

# LED STREETLIGHTING PILOT

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# Background

- Researched available product – all suppliers claim to meet retro-fit req.
- Went out to RFP
- 8 respondents
- All have min. or no experience in LED lighting
- Almost all claim that they can accomplish spread of 30 to 35 m
- Some samples submitted were of inferior quality and still in design stage
- One sample, although well constructed and very bright did not cater for dust/water run-off – lowers our confidence
- We also have at least 3 samples that are well constructed – difficult to determine level of brightness without installation
- Short-listed samples are currently being installed for evaluation
- Tender to go out in July 2009

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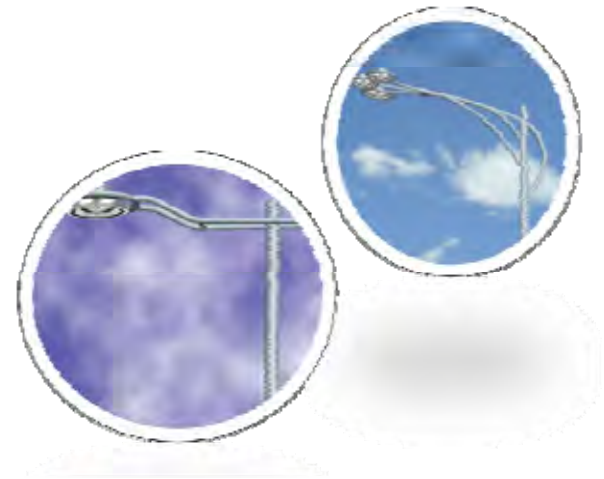
# Response to RFP

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# Disadvantages of LED

- Directional light – makes the side spread difficult to achieve for 33 to 40 m pole spacing
- Difficult to achieve a direct retrofit at existing pole spacing
- High power dissipation, require to get rid of junction and PSU temp.
- The brighter LEDs are high powered LEDs, driven harder – greater junction temp.
- Heat sink design is crucial to ensure lifespan
- Technology largely untested
- No standards available





# Advantages of LED

- High lumen output typical top end 75 to 100 lm/W
- LED offers up to eight times brightness
- Up to 80% energy savings
- Operating for an average of 10 hours per day LED has a life span of up to 13 years, 50,000 hours.
- Unlike traditional light bulbs LED is not fragile and susceptible to breakage or vandalism.
- High colour rendering index
- Softer and even light spread
- No glare or strobe effect - reduction in visual fatigue
- No dust absorption or yellowing caused by high temperatures
- Instant start – no ramp up to optimum brightness levels
- Dimmable
- No mercury content

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# HPS vs LED



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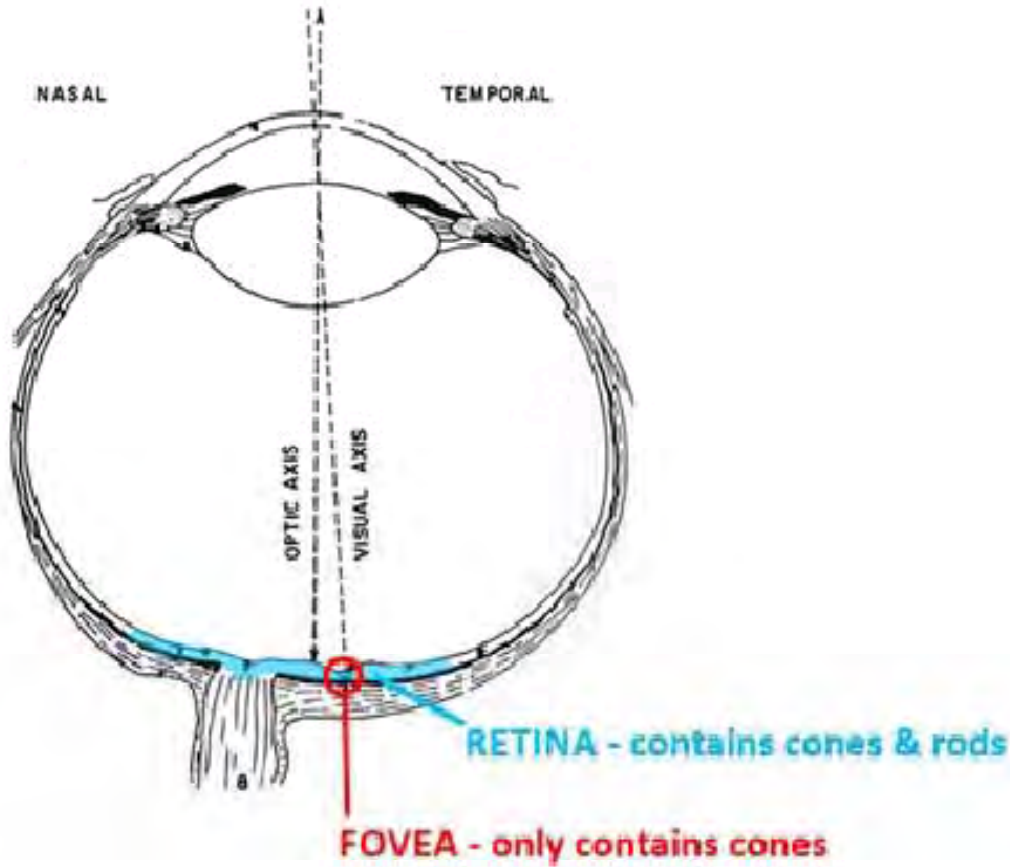
# Vision Tasks on a Roadway

- **Line of Sight Viewing** – object detection (photopic receptors)
- **Spatial Brightness Perception** – full field vision requires photopic & scotopic receptors
- **Non-central Vision** – for guidance and detection of targets of the line of sight or off-central vision
- **Movement Detection** – central and peripheral detection of movement – rods and cones

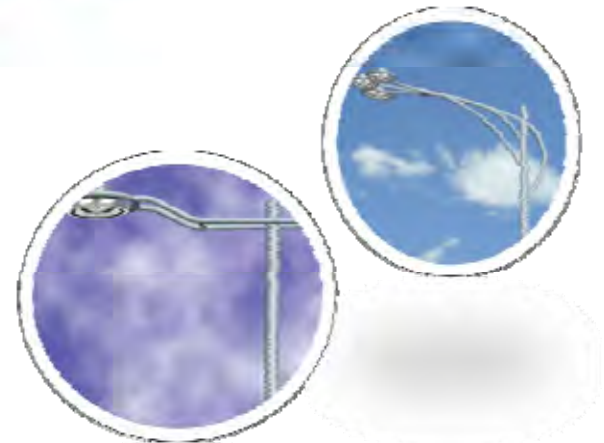
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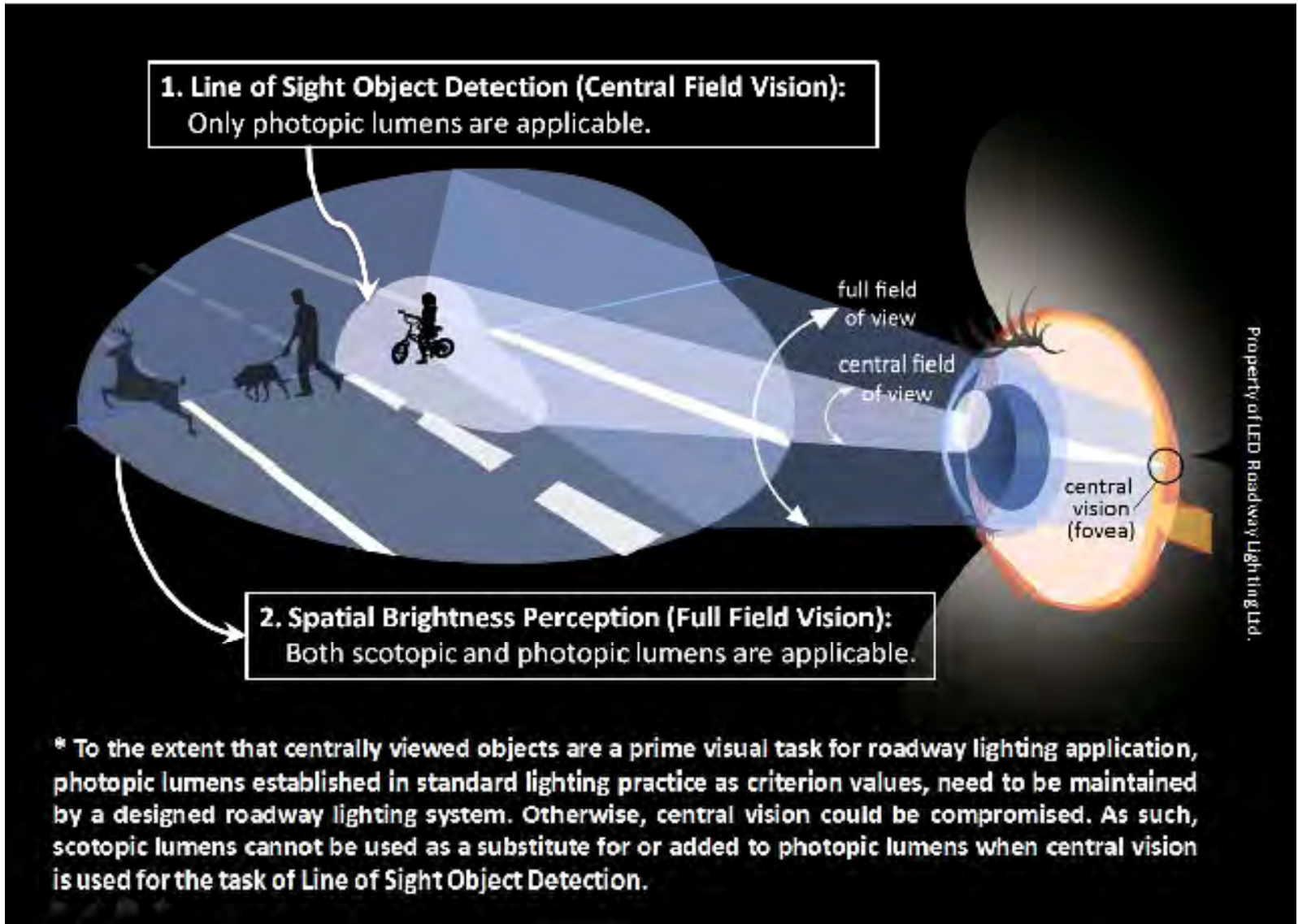
# Central Vision



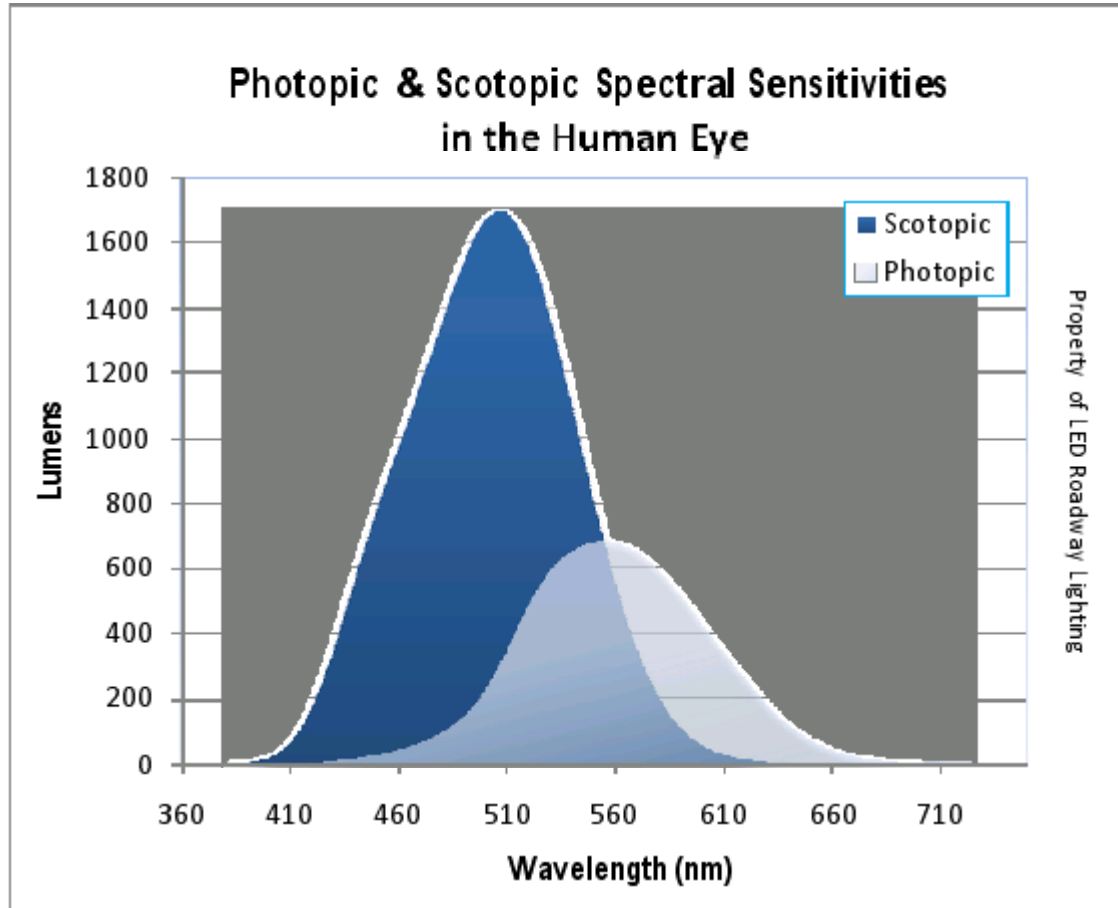
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# Photopic & Scotopic Vision



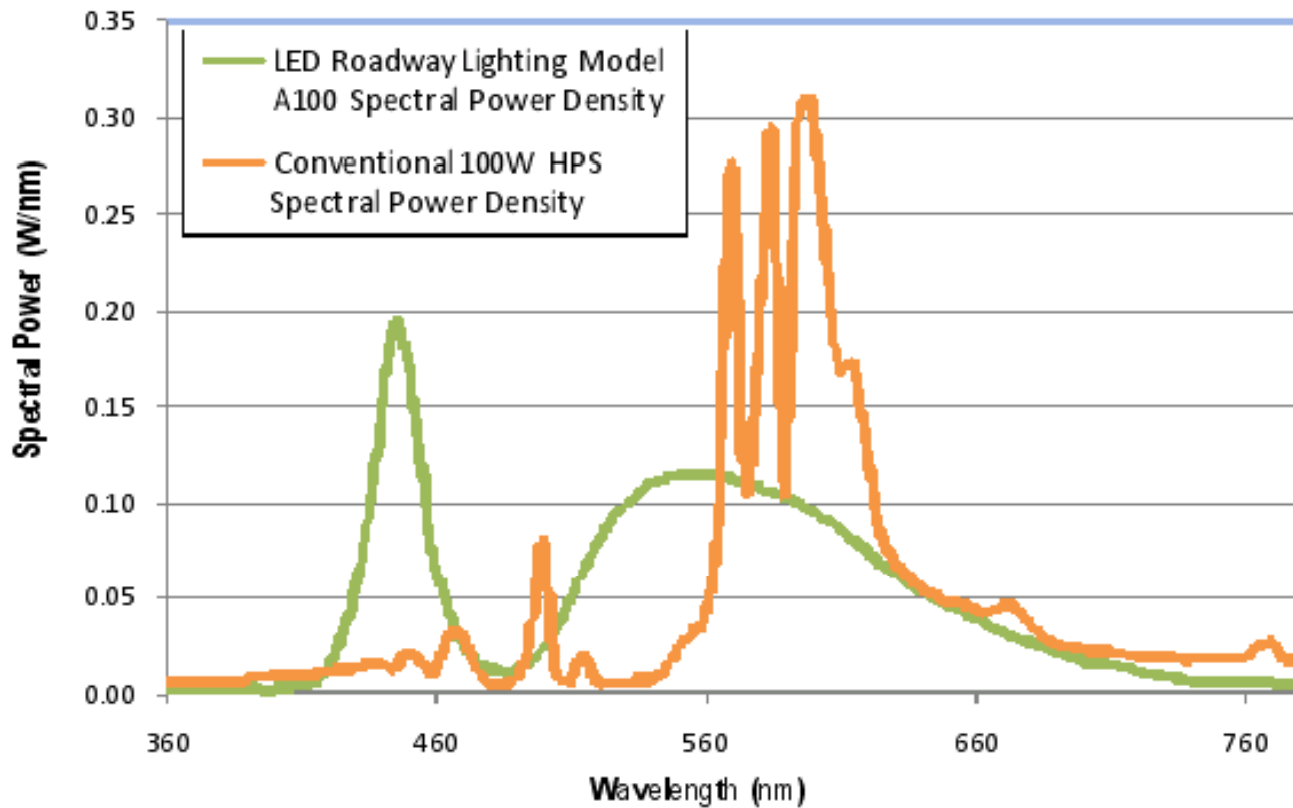
# Spectral Sensitivities



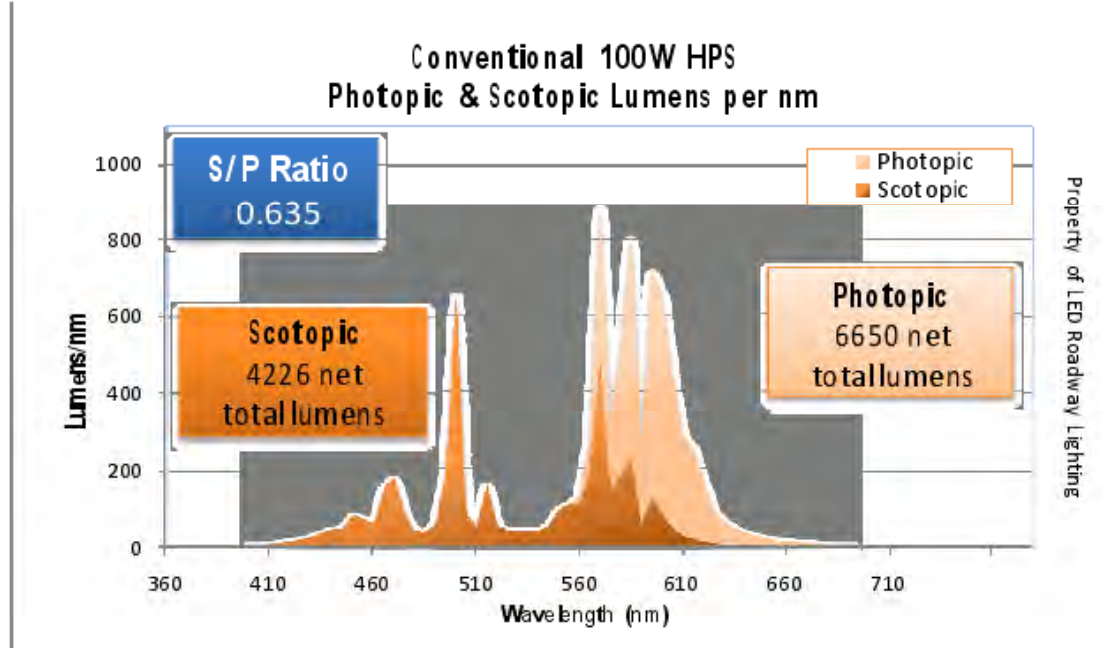
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# Spectral Power – HPS vs LED

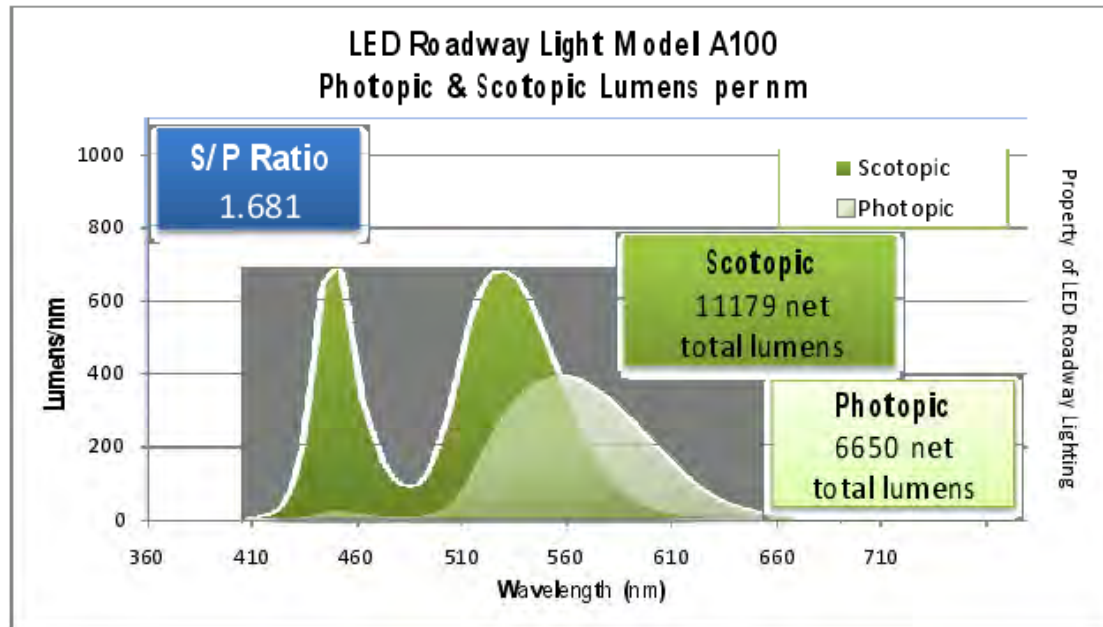
Conventional 100W HPS & LED Roadway Light Model A100  
Spectral Power Density



Property of LED Roadway Lighting



**Figure 6** Conventional 100W HPS Photopic & Scotopic Lumens per nm as incorporated by the Human Eye: The spectral power density of the HPS light output was weighted by the photopic and scotopic spectral sensitivities. Data from LED Roadway Lighting Limited (LRL [12]).



# Concern in implementation of LED

The net response of the eye to brightness is a summation of the photopic and scotopic responses in the brain.

It ignores the fact that photopic response may be negligible and hence central field vision may be drastically impaired.

It is therefore necessary to comply with the minimum photopic lighting levels as specified in IES (Illuminating Engineering Society) RP 8 00 or CIE (International Commission on Illumination) 115 2005 specifications that define minimum photopic light levels.

