CENTERVIEWS
THE PLANNING CENTER | NOVEMBER 2002

Building a New Stadium? Control the Lights and Keep the Neighbors Happy

As more school districts build sports facilities and build them closer to existing land uses, lighting impacts are a growing concern. However, advances in lighting technology give school districts a number of options to reduce light and glare impacts. This CENTER**VIEWS** discusses some of the strategies school districts can employ to meet on-field lighting standards, while reducing impacts on surrounding sensitive land uses.

LIGHTING IMPACTS UNDER CEQA[1]

Lighting impacts can take the following forms:

Spill Light is not efficiently directed and, as a result, it floods onto neighboring properties. Spill light is defined as light that trespasses off the intended area and illuminates adjacent property. It is generally considered unwanted. Spill light is measured in terms of illuminance, for which the units of measure are foot candles (fc) and lux (lx).[2]

Glare is the visibility from a light source, which is measured in candelas.[3] Glare is produced from an excessively bright light source that causes a reduction in the ability to see. Glare is dependent on the light source's brightness, the contrast between the light source and brightness of the surrounding environment, the size of the light source, and the position of the light source. Glare can be uncomfortable and/or disabling.

Sky Glow, the amount of light reflecting into the night sky that reduces visibility of the sky and stars, is a concern in many jurisdictions, including those with observatories. Sky glow is measured in lumens, which is a measure of total light output from a light source.

When evaluating a proposed lighting project, school districts must determine what constitutes "substantial light or glare" and then work toward reduction of those impacts. Most jurisdictions do not have established thresholds for spill light or glare. We recommend that school districts adopt both field lighting standards and impact significance criteria for spill light and glare.

In addition to aesthetic impacts, spill light and glare may also affect biological resources, particularly threatened and endangered wildlife. Lighting may disrupt wildlife breeding, settlement, and migration patterns. Therefore, lighting impacts may need to be addressed in both the aesthetic and biological impacts sections of a CEQA document.

TECHNOLOGICAL AND OPERATIONAL STRATEGIES TO REDUCE LIGHTING IMPACTS

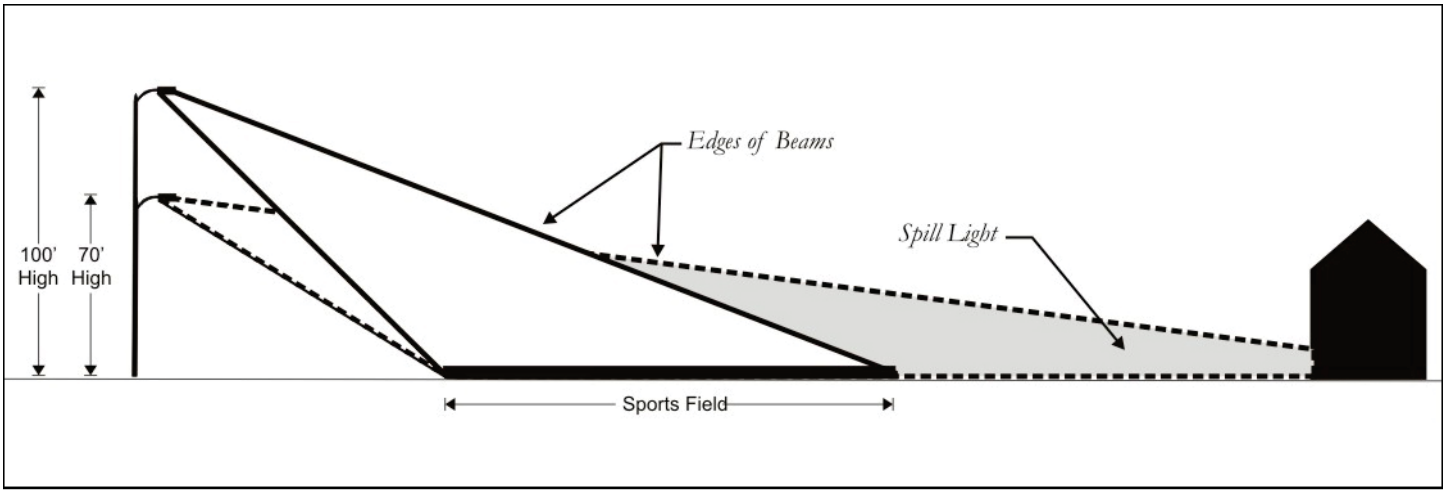
Technological Strategies. The strategies to control spill light and glare are different. Districts can employ both technological and operational strategies to control lighting impacts. Technological strategies are choices in the type of light fixture, the height of the light poles, and the number and placement of the light poles on the play field. One of the most effective ways to control spill light is to increase the height of the light poles. An increase in pole height affords more control in aiming light downward and away from surrounding properties. However, taller poles may be more visible during the daytime to surrounding sensitive receptors (*see Figure 1 on the following page*).

[1] Lighting definitions as defined in Musco Lighting's Technical Bulletin #TB0005.

[2] A foot candle is one lumen of light over one square foot. A lumen is a measurement of light energy. The foot candle is a unit based on English measurements. Lux is the metric unit equal to one lumen per square meter. Although foot candles are considered obsolete in some scientific circles, they will continue to be used because many existing light meters are calibrated in foot candles.

[3] A candela is equivalent to one candlepower of light.

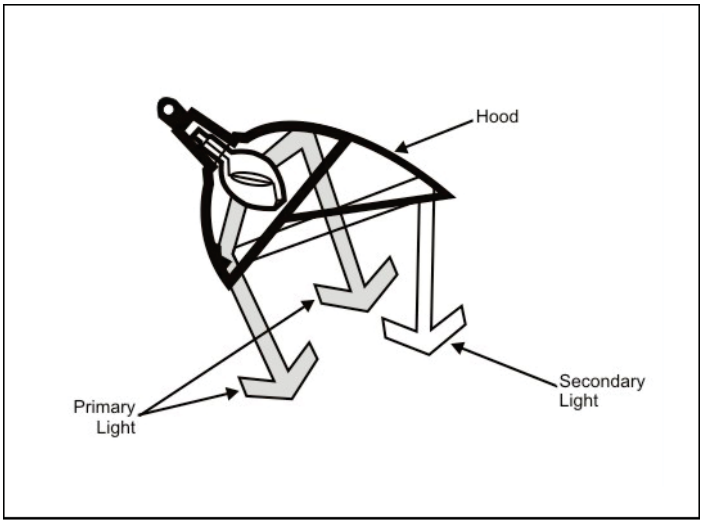
Figure 1 – Spill Light



Source: Musco Lighting

To control glare, districts can choose fixtures with reflectors, hoods, and side shields to change the angle of incidence in order to reflect light downward more effectively (*see Figure 2*).

Figure 2 – Hood Lighting



Source: Musco Lighting

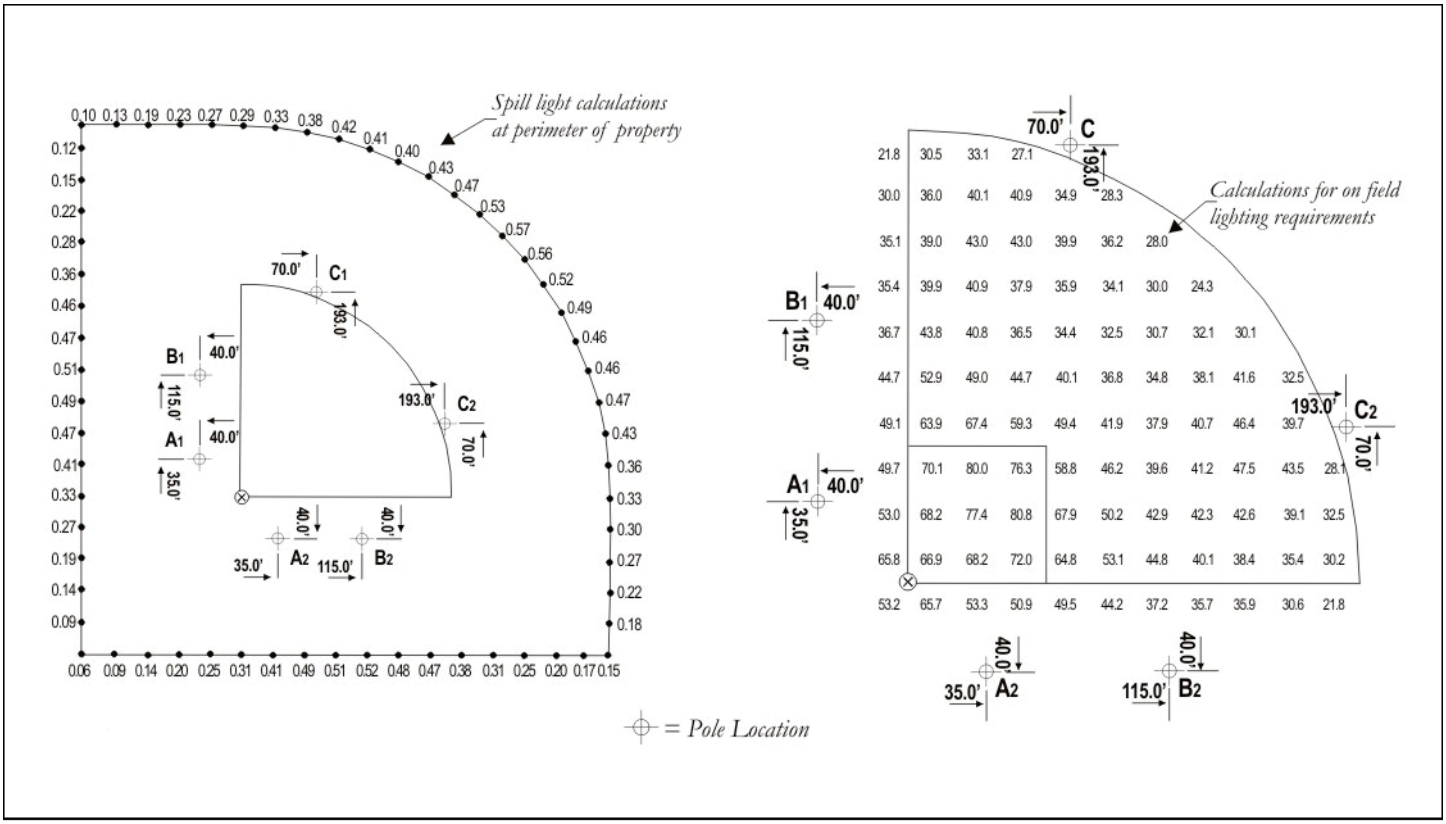
OPERATIONAL STRATEGIES

School districts can control light and glare by choosing hours of operation that correspond to heaviest peak nighttime use of the fields. Lights that have remote controlled shut offs can reduce energy costs and lengthen lamp life. School districts also need to have scheduled maintenance of their lights (cleaning reflectors and changing lamps) so that fields get the maximum lighting possible over the life of the lighting system.

RECOMMENDATIONS

Lighting specialists can help school districts choose lighting systems that reduce spill light and glare impacts. These specialists can install and adjust light fixtures, working with contractors and civil engineers to reduce these impacts to the maximum extent feasible. Calculations can be performed to determine the illumination at the property lines and across the play fields (*see Figure 3*). The location of poles and the direction of light and light intensity can then be adjusted accordingly.

Figure 3 – Lighting Calculations



Source: Musco Lighting

Steps you can take to reduce light and glare:

+ Match on-field lighting with your specific type of field use. Don't waste energy and create unnecessary impacts by over lighting for the expected use.
+ Identify areas of potential conflict with neighboring sensitive uses, both man-made and natural environments.
+ Develop mitigation measures by recommending lamp types, number and placement of light poles to maximize lighting on field and reduce off-site spill light and glare impacts.
+ Reduce infrastructure costs over the long-term by pole location and design of light standard.
+ Enhance energy cost savings by number and choice of lamp and control devices.

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The Planning Center wishes to thank Michael Marchetti and Matt Bindel of Musco Lighting. For more information about the firm's services, contact:

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