



PLANET-CENTRIC DESIGN

Artificial light at night provides for human safety, amenity and increased productivity. Artificial light also diminishes the natural environment as it consumes energy and, in the night environment, disrupts the natural balance of the ecosystem.

Plant centric lighting design starts with a shift in thinking. It moves from human centric design thinking to a design approach where lighting does not diminish the natural systems and provides amenity of all life, not just human. This shift in thinking needs to generate innovation, it needs to happen now and needs to be solutions-based. Based on our experience with recent projects built in sensitive natural environments we offer the following design tips. These Guidelines do not infringe on human safety requirements, they offer creative solutions that meet both human safety obligations and environmental ecosystem conservation.



LONGEVITY OF DESIGN

In a constantly accelerating world it becomes increasingly difficult to build for the long run. However, as designers we know we are on the right track if our design has the potential to last for a long time – if it offers lasting amenity to our clients and users.

TIPS for enhancing longevity of a lighting system are:

- Always use LED light sources due to their efficiency and longevity. LED lighting offers the potential for maintenance free lighting when it is installed correctly.
- Build future proofing into each design so as uses change the building can adapt with major renovations or changes.

ENERGY USE

Artificial lighting can account for up to 15% of a building’s annual electricity use. A planet-centric design aims to reduce this consumption of energy. Start with defining where natural light can be used, then, if artificial lighting is necessary, define the correct light levels for tasks. Do not over-light by evenly illuminating all areas to the highest requirement.

TIPS we use for reducing energy use are:

- Place different areas of a space into separately controlled lighting zones. Install a dimming system to auto tune the light levels to match the changes that occur across the day.
- Use task lighting where bright lighting is needed for finely detailed tasks, then illuminate surrounding areas to lower ambient levels.
- Install sensors to automatically dim and turn off lights dependent upon the amount of daylight and occupancy.

BIOPHILIA – THE LOVE OF NATURE

Deep down we all know that a connection to nature is important. Research tells us that biophilic design reduces stress, improves cognitive function and creativity and expedites healing. As we urbanise we spend more of our time in box-like structures that shuts out the natural systems of the world.

TIPS for restoring the connection to the natural world are:

- Where possible use natural light to provide illumination for day-time tasks.
- Do not light all areas evenly, create pools of light for performing tasks and pools of shadow for places of refuge.
- Light the wall and ceiling surfaces so spaces are lit with a mix of direct and diffuse, reflected light.
- Design for change in lighting patterns during the day to mark passage of time. Simple switch will allow an occupant vary the lighting to suit location and task.



THE COLOUR SPECTRUM

Both flora and fauna in the natural environment are affected adversely by artificial light at night. Different species are sensitive to different wavelengths of light but as a general rule avoid ultraviolet and blue wavelengths that are predominant in cool white light sources. If adding light to sensitive environments is required then consider the other forms of life that live there.

TIPS for selecting the correct colour of light are:

- If white is necessary then use warm coloured, long wavelength light as this is invisible to most wildlife.
- In paths of bird migration or nesting use monochromatic green light to enhance their ability to orientate and migrate.
- For turtle hatching beaches use amber or yellow coloured light and which will not distract them away from the sea.
- For low light environments, like observatories, use red light which promotes the adaption of human eyes to low nighttime light levels.

EXPOSURE – LOW DURATION AND INTENSITY

All life - plants, animals and us - depend upon the daily cycle of light and dark to govern life sustaining behaviours such as reproduction, nourishment and rest. When we light up the night we disrupt this cycle. So, the first question when considering outdoor light is whether it is really needed. If so, then consider how little the exposure of light could be.

TIPS we use for protecting nighttime ecosystems are:

- Light in a low-impact way – using luminescence as markers? on perhaps portable lighting?
- Light to very low light levels – it is possible read a book in moonlight with less than 2 lux.
- Light temporarily; have lights on timers and dimmers so that they activate only once occupancy is detected.

SCALE AND DIRECTION

The human eye adapts to the brightest light in view. As our eyes adapt to bright lights, our ability to see in darker areas is lost. Glare from bright lights plunge the surrounding areas into dark shadows. Glare not only masks our view it also is an indication that light is being 'spilled' wastefully into the environment.

TIPS for how we control light at night:

- Mount lights at a low height, preferably below eye height. In this way we light what we need to but retain the ability to see the nighttime natural environment.
- Mask lights to shine downwards only to illuminate the task and not allowing any waste light to shine upwards to create sky glow that masks the view of the stars.
- When there is a view place lights behind the viewer so the natural environment is not masked.