



PORT of
vancouver

Vancouver Fraser
Port Authority

Project and Environmental Review Guideline

Lighting

June 29, 2022

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1. Introduction

These guidelines are intended to assist applicants of projects on lands and waters managed by Vancouver Fraser Port Authority when determining outdoor lighting requirements and/or preparing outdoor lighting plans, or lighting design. It may also be useful to those preparing applications for review under the Project and Environmental Review (PER) process.

2. Principles/Objectives

It is a tenant's responsibility to design and install lighting appropriate to the site, for the works conducted there, and the location. Poorly designed or installed outdoor lighting may cause unsafe or unpleasant site conditions, impair the productive use of port authority property and tenant facilities, have off-site nuisance impacts, and result in unnecessary use of electric power.

These guidelines are intended to assist port authority tenants or applicants in determining the appropriate exterior lighting for their facilities in order to:

- Promote safety, security, and productivity
- Reduce unwanted light spill and other impacts on adjacent properties and communities
- Conserve electrical energy and reduce unnecessary use of electrical power

In some cases these guidelines highlight best practices or sources of useful information in lighting selection and design. In other cases more specific recommendations are made regarding lighting standards. The intent is to allow for flexibility in responding to these guidelines to enable applicants to design and deliver their projects consistent with specific needs and contexts.

In all circumstances good engineering practices and sound engineering judgment should be used in determining the most appropriate lighting solutions in context of site-specific needs.

3. Applicability

These guidelines apply to all proposed developments on Vancouver Fraser Port Authority property that require a project permit, and are applicable to the design, construction, and operation of the proposed facilities or terminals. The requirement for a lighting plan will be confirmed during the preliminary phase of the PER process, where applicable.

4. Guidance

This guideline should be considered in conjunction with the Illuminating Engineering Society of North America (IESNA) and other applicable standards, and will be used by port authority staff in reviewing PER applications.

5.1 General considerations

- (A) Lighting on port authority lands must conform to all applicable legislation and regulations, including to International Safety Guide for Oil Tankers and Terminals and other international standards where applicable
- (B) Sufficient light should be provided on any site during construction and operation to help ensure facilities are operated in a safe, secure, and efficient manner

- (C) Outdoor lighting should be designed in a way that provides a distribution of light that is appropriate to context without compromising safety and security – lighting installations should be designed to minimize harsh contrasts in colour or lighting levels
- (D) All exterior lighting should be properly maintained and remain in good working order – this may require regular inspections
- (E) Light fixtures should be energy-efficient while providing minimum illumination levels sufficient for personal safety and security, considering nationally recognized standards. Consider best available technology (BAT) for most energy efficient lighting. The preference is for light-emitting diode (LED) technology. Consider installation of controls (photocells and/or timers) to automatically shut off or dim exterior lights when not required for safety or operation, especially if not required during daylight hours or when the facility is not in use.
- (F) Lighting must not interfere with the visibility of existing or planned navigational aids. Navigational aids are lights used by vessel pilots and captains to navigate in darkness or during periods of reduced visibility. Waterfront sites must take the location of any navigational aids into account when considering the addition of new site lighting.
- (G) Ensure that appropriate and reasonable measures are taken in order to reduce the impact of lighting on adjacent tenants and residents, minimize light trespass from the site, and reduce development impact on nocturnal environments:
 - i. Lighting should not cause unnecessary glare to motorists or pedestrians, and all reasonable means should be taken to prevent the projection of light from the site, including onto neighboring properties, roadways, or water areas
 - ii. Where possible, shield exterior fixtures such that the installed device does not directly emit any light at an angle more than 90 degrees from straight down. LED lights, with a variety of directional optics available, may not require additional shielding

For reference purposes, the following diagrams illustrate the use of cut-off fixtures to reduce off site impacts.

Figure 1: Unshielded fixture causing pollution and trespass

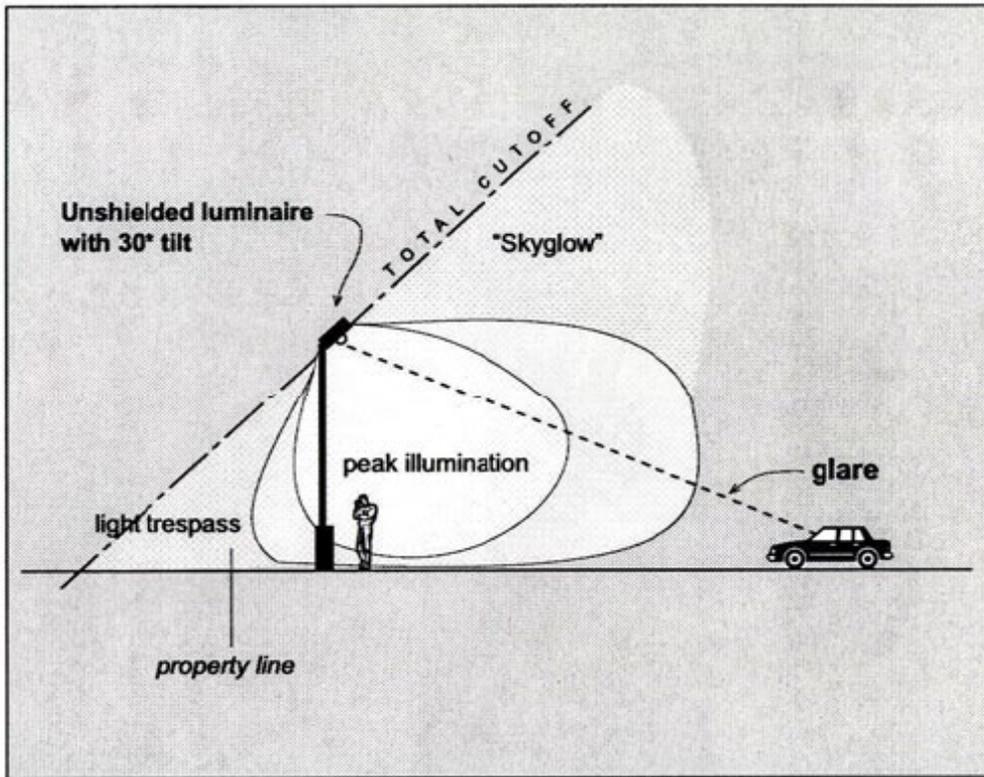
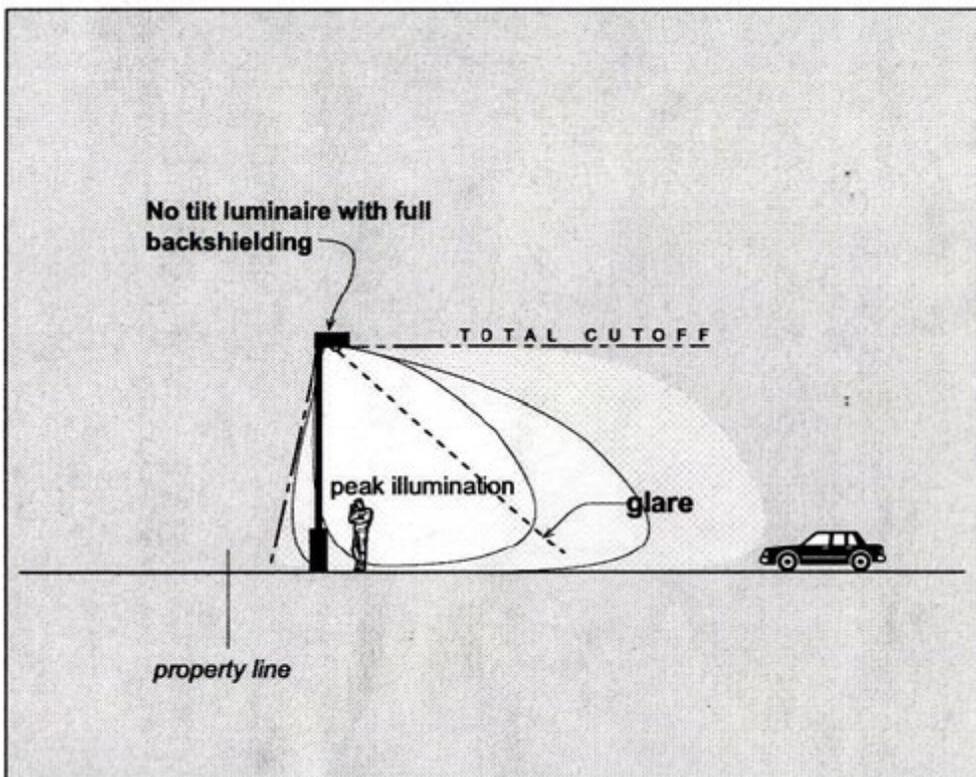


Figure 2: Full cut-off fixture which limits these effects



5.2 Lighting plans

Applications for proposed projects under the PER process may be required to prepare customized lighting plans to support a complete submission. Lighting plans should be designed to minimize glare, light trespass, maximize energy conservation, and to maintain dark skies while ensuring safety and security on the property. The requirement for a lighting plan (including an impact statement) will be confirmed in the preliminary review phase of the PER process.

Lighting plans should generally be prepared by a qualified lighting professional. At a minimum, lighting plans should include the following points.

- Proposed lighting should be depicted on a site plan and include a key to the proposed lighting that provides the following information:
 - Location of all current and proposed exterior lighting fixtures on the property, as well as the location of the proposed power source
 - Type of illuminating devices, fixtures, lamps, supports, reflectors, and other devices – including the cut-off characteristics
 - Lamp source type (e.g., high pressure sodium, LED), lumen output, and wattage for each fixture
 - Expected change in wattage for site
 - Mounting height with distance noted to the nearest property line for each fixture, with orientation noted
 - Types of timing devices used to control the hours set for illumination, as well as the proposed hours when each fixture will be operated
 - Whether fixtures are switched, timed, controlled by photocell, or other method
 - Cumulative lighting data for the overall lighting installation including design power consumption, average illumination, and uniformity levels
- The lighting plan should clearly indicate the regulations and standards applied in designing, selecting and/or locating exterior lighting
- Waterfront sites should identify the location of any existing or planned navigational aids (these are typically lights), and demonstrate that proposed site lighting does not interfere with the visibility of these aids

The lighting plan may need to include an impact statement, which identifies the impacts of proposed exterior lighting on adjacent residential areas. The impact statement should also identify the location of species sensitive to light that may be impacted by the proposed development. Mitigation measures should be included in the lighting plan in order to respond to issues identified in the lighting impact statement.

5. Definitions

Cutoff fixture is a fixture that provides a cutoff (shielding) of the emitted light. See also Fixture.

Fixture is the unwanted shining of light produced by a fixture beyond the boundaries of the property on which it is located, resulting from fixtures that shine light beyond their target areas. This potentially undesirable light can fall into neighboring buildings and infringe on people's outdoor activities.

Glare

(A) Light emitting from a fixture with intensity great enough to reduce a viewer's ability to see, or to produce sensation of discomfort

(B) The physical sensation caused by artificial light that is brighter than one's adapted surroundings

Impact statement is a holistic document that analyzes the potential impacts of light emissions from the project. May include inventory and analysis components, such as review of existing lighting systems at

the facility, creation of photometric models for the facility to determine actual lighting levels, photographing of the existing lighting from nearby viewpoints to record existing conditions, review of available lighting reports, and review of lighting recommendations for comparable facilities (for example bulk terminals, or warehouses). This may also be referred to as a **lighting impact assessment**.

Light pollution is any adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste. In addition, ecological light pollution produces documented effects on the behavior of many wild species.

Light trespass is the unwanted shining of light produced by a fixture beyond the boundaries of the property on which it is located, resulting from fixtures that shine light beyond their target areas. This potentially undesirable light can fall into neighboring buildings and infringe on people's outdoor activities.

Sky glow occurs when artificial light is projected into the sky, causing a cumulative glow above populated areas.

6. Notes/Links to other documents

These guidelines should be considered in conjunction with other best practices and applicable legislation, such as:

- Illuminating Engineering Society of North America (IESNA) Lighting Handbook
- National Building Code of Canada
- Canada Occupational Health and Safety Regulations
- Canada Labour Code
- International Safety Guide for Oil Tankers and Terminals (ISGOTT)

7. Contacts

Should you have any questions regarding these guidelines, please contact the Project and Environmental Review department at 604.655.9047 or PER@portvancouver.com.