LEGISLATIVE # 120023A

120023A

CITY OF GAINESVILLE
every path starts with passion
FLORIDA

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TO: **City Plan Board** **Item Number: 5**

FROM: **Planning Department Staff** **DATE: April 26, 2012**

SUBJECT: **Petition PB-12-40 TCH:** City Plan Board. Amend the Land Development Code to allow additional procedures for considering lighting intensities within off-street parking facilities, including parking structures.

Recommendation

Staff recommends approval of Petition PB-12-40TCH.

Description

This petition was initiated as a result of a request from an existing development to redesign the lighting at its site to improve security and to enhance the night time experience of patrons at its facility. After reviewing the request in context of the existing lighting standards, staff considered the history of the current ordinance, its effectiveness in achieving the general purpose and intent of a lighting ordinance, and how the ordinance addresses variations in site characteristics. One observation is that while the current ordinance tracks fairly closely to those of comparable cities, it does not address variations in site characteristics, vertical variations in intensity, and lighting for parking structures. One key factor is that while the ordinance allows for oversight review of most uses it does not allow exceptions for open parking lots.

On March 15, 2012, staff submitted a referral to the City Commission asking for authorization to address a modification to the lighting ordinance. The City Commission voted 7 to 0 to refer the request to the City Plan Board to initiate a petition for commission consideration.

This petition addresses that referral from the city commission and proposes the following changes.

PROPOSED CHANGES:

1. Reorganize the current lighting standards of Section 30-330, 345.1 and 30-93 under a new heading "Outdoor and Parking Structure Lighting ";
2. Add the following new sections:
    a. A new set of definitions to Sec. 30-23 pertaining to lighting.
    b. A "Purpose and Intent" statement.
    c. An "Applicability" section.
    d. A section modifying the "Submittal Requirements" for review.
    e. A section to address lighting for parking structures.
    f. A section to address lighting adjacent to single-family residential development.

3. Modify the regulations on "Pole Heights" to allow modifications; and
4. Expand the waiver provision to parking lots, so that advisory board or staff can consider requests that address unique designs that do not strictly conform to the standards, but are consistent with the purpose and intent of the ordinance.

Definitions:

Canopy: - A structure attached or detached from another structure, containing a roof and support structures which is open on two or more sides. This definition shall include canopies associated with drive-through of retail and financial establishments.

Character District:

A defined physical area of the city exemplifying a designated set of characteristics common to most of the area and generally related to a variety of development forms and intensities, based on the community's vision as it relates to the physical, environmental, social, economic and urban form and functions of the city.

Foot-Candle:- A unit of measure for illuminance. A unit of illuminance on a surface that is everywhere one foot from a uniform point source of light of one candle and equal to one lumen per square foot.

Full Cut-Off Type Fixture:- A luminaire or light fixture that; by design of the housing, does not allow any light dispersion or direct glare to shine above an 80 degree, horizontal plane from the base of the fixture. Full cut-off fixtures must be installed in a horizontal position as designed.

Glare: - A line-of-sight contact by a person's eye with a direct light source which affects the ability to see. It occurs when a point in the field of view is significantly brighter than the ambient light level.

Horizontal Illuminance: - The measurement of brightness from a light source, usually measured in footcandles or lumens, which is taken through a light meter's sensor at a horizontal position.

Pole Heights: - Pole height shall be measured as the vertical distance between the parking surface, walkway or average grade level and the base of the light fixture.

Shielded Fixture: - Fixtures that are shielded in such a manner that light rays emitted by the fixture, either directly from the lamp or indirectly from the fixture, are projected below a horizontal plane running through the lowest point in the fixture where light is emitted.

Transitional Lighting Corridor: - The "Transitional Lighting Corridor" is an area measuring 100 feet wide along a common boundary with properties zoned residential, within which outdoor parking is proposed.

Up lighting: - Any light source that distributes illumination above a 90-degree horizontal plane. Transitional

Uniformity Ratio: - Uniformity ratio describes the average level of illumination in relation to the lowest level of illumination for a given area. Example: U. ratio = 4:1 for the given area, the lowest level of illumination (1) should be no less than 25% or "4 times less" than the average (4) level of illumination.

Section 30-345 Outdoor and Parking Structure Lighting

1. ***Purpose and Intent:***

(a) The general purpose of this article is to protect and promote the public health, safety and welfare, and improve the quality of life by establishing standards and a process for review of outdoor lighting.
(b) This article establishes standards for outdoor lighting in order to accomplish the following:
  (1) To ensure that sufficient lighting can be provided where needed to promote safety and security in vehicular use areas for residents of the City;
  (2) Reduce light pollution, light trespass, glare, excessive lighting, and offensive light sources;
  (3) Promote quality, efficient and cost effective lighting, so as to conserve energy;
  (4) Provide an environmentally sensitive nighttime environment that minimize the impact of stray lighting on human health, habitat and environment and allow for the "dark sky" concept;
  (5) Allow flexibility in the style of light poles, lighting fixtures and shielding mechanisms to prevent inappropriate, poorly designed or installed outdoor lighting; and
  (6) To provide a schedule for bringing nonconforming lighting into conformance with this article.

2. **Applicability:**

(a) When an outdoor lighting installation is part of a new development proposal requiring Development Plan Review, a Building Permit, or a Special Use Permit, the Technical Review Committee shall review and approve the lighting design as part of the permitting process;
(b) Projects undergoing redevelopment or expansion shall be required to comply with the new standards when the redevelopment increases the gross floor area by 50% or more of existing floor area. This shall be base on the valuation of the existing project undergoing redevelopment;
(c) These regulations do not apply to individual single-family dwelling units but are applicable to community areas or public gathering places such as common areas in a subdivision, pathways, clubhouses, shared driveways, parking lots and play areas;
(d) These regulations do not apply to Public Right of Way and shall not conflict with City Street Light standards and design criteria; and
(e) These regulations do not apply to lighting necessary for emergency equipment and work conducted in the interests of law enforcement or for the safety, health, or welfare of the community.
(f) These regulations shall apply to the outdoor parking, storage, display and sales areas of new and used automobile dealerships.
(g) A development which has an outdoor parking facility and operates only during daytime hours shall be required to comply with these regulations if it changes to operate after dark.

3. **Submittal Requirements for Review of Photometric Plans, Waivers, Modifications and Unique Lighting Plans.**

In addition to the general requirements for development plan review as listed in Sec. 30-160, Submittal Requirements, all request for installation of outdoor lighting and associated features shall provide the following information:

(a) The applicant shall submit to the Technical Review Committee sufficient information, in the form of an overall outdoor lighting plan, to enable a determination that the applicable standards shall be satisfied. At a minimum, the outdoor lighting plan shall include at least the following:

(1) A brief written narrative, with accompanying plan or sketch, which demonstrates the objectives of the lighting;

(2) Manufacturer specification sheets, cut-sheets or other manufacturer provided information for all proposed lighting fixtures;

(3) The proposed location, mounting height, and aiming point of all outdoor lighting fixtures.

(4) If building elevations are proposed for illumination, drawings shall be provided for all relevant building elevations showing the fixtures, the portions of the elevations to be illuminated, the illuminance levels of the elevations, and the aiming point for any remote light fixture;

(5) Photometric data of all lamps (bulbs), and other descriptive information on the fixtures, and if applicable or required, designation as Illuminating Engineering Society of North America (IESNA) "cut-off" fixtures;

(6) A Computer generated or other type of photometric grid showing footcandle readings every 10 feet within the property or site, and 25 feet beyond the property lines. The map or grid shall be drawn to a scale acceptable to the City Manager or designee, but in no instance to a scale smaller than one inch equals 100 feet. Iso-footcandle contour line style plans are also acceptable;

(7) Maintained horizontal illuminance shown as footcandles showing maximum to minimum, average, average to minimum, Maximum to minimum and uniformity rations;

(8) Foundation details for each pole;

(9) Evidence that information is IESNA Certified or if information is from a different source, that it is certified by a lighting professional; and

(10) Landscaping information that indicates mature tree size, shrubbery and other vegetation in order to evaluate the long-term and seasonal effectiveness of lighting or screening of lighting.

4. **General Requirements:**

(a) Open-air parking lot lighting shall be designed to provide a minimum value of lighting necessary for the safety and identification of features.

(b) Open-air parking lot lighting shall be designed to provide for uniform lighting throughout the facility with no dark patches or pockets.

(c) Site lighting poles, fixtures, shielding mechanism and placement of lights shall be designed to direct light downwards and to minimize light spillover into the dark night sky.

(d) All lighting fixtures submitted for review of compliance with the lighting ordinance ~~serving parking lots~~ shall be full cut-off fixtures as defined by IESNA. They shall be designed to prevent direct illumination on adjacent and nearby properties or to prevent glare from normal viewing angles (from 30-330) Under the following circumstances, the appropriate reviewing board, city manager or designee ~~for development plans requiring only staff review.~~ may permit alternatives or supplements to the use of full cut-off fixtures:

1. If the design of an area suggests the use of ~~C~~cut-off type decorative light fixtures of either pedestrian or intermediate height (such as Washington globe, lantern, pendant, or other such decorative fixtures);
2. if the site is in a Historic District, a Special Area Plan, Special Character District;
3. if there are unique situations or hardships to the site; and
4. if the fixtures are of a particular period or architectural style,

In cases where alternate fixtures are used instead of full cut-off fixtures, the mounting height of such alternate fixtures shall not exceed 15 feet above average grade or pavement level.

The reviewing body may require reasonable measures to minimize light trespass and light spillover into the dark night sky.

(e) Vegetation and landscaping shall be planted and maintained in a manner that does not obstruct security lighting and minimizes possible entrapment spaces;

(f) Parking lot light locations shall not be in conflict with newly required trees or existing trees required to remain on the property;

(g) Transformer boxes or utility poles should not be located within required parking lot landscape islands. Where transformer boxes or utility poles are located within such islands, the island should be designed to ~~so the required tree will~~ have a minimum unobstructed continuous space of ~~still have the minimum of~~ 140 square feet;

(h) If the roof level of a multilevel parking facility is uncovered, said floor shall be considered an open-air parking lot. If the first floor and/or basement level of a structure is used for parking or storage of patron vehicles, said floor shall comply with the applicable lighting standards;

(i) The use of search lights, lasers, lighting or lights that pulse, flash, rotate or simulate motion for advertising or promotions is prohibited; and

(j) Where the subject site is separated from other nearby uses by a public or private street, trail, easement or other open space, in addition to the spillover lighting data, the applicant shall demonstrate how the proposed development will impact existing lighting conditions.

5. **Outdoor Lighting for Security Purposes and Outdoor Recreational Lighting.**

Lighting which is provided for the security of areas such as, but not limited to, building entrances, stairways, ramps and main walkways or for a permitted outdoor use of land (such as ball parks) shall not under any circumstances exceed a maximum average maintained illumination of 25 footcandles at ground level, and uniformity ratio of 6:1. Exterior wall-mounted lighting shall be full cut-off fixtures (as defined by IESNA). Lighting installations for outdoor recreational uses (including pole heights) may also be designed in accordance with IESNA standards, as outlined in report number RP-6-88, or any update thereto.

The maximum lighting intensity permitted for the security of the areas described above, for permitted outdoor land uses, or pole heights, ~~other than those located in off-street parking facilities~~, may be increased by the appropriate reviewing board through site plan review, or the board of adjustment by obtaining a special exception if site plan review is not required. This shall be done by submitting a unique lighting proposal for outdoor recreational lighting.

In reaching a decision the reviewing body shall rely on the criteria listed under "Waivers of General Standards".

6. **Outdoor Parking Lot Lighting** ~~(Sec. 30-330. - Design requirements for vehicle parking.)~~

(a) Except as provided in this article, ~~(4) *Lighting.*~~ All off-street parking facilities shall be continuously ~~lighted~~ lit after dark throughout the hours that they are in use by the public. Such lighting shall be designed to maintain an average horizontal illuminance not to exceed 2.5 foot-candles, and a minimum horizontal illuminance of 0.5 foot-candles. The uniformity ratio (ratio of average to minimum illuminance) shall be no greater than 5:1, and the maximum to minimum uniformity ratio shall be no greater than 15:1.

(b) Multiple-family dwellings must provide additional parking ~~area~~ lighting at the entrance and exit points sufficient to light the area for pedestrians entering and exiting the parking area. To promote safety and security of sights, lighting levels at entrances and exits shall be equal to the average lighting level for the associated parking lot. All other uses and development, shall, at a minimum, meet the standards provided in the "IESNA Lighting Handbook: Recommended Maintained Illuminances for Open and Covered Parking Facilities, Latest Edition (hereinafter IESNA)" for pedestrian safety. ~~All lighting fixtures serving open air parking lots shall be full cut-off fixtures as defined by IESNA. Cut-off type (as defined by the IESNA) decorative light fixtures of either pedestrian or intermediate height (such as Washington globe, lantern, pendant, or other such decorative fixtures) may be allowed by the appropriate reviewing board, or city manager or designee for development plans requiring only staff review. A photometric plan shall be provided in compliance with section 30-160 (d). Parking lot light locations shall not be in conflict with required trees or any existing trees required to remain on the property. Parking lot lighting locations shall not be in conflict with required trees or any existing trees~~

~~required to remain on the property.~~ *(Moved to Section 4. General Requirements)*~~The maximum height of fixtures shall not exceed 30 feet, except as regulated by an adopted special area plan or other applicable regulations~~. (*Moved to Section 7. Pole Heights)*~~Transformer boxes or utility poles should not be located within required parking lot landscape islands. Where transformer boxes or utility poles are located within such islands, the island should be designed so the required tree will have a minimum unobstructed space of still have the minimum of 140 square feet.~~ *(Moved to Section 4. General Requirements)*

(c) Lighting fixtures shall be aimed and shielded in a manner that prevents glare from normal viewing angles and shall not cast direct illumination on adjacent residential zones

~~(d) Fixtures should be of a type or adequately shielded so as to prevent glare from normal viewing angles.~~

(e) Poles, fixtures, shielding mechanisms and placement of lighting shall be designed to minimize light trespass and light spilled into the dark night sky.

(f) Light trespass and glare. Any development adjacent to a residential use shall not create light trespass of more than 0.5 footcandles measured perpendicularly from the light source at a distance of 25 feet from the property line.

(g) **Lighting Standards for Outdoor Parking Lots on Properties within 100 feet of Properties Zoned Residential**

(1) With reference to outdoor lighting for sites in this classification, there is hereby established a "Transitional Lighting Corridor" of 100 feet wide along the common boundary with properties zoned residential.

(2) The standard listed below shall apply to multi-family and non-residential development consisting of more than one acre or consisting of more than 60,000 square feet of gross floor area.

i. Sites within the "Transitional Lighting Corridor" shall be discouraged from having parking lots intended to operate after dark within 50 feet of the common boundary with properties zoned RSF-1, RSF-2, RSF-3, RSF-4 and RC. Where this cannot be avoided, the development shall comply with the standards listed below as well as in other applicable sections of this ordinance. Alternatively, the applicant may submit a unique lighting plan for consideration by the reviewing body, staff or the board of adjustment.

(3) Except as provided in this section, in addition to the lighting standards listed in this article, outdoor lighting installations and fixtures on properties adjacent to or within 100 feet of properties zoned residential shall comply with the following requirements:

i. Within the transitional lighting corridor all off-street parking facilities shall be continuously lit after dark throughout the hours that they are in use by the public. Such lighting shall be designed to maintain an average horizontal illuminance not to exceed 1.0 foot-candles, and a minimum horizontal illuminance of 0.2 foot-candles. The uniformity ratio (ratio of average to minimum illuminance) shall be no greater than 5:1, and the maximum to minimum uniformity ratio shall be no greater than 10:1. The area shall also comply with the light trespass and glare requirement listed for parking lots. The average vertical illuminance shall not exceed 0.1footcandles at 20 feet above average grade or the

parking surface given the same uniformity ratios of average to minimum and maximum to minimum as listed above.

ii. Light poles and lighting fixtures within the outer 75 feet of the "transitional lighting corridor" shall have a maximum height of 15 feet and shall be characteristic of lighting typical of residential districts; and

iii. Where feasible, additional landscaping may be required to provide light screening between commercial zones and residential zones to help prevent light trespass. Where landscaping is used for light screening, it shall be in addition to the applicable landscaping requirements listed in Article VIII of the Land Development Code. During development plan review, the Technical Review Committee shall determine whether existing vegetation is adequate to meet the required screening needs or whether additional light screening vegetation is necessary to supplement the existing standards of Article VIII.

iv. Light fixtures within the "Transitional Lighting Corridor" shall have 80 degrees full cut-off from the vertical.

7. **Pole Height**.

The following mounting height regulations shall apply to open-air parking lot lighting and the portion of lots adjacent to single-family residential outside the "transitional lighting corridor".

a) The maximum height of light fixtures, except as otherwise regulated by this section, shall not exceed 30 feet. Light fixtures for developments with more than 100,000 square feet of floor area may request an increase in the height of the pole to 50 feet provided the applicant establishes that the requested increase in height meets the following standards:

1) The increase in pole height is necessary to ensure required security needs for the specific use/s operated at the site or for conducting the permitted outdoor use;

2) The increased height is a more efficient and energy conserving option;

3) The required standards for the use as listed in this section will be maintained;

4) The increase in height will not exceed the maximum vertical uniformity ratio of 0.2fc at a height of 5 feet above the height of the pole; and

5) If adjacent to residential, as listed in (the section on single-family residential) Section 30-41, or adjacent to legal non-conforming residential uses, poles shall be located so that the light fixtures create an angle of incidence of the light source at the property line which is equal to or less than 10 degrees and that the light fixture has a source cut-off at 80 degrees from the pole.

8. **Waiver of General Standards**

(a) *Notwithstanding the standards listed in this article, an applicant may petition the city for exceptions or modifications to one or more of the listed standards (intensities, pole height, shields, and fixtures)* ~~The maximum lighting intensity permitted for the security of the areas described above,~~ for permitted outdoor land uses, ~~or pole heights, other than those located in~~

~~off-street parking facilities~~, ~~may be increased by~~ *or may submit a unique lighting plan for consideration of approval.*

(b) An application for a unique lighting plan must address all of the following criteria:

1) The lighting plan must be submitted by a certified lighting professional registered or recognized by the IESNA;
2) The applicant shall present the basic premise for the request whether it is intended to enhanced security lighting levels, to advance documented specific security standards of the company, to resolve a documented existing or potential security weakness;
3) That the parking facility will be used during hours of the day and/or night, where special security needs exist, or where vandalism or crime is possible. That there are specific site characteristics, level of vehicle and pedestrian activity needing special security or that there has been documented history or likelihood of crimes associated with the facility;
4) If the site is in a Historic District, a Special Area Plan, in a specially designated Character District or if there are unique situations or hardships to a site, the application must demonstrate how the alternative lighting methods, fixtures, and pole heights are necessary to accommodate compatibility and consistency with the unique character district, special area or unique circumstances;
5) If necessary, the applicant shall be required to pay a technical consultant review fee which shall be based on fees charged by an independent private consultant with no affiliation with the subject development. Fees shall be for review of the application, preparing a report based on an analysis of the application, consultation with staff and attendance at all meetings required for approval of the petition; and
6) The plan shall indisputably demonstrate how the unique proposal furthers the purpose and intent of the lighting ordinance and that the unique proposal will produce a result equal to or better than the existing prescriptive standards. The application shall address the components of a lighting plan listed below :
   i. Lighting intensities and data reflecting averages ,minimums, maximums, horizontal and vertical uniformity ratios,;
   ii. Glare and Spillover lighting onto adjacent properties and into the dark night sky;
   iii. Pole heights and light fixtures;
   iv. Impact of the proposed plan on the dark sky concept;
   v. Energy conservation and efficiency of the proposal; and
   vi. Glare vertical

(c) *In reviewing the request,* the appropriate reviewing board through site plan review, or the board of adjustment ~~by obtaining~~ through a special exception if site plan review is not required, ~~provided that~~ shall ensure conclusively that the applicant establishes that the requested modifications or unique lighting plan meets the following ~~standards~~ criteria:

1. The unique proposal is consistent with the purpose and intent of the ordinance;
2. Based on the permitted outdoor use/s operated at the site the increase in intensity proposed at the site is ~~reasonably~~ necessary to ensure ~~required for~~ convenience of the public accessing the site;
3. Ensure the safety and security requirements necessary to ~~purposes for~~ operate the specific permitted outdoor use/s ~~for conducting~~ at the site;

4. That the light ~~increase in~~ intensitiesy generated on site is confined internally with minimum spillover lighting onto adjacent properties, that the amount of spillover will not result in a nuisance to adjoining properties, and does not interfere with the lawful use and enjoyment of adjoining properties;
5. The lighting plan addresses light spillover into the dark night sky and does not result in stray and excessive lighting which will contribute to light pollution, light clutter and unnatural sky glow;
6. Necessary screening will be erected or exists and maintained to reduce the impact of the increase in intensity on adjoining properties;
7. The proposed lighting intensities of the unique plan are reasonably related to the nature and character of its operation;
8. The impact of the proposed lighting plan on the unique qualities and characteristics of surrounding special neighborhoods, special character districts and natural environmental factors;
9. The intent of the lighting plan is not directly or indirectly related to promotional or advertising purposes; and
10. In the case of a Historic District, Special area plan, special character district and where there is a claim of unique hardships, the reviewing body shall establish that the unique lighting plan is consistent with the characteristics of the special areas or that the hardship is related to the request for modifications.

In arriving at a decision, the board is authorized to impose conditions determined to allow the design to be consistent with the purpose and intent of the ordinance.

***9.* Canopy Lighting and Lighting of Fueling Stations**

(a) ~~**(e) Lighting.**~~ The lighting requirements for ~~lighting~~ all canopies, including those associated with drive-through and financial institutions and fueling stations are as follows:

(1) Lighting of such areas shall not be used to attract attention to the business. Signs allowed under the appropriate section of these regulations shall be used for that purpose.

(2) Lighting levels shall be adequate to facilitate the activities taking place in such locations.

~~(3) (1)~~*Remote areas.* Areas on the apron away from the gasoline pump islands, used for parking or vehicle storage, shall be illuminated in accordance with the requirements for parking areas as set forth in Section 30-345 ~~section 30-330(a)(4).~~

(4) ~~(2)~~*Areas around pump islands.* Areas within six feet of a pump island or under canopies shall be designed to maintain a minimum average horizontal illuminance of at least 2.0 footcandles and a maximum average of no more than ten footcandles. The uniformity ratio (ratio of average illuminance to minimum illuminance) shall be no greater than 5:1. The above lighting must be delineated on a photometric plan in accordance with the submittal requirements.

(5) ~~(3)~~*Fixtures.* In order to minimize the extent of direct glare, ~~L~~light fixtures mounted on or under canopies shall be full cut-off classification as defined by the IESNA, or recessed so that the lens cover is flush with the bottom surface (ceiling) of the canopy. Lights may also be shielded by fixtures or the edge of the canopy so that light is restrained to 85 degrees or less from vertical. The figure titled "Recessed Fixture" listed below illustrates this.

(6) ~~(4)~~*Alternatives.* As an alternative or supplement to recessed lights, indirect lighting may be used where light is aimed upward at the underside of the canopy and reflected back down from the underside of the canopy. When this method is used, ~~In this case~~ the light fixtures must be shielded so that all direct illumination is focused exclusively on the underside of the canopy. That the vertical illuminance is such cases shall not exceed 0.5 footcandles at 5 feet above the canopy level.

(7) ~~(5)~~*Prohibited lights.* Lights shall not be mounted on the top or sides (fascias) of the canopy when not part of a permitted sign~~, and~~. The ~~the~~ sides (fascias) of the canopy shall not be illuminated in a manner other than that prescribed under the section of the ordinance regulating signs. ~~, unless the illumination is part of a permitted sign.~~

(8) ~~(6)~~The submittal requirements of section 30-160(d), Land Development Code, shall be met.

Recessed Fixture

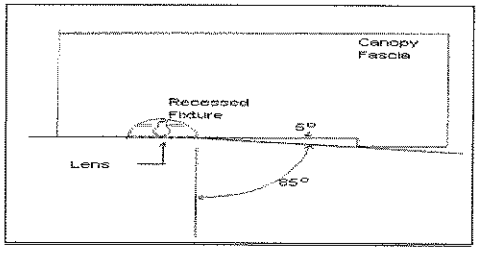
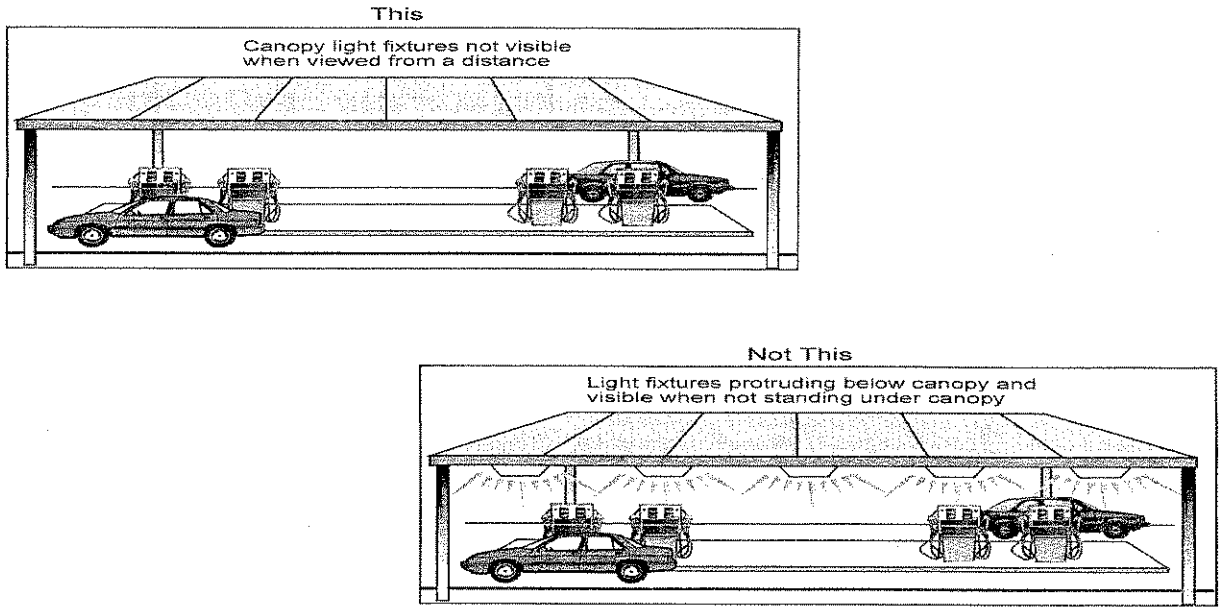


Figure 1. Canopy Lighting



Fundamental Lighting Aspects of Parking Structures

As urban core areas evolve densities and intensities of property use increases and surface real estate becomes less economical and less efficient to be used as open parking lot. Multi-level parking structures in combination with commercial, office and educational uses gradually replace the open surface parking lots and have become an essential compliment to floor space in core urban areas. Unfortunately, they have not been given sufficient attention in terms of security and are often dimly lit and have become security concerns for the community. Left unattended, they could become unsafe, dangerous and a concrete blight on our urban landscape.

From a lighting perspective, many factors will affect the visual environment within a parking garage, including vertical illumination, the light source and glare. The facility must be designed to achieve a balance between those factors (vertical illumination, the light source and glare) to create a comfortable environment that attracts customers and makes them feel safe and secure.

The question of how much light is needed within a facility has been addressed by many professionals but the Illuminating Engineering Society (IES) offers specific recommendations on how much light is needed within a facility. The recommendation is that the lowest levels that should be used within a parking structure should be based on the area of interest and the time period of the day. The minimum recommended ranges from 1 footcandle at nights and as much as 50 footcandles during the daylight hours. Those indices vary from one jurisdiction to another and often depend on the location of the facility in relationship to surrounding developments. Other factors important in attaining the purpose and intent for

lighting a parking facility are locations in the garage, the amount of light needed and how that light should be measured.

The most predominant feature within a parking structure is the automobile. However, since they do not get there by themselves, the driver/pedestrian has become an equally significant factor/element. The focus should therefore be on the role, function and activities of the driver/pedestrian within a garage. Within most parking garages, drivers must be able to see in front of them to safely maneuver a car through the aisles and into the parking spaces. Pedestrians must be able to see oncoming traffic as well as the parking spaces and the space between cars; they must also be able to identify other people. They can do this only when there is adequate lighting to enable visual discernment of objects. If obstacles to those functions exist within the structure, both drivers and pedestrians are impaired and the parking structure exists only as an urban box for automobiles and not a safe functional and complimentary feature of the urban landscape

Besides the quantity of light, the quality of the illumination is important. What type of light will provide the best environment—and what are the tradeoffs that must be made to achieve that environment? This element contains too many variables and should be left to designers and owners of the facility with the proviso that the quality of illumination must be consistent with the standards and should be implemented in a manner that would not be contrary to the purpose and intent of the lighting ordinance.

The literature recommends three types of high intensity discharge (HID) fixtures which are typically used in parking garage structures: cutoff, semi cutoff and refractor. In determining the type of fixtures to be used, consideration must be given to such factors as glare, vertical illumination and the cavern effect, which can occur in structures with dark ceilings. Fixture design and placement will affect the visual environment as well as the initial and life cycle costs of the project.

Glare—which affects people's ability to see—occurs when a point in the field of view is significantly brighter than the ambient light level. All HID fixtures will combat glare if the fixture is properly designed. However, there is a tradeoff. Cutoff fixtures will reduce glare but will decrease the uniformity and vertical illumination thus contributing to the cavern effect, which will make the garage feel darker.

A semi cutoff fixture will eliminate the cavern effect by aiming the light onto the ceiling. With this type of fixture, however, vertical illumination will suffer if the luminaire is not properly designed. A refractor type luminaire will provide the greatest level of vertical illumination and will create the feeling of an open environment. However, the risk of glare can be high if the fixture is not properly designed or the lamp wattage is too high.

10. Standards for Parking Structures:

(a) To address the concerns related to improper lighting of parking structures and to facilitate design, construction and operation of parking structures that comply with the intent and purpose of the ordinance, the following standards are proposed:

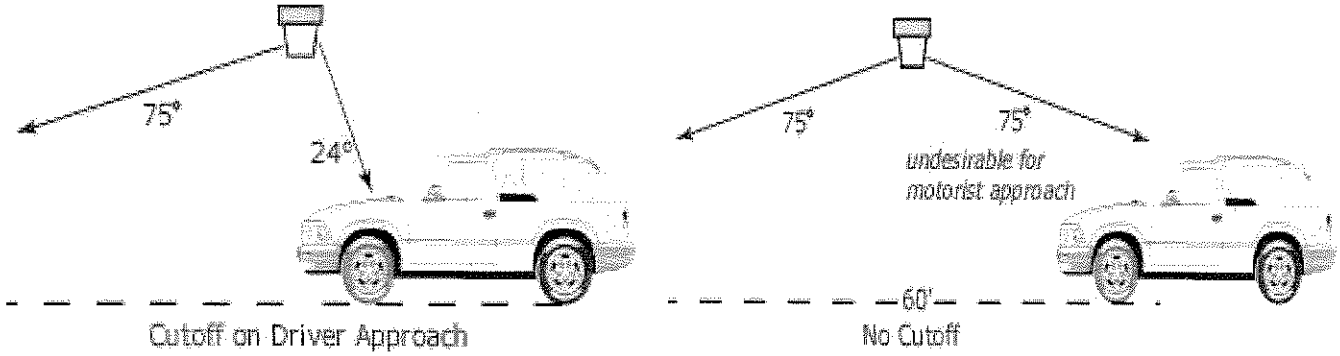
(1) Lighting intensities on each floor shall be as listed in Table 1.

Table 1:

-	Minimum Horizontal (measured in foot-candles)	Horizontal Uniformity Maximum/ Minimum	Minimum Vertical* (measured in foot-candles)
Basic per floor	1	10:1	.5
Ramps Day	2	10:1	1
Ramps Night	1	10:1	.5
Entrance Areas Day	50	-	25
Entrance Areas Night	1	10:1	.5
Stairways	2	-	1
*Measured facing the drive aisle at 5 feet above the parking surface at the point of the lowest horizontal illuminance.			

(2) Light fixtures within parking structures shall be designed primarily to meet the intent of the lighting ordinance. The type of fixtures used shall be cutoff, semi-cutoff and/or refractor High Intensity Discharge (HID) fixtures. The exact type, configuration and placement of fixtures shall be designed to prevent glare, cavern effect and to facilitate vertical illumination of the floor so that drivers are able to discern objects within the facility. Designs shall seek to attain a cutoff angle of 24° to 38° on the driver approach and 60° to 75° on the downstream side (See diagram below):

Transverse Coverage and Cutoff based on 8 foot Mounting Height



(3) If the top floor of a parking structure has no roof and is open to the sky, it shall be regulated in accordance with the standards for open parking lots. The maximum height of poles located on the open top floor of a parking structure shall be 15 feet;

(4) In order to demonstrate compliance, the applicant shall submit photometric data and drawings to illustrate how light sources are shielded to prevent spillover lighting and the aiming of lights to prevent glare to drivers, pedestrians and surrounding developments. Additionally, based on designs unique to local conditions and characteristics of a site, during development plan review, each facility shall demonstrate how the lighting plan within the parking structure addresses lighting intensities, glare, uniformity ratios, vertical and horizontal illuminance of the design, and the cavern effect of lighting on each floor in accordance with the above standards.

(b) **Reviews of Independent Lighting Plans for Parking Structures.**

(1) Due to the variation in methodology to address lighting within parking structures, it is anticipated that most proposals for parking structure lighting will be unique and will be submitted by an independent certified lighting professional. To accommodate such reviews, an applicant may submit unique designs for parking structure lighting that addresses all of the elements of the prescriptive method listed above. The unique design shall be submitted by a certified lighting professional who shall certify the submitted information. The City shall charge an additional technical review fee equivalent to the fee charged by a certified lighting professional to analyze the application submitted and to present findings to the appropriate reviewing body, city manager or designee.

(2) At a minimum, the application shall address the following:

i. Minimum horizontal and vertical lighting intensities of each floor, floor ramps, entrance areas and stairways. Data may be requested for certain daylight periods depending on the situation.

ii. Maximum to minimum and minimum to average horizontal uniformity rations for each floor, floor ramps, entrance areas and stairways. Data may be requested for certain daylight periods depending on the situation.

iii. Glare and spillover lighting

iv. Type of cutoff fixtures, height, placement and design of fixtures, and impact on the floor lighting.

v. The cutoff angle on drivers approach and the cavern effects of light shielding on each floor.

vi. Alternative type of fixtures and how they achieve the intent of the ordinance.

vii. Spillover into the dark night sky.

viii. Lighting at entrances, exits, stairwells and all areas of pedestrian circulation inside and on premises immediately outside the parking structure which it servers.

(3) The reviewing body or staff will review the application and arrive at a decision based on the criteria listed under Section 9, **Waiver of General Standards**

11. ~~Sec. 30-345.1.~~ Nonconforming luminaires.

All lamps, light fixtures and lighting systems (hereinafter "luminaires") lawfully in place prior to February 11, 2002, shall be deemed legally nonconforming. However, if cumulatively at any time, 50 percent or more of the existing outdoor light fixtures are replaced, or number of outdoor light fixtures is increased by 50 percent or more, then all outdoor light fixtures shall conform to the provisions of ~~section 30-160, section 30-330, and~~ **Section 30-345 Outdoor and Parking Structure Lighting**

(a) A development plan amendment shall be certified by a registered engineer or architect, or lighting professional holding a current L.C. (lighting certificate) from the National Council on Qualifications for the Lighting Profession (NCQLP). Additionally, nonconforming luminaires that direct light toward streets or parking areas that cause glare so as to cause a public nuisance should be either shielded or re-directed within 30 days of notification.

(b) A development which becomes non-conforming with these regulations due to a change in operation hours from daytime only to include night time operation shall be required to comply with these regulations within six (6) months of the effective date of the change.

Respectfully submitted,

Ralph Hilliard
Planning Manager

Prepared by: Prepared by:
Lawrence Calderon

List of Appendices

Appendix A Referral to City Commission
Appendix B Documents Submitted to the City Commission