QL2.3 MINIMIZE LIGHT POLLUTION

INTENT:

Prevent excessive glare, light at night, and light directed skyward to conserve energy and reduce obtrusive lighting and excessive glare.

LEVELS OF ACHIEVEMENT

IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
(1) Cost savings focus. The project team conducts and overall assessment of lighting needs for the project. The team looks for opportunities to reduce or eliminate outdoor lighting based on potential cost savings. Appropriate measures taken to prevent light spillage and glare in the design. Design specifications state the use of energy-efficient lighting and use of automatic turnoff of outdoor lighting during off hours. The design meets requirements for digital signage. Specify lighting requirements and limitations for the construction contractor. See Discussion below regarding requirements for digital signage. (A, B)	**(2) Non-lighting alternatives.** The project team makes additional reductions in the amount of lighting required by employing non-lighting alternatives, e.g., clear signage and clearly painted roadway lines. The design meets requirements for digital signage. The design reduces light spillage effects and glare through strategies such as high barriers and planted trees and shrubs. See Discussion below regarding requirements for digital signage. (A, B, C)	**(4) Cohesive zoning.** The project team aligns the project with appropriate lighting zones and existing zoned districts. The team may establish lighting zones based on lighting needs balanced against the needs and limitations posed by sensitive environments and receptors. The team assesses street lighting needs and specifies the removal of unneeded street lighting. (A, B, C)	**(8) Preserving the night sky.** The project team performs an audit of lighting needs for all the areas affected by the project. The team assesses lighting needs and makes recommendations for overall lighting needs, plus considerations for reducing light spillage. The design specifies outdoor lighting with full cutoff lenses and reductions in lighting intensity for preserving the night sky. The team optimizes energy efficiency, considering time of day lighting needs and the use of energy-efficient lamps. (A, B, C)	**11) Restoring the night sky.** Work with lighting experts to assess true lighting needs as well as areas where exterior lighting is directed upward. Identify more fully, where, when and to what levels lighting is needed to meet wayfinding, safety and other illumination requirements. Also identify and appropriately reduce or eliminate lighting where existing lighting is negatively impacting dark sky conditions. Extensive use of appropriate time of day lighting schedule. Broad application of full cutoff lenses. Optimize energy efficiency. Assess and optimize energy expenditures. Focus on reducing unnecessary upward illumination. (A, B, C)

DESCRIPTION

The red and purple glow that covers the sky and blocks out the stars in many densely populated areas is of concern for several reasons. The cumulative exterior light directed upwards into the sky due to inappropriate lighting design represents a massive waste of energy. Light spillage also disturbs nocturnal animals and interferes with sensitive environments, including open space, wilderness parks and preserves, areas near astronomical observatories, and other light-sensitive habitats.

Finally, the ambient light that blocks the stars from view is undesirable for human beings from both an aesthetic and health perspective. Light pollution has the potential to disrupt circadian rhythms and human sleep patterns with numerous health implications.

Well-designed lighting can maintain adequate light levels on the ground while reducing light pollution by using lighting more efficiently. Many cities and communities may be using more light than necessary and may benefit from a lighting needs audit and assessment.

Design for reducing light spillage effects and glare can be accomplished through the application of full cutoff lenses that direct lighting to where it is needed. High barriers and planted trees and shrubs can also block light spillage effectively.

ADVANCING TO HIGHER ACHIEVEMENT LEVELS

Benchmark: Compliance with local laws and regulations regarding light pollution, but not beyond what's required. Compliance with local laws and regulations regarding construction light pollution.

Performance improvement: Incorporate non-lighting alternatives and rethink real lighting needs. Eliminate unnecessary lighting. Reduce glare and light spillage. Increase use of dark-sky friendly lighting devices.

EVALUATION CRITERIA AND DOCUMENTATION

A. Has the project team conducted an overall assessment of lighting needs for the project?

1. *Documentation of lighting assessments conducted for the project.*
2. *Considerations of overall appropriate lighting zone levels.*

B. Has the project team designed the lighting components of the project in a way that reduces lighting energy requirements?

1. *Plans, drawings, specifications showing the use of energy-efficient lighting, removal of existing but unneeded lighting, use of automatic turnoff systems, application of non-lighting alternatives.*

C. Has the project team designed the lighting components of the project in a way that reduces or eliminates light spillage into sensitive environments and preserves the night sky?

1. *Plans, drawings, specifications showing reductions in lighting intensity, the use of high barriers and planted trees and shrubs, and the use of full cutoff lenses.*
2. *Demonstration that signage for the constructed works will meet the following standards for digital signs, digital billboards, electronic message boards or displays, electronic message centers, marquee signs and electronic display systems: During daylight hours between sunrise and*

METRIC:

Lighting meets minimum standards for safety but does not spill over into areas beyond site boundaries, nor does it create obtrusive and disruptive glare.

sunset, luminance shall be no greater than 2000 candelas per square meter. At all other times, luminance shall be no greater than 250 candelas per square meter. There shall be no display movement such as twirls, swirls, blinking, video clips or other forms of animation. Sign copy cannot change more than once per hour.

SOURCES

- CEEQUAL Assessment Manual for Projects Version 4, December 2008, Roger K. Venables, Section 11.5.
- Municipal Research and Services Center of Washington (MRSC), Light Nuisances - Ambient Light, Light Pollution Glare http://www.mrsc.org/subjects/legal/nuisances/nu-light.aspx ,\
- International Dark Sky Association, http://www.darksky.org/mc/page.do;jsessionid=611873BE90FA3AE5DE973FEDBC4D5DA2.mc0?sitePageId=119791 .
- The New England Light Pollution Advisory Group (NELPAG) http://www.cfa.harvard.edu/nelpag/nelpag.html .

RELATED CREDITS

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RA2.1 Reduce Energy Consumption

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