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1 November 2008

Carl Holm, Planning Manager
Monterey County Planning Department
168 W. Alisal St., 2nd Floor
Salinas, CA 93901

Dear Mr. Holm,

This letter, in response to the request for comments on the DEIR for the 2007 Monterey County General Plan, describes an effective but overlooked mitigation available to the County to reduce the overall light and glare (Impact AES-4) during the buildout of the 2007 General Plan.

Light pollution, including trespass and glare, has a significant impact on most flora and fauna, including marine[1]. Birds, amphibians, and insects are especially vulnerable but both nocturnal and diurnal mammals are also strongly affected.

The view of the night sky, once thought to be an undeniable human heritage, is so rare that a recent survey of CSUMB students revealed that 90 percent had never seen the Milky Way! Students, and even their parents, visiting the MIRA Observing Station on Chews Ridge, are often surprised to see a dark night sky filled with stars, planets, and galaxies. 1

The Santa Lucia Mountains of Monterey County provide one of the last high-quality dark sites in the United States for optical astronomical observations. These conditions[2] drove the decision to locate the MIRA astronomical observatory in Monterey County in preference to any other location in the U.S. The quality of these conditions is now being reduced by the light pollution from the growth of the Monterey Peninsula, the Salinas area and, especially, because of its proximity, the Salinas Valley.

For example, MIRA, funded by a NASA grant, has been researching zodiacal light, the reflection of sunlight off interplanetary dust, in order to decode what it tells us of the

[1] See, for example, Rich, C. & Longcore, T. 2006. *Ecological Consequences of Artificial Night Lighting.* Island Press, Washington, USA. and references therein.

[2] Walker, M. 1970. The California Site Survey. *Publications of the Astronomical Society of the Pacific*, 82, 672.

evolution of our solar system. Zodiacal light was easily observed over the Salinas Valley from MIRA's Oliver Observing Station on Chews Ridge in 1986. This delicate cosmic feature is now swamped by uncontrolled lighting from the rapidly growing developments in the Salinas Valley and it is now unobservable from this site.

In response to our previous letter commenting on the 2006 DEIR, it was claimed that the towns along the Salinas valley were too far away to have a significant impact. This is completely incorrect. Professional astronomers, including those in Monterey County, routinely observe cosmic objects five million times fainter than can be detected with the unaided eye. In extreme cases, we observe objects 100 times fainter than the intrinsic brightness of the unpolluted night sky. Almost all of the central Salinas Valley, from the Indian Springs development to Greenfield, is less than 20 miles from the MIRA Observatory. By comparison, the separation between Kitt Peak National Observatory and Tucson, the light from which has had a serious impact on the scientific capabilities of the national observatory, is over 40 miles.

Light pollution can be greatly reduced simply through restricting lighting and views of the light sources to only those specific onsite areas requiring illumination (Land Use Element Policy LU-1.13). Unlike most forms of pollution where the reduction increases costs, the savings in energy use *reduces* operating costs. 1

> *"Of all the pollutions we face, light pollution is perhaps the most easily remedied. Simple changes in lighting design and installation yield immediate changes in the amount of light spilled into the atmosphere and, often, immediate energy savings."* V. Klinkenborg National Geographic Nov. 2008

Mitigation beyond the 2007 General Plan policies. Current light pollution levels can be substantially reduced by correcting current bad lighting practices during standard upgrades and maintenance. *In a ten year period, Tucson, while enjoying substantial population growth, reduced its light pollution to one-third its initial level through such techniques.* That is, contrary to the assertions of the DEIR, mitigation techniques can reduce the level of light pollution in Monterey County to half its current level while the population increases by 39% by year 2020. Detailed mitigation techniques are described at the web site for the International Dark Sky Association (www.darksky.org).

As a specific example, 40 percent of urban light pollution is caused by early-design street lamps such as the 'drop-lens cobra' luminaires that populate much of the County. During maintenance or replacement, they could be replaced with modern, full cut-off fixtures. *An effective and low cost technique is to attach a shield, a standard accessory for these street lights, during bulb replacement.* This technique is credited as one of the most successful in reducing the Tucson light pollution. These shields are now standardly installed when a consumer complains about light glare or trespass at a residence. A County policy would extend that remedy to the general public. This

technique alone would completely mitigate the light pollution increment due to the predicted population growth by the year 2020.

A comprehensive policy should address issues such as lighting types and levels, outdoor lighting after closing times, curfews for outdoor illuminated signs, etc. As possible detailed models, specific ordinances have been adopted in many cities and counties in the United States and abroad. In addition, astronomers at MIRA are available to work with the County to develop light pollution ordinances that would be tailored to Monterey's unique needs.

In summary:

- Increased light pollution in Monterey County will have a significant impact on flora, fauna, and the natural patrimony of its residents to view their place in our Galaxy and the Universe.
- Research and education at MIRA's Bernard M. Oliver Observing Station, located at one of the best sites for optical astronomy remaining in the continental United States, will be significantly impacted by increased light pollution in Monterey County. This will be especially true for light pollution from the Salinas Valley. 1
- Unlike other forms of pollution, the mitigation of light pollution in new developments saves money by reducing energy costs and, concomitantly, lowers the carbon footprint of the County.
- Techniques for substantial mitigation of light pollution in existing developments are well understood and relatively inexpensive.
- Simple shielding of existing lights and the use of approved fixtures for new lighting would *lower* the level of light pollution below its current levels even with the population increase expected by the year 2020.

Sincerely yours,

Wm. Bruce Weaver, Ph.D.
Director