NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
INTERIM DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
JAN S. GOUVEIA
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

March 16, 2011

TESTIMONY OF THE DEPARTMENT OF TRANSPORTATION

SENATE BILL NO. 1493, SD1

COMMITTEE ON TRANSPORTATION

The Department of Transportation opposes the bill.

The Department, as it testified earlier before other House Committees, has already taken steps, over the past years, to provide the higher or more stringent lighting fixtures in counties within the State but those efforts were accomplished under a systematic and planned program of projects.

The Department's actions demonstrate our effort to address the intent of this bill. However, as proposed, we have several concerns and reservations with this bill.

The Department's effort to implement new lighting projects and change outs through maintenance or repairs need to be done in a coordinated and consistent program that is systematically planned and budgeted, especially due to the limited resources and funding currently facing the Department.

Implementation will require coordination with the scientific and environmental parties to properly address our lighting needs and to ensure that energy waste, light trespass, visual confusion, sky glow, etc. are considered so as not to adversely impact the need for dark night sky in areas such as astronomy or the protection of endangered species in Hawaii. These considerations must be balanced with the need to maintain and ensure transportation safety and security, for which the DOT is responsible through its Airports, Highways and Harbors Divisions

The bill's effective date also imposes an unreasonable timeframe to achieve compliance for our divisions to meet the requirements of the bill. Additional time is needed to effectively coordinate, plan, program and, most importantly, obtain the funding for implementation of the lighting.

Our Department has been a participant in the Starlight Reserve Committee and continuation of this Committee to allow further dialog among all affected parties and agencies and provide inter-agency coordination to develop a night sky strategy is critical.

The Department of Transportation stands ready to continue its participatory work with the Starlight Reserve Committee and is committed to work to address dark night sky conditions as well as enable our modal divisions to provide for the lighting needs of the traveling public.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Testimony of
WILLIAM J. AILA, JR.
Chairperson

Before the House Committee on
TRANSPORTATION

Wednesday, March 16, 2011
9:00 AM
State Capitol, Conference Room 309

In consideration of
SENATE BILL 1493, SENATE DRAFT 1
RELATING TO LIGHT POLLUTION

Senate Bill 1493, Senate Draft 1 proposes to require the use of shielded lights for all new outdoor lighting fixtures, including those for government agencies. While the Department of Land and Natural Resources (Department) supports the intent of this bill and its future implementation, the Department nonetheless defers to affected parties to further identify potential difficulties, if any, in its implementation and discuss appropriate modifications to reduce unintended and avoidable impacts on operations and safety.

The use of artificial lighting serves the essential purpose of providing safety and security, and facilitates many of the routine activities of society. However, artificial lighting also affects biological and cultural resources by impacting wildlife populations and interfering with night sky viewing. The excessive use of artificial lights also contributes to wasted consumption of energy resources and exacerbates global climate change.

Adoption of this measure is an important step to reduce the negative impacts of artificial lighting on cultural and natural resources. This legislation is one of the initial recommendations of the Starlight Reserve Advisory Committee, which was established by Act 161 of the 2009 Legislature to examine issues related to artificial lighting and recommend workable solutions to reduce the negative impacts of lighting on natural resources and related activities.

NEIL ABERCROMBIE
GOVERNOR

RICHARD C. LIM
INTERIM DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804
Web site: www.hawaii.gov/dbedt

Telephone: (808) 586-2355
Fax: (808) 586-2377

Statement of

RICHARD C. LIM
Interim Director

Department of Business, Economic Development & Tourism

before the

HOUSE COMMITTEE ON TRANSPORTATION

Wednesday, March 16, 2011
9:00 a.m.
State Capitol, Conference Room 309

in consideration of
SB 1493 SD1
RELATING TO LIGHT POLLUTION.

Chair Souki, Vice Chair Ichiyama, and members of the Committee. The department supports the intent of SB 1493 SD1 to minimize glare and light pollution in Hawaii's night skies.

Our department convened a Starlight Reserve Committee in July of 2010 to study the impacts of nighttime light pollution statewide and provide recommendations for a Starlight Reserve Strategy that would address these issues. The chairman of this committee, Dr. Richard Wainscoat, is providing testimony today on SB 1493 SD1. In addition, we would request that care be taken to ensure that this bill does not weaken existing county ordinances that mandate full shielding of outdoor lighting.

Thank you for the opportunity to testify on this bill.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

COLLINS D. LAM, P.E.
DIRECTOR

LORI M. K. KAHIKINA, P.E.
DEPUTY DIRECTOR

March 14, 2011

The Honorable Joseph M. Souki, Chair
and Members
Committee on Transportation
State Capitol
Honolulu, Hawaii 96813

Dear Chair Souki and Members:

Subject: Senate Bill No. 1493 SD1, Relating to Light Pollution

The Department of Design and Construction (DDC) supports the intent of SB1493 and respectfully offers the following suggestions to improve the clarity of the bill and the practicality of implementing it:

1. We recommend the term "fully shielded" be revised to "full-cutoff" for consistency with the terminology defined in the Illumination Engineering Society of North America (IES) illumination standards, which are used by the City (excerpt enclosed).

2. The proposed terminology requiring every new and replacement outdoor light fixture to be "fully shielded" (full-cutoff) needs to be qualified to indicate that the fixture used shall be able to provide the illumination required for the application. In some applications full-cutoff light fixtures may not be available to provide the illumination requirements. In these applications non-complying fixtures need to be used.

3. A qualification to replacement of outdoor light fixtures with "fully shielded" (full-cutoff) fixtures is needed to specify that an inoperable lighting fixture shall be replaced with a full-cutoff lighting fixture that provides equal or better illumination and uniformity as recommended by the IES. If such fixture is not available for the existing light pole spacing, a non-complying fixture that meets the IES illumination and uniformity design criteria shall be allowed. At some locations, full-cutoff light fixtures may not be capable of providing the IES standard of illumination, used by the City & County of Honolulu, with the existing light pole spacing. Replacement of existing light poles with more closely spaced light poles in order to satisfy both the illumination and shielding requirements due to a single inoperable fixture would be impractical and prohibitively expensive.

4. The requirements for acceptable luminaries for athletic facilities where "fully shielded" fixtures are not used should be deleted and replaced with the requirement that acceptable luminaries shall include those that can provide the required illumination as determined by a registered electrical engineer, while minimizing light directed above the horizontal plane and off-site light trespass. The specific criteria presented in the proposed new section of Hawaii Revised Statutes, Chapter 201-_ (b) (1) and (2) may be acceptable for some facilities but would be too limiting for others, as athletic facility lighting requirements vary considerably.

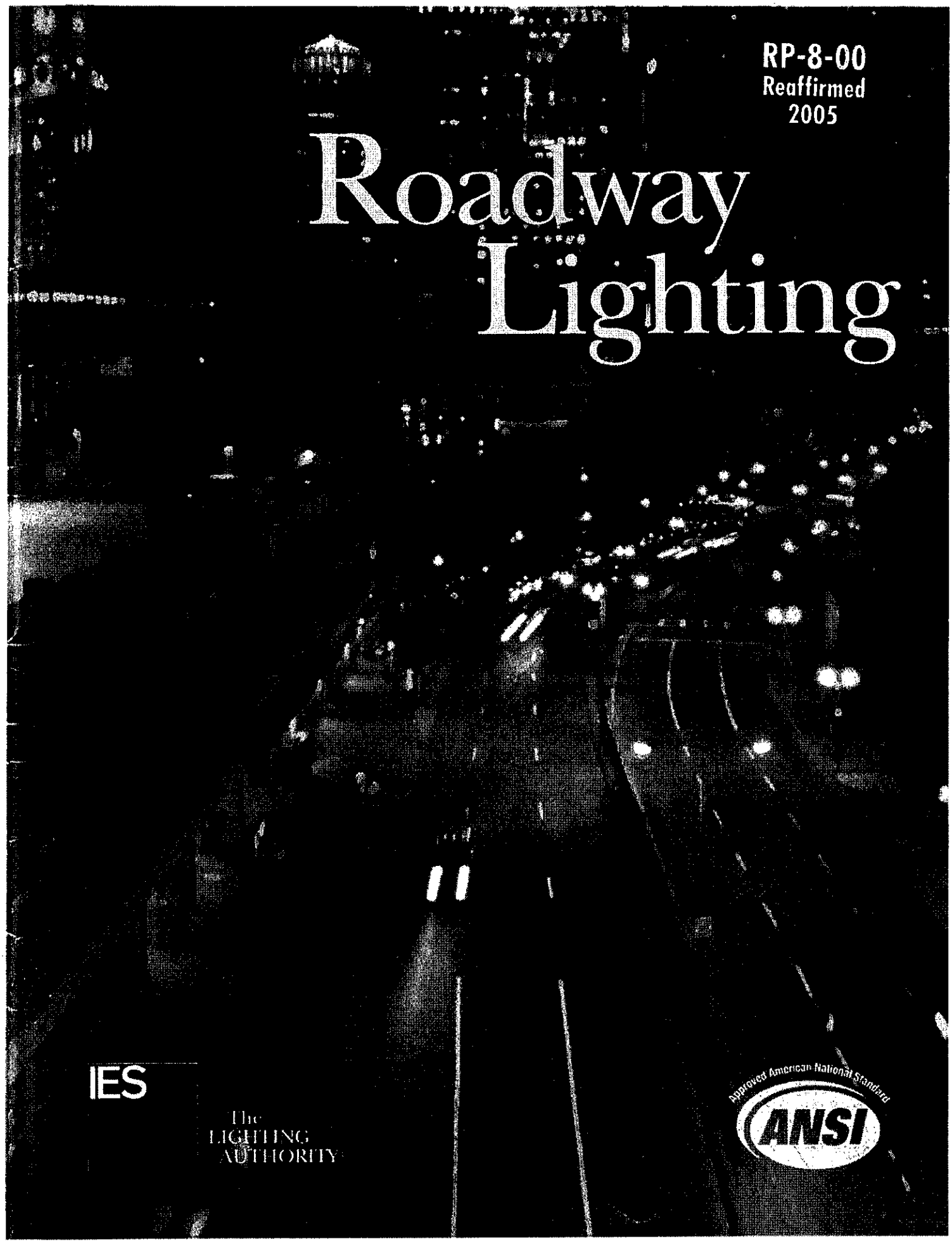
Thank you for the opportunity to testify.

Very truly yours,

for Collins Lam, P.E.
Director

CDL:WB:hm

Enclosure



RP-8-00
Reaffirmed
2005

Roadway Lighting

IES

The
LIGHTING
AUTHORITY

Approved American National Standard

ANSI

Upward light from a luminaire or lighting system must be evaluated. Such light generally adds to sky glow and wastes energy. Unless it is desirable in an urban area, it should be minimized.

2.4.2 Luminaire Cutoff Classifications. Luminaire distribution (see **Figure 1**) is described by the following terms:

Full Cutoff: A luminaire light distribution where zero candela intensity occurs at or above an angle of 90° above nadir. Additionally the candela per 1000 lamp lumens does not numerically exceed 100 (10 percent) at or above a vertical angle of 80° above nadir. This applies to all lateral angles around the luminaire.

Cutoff: A luminaire light distribution where the candela per 1000 lamp lumens does not numerically exceed 25 (2.5 percent) at or above an angle of 90° above nadir, and 100 (10 percent) at or above a vertical angle 80° above nadir. This applies to all lateral angles around the luminaire.

Semicutoff: A luminaire light distribution where the candela per 1000 lamp lumens does not

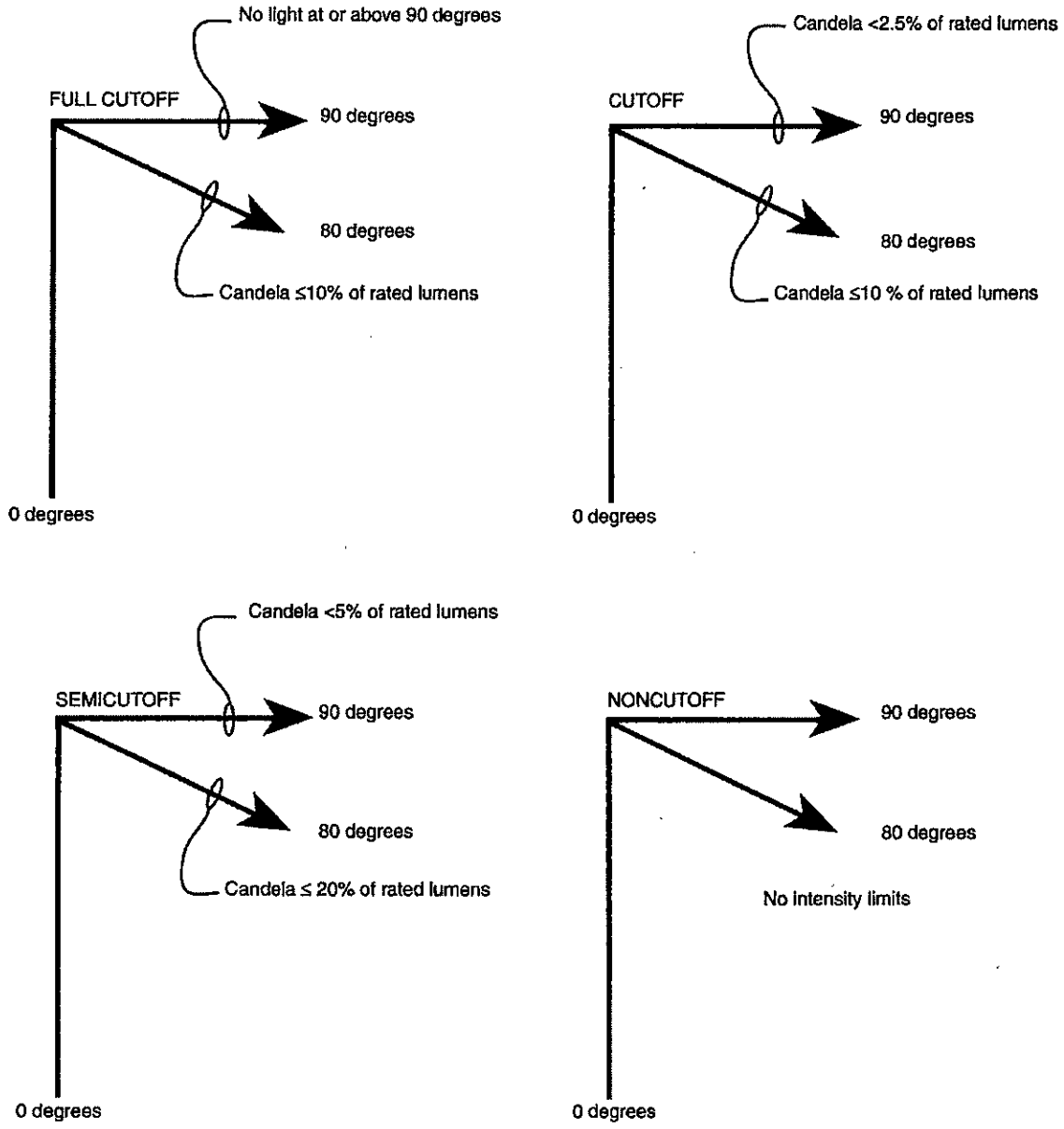


Figure 1. Four different cutoff classifications.

numerically exceed 50 (5 percent) at or above an angle of 90° above nadir, and 200 (20 percent) at or above a vertical angle 80° above nadir. This applies to all lateral angles around the luminaire.

Noncutoff: A luminaire light distribution where there is no candela limitation in the zone above maximum candela.

3.0 DESIGN CRITERIA

This Standard Practice includes three different criteria for use in continuous roadway lighting design. These are illuminance, luminance, and STV. The designer should be familiar with all of these criteria in order to decide which one best addresses the needs of the particular project. Calculation procedures and additional information about these methods are included in the **Annexes**. Consideration should also be given to glare and sky-glow issues stated in **Section 4.6**. For issues about light trespass see IESNA TM-10, *IESNA Technical Memorandum Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in Conjuction with Roadway Lighting.*

The recommended design values, as well as the uniformity ratios as shown in **Tables 2**, **3**, and **4**, represent the lowest maintained values for the kinds of roadways and walkways in various areas. Numerous installations have been made at higher values. Furthermore, the design values can be made using different combinations of luminaire light distribution, lamp sizes, mounting heights, spacings, and transverse locations. These figures do not represent *initial* readings, but the lowest *in-service* values of systems designed with the proper light loss factor. When design values for continuous roadway lighting vary due to changes in the road or area classification no special transitions are necessary.

This document follows the guidelines of IESNA LM-67-94, *Calculation Procedures and Specification of Criteria for Lighting Calculations.*

3.1 Illuminance Criteria

The illuminance method of roadway lighting design determines the amount of light incident on the roadway surface from the roadway lighting system. Because the amount of light seen by the driver is the portion that reflects from the pavement towards the driver, and because different pavements exhibit varied reflectance characteristics, different illuminance levels are needed for each type. The illuminance criteria gives recommendations for average maintained lux for various road and area classifications depending on the pavement type used. The recommended illuminance values and the uniformity ratio are in **Table 2**. Veiling Luminance Ratios, derived from the luminance calculation method, must also be determined to avoid a lighting system that produces disability glare. (See **Table 2.**)

3.2 Luminance Criteria

The luminance method of roadway lighting design determines how "bright" the road is by determining the amount of light reflected from the pavement in the direction of the driver. The luminance criteria is stated in terms of pavement luminance, luminance uniformity, and disability veiling glare produced by the lighting system. **Table 3** provides the recommended luminance design requirements, uniformity and the relationship between average luminance (L_{avg}) and the veiling luminance (L_v).

3.3 Small Target Visibility (STV) Criteria

The STV method of design determines the visibility level of an array of targets on the roadway considering the following factors:

(a) The luminance of the targets
(b) The luminance of the immediate background
(c) The adaptation level of the adjacent surroundings
(d) The disability glare

The weighted average of the visibility level of these targets results in the STV. The values of STV are included in **Table 4** as well as uniformity ratios and luminance requirements for mitigating the effect on approaching headlights. The veiling luminance ratio component is included in the STV calculation methodology.

3.4 High Mast Lighting

Ordinarily, conventional lighting along streets and highways involve mounting heights of 15 meters (49.2 ft.) or less. Poles of 20 meters (65:6 ft.) or greater height have been utilized in several situations:

- Large parking lots - such as regional shopping centers, and stadiums

- Interchanges and complex intersections in both urban and rural areas and tangent sections with more than six lanes

Opinions differ on whether light levels can be lower when high mast lighting is used, compared with the use of conventional poles of 15 meters (49.2 ft.) or less. Typically, the surround conditions are more uniform with the high mast design and, seeing is easier. Prior editions of ANSI/IESNA RP-8 have allowed lower

UNIVERSITY OF HAWAI'I SYSTEM
Legislative Testimony

Written Testimony Presented Before the
House Committee on Transportation
Wednesday, March 16, 2011 at 9:00 a.m.
by
Virginia S. Hinshaw, Chancellor
and
Richard J. Wainscoat, Astronomer
University of Hawai'i at Mānoa
Chair, Light Pollution Working Group
International Astronomical Union — Commission 50

SB 1493 SD1 RELATING TO LIGHT POLLUTION

Chair Souki and members of the Committee. My name is Richard Wainscoat and I am here today to submit this testimony on behalf of the University of Hawai'i. The University of Hawai'i strongly supports this bill that will require full shielding of new and replacement bright lights in Hawai'i.

Mauna Kea on the island of Hawai'i, and Haleakalā on the island of Maui, are two of the best astronomy sites in the world. Dark night skies are essential for these observatories to continue to operate. However, increasing urban lighting is threatening the dark night skies over these observatories. Light pollution extends well beyond county boundaries; lights from Oahu have a major and growing impact on Haleakala, and also affect Mauna Kea. Statewide legislation is needed to protect the observatories.

Astronomy in Hawai'i has a major economic impact. The present economic impact of astronomy is estimated to be $150 to $200 million per year.

Full shielding of lights is one of the most important techniques for protecting astronomical observatories from light pollution. Light emitted from poorly shielded fixtures at small angles above the horizontal travels enormous distances through the atmosphere, and is a major contributor to light pollution — it increases sky glow at remote locations, making it difficult or impossible to see faint objects. Fully shielded light fixtures emit no light above the horizontal, and therefore have much less impact on remote locations.

Full shielding also reduces glare, which is a very important safety factor, particularly for older drivers, and greatly reduces the impact of nighttime lighting on species that are affected by light at night, including endangered birds and turtles. Fully shielded lights also deliver more light to the roadway, producing brighter average illuminance per Watt of energy used, and allowing the possible selection of lower Wattage fixtures, thereby reducing energy usage.

The University feels that the effective date of July 1, 2013 in the present draft of the bill is too far in the future, and that substantial damage to the quality of the night sky will be caused by the two year delay in implementation of full shielding of lights. An important factor is that Light Emitting Diodes are likely to come into widespread usage during the next two years. Most light emitting diodes emit a large amount of blue light that is very damaging to astronomy and to the environment. It is therefore very important that these lights are fully shielded. The University suggests changing the effective date to January 1, 2012, as a compromise that will allow existing inventory of spare lights to be used, while affording protection to astronomy and the environment.

Testimony Related to

Senate Bill 1493

RELATING TO LIGHT POLLUTION

Presented before the

Senate Committee on Energy and the Environment
and
Senate Committee on Economic Development and Technology

The Twenty-Sixth Legislature

February 24, 2011

by

Richard J. Wainscoat

Chair, Starlight Reserve Committee

Chair Souki, and members of the Committee. My name is Richard Wainscoat and I am here today to submit this testimony in my capacity as Chair of the Starlight Reserve Committee.

The Starlight Reserve Committee was established by the 2009 state legislature. It held its first meeting in July 2010, and has met on four occasions. The committee engaged in much fact finding during these meetings, and found a common factor that proper shielding of nighttime lighting is critically important. During its third meeting, the committee recommended introduction of legislation in the 2011 legislature that would result in shielding of new and replacement bright light sources.

Full shielding of lights has the following important advantages:

1. Light sources are not visible from above, meaning that the impact on endangered birds that are attracted to lights at night, such as the Newell's shearwater, is much reduced.
2. Fully shielded lights emit little light near the horizontal, so the impact on endangered turtles that become disoriented by lights on beaches is much reduced.
3. Fully shielded lights cause much less glare than partially shielded lights, improving safety, including on our roadways. It is particularly important to avoid glare for elderly drivers, who may have degraded vision due to cataracts or other reasons.
4. Fully shielded lights cause much less skyglow, dramatically reducing the impact of artificial lighting on Hawaii's astronomical observatories. Light emitted at small angles above the horizontal travels enormous distances through Earth's atmosphere. It does not respect county boundaries. Light from Honolulu affects both Haleakala and Mauna Kea

Observatories. Use of fully shielded light fixtures is the most important technique for protecting astronomy in Hawaii.

5. Partially shielded lights emit some of their energy directly into space where it is wasted. Fully shielded lights direct their energy downwards only, where it is needed, and can therefore save energy. Fully shielded lights produce higher illuminance on the roadway per Watt of energy used, and higher small target visibility. Use of fully shielded lights allow lower Wattage lamps to be selected in some cases, producing substantial energy savings.
6. Fully shielded lights emit much less light at near horizontal angles, meaning that light trespass is substantially reduced. Light from adjacent properties or from streetlights entering our bedrooms is a form of light trespass. It can make it difficult to sleep at night. Excessive light at night has been linked to some forms of cancer, particularly breast cancer.
7. Use of fully shielded lights across Hawaii will result in a substantial decrease in skyglow, and restore the ability of Hawaii's residents and visitors to see the night sky. The Milky Way is no longer visible from urban Honolulu. Only about the brightest 20 stars are visible from urban Honolulu. About 2,000 stars can be seen from a dark location. The dark night sky on the island of Hawaii is becoming a tourist attraction — many of Hawaii's visitors come from urban locations that have severe light pollution, and are amazed by the view of the dark night sky from the island of Hawaii. Sadly, many of our children are growing up without ever seeing the magnificent night sky. This is unnecessary, and is a direct result of irresponsible and careless use of light at night.

The 3,000 lumen exemption recommended for this legislation is a very generous exemption. It is the equivalent of a 150 Watt halogen lamp. The Starlight Reserve Committee will discuss this exemption in future meetings and may recommend a lower limit in the future. Because lighting is on the verge of a revolution coming from rapid improvements of light emitting diodes, the committee felt that it was important to make a first step at improving lighting this year, and chose the 3,000 lumen exemption in an effort to make the proposed legislation uncontroversial, while yielding meaningful results from good shielding of the brightest new light sources.

The 3,000 lumen exemption means that most residential lighting in Hawaii will be exempt — only very bright outdoor residential lights, such as high intensity discharge lamps, will be affected.

The effective date of July 1, 2013 in the present draft of the bill is too far in the future. Substantial damage to the quality of the night sky will be caused by the two year delay in implementation of full shielding of lights. An important factor is that Light Emitting Diodes are likely to come into widespread usage during the next two years. Most light emitting diodes emit a large amount of blue light that is very damaging to the environment, to skyglow, and to astronomy. It is therefore very important that these lights are fully shielded. I recommend changing the effective date to January 1, 2012, as a compromise that will allow existing

inventory of spare lights to be used, while affording protection to the environment and astronomy.

In order to alleviate concerns from the City and County of Honolulu, and from the State Department of Transportation regarding existing pole spacing, I suggest adding an additional exception regarding uniformity. The suggested wording is:

Replacement lighting for roadways and highways shall be fully shielded unless a registered electrical engineer certifies that fully shielded lighting with the existing pole spacing cannot achieve the lighting uniformity levels recommended by the Illuminating Engineering Society of North America. Where fully shielded fixtures are not used, acceptable luminaires shall be partially shielded lights that emit no more than 5% of their light above the horizontal.

Finally, there is a spelling error where "luminaire" is misspelt as "luminarie." That spelling error should be corrected.

ichiyama3 - Cu Ri

From: mailinglist@capitol.hawaii.gov
Sent: Friday, March 11, 2011 9:25 PM
To: TRNtestimony
Cc: babyjean@hotmail.com
Subject: Testimony for SB1493 on 3/16/2011 9:00:00 AM

Testimony for TRN 3/16/2011 9:00:00 AM SB1493

Conference room: 309
Testifier position: support
Testifier will be present: No
Submitted by: Ronnie Perry
Organization: Individual
Address:
Phone:
E-mail: babyjean@hotmail.com
Submitted on: 3/11/2011

Comments:
Light pollution is a real problem on Oahu. I am especially worried about the shearwaters that I have to save every year. I strongly support this bill.

ichiyama3 - Cu Ri

From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 13, 2011 12:43 PM
To: TRNtestimony
Cc: idasony@aol.com
Subject: Testimony for SB1493 on 3/16/2011 9:00:00 AM

Testimony for TRN 3/16/2011 9:00:00 AM SB1493

Conference room: 309
Testifier position: support
Testifier will be present: No
Submitted by: Dr. David L. Crawford
Organization: Individual
Address:
Phone:
E-mail: idasony@aol.com
Submitted on: 3/13/2011

Comments:
As both a professional astronomer (retired) and lighting consultant, and as a frequent visitor to the islands, I fully support this bill. It discusses the issues remarkably well and the proposed solutions to the problems are very well stated. When enacted, it will help greatly solve all the issues noted in the bill. It will be a model for other states and affirm Hawaii as a leader in both understanding the issues and proactively doing something effectively and efficiently about them. I congratulate you for these efforts.

ichiyama3 - Cu Ri

From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 13, 2011 3:40 PM
To: TRNtestimony
Cc: swartzg001@hawaii.rr.com
Subject: Testimony for SB1493 on 3/16/2011 9:00:00 AM

Testimony for TRN 3/16/2011 9:00:00 AM SB1493

Conference room: 309
Testifier position: oppose
Testifier will be present: No
Submitted by: gregory swartz
Organization: Individual
Address:
Phone:
E-mail: swartzg001@hawaii.rr.com
Submitted on: 3/13/2011

Comments:
This bill denies homeowners and businesses the legitimate lighting they need for their safety and security. Property crimes are rampant in Hawaii. I hate to hear what homeowners are going to say when they discover the impact of this bill.

W. M. KECK OBSERVATORY

On the summit of Mauna Kea, Island of Hawai'i

LATE TESTIMONY

TO: House Transportation Committee, Hawaii State Legislature

FROM: Taft Armandroff, Director, W. M. Keck Observatory

DATE: March 15, 2011

Aloha Chair Joseph Souki, Vice-Chair Linda Ichiyama and Committee Members,

Thank you for the opportunity to provide testimony in support of SB1493, which would require fully-shielded lights on new and replacement outdoor light fixtures.

The W. M. Keck Observatory operates the world's two largest fully steerable optical / infrared telescopes on the summit of Mauna Kea. Mauna Kea has been clearly demonstrated to be an excellent environment to study our Cosmos using optical astronomy. Many have argued compellingly that Mauna Kea is a unique site on Earth, allowing the clearest views of the Universe with the least interference by our atmosphere and by man-made interference. Astronomers are using Keck Observatory nightly to deepen our understanding of the Cosmos. Topics studied include the origins of stars and planets.

Astronomy is a clean, sustainable, high-tech industry that Hawaii is uniquely suited for. All of the observatories in Hawaii are actively engaged in educational outreach to our schools and communities, promoting STEM (science, technology, engineering and mathematics) learning. The local public has been captivated by the discoveries from Mauna Kea, including the announcement this fall on the front pages of all Hawaii papers announcing the discovery of an earth-like planet beyond our own Solar System that is sufficiently temperate to permit liquid water on its surface.

Light pollution is the prime factor that we can control that impacts astronomy. The shielding measures recommended are highly prudent and are of direct benefit to astronomy. Please preserve this unique resource of our dark Hawaii night sky for astronomical discovery.

Please vote "yes" on this important measure benefitting astronomy and clean industry in Hawaii.

Thank you again for the opportunity to provide testimony.

Tel: 808.885.7887 ● Fax: 808.885.4464

Headquarters: 65-1120 Mamalahoa Highway, Kamuela, HI 96743 www.keckobservatory.org

LATE TESTIMONY

Office of the Director
Northern Operations Center – 670 N. A'ohoku Place, Hilo, Hawai'i
Phone: (808) 974-2514 Fax: (808) 974-2599 Email: dsimons@gemini.edu

To: Chair Joseph Souki, Vice-Chair Linda Ichiyama, House Transportation Committee Members
From: Doug Simons, Gemini Observatory Director
Date: March 15, 2011
Subj: SB1493 Testimony

Mauna Kea is the premier site for ground-based astronomy worldwide thanks to a number of unique conditions that exist on the Big Island. One of them is the dark Hawaiian nighttime sky which helps enable truly remarkable discoveries from this portal on the universe. Currently, forefront research in astronomy is being conducted by the largest telescopes in the world and a significant fraction of them now operate on Mauna Kea, including Keck, Subaru, and Gemini. Combined with the other Mauna Kea observatories, these facilities represent over a billion dollars in investment and are a key element in the Big Island economy. Beyond supporting research, a core function of Gemini Observatory (which is funded by an international partnership include the US National Science Foundation) is to provide education and outreach opportunities for our local community, which we do through a variety of mechanisms (see below).

Over the past several decades, the viability of conducting forefront astronomical research from Mauna Kea has regretfully been eroded by the steady increase in outdoor lighting in Hawai'i. Though the Big Island has a lighting ordinance in place, additional measures will be needed in the future to protect Mauna Kea as a premier site for conducting astronomical research. For this reason I support Senate Bill 1493 as it represents a reasonable approach to minimizing the stray outdoor lighting which interferes with observations conducted by Gemini and other Mauna Kea observatories. Simply preventing lights from shining up, into the sky, where they serve no purpose for the public and are not wanted by the astronomical community is the essence of this legislation. It does not require advanced technologies or massive investments in infrastructure – this legislation simply requires shields to block light where it is not needed. This represents a win-win approach to a growing problem as these shields will direct more light downward, improving public safety, and less light upward, preserving the conditions that make Mauna Kea so unique. If passed, this legislation would not take effect for two years, giving enough time to adapt to its requirements while allowing unshielded lights for special applications like road construction, navigation systems, and emergencies.

As a long time resident of Hawai'i I am interested in striking a reasonable balance between the needs of the community and preserving Mauna Kea as a unique resource for so many things, including astronomy. I support SB1493 and hope you will as well.

Aloha,

Doug Simons

Dr. Douglas A. Simons
Director, Gemini Observatory

Above: Big Island teachers prepare to assemble telescopes and receive training in their use through Gemini's outreach program.

Below: Much of the *Journey Through the Universe* team is seen, preparing to provide unique astronomy education for nearly 7000 K-12 students each year in east Hawaii.

LATE TESTIMONY

Canada-France-Hawaii Telescope Corporation
65-1238 Mamalahoa Hwy, Kamuela, Hawaii 96743 USA

Société du Télescope Canada-France-Hawaii
Telephone (808) 885-7944 Fax (808) 885 -7288

TO: House Transportation Committee, Hawaii State Legislature

FROM: Christian Veillet, Executive Director, Canada-France-Hawaii Telescope Corporation

DATE: March 15, 2011

It is an honor to have the opportunity to write this testimony in support of SB1493, which relates to light pollution and would require every new and replacement outdoor light fixture to be fully shielded.

The Canada-France-Hawaii Telescope Corporation (CFHT) is an international astronomical observatory on Maunakea owned jointly by the State of Hawaii and the nations of France and Canada. It has operated from its Maunakea site for more than three decades and has remained for all these years at the forefront of astronomical thanks in part to the amazing quality of the sky above the mountain, which makes Maunakea one of the best astronomical sites in the world, and likely the best in the Northern hemisphere.

If many factors contribute to the quality of an astronomical site, like its elevation, the overall weather patterns, the stability of the air above, there is one which is key to our exploration of the cosmos: the darkness of its night sky.

It is therefore with both delight and relief that CFHT sees SB1943 coming in front of your Committee today: Delight because the State of Hawaii has a chance to make a clear stand on how important is dark sky, not just for observatories, but beyond for the people of Hawaii; Relief because we have faced a period of much development over the past decades which brought the level of light pollution in various areas to a point where only a few stars can be seen at night. To see this trend reversed by this Bill is definitely a relief!

Indeed, beyond the pure professional interest of an observatory for dark skies, there is a more fundamental need to protect the sighting of planets, the stars, and our galaxy, the Milky Way for the people of Hawaii: this sighting is our only direct way to realize the existence of the universe beyond our Earth.

I sincerely hope that you will be in favor of this Bill.

Thanks for the opportunity to testify.

Aloha,

Christian Veillet

Subaru Telescope
National Astronomical Observatory of Japan
650 North A'ohoku Place, Hilo, Hawaii 96720, U.S.A.

LATE TESTIMONY

March 15, 2011

Dear Chair Joseph Souki, Vice-Chair Linda Ichiyama, and the House Transportation Committee members of the Hawaii State Legislature,

As the director of the Subaru Telescope on Mauna Kea, I would appreciate the opportunity for letting us to submit this testimony in support of SB1493 that would require all new and replacement outdoor light fixtures be fully shielded beginning July 1, 2013.

The Subaru Telescope is fortunate to be allowed the use of the world best site for astronomy, the summit of Mauna Kea, for the best telescope Japan could offer to astronomers worldwide. Since the first light in 1999 Subaru Telescope has been contributing to many discoveries ranging those of the most distant and therefore earliest galaxies humankind observed to those of planets other than of our own Solar System. We are continuing our efforts on Mauna Kea to keep the telescope one of the most sensitive in the world in anticipation for more discoveries to come under the best conditions for astronomical observations.

The Subaru Telescope also recognizes that one of the challenges today to humankind is global energy consumption. The light illuminating the sky upward is not only the pollution of the sky darkness and detrimental to the most sensitive astronomical instrumentations on Mauna Kea, it is also substantial wasted energy. Being able to eliminate the waste would only lead to the reduction of energy consumption with no harm to anything else.

For these reasons, I would like to submit this testimony in support of the SB1493 wholeheartedly, representing the Subaru Telescope and also the astronomical community that benefits from the Subaru Telescope on Mauna Kea.

Thank you very much.

Yours truly,

Dr. Hideki Takami
Director

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