

## Light Pollution – The Problem of Glare – 1/2.

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A high amount of glare is produced by this semi-cut-off light fixture used to illuminate a parking lot.

Under these conditions it is difficult to see as the light produces harsh shadows which may even compromise the safety of a pedestrian.

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Glare is an effect produced when the eye is confronted by a bright light against a dark background. This effect is common with oncoming car lights at night and is also the case when dealing with street lights.

Most contemporary streetlights are usually cobra-head or cone-head fixtures. These fixtures, because they throw light in all directions, direct light right into your eyes as you approach them.

During approach the light is quickly getting brighter and your eyes try to adjust by contracting the pupils. This now means that less light is entering your pupil, making it more difficult to see in the dark and to see dark objects in your path. Other pedestrians and objects nearby in the shadows or on the roadway may be almost impossible to see if the glare is bad enough, depending on the amount of light they are reflecting or producing.

If you are driving, pits, dirt, snow or rain on your windshield will only compound the problem of glare.

Full or complete cut-off fixtures, because they direct most of the light directly downward to the street, protect the driver or pedestrian from glare until you are almost directly under the fixture.

Since, at this point, your eyes are directed forward, rather than upward, the glare is dramatically reduced and visibility improved.



This street scene at night illustrates the problem of glare as streetlights, car lights and light reflected from the wet road surface all contribute to the glare the eye experiences. Objects on the sidewalk and in the darker areas are not visible.

## Light Pollution – The Problem of Glare – 2/2.



This evening photo well illustrates the lack of glare from full cut-off fixtures, such as the fixture third from the right. The glare of the cobra-head streetlights reduces the exposure of the camera, much as in the human eye, leaving the ground area darker and less visible while creating safety concerns.

Research on streetlight glare and visibility has been done with some surprising results.

A discussion paper produced by Climate Change Central has cited research done for the City of Calgary Roads: “*STREET LIGHTING AND TRAFFIC SIGNALS REPLACEMENT PROGRAM,*” Discussion Paper C3 - 07, Prepared by: R. Lloyd Bertschi & Don Wiebe, Elite Energy Services Inc.

*“Shaflik Engineering, a firm with expertise in the area of street lighting, researched this issue for Calgary Roads. Their findings are summarized as follows: It is perceived by many that the brighter an area is, the better the visibility is in the area. This is not necessarily true. It has been found that the absolute amount of light on an area is not directly related to the visibility of objects in the area. It is quite conceivable that an area of lower illumination may have better visibility than an area of brighter illumination. Therefore, it should not be pre-supposed that the reduction of street lighting will degrade the visibility. It is highly likely that the reduction of street lighting will actually increase the visibility.*”

*Similarly, the visibility of objects is increased if the background glare from the lighting source can be reduced. By changing from dropped lens luminaires to low-glare flat lens luminaires, the lighting source glare is significantly reduced thereby increasing the visibility in the area.*

*The reduction of glare by using flat lens luminaires is sometimes interpreted by individuals as a significant reduction in lighting levels. This is a psychological effect and is a perception only. It does not relate to the actual lighting levels or the visibility level in the area.*”

The above excerpts indicate strong support the use of full cut-off streetlight fixtures on light town and city roads.

It also underlines the concept that lower lighting levels may actually increase visibility, thus improving safety in lit areas.

**The bottom line is that visibility is dependent on reducing glare and glare is significantly reduced by changing non-and semi-cut-off fixtures to the full-cut-off variety.**