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**Dark Sky Stakeholders Group (DSSG) Draft Meeting Notes
May 5, 2009**

1. Welcome and Introductions.
2. Review of Model Pattern Lighting Code (PLC) sections 4.1 and 4.2

Chris Luginbuhl, member of the astronomy community, led discussion on sections 4.1 and 4.2 of the draft MAG Pattern Lighting Code (PLC). He said the goal is to aim for consensus on the pattern code. He said the draft document to be discussed at this meeting is not meant to be a final document.

Heidi Pahl summarized comments on section 4.1 and 4.2 in the draft MAG PLC document.

Comments on Table 4.1 Shielding Standards

Add column at end of table for Notes.

No reference for note 5. Preserve information in Note 5 but restructure it.

Move Note 3 to definition section.

Class 3 lighting is too restrictive. Allow for some leniency for design and architecture of this type of lighting. Avondale to provide examples at next meeting of not fully shielded decorative lighting.

Buckeye asked if Table 4.1 should include minimum figures. Chris Luginbuhl replied that it would complicate the code to include minimum figures. He added that it is not common to have a minimum in a code. He said typically, the design guidelines state the minimum.

Comments on Table 4.2 Maximum Total Outdoor Light Output Standards Lumen Caps - Initial Lamp Lumens per Net Acre

Provide example of how lumens are calculated.

Insert group COI (commercial, office, industrial) development language into this PLC.

Establish feasible maximum of lumens.

LZ1 and LZ2 map would be part of this lighting code.

Questions, Responses and Discussion From the Meeting

A number of questions were asked during the meeting. Responses were provided by members of the astronomy community: Chris Luginbuhl, Elizabeth Alvarez, and Dan Brocius.

In the draft MAG PLC it was suggested that the definitions need to be clear and may need to be moved to the front of document.

The City of Mesa lighting code discusses filtered lights. Mesa asked if the draft MAG PLC should address filtered lights. Chris Luginbuhl replied no, it is not necessary. The language regarding filtering arose in older codes because of the wide-spread use of mercury-vapor lighting; this is no longer an issue due to changes in technology and

DRAFT

lighting practice. Mr. Luginbuhl added that filtered florescent lights are no longer an issue either.

James Truman asked for clear definition of shielded and not shielded lights. Mr. Truman commented that fully shielded lights may not help people on the street due to light going where it is not needed and also light creating glare. Chris Luginbuhl responded that it is important to control light so it is going to the area where it is needed. James Truman said the Verrado development in Buckeye has good street lighting, keeping light to a specific area.

Chris Luginbuhl said the goal is to create a uniform standard with a MAG PLC. It is hoped that this uniform standard can be adopted by each jurisdiction in Maricopa County so that there is consistency in lighting codes across the region, though some changes jurisdiction-to-jurisdiction must be expected.

What does a 100 watt incandescent bulb mean in lumens? Fountain Hills asked for an explanation of the lumens per acre cap. Elizabeth Alvarez noted that it is not necessary to have a lumens per acre cap for residential. There is limited control of residential lighting. If a neighbor complains, the lighting is typically checked by the city. The education component is critical for effective residential control.

Chris Luginbuhl offered to provide examples of lumens per acre caps. The acreage of a building footprint is included in the area used for the lumens per acre calculation.

The question of how to add lumens to a development arose. Chris Luginbuhl offered to create a table that cities can use if a developer approaches them with a plan. The table will list the number of lamps and output of the lamps. This draft MAG PLC is intended to be used in the plan review stage.

Chris Luginbuhl informed that the lamp and fixture are generally matched for high-output outdoor lighting such as usually used in non-residential projects. This makes it unlikely that lighting users will change the wattage of approved lights after installation.

Mesa discussed Fiesta Mall in terms of how to implement outdoor light output standards effectively to meet needs of store owners, patrons, and a city's dark sky ordinance.

Avondale suggested that the MAG PLC be a comprehensive lighting code that provides ratios for an entire site and enforces uniform lighting. It was stated that municipal staff have more power with a developer when a lighting code is not a guideline (guidelines are suggestions and suggestions can be ignored). So if the lighting ordinance becomes a code it is easier for municipal staff to enforce with a developer. Chris Luginbuhl said that this issue illustrates the difference between a "proscriptive" code, as are most lighting codes, and "prescriptive" codes. Proscriptive codes are written to limit obtrusive aspects of lighting (light trespass, glare, energy waste, sky glow, etc), while prescriptive codes primarily or additionally define other characteristics of lighting related to quality and appearance, such as lighting levels, uniformity, etc. Lighting uniformity ratios require

DRAFT

lighting designers or someone trained to use a light meter. He said measuring a uniformity ratio is not trivial, whether at design stage or on-the-ground after construction. Lighting ratios make the code more complicated. A lighting designer understands minimum, maximum, and uniformity. Prescriptive codes are much more complicated than proscriptive codes. Developers are not required to follow guidelines but may need to defend why not at Design Review Board (DRB).

Crime Prevention through Environmental Design (CPTED) was mentioned. Crime and lighting was briefly mentioned.

The draft MAG PLC bases the lumen allowance on net parcel size and does not address pro-rated amounts, that is if only a portion of a parcel is proposed for development, there is currently no wording in the PLC to define how to pro-rate the amount of light allowed based on the parcel portion to be used. Jurisdictions have used their judgment on this issue, administratively limiting lighting on a partially-used parcel to the proportion developed or to the anticipated future needs (for exampl, a commercial building pad with no currently proposed tenant or building may require limited future lighting if the entire parking lot is part of the current proposal.).

The City of Tempe suggests that the IKEA parking lot is an example of good outdoor lighting and MAG offered to send Chris Luginbuhl the site plan for the IKEA parking lot and he agreed to provide the lumens per acre cap for this site.

Take lighting inventory in each jurisdiction to showcase good and bad areas of lighting within Maricopa County.

Mesa suggested asking municipal legal staff about the implications of Proposition 207.

It was mentioned that the DSSG should review the MAG PLC until consensus is reached. After consensus by DSSG, it was suggested that other players be invited to the meetings to provide input (e.g. developers, Arizona Sign Association, lighting designers, architects, biologists, environmentalists, crime professionals, car dealers, police departments, well-informed public, marketing staff etc.) Avondale and Buckeye offered to contact industry experts.

The DSSG wants to host an interactive Q&A on the MAG web site.

The DSSG contact list will be placed on the MAG web site as a resource.

It was suggested that research be done to determine if the PLC is to be part of a municipal zoning ordinance or be part of a municipality's building code. Elizabeth Alvarez noted that Pima County has their lighting code as part of their building code. Chris Luginbuhl noted that the International Energy Conservation Code (IECC) is a complicated code.