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MUNDUS BISHOP

A memorial made whole
at Denver's Babi Yar Park

A RECKONING IN RALEIGH

The invisible freight of Chavis Park

SYDNEY'S SOARING TRELLIS

Plants are part of the view on high

GÜNTHER VOGT

Inside his design curio cabinet



ILLUMINATION BLUES

THE COMING CONFLICT
BETWEEN TWO SEPARATE
ENVIRONMENTAL ISSUES.

People often equate energy efficiency with environmental sensitivity, but a recent trend in LED lighting, namely, the uptick in what's known as blue-rich white light, has the potential to divorce these goals and put the lighting industry on a collision course with those aiming to design healthful public spaces.

Over the past several years, an increasing number of LED manufacturers are turning to blue-emitting diodes, which are coated with phosphor to produce a clean, white light. Blue LEDs can handle higher-than-average power densities, which greatly increase efficiency. The technology is so revolutionary that the physicists who developed it received the Nobel Prize. But blue LEDs also pose a threat to the welfare of wildlife and human beings.

Light in the blue spectrum (between 460 and 480 nanometers) isn't bad during the day; in fact, it helps our bodies produce the hormone serotonin. At night, however, it prevents our bodies from producing another hormone, melatonin, which regulates sleep. According to the National Cancer Institute, a lack of melatonin may contribute to breast cancer in women. Blue light also has been

shown to disrupt animals' circadian rhythms, which mimic our own, and cause adverse effects in animal behavior.

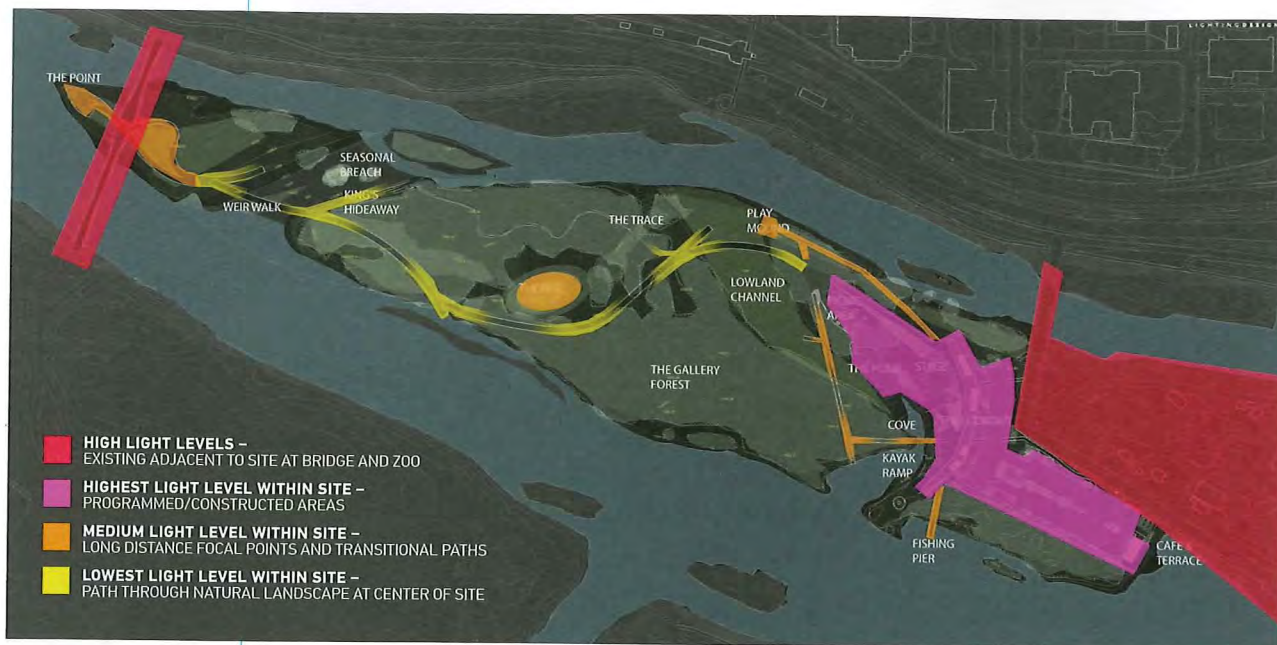
"If you do a sky-glow mapping of everything, light between 460 and 480 nanometers is missing in our natural phenomena, and that's right at the blue spectrum," says Nancy Clanton, who founded Clanton & Associates Lighting Design in Boulder, Colorado, and who sees the emergence of blue-rich white light as a major environmental issue. "No matter how warm of an LED light you have, you have a spike in blue light. So we've got a problem."

It's a problem that may take years to solve, given the complexity of this conflict between energy efficiency and ecosystem health. In the meantime, lighting designers are coming up with their own solutions. For a new 30-acre park on St. Patrick's Island in Calgary, Alberta, the design team, which included W Architecture & Landscape Architecture, Civitas, and Tillett Lighting Design, was challenged to consider not just human users but bats, owls, and mosquitoes—any living thing that might call the island home. The result is a park that uses darkness as a shield, a protective charm against human intrusion.

Mark Johnson, FASLA, president of Denver-based Civitas, has developed what he calls a "theory of seeing," which contradicts conventional wisdom about lighting for public safety. "What's

TOP
Portions of St. Patrick's Island in Calgary were left unlit to avoid disturbing nocturnal wildlife.

TILLETT LIGHTING DESIGN



critical to public safety is an even amount of light, an amount of light that allows you to see as evenly as reasonable across landscapes," he says. "So at St. Patrick's Island, we have a higher-than-usual number of fixtures, which have a lower wattage so that we're putting a more average amount of light down onto the ground." The design averages just one to two foot-candles per luminaire (eight foot-candles is not uncommon in outdoor applications, Johnson says), and even less along minor pathways, and lights use astronomical time clocks to determine when at night they automatically turn off.

Johnson's theory is backed up by hard data. Clanton, who helped develop the International Dark-Sky Association's Model Lighting Ordinance in 2011, has conducted several lighting studies and found that visibility remains the same even with a 50 percent reduction in illumination. Even more striking, in one study, visibility actually increased with a 25 percent reduction. "So we don't know what the bottom is," she says. This summer, Clanton will join Charles Stone, Randy Burkett, Naomi Miller, and several other prominent lighting designers on a special committee of the Illuminating Engineering Society to explore this issue and others, including blue-rich white light, sky glow, and lighting for public safety.

Like LED manufacturers, lighting designers are forced to operate within a system of trade-offs. Concrete paths, for instance, can increase visibility but may also contribute to sky glow. Aiming lights downward may decrease light pollution, but it can drive away ground-dwelling creatures. And, light pointing straight up matters less than light shining roughly 10 degrees above horizontal, Clanton says.

For Linnaea Tillett, Affiliate ASLA, who led the design of the lighting for St. Patrick's Island, creating darker skies and safe public spaces will require finesse. Many people, particularly those who feel unsafe in their communities, believe that "light is the answer," she says, "and you can't just say, 'No, it's not.' It's not just a question of going around and turning everything off or down. You have to respond to what the community's perception is. I think you can do that and do dark sky."

Fortunately, many lighting manufacturers are asking the right questions, Tillett says. Some have already released luminaires with night settings that switch from blue light to amber in the evening, and Clanton expects that color tuning, which already is common in interior lighting, will be the norm in outdoor spaces as well.

And, of course, technology continues to evolve. Blue LEDs may one day be replaced by an even more efficient but less harmful light source. "There are some LEDs like the Soraa lamp that use a violet [LED]," Clanton says. "I'm intrigued by that." ●

TOP
A study of existing and planned light levels in the park shows dimly lit paths through natural areas.

TILLET LIGHTING DESIGN