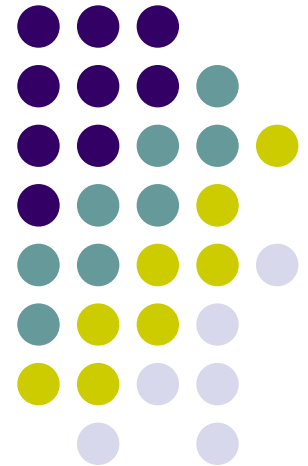


Model Lighting Ordinance

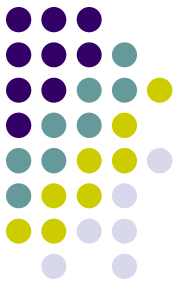
Jointly developed by ...
International Dark-Sky Association
Illuminating Engineering Society



Major Caveat



- *This is a ‘model’ ordinance and may be adopted with one or more significant modifications. The ordinance specific to any one area must be reviewed separately.*

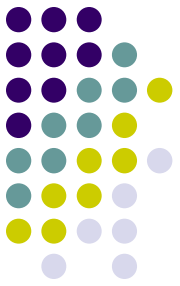


General Overview

- *Jointly developed by IDA and IES*
- *Intended to be a regionally coordinated system*
 - *not a state or national ordinance*
- *an 'overlay zoning' ordinance*
- *should be reviewed and updated periodically*

Intended Users

- *lighting designers*
- *city officials*
- *engineers*
- *citizen groups*





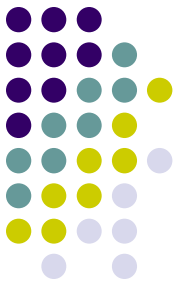
I. Purpose

- *Match permitted outdoor lighting to minimum IES recommendations*
- *Minimize light trespass and obtrusive light*
- *Curtail light pollution*
- *Protect the natural environment*
- *Conserve energy*



II. Lighting Zones

- *Match stringency to area*
- *accommodate community intent*
- *fine tune impact without changing the MLO*



Lighting Zones (cont.)

- *LZ0 – no ambient lighting*
- *LZ1 – low ambient lighting*
- *LZ2 – moderate ambient lighting*
- *LZ3 – moderately high ambient lighting*
- *LZ4 – high ambient lighting*

LZ-0



- Areas where the natural environment will be seriously and adversely affected by lighting.
- Impacts include disturbing the biological cycles of flora and fauna and/or detracting from human enjoyment and appreciation of the natural environment.
- Human activity is subordinate in importance to nature.
- The vision of human residents and users is adapted to the darkness, and they expect to see little or no lighting.
- When not needed, lighting should be extinguished.

LZ-1



- Areas where lighting might adversely affect flora and fauna or disturb the character of the area.
- The vision of human residents and users is adapted to low light levels.
- Lighting may be used for safety and convenience but it is not necessarily uniform or continuous.
- After curfew, most lighting should be extinguished or reduced as activity levels decline.

LZ-2



- Areas of human activity where the vision of human residents and users is adapted to moderate light levels.
- Lighting may typically be used for safety and convenience but it is not necessarily uniform or continuous.
- After curfew, lighting may be extinguished or reduced as activity levels decline.

LZ-3

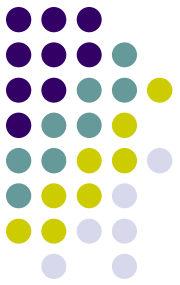


- Areas of human activity where the vision of human residents and users is adapted to moderately high light levels.
- Lighting is generally desired for safety, security and/or convenience and it is often uniform and/or continuous.
- After curfew, lighting may be extinguished or reduced in most areas as activity levels decline.

LZ-4

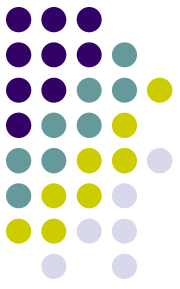


- Areas of human activity where the vision of human residents and users is adapted to high light levels.
- Lighting is generally considered necessary for safety, security and/or convenience and it is mostly uniform and/or continuous.
- After curfew, lighting may be extinguished or reduced in some areas as activity levels decline.



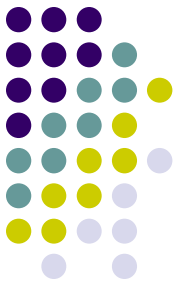
III. General Requirements

- *Conference with all Applicable Codes*
- *Applicability*
- *Lighting Control Requirements*



'Typical' Exemptions

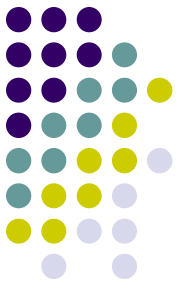
- *Street Lighting*
- *Lighting for public monuments/statuary*
- *Lighting for signage*
- *Repairs to existing lighting (if < 25%)*
- *Certain temporary lighting*
- *Underwater lighting*
- *Emergency lighting*
- *Certain low voltage lighting*



'Typical' Exceptions

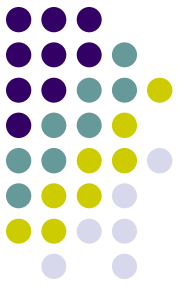
- *Special Use Permits*
- *Lighting required by federal or state laws or regulations*

Lighting Control Requirements



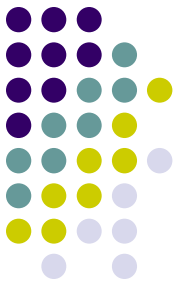
- *Automatic Switching Requirements*
- *Automatic Lighting Reduction Requirements*

Automatic Switching Requirements

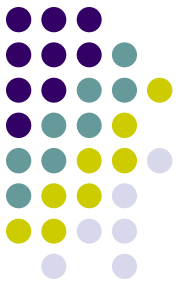


- *Off when sufficient daylight is available*
- *Exceptions:*
 - Lighting under canopies
 - lighting for tunnels, parking garages, garage entrances and similar conditions

Automatic Lighting Reduction Requirements



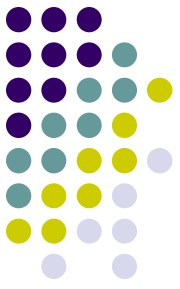
- *Reduce total outdoor lighting load by at least 30% after curfew*
- *Exceptions*
 - Non-landscape lighting for residences
 - when there is only 1 outdoor luminaire
 - code required lighting for steps, stairs, walkways and building entrances
 - when the Authority says illuminance levels need to be maintained
 - motion activated lighting
 - special permit lighting
 - at 24/7 businesses



Lighting Curfews

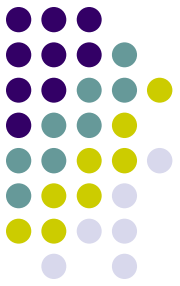
- *Benefits: reduced environmental impact & enhanced night time patrolling*
- *Typically, one hour after close of business; should accommodate entertainment facilities, shift workers, 24/7 operations*

IV. Non-residential Lighting

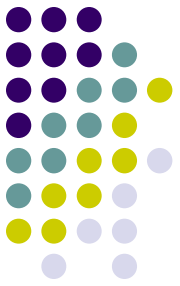


- *Scope:*
 - *Non-residential properties*
 - multiple residential properties of seven domiciles or more and having common outdoor areas
- *All outdoor lighting is to comply with one of these two methods:*
 - *Prescriptive Method – precise and easily verifiable requirements*
 - *Performance Method – more flexibility and typically involves a lighting designers*

Prescriptive Method



- *Both of the following must be met:*
 - *Total Site Lumen Limit*
 - *Limits to Off Site Impacts*



Total Site Lumen Limit

- *One of the these two must be met:*
 - *Parking Space Method (Table A)*
 - *May only be applied to properties with 10 or fewer parking spaces (including handicapped accessible spaces)*
 - *Hardscape Area Method (Table B)*
 - *When lighting intersections of site drives and public streets or roads, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting*

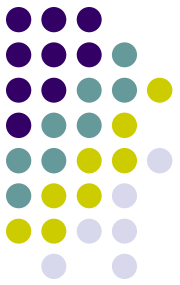


Table A

Lighting Zone:	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Lumens Allowed Per Parking Space	350	490	630	840	1,050

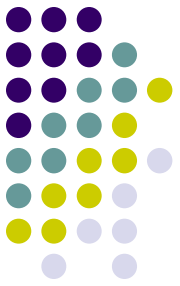
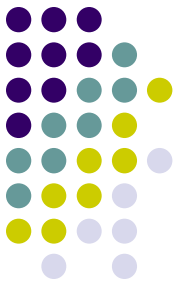


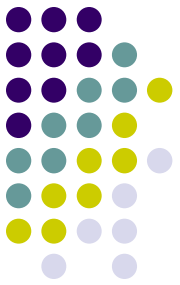
Table B – Allowed Lumens per Sq.ft

	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Base Allowance	0.5	1.25	2.5	5.0	7.5
Additional Allowances for sales and service facilities. No more than 2 additional allowances per site. Use it or lose it.					
Outdoor Sales Lots	0	4	8	16	16
Outdoor Sales Frontage (per linear foot)	0	0	1000	1500	2000
Drive Up windows (per drive-up window)	0	2000	4000	8000	8000
Vehicle Service Station (per pump)	0	4000	8000	16000	24000

Example Table B Computation

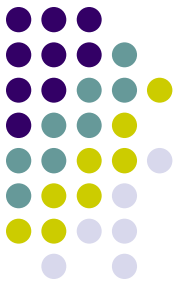


Site Allowed Total Initial Lumens	
Site Description	Light Commercial
Lighting Zone	LZ-2
Hardscape Area (sq.ft)	100,000
Allowed Lumens/Sq.ft of Hardscape	2.5
Site Allowed Total Initial Lumens	250,000



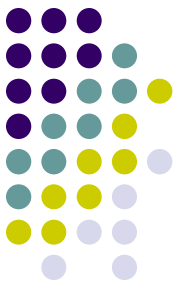
Example Compliance Chart

Prescriptive Method Example			
Lamp Description	Quantity	Initial Luminaire Lumens	Total
70W MH	8	3,920	31,360
150W MH	20	9,600	192,000
18W LED	24	1,020	24,480
Total Initial Luminaire Lumens			247,840
Site Allowed Total Initial Lumens			250,000
Project is Compliant?			YES



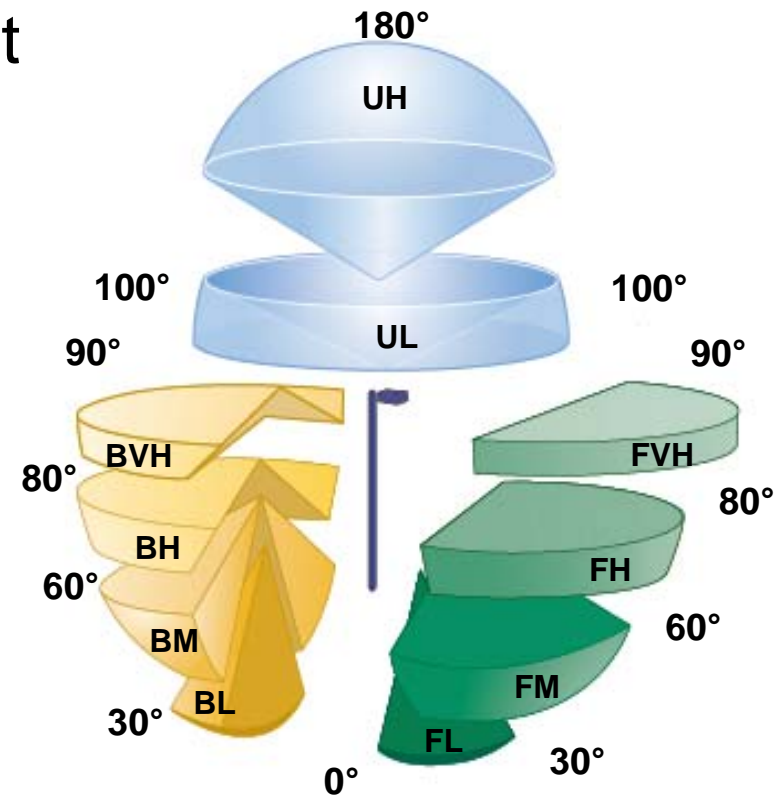
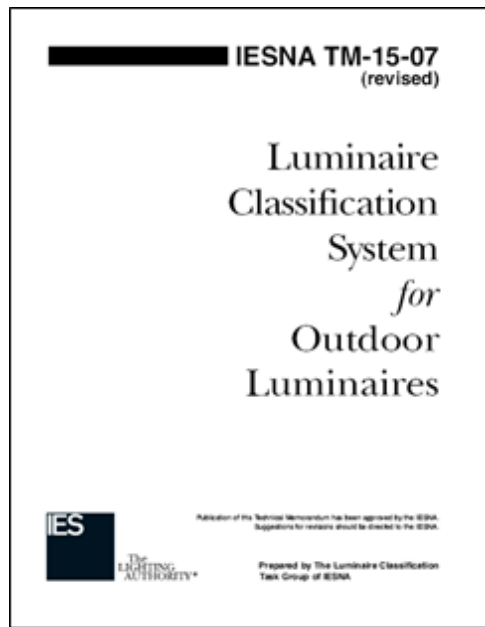
Limits to Off Site Impacts

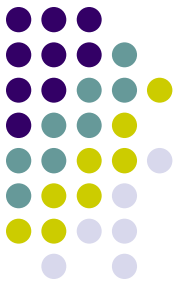
- *All luminaires shall be rated and installed according to table C*
 - *Backlight – Table C-1*
 - *Uplight – Table C-2*
 - *Glare – Table C-3*



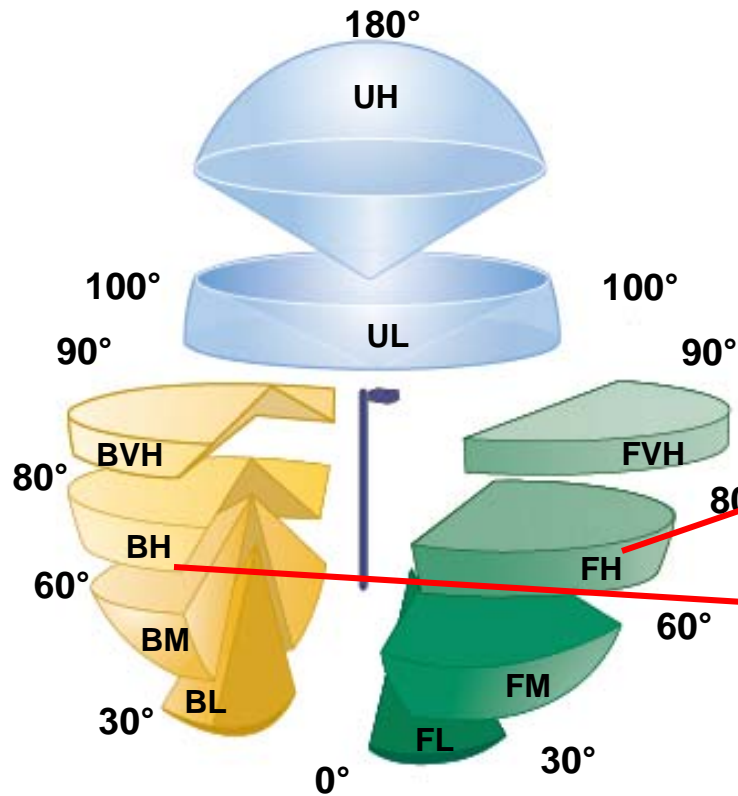
Luminaire Classification System

- TM-15
 - Ten zones / lumen count





TM-15 Zonal Lumens



LCS TABLE		
BUG Rating	B2-U0-G2	
Forward Light	Lumens	Lumens %
Low(0-30):	638.9	4.6%
Medium(30-60):	3,787.0	27%
High(60-80):	2,346.4	16.8%
Very High(80-90):	25.6	0.2%
Back Light		
Low(0-30):	564.3	4%
Medium(30-60):	1,686.1	12%
High(60-80):	272.2	1.9%
Very High(80-90):	3.5	0%
Uplight		
Low(90-100):	0	0%
High(100-180):	0	0%
Trapped Light:	4,676.1	33.4%



Backlighting

LCS TABLE		
BUG Rating	B2-U0-G2	
Forward Light	Lumens	Lumens %
Low(0-30):	638.9	4.6%
Medium(30-60):	3,787.0	27%
High(60-80):	2,346.4	16.8%
Very High(80-90):	25.6	0.2%
Back Light		
Low(0-30):	564.3	4%
Medium(30-60):	1,686.1	12%
High(60-80):	272.2	1.9%
Very High(80-90):	3.5	0%
Uplight		
Low(90-100):	0	0%
High(100-180):	0	0%
Trapped Light:	4,676.1	33.4%

Table A-1: Backlight Ratings (maximum zonal lumens)

Secondary Solid Angle	Backlight Rating					
	B0	B1	B2	B3	B4	B5
BH	110	500	1000	2500	5000	>5000
BM	220	1000	2500	5000	8500	>8500
BL	110	500	1000	2500	5000	>5000

Table A-3: Glare Ratings (maximum zonal lumens)

Glare Rating for Asymmetrical Luminaire Types (Type I, Type II, Type III, Type IV)

Secondary Solid Angle	G0	G1	G2	G3	G4	G5
FVH	10	100	225	500	750	>750
BVH	10	100	225	500	750	>750
FH	660	1800	5000	7500	12000	>12000
BH	110	500	1000	2500	5000	>5000

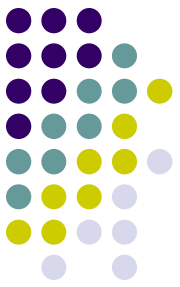
Table A-2: Uplight Ratings (maximum zonal lumens)

Secondary Solid Angle	Uplight Rating					
	U0	U1	U2	U3	U4	U5
UH	0	10	50	500	1000	>1000
UL	0	10	50	500	1000	>1000

Glare Rating for Quadrilateral Symmetrical Luminaire Types (Type V, Type V Square)

Secondary Solid Angle	G0	G1	G2	G3	G4	G5
FVH	10	100	225	500	750	>750
BVH	10	100	225	500	750	>750
FH	660	1800	5000	7500	12000	>12000
BH	660	1800	5000	7500	12000	>12000

Table C-1 – Allowed Backlight Rating*



	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Greater than 2 MH from property line	B1	B3	B4	B5	B5
Between 1 and 2 MH from property line and ideally oriented**	B1	B2	B3	B4	B4
Between 0.5 and 1 MH from property line and ideally oriented	B0	B1	B2	B3	B3
Less than 0.5 MH from property line and ideally oriented	B0	B0	B0	B1	B2



Footnotes to Table C-1

- *For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
 - NOTE: This adjustment is relative to Table C-1 and C-3 only and shall not be used to increase the lighting area of the site.
- ** To be considered 'ideally oriented', the luminaire must be mounted with the backlight portion of the light output oriented perpendicular and towards the property line of concern.

Table C-2 – Allowed Uplight Rating



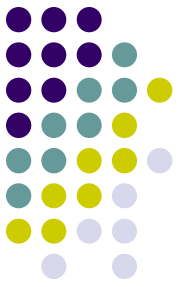
	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Allowed Uplight Rating	U0	U1	U2	U3	U4
Allowed % light emission above 90° for street or area lighting	0%	0%	0%	0%	0%

Table C-3 – Allowed Glare Rating



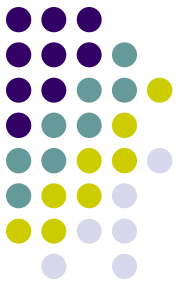
Not ideally oriented and ...	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
1 to 2 MH from property line	G0	G0	G1	G1	G2
0.5 to 1 MH from property line	G0	G0	G0	G1	G1
< 0.5 MH from property line	G0	G0	G0	G0	G1
Otherwise	G0	G1	G2	G3	G4

Light Shielding for Parking Lot Illumination

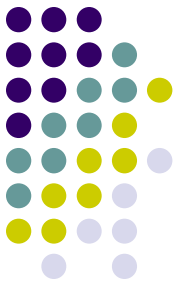


- *No light emitted above 90 degrees*
- *Exception:*
 - certain ornamental lighting

Performance Method



- *Both of these must be met:*
 - *Total Site Lumen Limit*
 - *Limits to Off Site impacts*



Total Site Lumen Limit

- *Tables D & E*
 - *Table D – Base Lumens + Lumens Per SF*
 - *Table E – Additional Allowances*
- *Existing Lighting* - sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens.

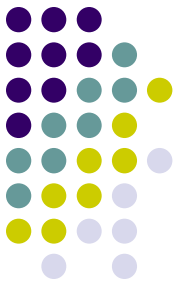
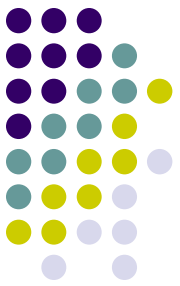


Table D

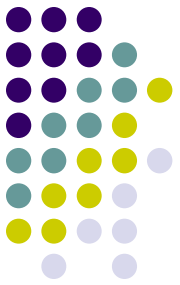
	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Allowed Base Lumens Per Site	0	3500	7000	14000	21000
Allowed Lumens Per SF	0.5	1.25	2.5	5.0	7.5

Table E(1) – Additional Allowances*



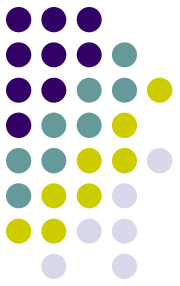
*A MAXIMUM OF THREE (3) ALLOWANCES ARE PERMITTED. THESE ALLOWANCES ARE "USE IT OR LOSE IT".	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Building Entrances or Exits (per door)	400	1000	2000	4000	6000
Building Facades (per sq.ft)	0	0	8	16	24
Canopies (per sq.ft)	0	3	6	12	18
Guard Stations (per sq.ft)	0	6	12	24	36
Outdoor Dining (per sq.ft)	0	1	5	10	15
Drive Up Windows (per window)	0	2000	4000	8000	8000

Table E(2) – Additional Allowances – Service Stations Only



Service stations may not use any other additional allowances.	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Vehicle Service Station Hardscape (per sq.ft)	0	4	8	16	24
Vehicle Service Station Canopies (per sq.ft)	0	8	16	32	32

Table E(3) – Additional Allowances – Outdoor Sales Facilities Only



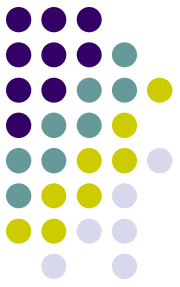
<p>Outdoor Sales facilities may not use any other additional allowances.</p> <p>NOTICE: lighting permitted by these allowances shall employ controls extinguishing this lighting after a curfew time to be determined by the Authority.</p>	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Outdoor Sales Lots (per sq.ft)	0	4	8	12	18
Outdoor Sales Frontage (per linear foot)	0	0	1000	1500	2000

Limits to Off Site Impacts



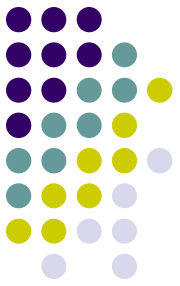
- *Either of these options may be used:*
 - *Option A – All luminaires rated per Table C*
 - *Option B – Software Modeling*

Software Modeling



- *The enclosure:*
 - *Calculation planes (of 0% reflectance) around the perimeter of the site*
 - *Top of enclosure: no less than 33' above the tallest luminaire*
 - *Calculations include:*
 - *Total lumens on inside of the enclosure*
 - *Max vertical illuminance of sides of enclosure*
- *Design complies if:*
 - *$\leq 15\%$ 'Inside the Box', AND*
 - *Maximum vertical illuminance (Table F)*

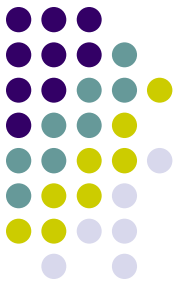
Table F – Maximum Ev in Planes of Property Line



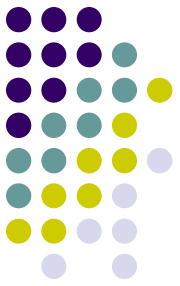
LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
0.05 fc	0.1 fc	0.3 fc	0.8 fc	1.5 fc

V. Residential Lighting

- *General Requirements*
- *Landscape Lighting*

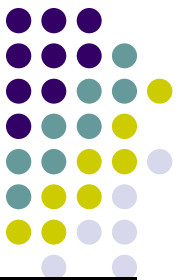


General Requirements



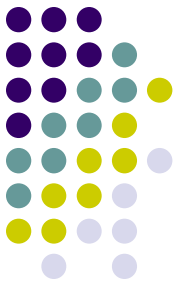
- *Fully shielded*
- *Lumen output limit (Table G)*
- *Exceptions:*
 - 1. One partly shielded or unshielded luminaire at the main entry, not exceeding the allowed lumen output in Table G row 1.
 - 2. Any other partly shielded or unshielded luminaires not exceeding the allowed lumen output in Table G row 3.
 - 3. Low voltage landscape lighting aimed away from adjacent properties and not exceeding the allowed lumen output in Table G row 4.
 - 4. Shielded directional flood lighting aimed so that direct glare is not visible from adjacent properties and not exceeding the allowed lumen output in Table G row 5.
 - 5. Open flame gas lamps.
 - 6. Lighting installed with a vacancy sensor, where the sensor extinguishes the lights no more than 15 minutes after the area is vacated.
 - 7. Lighting exempt per Section III (B.).

Table G – Maximum Allowed Lumens Per Luminaire*



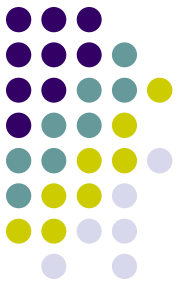
Row #	* Luminaire lumens equals Initial Lamp Lumens for a lamp, multiplied by the number of lamps in the luminaire	LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
1	Unshielded at 1 Entry Only	Not allowed	420	630	630	630
2	Fully Shielded	630	1260	1260	1260	1260
3	Unshielded At Other Than Main Entry	Not allowed	315	315	315	315
4	Landscape Lighting	Not allowed	Not allowed	1050	2100	2100
5	Shielded Directional Flood	Not allowed	Not Allowed	1260	2100	2100
6	Low Voltage Landscape	Not allowed	Not Allowed	525	525	525

Landscape Lighting



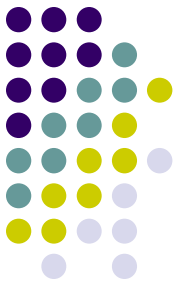
- *Comply with Table G*
- *Not aimed onto adjacent properties*

VI. Lighting by Special Permit Only



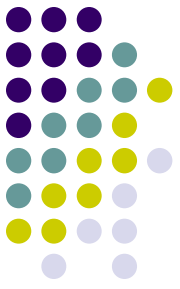
- *High intensity and Special Purpose Lighting*
- *Complex and Non-conforming Uses*

High Intensity and Special Purpose Lighting

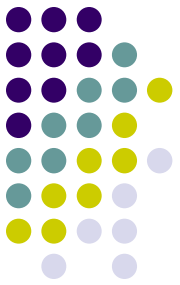


- *Temporary lighting in which any single luminaire exceeds 20,000 initial luminaire lumens or total exceeds 160,000 initial luminaire lumens*
- *Aerial lasers*
- *Searchlights*
- *Any luminaire with more than 200,000 initial luminaire lumens*
- *Any luminaire with an intensity in any one direction of more than 2,000,000 candela*

Complex and Non-conforming Uses

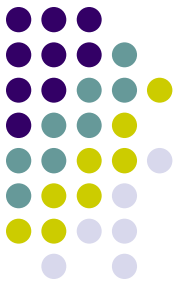


- *Sports facilities*
- *Construction lighting*
- *Lighting for industrial sites with special lighting needs*
- *Parking structures*
- *Urban parks*
- *Ornamental lighting of bridges, public monuments, statuary and public buildings*
- *Theme and amusement parks*
- *Correction facilities*



VII. Existing Lighting

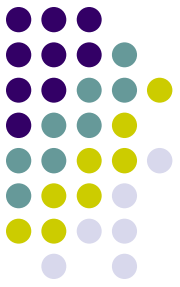
- *Amortization*
- *New Uses or Structures, or Change of Use*
- *Additions or Alterations*



Amortization

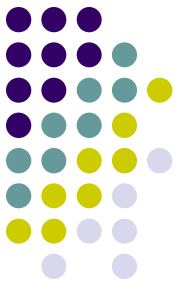
- *On or before <date>, all outdoor lighting shall comply with this code*

New Uses or Structures, or Change of Use



- Whenever there is a new use of a property (zoning or variance change) or the use on the property is changed, all outdoor lighting on the property shall be brought into compliance with this Ordinance before the new or changed use commences.

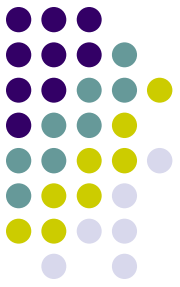
Additions or Alterations



- *Major Additions*

- If a major addition occurs on a property, lighting for the entire property shall comply with the requirements of this Code. For purposes of this section, the following are considered to be major additions:
 - Additions of 25 percent or more in terms of additional dwelling units, gross floor area, seating capacity, or parking spaces, either with a single addition or with cumulative additions after the effective date of this Ordinance.
 - Single or cumulative additions, modification or replacement of 25 percent or more of installed outdoor lighting luminaires existing as of the effective date of this Ordinance.

Additions or Alterations (cont.)



- Minor Modifications, Additions, or New Lighting Fixtures for Non-residential and Multiple Dwellings
 - For non-residential and multiple dwellings, all additions, modifications, or replacement of more than 25 percent of outdoor lighting fixtures existing as of the effective date of this Ordinance shall require the submission of a complete inventory and site plan detailing all existing and any proposed new outdoor lighting.
 - Any new lighting shall meet the requirements of this Ordinance.

Additions or Alterations (cont.)



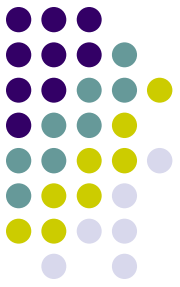
- Resumption of Use after Abandonment
 - If a property with non-conforming lighting is abandoned for a period of six months or more, then all outdoor lighting shall be brought into compliance with this Ordinance before any further use of the property occurs.

VIII. Enforcement & Penalties



- (Reserved)

X. Definitions

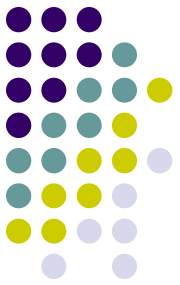


Absolute photometry



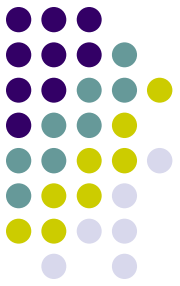
- Photometric measurements (usually of a solid-state luminaire) that directly measures the footprint of the luminaire. Reference Standard IES LM-79

Architectural lighting



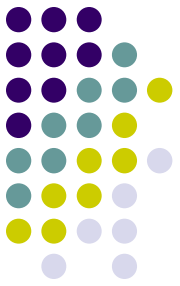
- Lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is incidental.

Authority

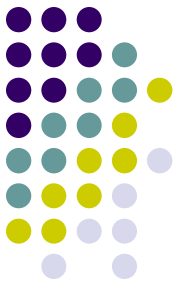


- The adopting municipality, agency or other governing body

Astronomic Time Switch



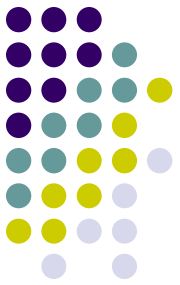
- An automatic lighting control device that switches outdoor lighting relative to time of solar day with time of year correction.



Backlight

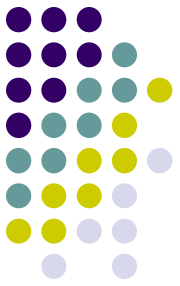
- For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the luminaire. For luminaires with symmetric distribution, backlight will be the same as front light.

BUG

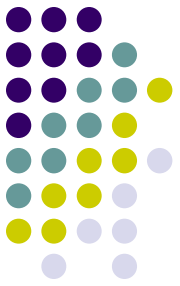


- A luminaire classification system that classifies backlight (B), upright (U) and glare (G).

Canopy



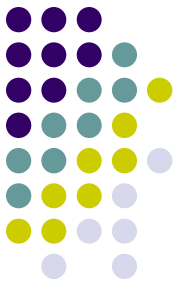
- A covered, unconditioned structure with at least one side open for pedestrian and/or vehicular access. (An unconditioned structure is one that may be open to the elements and has no heat or air conditioning.)



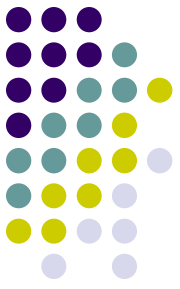
Common Outdoor Areas

- One or more of the following: a parking lot; a parking; a common entrance or public space structure or covered vehicular entrance shared by all occupants of the domiciles.

Curfew

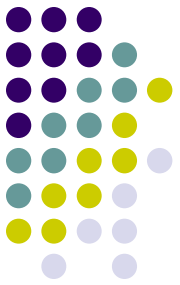


- A time defined by the authority when outdoor lighting is reduced or extinguished.



Emergency Conditions

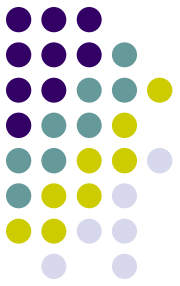
- Generally, lighting that is only energized during an emergency; lighting fed from a backup power source; or lighting for illuminating the path of egress solely during a fire or other emergency situation; or, lighting for security purposes used solely during an alarm.



Footcandle

- The unit of measure expressing the quantity of light received on a surface. One footcandle is the illuminance produced by a candle on a surface one foot square from a distance of one foot.

Forward Light



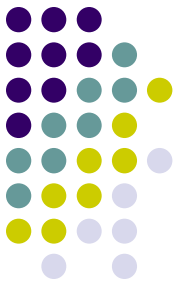
- For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the direction of the intended orientation of the luminaire.

Fully Shielded Luminaire



- A luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the luminaire, is projected below the horizontal plane through the luminaire's lowest light-emitting part.

Glare

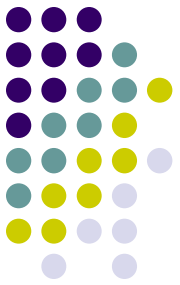


- Lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.



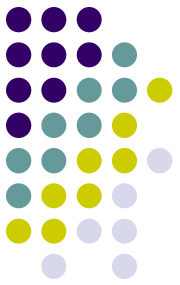
Hardscape

- Permanent hardscape improvements to the site including parking lots, drives, entrances, curbs, ramps, stairs, steps, medians, walkways and non-vegetated landscaping that is 10 feet or less in width. Materials may include concrete, asphalt, stone, gravel, etc.



Hardscape Area

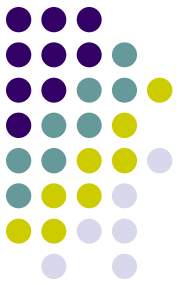
- The area measured in square feet of all hardscape. It is used to calculate the Total Site Lumen Limit in both the Prescriptive Method and Performance Methods. Refer to Hardscape definition.



Hardscape Perimeter

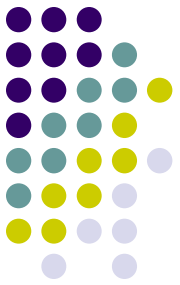
- The perimeter measured in linear feet is used to calculate the Total Site Lumen Limit in the Performance Method. Refer to Hardscape definition.

IDA



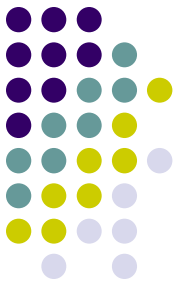
- International Dark-Sky Association.

IESNA



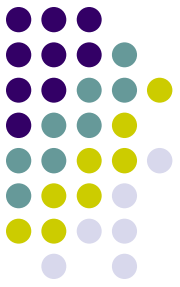
- Illuminating Engineering Society of North America.

Impervious Material



- Sealed to severely restrict water entry and movement

Industry Standard Lighting Software

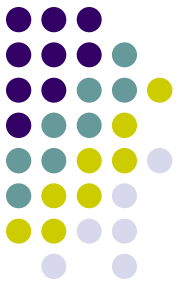


- Lighting software that calculates point-by-point illuminance that includes reflected light using either ray-tracing or radiosity methods.



Initial Lamp Lumens

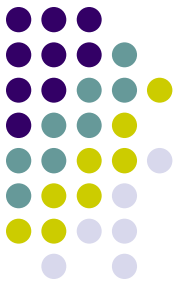
- Calculated as the sum of the initial lamp lumens for all lamps within an individual luminaire, multiplied by the luminaire efficiency. If the efficiency is not known for a residential luminaire, assume 70%. Although not applicable to solid-state luminaires tested with absolute photometry, initial luminaire lumens are approximated as 140% of luminaire lumens for all luminaires tested with absolute photometry. Lumen rating of a lamp or luminaire tested with absolute photometry when the lamp or luminaire is new and has not depreciated in light output.



Initial Luminaire Lumens

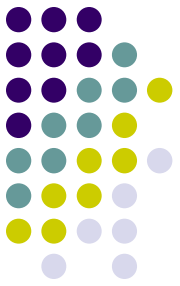
- Calculated as the sum of the initial luminaire lumens for all luminaires.

Lamp



- A generic term for a source of optical radiation (i.e. “light”), often called a “bulb” or “tube”. Examples include incandescent, fluorescent, high-intensity discharge (HID) lamps, and low pressure sodium (LPS) lamps, as well as light-emitting diode (LED) modules and arrays.

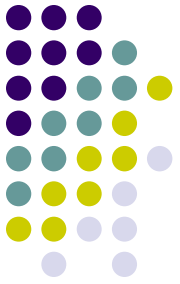
Landscape Lighting



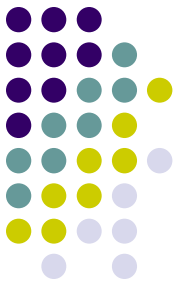
- Lighting of trees, shrubs, or other plant material as well as ponds and other landscape features.

LED

- Light Emitting Diode

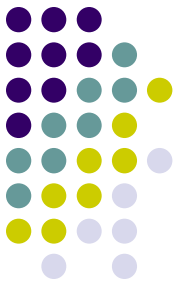


Light Pollution



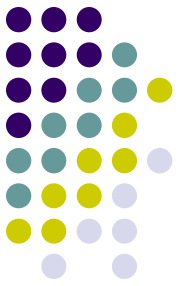
- Any adverse effect of artificial light including, but not limited to, glare, light trespass, skyglow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

Light Trespass



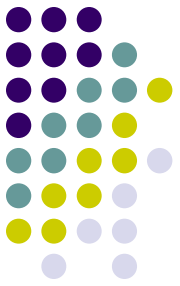
- Light that falls beyond the property it is intended to illuminate.

Lighting

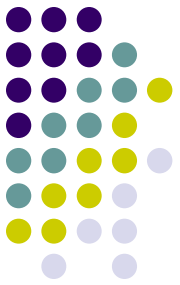


- “Electric” or “man-made” or “artificial” lighting.
See “lighting equipment”.

Lighting Equipment



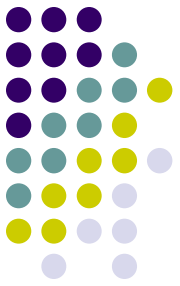
- Equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(s), and related structures, electrical wiring, and other necessary or auxiliary components.



Lighting Zone

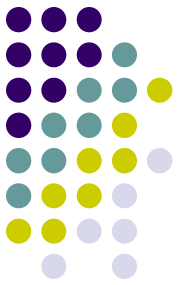
- An overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.

Low Voltage Landscape Lighting



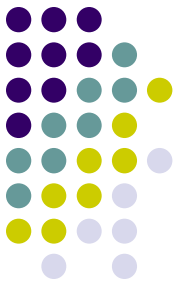
- Landscape lighting powered at less than 15 volts and limited to luminaires having a rated initial luminaire lumen output of 525 lumens or less.

Lumen

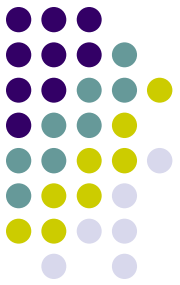


- The unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire (as distinct from “watt,” a measure of power consumption).

Luminaire



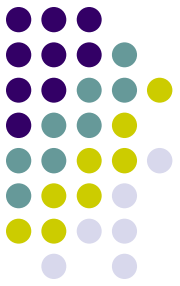
- The complete lighting unit (fixture), consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light (reflector, lens, diffuser), to position and protect the lamps, and to connect the lamps to the power supply.



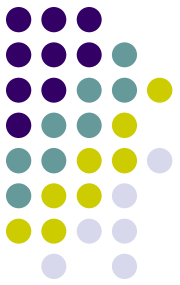
Lux

- The SI unit of illuminance. One lux is one lumen per square meter. 1 Lux is a unit of incident illuminance approximately equal to 1/10 footcandle.

Mounting Height



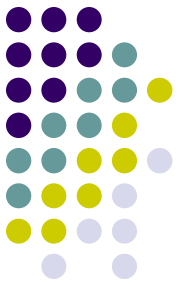
- The height of the photometric center of a luminaire above grade level.



New Lighting

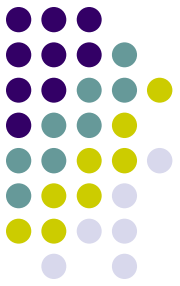
- Lighting for areas not previously illuminated; newly installed lighting of any type except for replacement lighting or lighting repairs.

Object



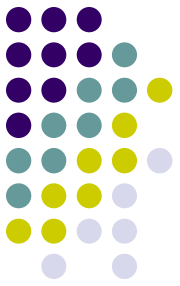
- A permanent structure located on a site. Objects may include statues or artwork, garages or canopies, outbuildings, etc.

Object Height



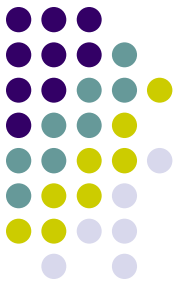
- The highest point of an entity, but shall not include antennas or similar structures.

Ornamental Lighting



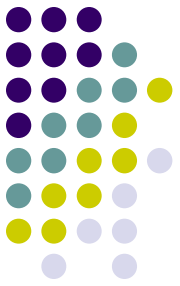
- Lighting that does not impact the function and safety of an area but is purely decorative, or used to illuminate architecture and/or landscaping, and installed for aesthetic effect.

Ornamental Street Lighting



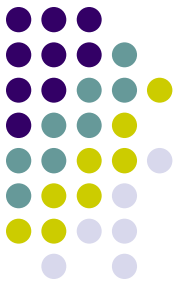
- A luminaire intended for illuminating streets that serves a decorative function in addition to providing optics that effectively deliver street lighting. It has a historical period appearance or decorative appearance, and has the following design characteristics:
 - designed to mount on a pole using an arm, pendant, or vertical tenon;
 - opaque or translucent top and/or sides;
 - an optical aperture that is either open or enclosed with a flat, sag or drop lens;
 - mounted in a fixed position; and
 - with its photometric output measured using Type C photometry per IESNA LM-75-01.

Outdoor Lighting



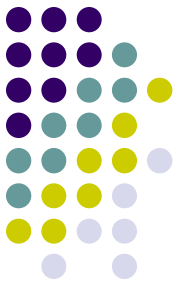
- Lighting equipment installed within the property line and outside the building envelopes, whether attached to poles, building structures, the earth, or any other location; and any associated lighting control equipment.

Partly Shielded Luminaire

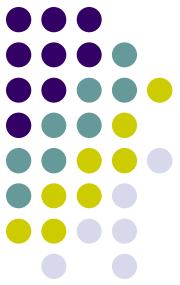


- A luminaire with opaque top and translucent or perforated sides, designed to emit most light downward.

Pedestrian Hardscape



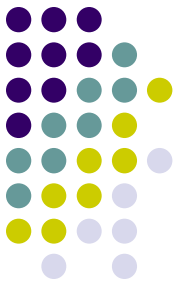
- Stone, brick, concrete, asphalt or other similar finished surfaces intended primarily for walking, such as sidewalks and pathways.



Photoelectric Switch

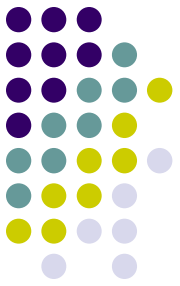
- A control device employing a photocell or photodiode to detect daylight and automatically switch lights off when sufficient daylight is available.

Property Line



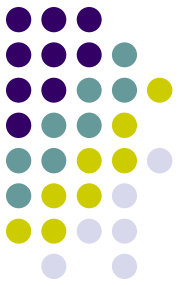
- The edges of the legally-defined extent of privately owned property.

Relative Photometry



- Photometric measurements made of the lamp plus luminaire, and adjusted to allow for light loss due to reflection or absorption within the luminaire. Reference standard: IES LM-63.

Repair(s)



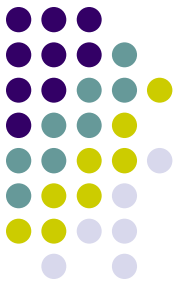
- The reconstruction or renewal of any part of an existing luminaire for the purpose of its ongoing operation, other than relamping or replacement of components including capacitor, ballast or photocell. Note that retrofitting a luminaire with new lamp and/or ballast technology is not considered a repair and for the purposes of this ordinance the luminaire shall be treated as if new. “Repair” does **not** include normal relamping or replacement of components including capacitor, ballast or photocell.

Replacement Lighting



- Lighting installed specifically to replace existing lighting that is sufficiently broken to be beyond repair.

Sales Area



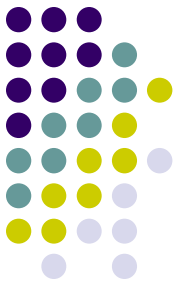
- Uncovered area used for sales of retail goods and materials, including but not limited to automobiles, boats, tractors and other farm equipment, building supplies, and gardening and nursery products.

Seasonal Lighting



- Temporary lighting installed and operated in connection with holidays or traditions.

Shielded Directional Luminaire



- A luminaire that includes an adjustable mounting device allowing aiming in any direction and contains a shield, louver, or baffle to reduce direct view of the lamp.

Sign



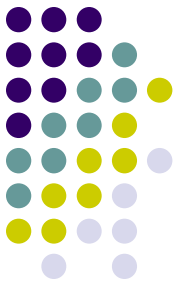
- Advertising, directional or other outdoor promotional display of art, words and/or pictures.

Sky Glow



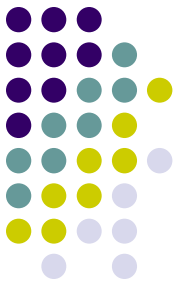
- The brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere. Skyglow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the night sky.

Temporary Lighting



- Lighting installed and operated for periods not to exceed 60 days, completely removed and not operated again for at least 30 days.

Third Party



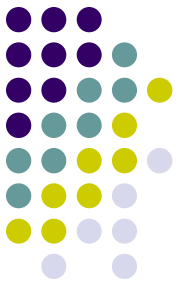
- A party contracted to provide lighting, such as a utility company.

Time Switch

- An automatic lighting control device that switches lights according to time of day.

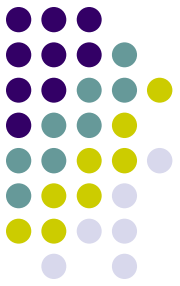


Translucent



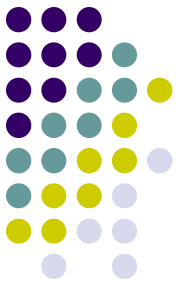
- Allowing light to pass through, diffusing it so that objects beyond cannot be seen clearly (not transparent or clear).

Unshielded Luminaire



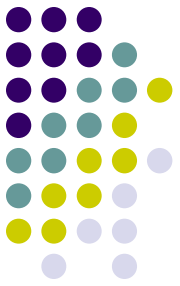
- A luminaire capable of emitting light in any direction including downwards.

Uplight



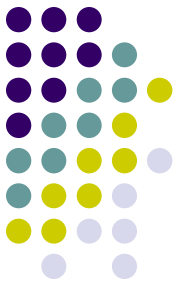
- For an exterior luminaire, flux radiated in the hemisphere at or above the horizontal plane.

Vertical Illuminance

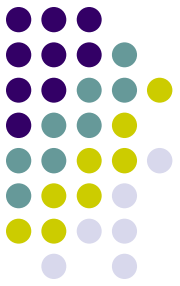


- Illuminance measured or calculated in a plane perpendicular to the site boundary or property line.

XI. Optional Streetlight Ordinance



- Streets only, not roadways or highways
- Sections
 - Preamble
 - Definitions
 - Scope
 - Master Lighting Plan
 - Warranting
 - Light Shielding and Distribution



Preamble

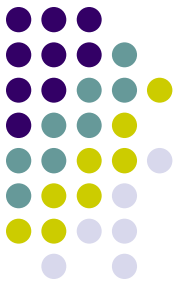
- The purpose of this Ordinance is to control the light pollution of street lighting, including all collectors, local streets, alleys, sidewalks and bikeways, as defined by ANSI/IES RP-8 Standard Practice for Roadway and Street Lighting and in a manner consistent with the Model Lighting Ordinance.

Scope



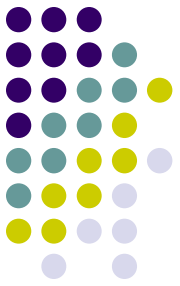
- All street lighting not governed by regulations of federal, state or other superseding jurisdiction.
- ***EXCEPTION:***
 - lighting systems mounted less than 10.5 feet above street level and having less than 1000 initial lumens each.

Master Lighting Plan



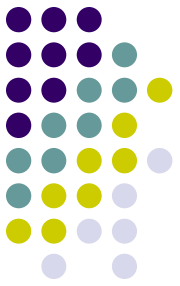
- The Authority shall develop a Master Lighting Plan based on the American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide GL-6, October 2005, Chapter 2. Such plan shall include, but not be limited to, the Adoption of Lighting Zones and:
 - 1. Goals of street lighting in the jurisdiction by Lighting Zone
 - 2. Assessment of the safety and security issues in the jurisdiction by Lighting Zone
 - 3. Environmentally judicious use of resources by Lighting Zone
 - 4. Energy use and efficiency by Lighting Zone
 - 5. Curfews to reduce or extinguish lighting when no longer needed by Lighting Zone

Warranting



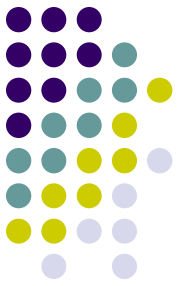
- The Authority shall establish a warranting process to determine whether lighting is required. Such warranting process shall not assume the need for any lighting nor for continuous lighting unless conditions warrant the need. Lighting shall only be installed where warranted.

Light Shielding and Distribution



- All street lighting shall have no light emitted above 90 degrees.
- Exception:
 - Ornamental street lighting for specific districts or projects shall be permitted by special permit only, and shall meet the requirements of Table H below without the need for external field-added modifications.

Table H - Uplight Control Requirements for Ornamental Street Lights - by Special Permit Only



Lighting Zone	Maximum Uplight Rating
LZ-0	U0
LZ-1	U1
LZ-2	U2
LZ-3	U3
LZ-4	U4