

265000 Lighting

Sections Included In This Section:

- 1.1 General
- 1.2 Exterior Lighting
- 1.3 Interior Lighting
- 1.4 Exit Lighting

1.1 GENERAL

- A. It is the responsibility of each project to provide all security, walkway, plaza, and parking lot lighting necessitated by that project. Such exterior lighting shall utilize down-lighting techniques and produce lighting power densities 20% below those defined in ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section.
- B. New exterior lighting installations should be in character with the architecture and its surroundings. Attention shall be given to established historic districts or buildings.
- C. In new construction, do not use conventional incandescent lighting. For small surface lights, track lights, and recessed cans, CFL's or replaceable LED's are preferred. Halogen bulbs may be used, particularly where dimming is required, if suitable fixtures with the preferred lamps are unavailable.
- D. For energy conservation and light pollution reduction, non-essential exterior lighting (landscape and architectural) shall be kept to a minimum and in no instance exceed 50% of the lighting power densities defined by AHRAE/IESNA 90.1-2004, Exterior Lighting Section.
- E. All conductors for exterior lighting shall be installed underground. Special permission from the applicable Maintenance Division Director shall be obtained for special installations or circumstances.
- F. All exterior lighting shall be weatherproof. For example, if fixtures are provided with an individual photocell receptacle, and the lights are controlled by another device (other than a photocell), a "dummy" photocell shall be installed to weatherproof the fixture.
- G. All fuses shall be GLR type. Not in-line style.
- H. Interior lighting shall be designed so that direct beam illumination from interior luminaires remains within the building.

1.2 EXTERIOR LIGHTING

- A. GENERAL PROVISIONS – LAMP AND LUMINAIRE TYPE:

Exterior lighting shall be pulse start Metal Halide, except where other provisions apply. Installations close to the University of Florida's Observatory shall be Low Pressure Sodium.

Exterior lighting including security lighting, shall be cut-off fixtures and shall document that no more than five percent of the total designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down). Luminaires shall be selected and designed to prevent visibility of the light source. Sag lenses, convex lenses and drop lenses are prohibited. Luminaires, including wall-mounted fixtures, shall not be tilted but shall be installed at 90 degrees horizontal. Exterior lighting fixtures should be approved by the International Dark Sky

Association (www.darksky.org).

- B. **FIXTURES:** All fixtures shall be identified inside of hand hole cover with name of fixture, manufacturer, and model number. All new light poles shall receive a number assigned by PPD and installed by contractor. On smooth metal poles contractor will use Brother P-touch #TZ-251 or equal. On concrete, wood, or fluted metal poles the contractor shall use ALMETEK aluminum tag holder with 1 ½" x 1" UV tag or equal.

The following indicates the fixture type, by application.

1. Core Campus Walkways and Plazas:

- a) Type: Fixture shall be post-top acorn globe style.
- b) Use: Core campus walkways and plazas (see Drawing 16500-A).
- c) Manufacturer: Moldcast, King, Antique, Lumec, Sun Valley
- d) Model: Moldcast-PCC Series
- e) Luminaire: Optical system shall provide reduced glare greater than 75 degrees above vertical and contain an internal multi-tiered reflector element. Globe shall be non-yellowing patterned clear acrylic with minimum 3-year warranty against yellowing. Luminaire dimensions; 14 inches in diameter by 33 inches high (nominal). Luminaire housing shall include a black cast aluminum finial top.
- f) Lamp: 85-150 watt clear metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Pole: The pole shall be extruded aluminum upper shaft welded to a cast aluminum decorative base. Pole height shall be 10'. Posts are to be 4 inch, smooth, with round cross-section and straight shaft. Pole base shall be Moldcast type DB1 Series.
- h) Finish: Premium abrasion and fade resistant black polyester powder coat.
- i) Comments: To reduce light spillage and improve light distribution, optical systems may be adapted with light deflection devices provided that the device allows nighttime visibility of the entire luminaire rather than making the upper portion appear dark. Such a device may include the Moldcast Dark Skies Shield or Moldcast House Shield.

2. Core Campus Parking Lots and Streets:

- a) Type: Fixture shall be post-top acorn globe style. Where used in roadway medians and internal parking lot medians, the fixture shall be a twin arm post-top acorn globe style.
- b) Use: Core campus parking lots and streets (see Drawing 16500-A).
- c) Manufacturer: Moldcast, King, Antique, Sun Valley
- d) Model: Moldcast- Federal Globe FGL Series

- e) Luminaire: Optical system shall provide reduced glare greater than 75 degrees above vertical and contain an internal multi-tiered reflector elements. Globe shall be non-yellowing, patterned clear acrylic with minimum 3 year warranty against yellowing. Luminaire dimensions; 16 inches diameter by 41 inches high (nominal).
- f) Lamp: 150 - 250 watt clear metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Pole: The pole shall be extruded aluminum upper shaft welded to a cast aluminum decorative base. Mounting height shall be 14'. Posts are to be 4 inch (minimum), smooth, round cross-section and straight shaft. Pole base shall be Moldcast type DB1.

Pole for post top twin-arm installations shall be 5 inch (minimum), smooth, round cross-section and straight shaft. Poles shall be Moldcast type DB2. Twin-arm mounts are to be Antique WTA28 series.
- h) Finish: Premium abrasion and fade resistant black polyester powdercoat.
- i) Comments: To reduce light spillage and improve light distribution, optical systems may be adapted with light deflection devices provided that the device allows nighttime visibility of the entire luminaire rather than making the upper portion appear dark. Such a device may include the Moldcast Dark Skies Shield or Moldcast House Shield.

3. General Campus Walkways and Plazas:

- a) Type: Round cutoff, post top.
- b) Use: Walkways and plazas beyond the core campus area (see Drawing 16500-A).
- c) Manufacturer: Kim, Gardco with Type III distribution.
- d) Model: Kim CCS Series, Gardco – CP Series
- e) Luminaire: Fixture shall have round shape, flat top, with flat, tempered glass lens in a hinged aluminum frame. Housing material shall be spun aluminum with all welds and fasteners concealed. Optical system is to be 90 degrees rotatable, segmented aluminum reflector, electrochemically brightened and sealed. Luminaire dimensions; 17 inches in diameter and 8 inches in height (nominal).
- f) Lamp: 85-150 watt clear metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Pole: Pole height; maximum 16 feet. Pole shall be extruded aluminum, black, with round cross-section, straight shaft, smooth and 4 inch (minimum) in diameter.
- h) Finish: Premium abrasion and fade resistant black polyester powdercoat.

- i) Comments: The round shape, dome top version of this fixture (Gardco – MP Series; 17” diameter and 11’ height) may be used if located in proximity to installations of the round shape dome top fixture (Gardco MA or MW series) for street, parking lot and wall-mounted area lighting per items #6 and #9 below. The round shape, dome top fixtures are recommended for University Athletic Association installations.

4. Streets and Parking Lots – Option One:

- a) Type: High mast cutoff cobrahead light.
- b) Use: Enhancements or additions in streets and parking lots beyond the core campus that currently have this fixture type.
- c) Manufacturer: General Electric.
- d) Model: GE MDCL Series
- e) Luminaire: Luminaire dimensions; 15 inches by 31 inches.
- f) Lamp: 400 watt clear metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Pole: Aluminum octaflute pole. Union metal-aluminum octaflute-101A-HJ-340-A2B/2C. Mounting height: 23 feet to 35 feet, lower where tree cover needs to be preserved and near the campus observatory. Arm length shall be a minimum of 4 feet.
- h) Finish: Grit blast aluminum.

5. Streets and Parking Lots – Option Two:

- a) Type: Black high mast cutoff cobrahead light.
- b) Use: Replacements or new installations in streets, service drives and parking lots beyond the core campus. This fixture should not be intermixed with existing cobrahead fixtures of a different design.
- c) Manufacturer: General Electric, American Electric
- d) Model: GE MDCL Series
- e) Dimensions: Luminaire dimensions – 15 inches by 31 inches, black.
- f) Lamp: 400-Watt clear metal halide, pulse start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Ballast: Cold Weather rated
- h) Pole:

- Description: Octagonal black aggregate concrete
- Type: Direct buried
- Color: Black/black (6P3K colorized finish on a black aggregate, centrifugally spun concrete pole. Note: Color consists of a black Amershiield polyurethane coating and shall contain antigraffiti characteristics with a 10-year warranty.)
- Style: Pole is to be tapered at a rate according to manufacturer's recommendations per pole height.
- Access: Above Ground – handhold is to have a cover painted with black polyester powder coat finish; Below Ground – two conduit entrance points 180 degrees apart to allow conduit entrance. Pole top – tenon to be painted to match pole and handhold cover paint.
- Mounting height: 23 to 35 feet, lower where treecover needs to be preserved and near the campus observatory.
- Arm length: A minimum of 4 feet, painted to match pole and handhold cover.
- Manufacturer is Ameron.

i) Finish: Black polyester powder coat luminaire.

6. Streets and Parking Lots - Option Three:

a) Type: Round cutoff, arm mount.

b) Use: Replacements or new installations in streets, service drives and parking lots beyond the core campus. This fixture should not be intermixed with existing cobrahead fixtures of a different design. The appropriateness of applying the "Streets and Parking Lots: Option Three" standards shall be confirmed during the design phase based upon the area's prominence, existing use of this fixture in the vicinity, and alternatives analysis. This is the recommended fixture for University Athletic Association installations.

c) Manufacturer: Kim, Gardco with Type III distribution.

d) Model: Gardco MA Series for projects of the University Athletic Association (UAA); Gardco CA Series for all other locations

e) Luminaire: Fixture shall have round shape, flat top (dome top for UAA installations), with flat, tempered glass lens in a hinged aluminum frame. Housing material shall be spun aluminum with all welds and fasteners concealed. Optical system is to be 90 degrees rotatable, segmented aluminum reflector, electrochemically brightened and sealed. Luminaire dimensions; 17 inches in diameter and 11 inches in height (nominal).

f) Lamp: 150 watt clear metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase. At 30 foot mounting height, a 250 watt clear metal halide, pulse start lamp may be acceptable as needed to meet illumination standards.

g) Pole: Mounting height 20-30 feet. Pole shall be aluminum, smooth, round cross-section. The pole shall be tapered with an 8 inch base and 4 inch top. Arm mount shall be a minimum of 4 feet length.

h) Finish: Premium abrasion and fade resistant black polyester powdercoat.

7. Parapet Mounted Area Light:

- a) Type: The use of parapet mounted area lights is discouraged.
- b) Use: Green Areas (i.e. lawns, softscape) only with an approved Standards Deviation Request Form.
- c) Manufacturer: Sterner, Hydrel.
- d) Model: Sterner 872 Series
- e) Luminaire: Luminaire dimensions; 9 inches deep by 20 inches high by 23 inches wide.
- f) Lamp: 400 watt clear metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Mounting: Mounting height: 5 to 8 building stories above surface to be lighted.
- h) Finish: Premium abrasion and fade resistant black polyester powdercoat.
- i) Comments: For mounting height of 3 to 4 building stories above surface to be lighted, a 250 watt, metal halide, pulse start, lamp shall be used. The luminaire shall provide glare control.

8. Wall Mounted Cutoff Entry and Area Light – Option One:

- a) Type: Wall mounted cutoff.
- b) Use: Entrances and small areas with low mounting heights. Area lights only with justification by the design professional and approval during the design phase.
- c) Manufacturer: McPhilben, Gardco.
- d) Model: McPhilben 101 Series
- e) Luminaire: Luminaire dimensions; 9 inches deep x 7 inches high x 16 inches wide.
- f) Lamp: 50-150 watt, metal halide, pulse-start, 4-pin. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Mounting: Depends on application; install at 6 feet to 12 feet above grade. Mounting angle shall be 90 degrees horizontal such that the light source is not visible.
- h) Finish: Premium abrasion and fade resistant black polyester powdercoat.

9. Wall Mounted Cutoff Entry and Area Light – Option Two:

- a) Type: Wall mounted cutoff.
- b) Use: Entrances and small areas with low mounting heights. This is the

recommended fixture for University Athletic Association installations. Area lights only with justification by the design professional and approval during the design phase.

- c) Manufacturer: Gardco
- d) Model: Gardco MW Series for projects of the University Athletic Association (UAA); Gardco CW Series for all other locations
- e) Luminaire: Fixture shall have round shape, flat top (dome top for UAA installations), with flat, tempered glass lens in a hinged frame. Luminaire dimensions; 17 inches in diameter and 11 inches in height (nominal).
- f) Lamp: 50-150 watt metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Mounting: Depends on application; install at 6 feet to 12 feet above grade. Mounting angle shall be 90 degrees horizontal such that the light source is not visible.
- h) Finish: Premium abrasion and fade resistant black polyester powdercoat.

10. Facade (Sign) and Landscaping Light:

- a) Type: The use of ground mounted uplights is discouraged.
- b) Use: Low walls (such as for signs) and landscaping only with an approved Standards Deviation Request Form.
- c) Fixture Manufacturer: Omegalux, Design Plan
- d) Model: Omegalux - 1200 series
- e) Luminaire: Luminaire dimensions; 3.75" deep by 6.5" high. Width varies, may be 10 inch or 19 inch wide.
- f) Lamp: For 10 inch wide luminaries: 26 watt compact fluorescent quad tube, 4-pin. For 19 inch wide luminaries: Two (2) 26-watt compact fluorescent quad tubes, 4-pin. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Mounting: Mounting height, varies.
- h) Finish: Black or dark bronze
- i) Comments: Requires additional ingrade wiring compartment.

11. Building Facades - Ground Mounted:

- a) Type: Ground mounted uplight.
- b) Use: Building facade only with justification by the design professional and

approval during the design phase.

- c) Manufacturer: Sterner, Gardco, Hydrel, Kim.
- d) Model: Gardco DF7 Series.
- e) Luminaire: varies.
- f) Lamp: 150 watt, metal halide, pulse-start. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Mounting: height varies.
- h) Finish: Premium abrasion and fade resistant black polyester powdercoat.

12. Building Facades - Pole Mounted:

- a) Type: Floodlighting pole.
- b) Use: Building facades only with justification by the design professional and approval during the design phase.
- c) Manufacturer: Sterner, Gardco, Hydrel, Kim.
- d) Model: as required by application.
- e) Lamp: varies
- f) Pole: Mounting height shall be 20 feet to 30 feet. Pole shall be aluminum, round cross section, smooth, tapered with 8" base and 4" top.
- g) Finish: Premium abrasion and fade resistant black polyester powdercoat.

13. Trees:

- a) Type: Ground mounted uplight or pole mounted downlight.
- b) Use: Trees and sculpture.
- c) Manufacturer: Sterner, B.K. Lighting, Inc., Lumiere, Hydrel
- d) Model: Sterner VE6 Series
- e) Luminaire: varies
- f) Lamp: 35-39 watt metal halide PAR20, Flood or spot. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets UF illumination standards is encouraged and may be acceptable pending justification by the design professional and approval during the design phase.
- g) Finish: Premium abrasion and fade resistant black or dark bronze polyester powdercoat.

- h) Comments: Requires additional ingrade wiring compartment and electronic ballast. Downlight is preferable to reduce light pollution and should have a discretely placed pole that blends into the landscaping. Pole placement must not be attached to the tree or so close that tree trunk growth may eventually engulf the pole. Consult PPD Grounds for questions regarding pole placement next to trees.

14. Close to Observatory:

- a) Type: square, cutoff, arm mount
- b) Use: Areas within direct sight line of the observatory. Direct sight line is defined as those places not obscured by buildings or tree groves when viewed from the observatory at ground level. Building sites on higher elevations or with light installations at higher elevations (such as roof-top decks), shall also be considered within direct site line of the Observatory.
- c) Manufacturer: Emco, Gardco.
- d) Model: Infinity – LA Series
- e) Lamp: Low Pressure Sodium. Amber LED lamps may be acceptable pending justification by the design professional and approval during the design phase and consultation with UF's Department of Astronomy.
- f) Mounting: 20 – 30 feet
- g) Finish: Premium abrasion and fade resistant black polyester powdercoat.
- h) Comments: Within areas close to the observatory, lower pole heights shall be used for all lighting installations. This shall include the selection of fixtures with lower pole heights, as appropriate, and/or lighting design that utilize the lower-end of the range of acceptable mounting heights. For pole height considerations, the use area close to the observatory is defined as above plus any lighting installations an elevation higher than the observatory where building and landscape features do not provide the necessary obstruction. All lighting fixtures utilized in these areas shall be full cutoff and shall be designed in consultation with UF's Department of Astronomy.

15. North of University Avenue and West of SW 13 Street:

- a) Projects that include street lighting and are on university lands that lie north of University Avenue or west of SW 13 Street shall be lighted in consultation with the City of Gainesville (Public Works Department and Gainesville Regional Utilities). City of Gainesville standard fixtures shall be used for roadway and pedestrian lighting along public streets. Refer to Drawing 16500-A for the areas to be illuminated according to City of Gainesville/Community Redevelopment Agency district standards.

C. LIGHT LEVELS - ILLUMINANCE AND UNIFORMITY RATIO:

Campus lighting shall provide security and comfort to nighttime campus users. The lighting shall be uniform and of a high quality, which the human eye can efficiently use. Careful design is required to address the issues of glare, light trespass, and light pollution while providing adequate and efficient lighting. The following lighting standards table provides fixture and illumination requirements to be applied in different campus settings based on IESNA standard applications. If

IESNA adopts revised standards for these applications, the latest version of IESNA standards will apply. A photometric plan shall be provided that clearly demonstrates conformance with these standards. Deviations from these standards require approval of the University's Lighting Committee. This approval may be obtained from the Lighting Standards Subcommittee (contact the Design and Construction Standards Subcommittee Chair).

1. Design Areas and Spill Light

- a) At the initial design phase, the light fixture category and design area shall be identified. The lighting design area shall be confirmed with the project manager to be used for illumination standards and LEED site evaluation.
- b) The lighting design area shall consider adjacent areas and their relation to illumination within the project site. Spill light (e.g. light that falls outside the project site where the luminaire is installed) shall be evaluated in the context of adjacent areas. Project sites adjacent to built areas must ensure that illumination on the project periphery provides an acceptable transition or uniformity to illumination levels in adjacent areas. Project sites adjacent to undeveloped natural areas shall ensure that a gradual transition exists between the project site edge and the darker undeveloped site. Care should be taken to ensure that light trespass does not interfere with natural habits or attract pedestrians into areas where their presence is discouraged. Project sites adjacent to public roads and non-university property should consult the appropriate local government codes regarding light spillage.
- c) Lighting applications in "green areas" (i.e. lawns, softscapes) should assume that the design area includes only the walkways and plazas within the "green area" unless otherwise directed by the project manager.
- d) Illuminating footpaths through natural areas is generally discouraged. However, when a formal walkway exists through the natural area for use during nighttime hours, it shall be illuminated according to the standards for General Campus walkways.
- e) Isolated Sites and Locations Away from Main Campus: Exterior luminaries, including all site and wall-mounted fixtures, shall produce no more than 0.20 horizontal and vertical footcandles at the LEED site perimeter and 0.01 horizontal footcandles 15 feet outside of the LEED site ("LEED site" identified by the project manager and design team for the purposes of certification from U.S. Green Building Council's Leadership in Energy and Environmental Design.)

2. Other Applications:

- a) Lighting intensities for projects or locations not specifically identified in this section (for example athletic fields and courts, bikeways, and parking garages) shall be designed as recommended by the Illuminating Engineering Society of North America (IESNA).
- b) Lighting at Automated Teller Machines is governed by the Florida Building Code and IESNA.
- c) Special attention should be given to illumination levels at bicycle parking facilities, crosswalks and bus stops on night routes to ensure visibility, security, and uniformity. Illuminance at these locations should be consistent with that achieved in the surrounding area, whether it be a parking lot, building entry, sidewalk or road edge.

- d) Bus shelters are required to be internally lighted. Consult the Transportation and Parking Services Director for information on bus shelter lighting.
- e) Energy efficient technology, such as induction, LED, and High Intensity Fluorescent is encouraged in these "other" applications if the fixture provides similar white light quality and adequate illumination, pending justification by the design professional and approval during the design phase.

3. Uniformity

All exterior lighting applications shall provide a maximum 4:1 average-to-minimum uniformity ratio unless IESNA standards require a different uniformity ratio specific to a certain application. When a uniformity ratio is specified by IESNA, that ratio shall prevail.

LIGHTING STANDARDS				
CATEGORY	HEIGHT	TYPE	LAMP ⁵	IESNA ILLUMINANCE ¹ STANDARD APPLICATION
CORE CAMPUS WALKWAYS AND PLAZAS ²	10'-0"	Acorn Globe	Metal Halide (Pulse Start) 100-150 watt	Pedestrian Way
GENERAL CAMPUS WALKWAYS AND PLAZAS ³	16'-0"	Cutoff Round (Post-Top)	Metal Halide (Pulse Start) 150 watt	Pedestrian Way
CORE CAMPUS PARKING LOTS ²	14'-0"	Acorn Globe (Post-top or Twin-Arm)	Metal Halide (Pulse Start) 150-250 watt	Medium Security Parking Lots unless otherwise directed by Project Manager
PARKING LOTS ⁴ Option One and Two	23' – 35'	Cutoff Cobrahead (black or aluminum)	Metal Halide (Pulse Start) 400 watt	Medium Security Parking Lots unless otherwise directed by Project Manager
PARKING LOTS ⁴ Option Three	20 – 30'	Cutoff Round (Arm-Mount)	Metal Halide (Pulse Start) 150-250 watt	Medium Security Parking Lots unless otherwise directed by Project Manager
CORE CAMPUS STREETS ²	14'-0"	Acorn Globe (Post-top or Twin-Arm)	Metal Halide (Pulse Start) 150-250 watt	Collector Streets in Commercial Areas
STREETS ⁴ Option One and Two	23' – 35'	Cutoff Cobrahead (black or aluminum)	Metal Halide (Pulse Start) 400 watt	Collector Streets in Commercial Areas
STREETS ⁴ Option Three	20 – 30'	Cutoff Round (Arm-Mount)	Metal Halide (Pulse Start) 150-250 watt	Collector Streets in Commercial Areas

NOTES:

- 1. Illuminance is measured as Maintained Foot candles of horizontal illuminance at grade.

2. For the purpose of lighting standard application, the Core Campus Area is depicted on Drawing #16500-A at the end of this Section.
3. General Campus Walkways fixture and illuminance standards apply outside the Core Campus Area as depicted in Drawing #16500-A. The General Campus Walkways illuminance standard also applies to all sidewalks adjacent to campus or public roadways.
4. Standards for Streets and Parking Lots apply outside the Core Campus Area as depicted in Drawing #16500-A at the end of this Section.
5. Comparable induction, LED, High Intensity Fluorescent or other energy efficient technology that provides similar white light quality and meets all other UF Exterior Lighting Design and Construction Standards is encouraged and acceptable pending justification by the design professional and approval during the design phase.

D. FIXTURE MOUNTING:

Fixtures shall be fastened with galvanized hardware through cast holes. Field cut holes are not acceptable. All hardware shall be made of non-rusting, non-corroding material.

E. GROUNDING:

Steel and aluminum poles shall have all conductive metal parts bonded together and connected to an equipment-grounding conductor, and connected to the fixture at the top. Also connect to the branch circuit equipment-grounding conductor and to a ground rod at the bottom of each pole.

F. CONTROL:

1. See Specification Section 260900.

G. TIME CLOCKS:

1. All time clocks shall have a snap-out timing mechanism, such as with a Tork 1103.
2. For the Health Science, a digital clock with battery or capacitor back-up may be acceptable.

H. METERING:

The following is the PPD policy for metering on exterior lighting projects:

1. Lighting installations do not need a meter if the connected load is less than one KVA.
2. New lights should preferably be connected to existing, metered, lighting circuits. If the existing lighting circuit is un-metered, and the subsequent connected load is greater than one KVA, then the lighting project must include installation of a meter for the entire lighting circuit.
3. Alternatively, new lights in areas of general use may be connected to a building funded by the University's E & G (Education & General) budget, and new lights in non-E & G areas may be connected to a building funded by the benefiting non-E & G entity. If the new lighting load is less than 0.5 KVA, then it may be connected to an E & G or non-E & G circuit, regardless of who is the beneficiary.

I. POLES:

1. Concrete, stainless steel and wood poles shall only be used within less public areas of campus defined as IFAS, Veterinary Medicine research fields, barns and greenhouses, PPD warehouses, the Surge Area, and certain remote properties.
2. Concrete poles shall be pre-stressed, and shall have a 4" X 6" handhole located 18" above finished grade. Cover shall be stainless steel, fastened with stainless steel tamper resistant screws, and bonded to ground with flexible braid copper of the same size as the equipment-grounding conductor.
3. Wood poles shall be CCA treated. Specify ANSI-05.1 and AWPA C-1 and C-4. Bottoms of wood poled placed in concrete shall be wrapped with 'Osiose' felt barriers to prevent wicking of the preservative.
4. Poles shall have a wind-loading factor compliant with current codes, including any allowance for 'gusts.'

J. EXECUTION:

Joints shall be made in "splice boxes" in the pole, or in oversized junction boxes located in the ground near the pole. Locations of junction boxes shall be marked on as-built prints.

Acceptable manufacturer of junction boxes is: CDR (24" deep) - Load Designation - AASHTO - H15.

1.3 INTERIOR LIGHTING

A. FIXTURES: The project lighting designer/electrical engineer shall select the appropriate fixtures for the project. Selections shall be presented to the UF Project Manager early in the design phase for review. It is the University's goal to reduce electrical energy consumption while providing pleasing, sufficiently lit spaces. For example, consider reducing the average maintained footcandle (fc) level in offices and provide task lighting. This reduces building energy consumption while providing individual occupants with lighting control, both of which contribute to LEED points. Consider the use of high efficiency fixtures with T5 lamps. One of the benefits of using this type of fixture is the potential to reduce the total quantity of fixtures needed to light a space and increase the spacing between the fixtures (as compared to T8 fixtures). Engineering judgment shall be used as every space has many variables to be considered in lighting design. T5HO lamps shall only be used in fixtures that reduce glare by using indirect or diffuse optics. Consider the use of occupancy sensors and daylight harvesting (see control section).

1. Traditional, Flush-Lensed Fixture; Lithonia 2GT8 32 RW A12 LG GEB (See Ballast Specification). Or equal by Day-Brite, Williams, Metalux, Columbia, Lithonia
2. Parabolic Troffer; Large Cell, 3" Deep, Semi-Specular Silver Finish; Lithonia 2PM3N G (A,B,H) (2,3,4) 32 16 (120,277) GEB (See Ballast Section). The brackets "()" around the preceding numbers indicate options. Or equal by Day-Brite, Williams, Metalux, Columbia
3. High Efficiency, Recessed Fixture; Day-Brite SofTrace 2ST-G-228-D-EB95 (See Ballast Section). Or equal by Lithonia (RT5 series), Williams (HET series), Columbia (E-POC series).
4. Round, Recessed Downlights; 18W, 26W, 32W & 42W compact fluorescent downlights.

5. Miscellaneous fluorescent fixtures (suspended linear indirect, wrap-around, surface mounted, industrial, etc) shall utilize T8 or T5 lamps with electronic ballasts.
6. When fixtures contain lamps which are ballast fed, comply with the following:
 - a. For small rooms or rooms with small quantities of fixtures, the fixtures are to be considered as stand alone. Each fixture shall contain one ballast for lamps, or two ballasts for inboard/outboard switching.
 - b. Where large rooms require (large) quantities of fixtures, continuous rows of lighting may have tandem wiring for energy efficiency. In these instances, one ballast may be used for no more than two fixtures, or one ballast may be used per fixture for inboard/outboard switching.
 - c. Design the lighting for the application. (It is more practical to design the room with the exact lighting requirements, rather than over designing the lighting level and trying to obtain energy savings by having occupants control lighting levels by switching off lamps.) Inboard/outboard switching should be used only where two lighting levels are required by application (computer lighting, etc.). Provide the minimum number of ballasts possible for the application, following the requirements above.
 - d. If tandem wiring is utilized, the circuiting should be indicated on the fixtures (e.g. blue dots and red dots stickers to indicate from floor level below that these fixtures are wired together) and on the conduit with labels. Labeling shall be provided on tandem wired fixtures to indicate wiring on interconnected fixtures, particularly for the routing of switch legs.

B. LAMPS:

1. Lamps shall be:
 - a) T8: rapid start, low mercury, 32W, 48", 2900 initial lumens, CRI 85 (minimum), 4100k, rated avg. life 30,000 hours at 3 hours/start, 35,000 hours at 12 hours/start.
 - b) T5: rapid start, low mercury, 28W, 45.2", 5000 initial lumens, CRI 85 (minimum), 4100k, rated avg. life 20,000 hours at 3 hours/start.
 - c) T5HO: rapid start, low mercury, 54W, 45.2", 5000 initial lumens, CRI 85 (minimum), 4100K, rated avg. life 30,000 hours at 3 hours/start, 35,000 hours at 12 hours/start.
 - d) Compact Fluorescent: rapid start, low mercury, PLT 4-pin, 18/26/32/42W, 1200/1800/2400/3200 initial lumens respectively, CRI 82 (minimum), 4100K, rated avg. life 12,000 hours at 3 hours/start.
2. Acceptable Manufacturers: Sylvania, Phillips, GE
3. Disposal: Lamps shall be legally disposed of at Constructor's expense during renovation projects. Contact EH&S for additional information.

C. BALLASTS:

1. Ballasts shall be electronic, high frequency (at least 20khz).
2. Ballasts shall be UL listed (Class P) with a Class A sound rating.
3. Ballasts shall produce less than 10 percent Total Harmonic Distortion (THD) in the input current waveform and shall operate at a power factor of at least 90%.

4. Two, three, and four lamp ballasts are acceptable.
5. Qualifying manufacturers shall have been manufacturing electronic fluorescent ballasts for a minimum of five years with a satisfactory performance record. Ballasts shall be warranted by the manufacturer for a minimum of three years.
6. Acceptable Manufacturers: Advance Transformer Company, Sylvania, GE.
7. PCB Ballast Disposal: Unless existing ballasts are labeled to indicate no PCB's, assume they contain PCB's; and they shall be legally disposed of at the constructor's expense. Contact EH&S Hazardous Materials Disposal Department at (352) 392-8400.
8. Remote Ballasts: If a ballast cannot be reached by a standard 8-foot stepladder, or it weighs more than 20 lbs, the ballast must be remote mounted and placed in an accessible location unless approved otherwise. (Verify use and location(s) of remote mounting with maintenance entity during design and construction process.)

D. CONTROLS:

1. See Specification Section 260900.

E. EGRESS (EMERGENCY ESCAPE PATH) LIGHTING:

Egress (Emergency Escape Path) lighting shall be provided for a minimum of ninety minutes after a power failure. Check with the facilities personnel to determine best practice for the installation location and for the amount of available power. Provide emergency power per one (or more) of the following methods, in descending order of preference:

1. Connect fixtures to emergency power provided from a generator fed system (preferred at HSC).
2. Power selected lamps with emergency battery packs in fluorescent fixtures.
3. Provide dedicated incandescent fixtures with maintenance free battery packs.
4. Push test buttons: For maintenance purposes, when push test buttons are installed and they cannot be reached by a standard 8 foot step ladder, the push to test switches shall be located at typical wall switch height.

F. TEACHING AUDITORIUMS:

Refer to Section 115200 for special lighting requirements for teaching auditoriums relating to the installation and operation of audio-visual equipment.

1.4 **EXIT LIGHTING**

A. GENERAL:

In buildings without emergency generators, provide exit lights with battery backup and charger.

B. TYPE:

Exit lights shall be Photoluminescent type or Light Emitting Diodes (LEDs) with red lettering and a minimum 5-year warranty on fixture, batteries and lights. For minor renovations, matching existing fixtures are acceptable.

C. ACCEPTABLE MANUFACTURERS:

Trace, Dual-Lite, Prescolite, Evenlight, GE, Firefly

D. EXIT SIGNS:

All exit signs shall remain on continuously and shall not be switched.

END OF SECTION