feet high. Vehicular areas shall be lit using fixtures set at heights of 20 to 30 feet high to provide better coverage and minimize the total number of fixtures required to cover a larger area of space. Building mounted lighting shall be placed as close to its intended illuminating area as possible to prevent unnecessary spillage.
- B. Labeling – Label fixtures to identify them both as to their type and service location. Integrate with GIS mapping. Include location and service, as well as lamp, manufacturer, date installed, wattage, date of last service, etc.

3.02 – FIELD QUALITY CONTROL – not used.

3.03 – CLEANING – not used.

3.04 – PROTECTION OF FINISHED WORK – not used.

3.05 – SCHEDULE – not used.

END OF SECTION