

# TOWN OF BON ACCORD POLICY STATEMENT

**SECTION:** Administration

**POLICY NO.:** 15.51

**SUBJECT:** LIGHT EFFICIENT COMMUNITY POLICY

**RESPONSIBLE AUTHORITY:** Administration Department

**REVIEWED & APPROVED BY COUNCIL:** February 17, 2015

**PURPOSE AND INTENT:**

To provide a framework for Council and a set of minimum standards for the adoption of a light use policy promoting efficient and environmentally responsible lighting in accordance with the Model Lighting Ordinance (MLO).

**POLICY STATEMENT:**

The Town of Bon Accord will adopt a lighting ordinance which achieves the minimum requirements of the Model Lighting Ordinance created by the International Dark-Sky Association (IDA), the Illuminating Engineering Society of North America (IES), and the Transportation Association of Canada (TAC). The Town is updating their Light Efficient Community Policy to facilitate an application to the International Dark-Sky Association for the designation of an IDA Dark Sky Community, the first such designation to be awarded in Canada.

**DEFINITIONS:**

1. ***“Absolute photometry”*** is a photometric measurement (usually of a solid-state luminaire) that directly measures the footprint of the luminaire. Reference Standard IES LM-79.
2. ***“Astronomic Time Switch”*** is an automatic lighting control device that switches outdoor lighting relative to time of solar day with time of year correction.
3. ***“Backlight”*** is a reference to an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the luminaire. For luminaires with symmetric distribution, backlight will be the same as front light.
4. ***“BUG”*** is luminaire classification system that classifies backlight (B), uplight (U) and glare (G).

5. **"Canopy"** is a covered, unconditioned structure with at least one side open for pedestrian and/or vehicular access. (An unconditioned structure is one that may be open to the elements and has no heat or air conditioning.)
6. **"Common Outdoor Areas"** One or more of the following: a parking lot; a parking structure or covered vehicular entrance; a common entrance or public space shared by all occupants of the domiciles.
7. **"Correlated Colour Temperature"** or CCT is a measure of light source color appearance defined by the proximity of the light source's chromaticity coordinates to the blackbody locus, as a single number rather than the two required to specify a chromaticity.
8. **"Development Officer"** is an official of Bon Accord appointed, according to the procedures authorized by Town Council, to act as a development authority according to the *Municipal Government Act*.
9. **"Emergency Conditions"** is lighting that is only energized during an emergency; lighting fed from a backup power source; or lighting for illuminating the path of egress solely during a fire or other emergency situation; or, lighting for security purposes used solely during an alarm.
10. **"Footcandle"** The unit of measure expressing the quantity of light received on a surface. One footcandle is the illuminance produced by a candle on a surface one foot square from a distance of one foot. One footcandle is equal to one lumen per square foot or approximately 10.76391 lux.
11. **"Forward Light"** For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the direction of the intended orientation of the luminaire.
12. **"Fully Shielded Luminaire"** is a luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the luminaire, is projected below the horizontal plane through the luminaire's lowest light-emitting part.
13. **"Glare"** is lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.
14. **"Hardscape"** is permanent landscape improvements to a site including parking lots, drives, entrances, curbs, ramps, stairs, steps, medians, walkways and non-vegetated landscaping that is three (3) metres or less in width. Materials may include concrete, asphalt, stone, gravel, etc.
15. **"Hardscape Area"** is the area measured in square metres of all hardscape. It is used to calculate the Total Site Lumen Limit in both the Prescriptive Method and Performance Methods. Refer to Hardscape definition.
16. **"Hardscape Perimeter"** is the perimeter measured in linear metres and is used to calculate the Total Site Lumen Limit in the Performance Method. Refer to Hardscape definition.

17. **"IDA"** is the International Dark-Sky Association.
18. **"IESNA"** is the Illuminating Engineering Society of North America.
19. **"Illuminance"** is the total luminous flux incident on a surface, per unit area. It is a measure of how much the incident light illuminates the surface, correlated with brightness perception.
20. **"Initial Lumens"** is the amount of light output from a lamp when it is new. For a metal halide lamp, these ratings are averages based on photometry at rated lamp watts after 100 hours of operation.
21. **"Lamp"** is a generic term for a source of optical radiation (i.e. "light"), often called a "bulb" or "tube". Examples include incandescent, fluorescent, high-intensity discharge (HID) lamps, and low pressure sodium (LPS) lamps, as well as light-emitting diode (LED) modules and arrays.
22. **"Landscape Lighting"** is lighting of trees, shrubs, or other plant material as well as ponds and other landscape features.
23. **"Light Efficient Community"** is a community that uses lighting responsibly. It uses the most effective and efficient artificial lighting available to minimize energy waste, glare, light trespass and pollution by employing designs, measures, legislation and good lighting practices. By doing so the community is able to reduce energy costs and its carbon footprint while preserving the natural environment and ensuring health, safety, and a high quality of life for all.<sup>1</sup>
24. **"Lighting Equipment"** is equipment specifically intended to provide gas or electric illumination, including, but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, or lens(es), and related structures, electrical wiring, and other necessary or auxiliary components.
25. **"Light Pollution"** is excessive, misdirected, or obtrusive artificial light which competes with starlight in the night sky for urban residents. This light has adverse health effects on urban residents by interrupting the circadian rhythm as well as surrounding ecosystems.
26. **"Light Trespass"** means the shining of light produced by a luminaire beyond the boundaries of the desired application or property on which it is located.
27. **"Lighting Zone"** is an overlay zoning system establishing legal limits for lighting of particular parcels, areas, or districts in a community.
28. **"Low Voltage Lighting"** is lighting powered at less than 15 volts and limited to luminaires having an initial rated luminaire lumen output of 525 lumens or less.
29. **"Lumen"** is the photometric unit of light output and the unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire (as distinct from 'watt,' a measure of power consumption).

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<sup>1</sup>This definition was adopted by Council on 07 February 2012 in Council Meeting-Resolution 12.29.

30. **“Luminaire”** is a complete lighting unit or fixture, consisting of a lamp (bulb), or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light (reflector, lens, diffuser), to position and protect the lamps, and to connect the lamps to a power supply.
31. **“Luminaire Efficiency”** is a ratio of the light emitted by a luminaire to the light emitted by the lamps inside the luminaire.
32. **“Luminaire Lumens”** is a calculated sum of the initial lamp lumens for all lamps within an individual luminaire, multiplied by luminaire efficiency. If the efficiency is not known for a residential luminaire, it shall be assumed to be 70%. For luminaires with absolute photometry per IES LM-79, it is the total luminaire lumens. The lumen rating of a luminaire assumes the lamp or luminaire is new and has not depreciated in light output.
33. **“Lux”** is the International System of Units (SI) unit of illuminance. One lux is one lumen per metre squared. 1 Lux is a unit of incident illuminance approximately equal 1/10 footcandle.
34. **“Model Lighting Ordinance (MLO)”** is a sample ordinance created by the International Dark-Sky Association (IDA) and the Illuminating Engineering Society (IES) which establishes ‘best practices’ in the use and applications of outdoor lighting. This ordinance suggests regulating the use of outdoor light to minimum recommended levels for night-time safety, utility, security, productivity, enjoyment and commerce. By achieving this safe minimum level of lighting the goals of reducing adverse offsite lighting such as light trespass, obtrusive light, light pollution, and sky glow are achieved.
35. **“Mounting height”** is the height of the photometric centre of a luminaire above grade level. The horizontal spacing of luminaires is often measured in units of mounting height. For example, the luminaires can be spaced at 4 mounting heights apart.
36. **“New lighting”** is lighting for areas not previously illuminated; newly installed lighting of any type except for replacement lighting or lighting repairs.
37. **“Outdoor Lighting”** is lighting equipment installed within the property line and outside the building envelopes, whether attached to poles, building structures, the earth, or any other location; and any associated lighting control equipment.
38. **“Partially shielded luminaire”** is a luminaire with an opaque top, translucent or perforated sides that is designed to emit most light downward.
39. **“Pedestrian Hardscape”** is stone, brick, concrete, asphalt or other similar finished surfaces intended primarily for walking, such as sidewalks and pathways.
40. **“Photometry”** is the science of the measurement of light, in terms of its perceived brightness to the human eye. In modern photometry, the radiant power at each wavelength is weighted by a luminosity function that models human brightness sensitivity.
41. **“Photoelectric Switch”** is a control device employing a photocell or photodiode to detect daylight and automatically switch lights off when sufficient daylight is available.

42. **"Property line"** is the edges of the legally defined extent of privately owned property.
43. **"Relative Photometry"** is photometric measurements made of the lamp plus luminaire, and adjusted to allow for light loss due to reflection or absorption within the luminaire. Reference Standard IES LM-63.
44. **"Repair"** is reconstruction or renewal of any part of an existing luminaire for the purpose of its ongoing operation, other than re-lamping or replacement of components including capacitor, ballast or photocell. Note that retrofitting a luminaire with new lamp and/or ballast technology is not considered a repair and for the purposes of this ordinance the luminaire shall be treated as if new. "Repair" does **not** include normal re-lamping or replacement of components including capacitor, ballast or photocell.
45. **"Replacement Lighting"** is lighting installed specifically to replace existing lighting that is sufficiently broken to be beyond repair.
46. **"Shielded Directional Luminaire"** is a luminaire that includes an adjustable mounting device allowing aiming in any direction and contains a shield, louver, or baffle to reduce direct view of the lamp.
47. **"Sign"** is advertising, directional or other outdoor promotional display of art, words and/or pictures.
48. **"Sky Glow"** is the brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere. Sky glow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the night sky.
49. **"Temporary lighting"** is lighting installed and operated for periods not to exceed 60 days, completely removed and not operated again for at least 30 days.
50. **"Time Switch"** is an automatic lighting control device that switches lights according to time of day.
51. **"Unshielded Luminaire"** is a luminaire capable of emitting light in any direction including downwards.
52. **"Uplight"** is a reference to an exterior luminaire, lumens emitted or radiated in the hemisphere at or above the horizontal plane.
53. **"Vertical Illuminance"** is illuminance measured or calculated in a plane perpendicular to the site boundary or property line.
54. **"Watt"** is a derived unit of power. The unit, "W" is defined as joule per second and can be used to express the rate of energy conversion to light with respect to time.

## **PROCEDURES:**

1. All new or retrofitted luminaires on public or private land within the legal and corporate limits of the Town of Bon Accord shall comply with the minimum requirements of the MLO, namely:
  - a. All lighting fixtures or luminaires over 1000 lumens initial lamp output shall be fully shielded, AND;
  - b. Restrictions on total amount of unshielded lighting, such as a limit on lumens per acre or total site lumens in unshielded fixtures, AND;
  - c. A policy to address over-lighting, such as energy density caps, lumens/acre caps, or maximum illuminance specifications, AND;
  - d. Any outdoor lighting owned by the Town of Bon Accord installed after the adoption of this *Policy* shall have a Correlated Colour Temperature (CCT) of 3,300° K or less. It is recommended that all lighting installed follow this CCT limitation.
  - e. A draft ordinance shall be attached in the Light Efficient Community Bylaw.
  
2. This Policy shall apply to all luminaires lawfully installed and operational since the adoption of Resolution 12.29, passed unanimously by Council on 07 February 2012. This previous Policy created an exception to allow for the “grandfathering” of existing luminaires. All grandfathered luminaires must comply with the Light Efficient Community Bylaw. Upon adoption of this Policy, the exemptions shall be as follows:
  - a. Permanent Exemptions:
    - i. Previously Existing Fixtures;
    - ii. Fossil Fuel Light;
    - iii. Federal and Provincial Facilities;
    - iv. Emergency Conditions;
    - v. Holiday or Seasonal Lighting; OR
    - vi. Event Lighting.
  
  - b. Special Requirements:
    - i. Regional or County Airports;
    - ii. Correctional Institutions.
  
  - c. Any exemptions not covered by the above shall be dealt with by the Chief Administrative Officer of the Town of Bon Accord or their designated officials or assignees.
  
  - d. A full description of the above exemptions is found in the Light Efficient Community Bylaw.
  
3. Upon adoption of this Policy by council, this Policy will be integrated into all related Town policies, standards and regulations, including, but not limited to the Engineering Servicing Standards, the Municipal Development Plan, and the Land Use Bylaw. These policies will address the specific needs of stakeholders in the Town and be created in tandem with educational programs for Town staff, residents and businesses. These policies will respect the following principles:

- a. The Town of Bon Accord will adopt policies and regulations to prevent the installation of any lighting on Town-controlled/owned/operated property that is not dark sky compliant. Further it agrees to continue to implement reasonable lighting curfews on Town-controlled properties and facilities. Further, the Town agrees to install adaptive controls where appropriate and feasible.
- b. Lighting will be used where it is needed, when it is needed, and at levels suited to the required task(s). In some cases, such as natural areas, this may mean a total absence of artificial light. Council or administration will create appropriate lighting zones as defined in the Light Efficient Community Bylaw.
- c. All new or retrofitted luminaires shall employ adaptive controls and reasonable curfews such as but not limited to motion detection sensors, timers, wireless remote monitoring and turn on/off capabilities, photo sensitive light controls, etc. Reasonable curfews shall be determined for all non-essential lights.
- d. Lighting technology will be selected to address visibility needs in the most energy efficient form that is practical.
- e. Luminaires will confine light to the area(s) needing illumination.
- f. Light trespass will be minimized.
- g. Lighting that creates unsafe conditions or harmful glare will not be permitted.
- h. New outdoor lighting fixtures shall be allowed when new Town owned buildings and infrastructure are constructed and when existing buildings and infrastructures are modified with physical alterations or by a change of use and the need for outdoor lighting to provide nighttime safety and utility is deemed necessary by the Town. New lighting fixtures may also be installed on existing buildings and infrastructure in the case where the Town determines that a hazardous nighttime situation exists.
- i. Nothing in this Policy shall be interpreted in such a way that prevents adequate lighting on roadways or other similar public spaces in order to ensure public safety. The definition of adequate lighting will be guided by accepted engineering standards and principles of Crime Prevention through Environmental Design.
- j. Voluntary light curfews will be encouraged for all residential, commercial, recreational and institutional use of exterior night time illumination.
- k. All types of outdoor lighting are subject to this Policy, including, but not limited to light for streets, trails, signs, walls, and landscaping.

### **ROLES AND RESPONSIBILITIES**

The role of **Administration** is to:

1. Ensure alignment of this *Policy* with the Strategic Plan and Integrated Community Sustainability Plan.
2. In collaboration with Planning and Development, oversee creation of appropriate lighting zones and ensure they remain up to date in accordance with the Light Efficient Community Bylaw.
3. Draft a new class of business license which incorporates membership into the IDA and adoption of the dark sky principles by the applicants.

The role of **Planning and Development** is to:

1. Update the Municipal Development Plan and Land Use Bylaw to reflect the principles and goals of this *Policy*.
2. Review all outdoor lighting plans of projects in development and applying for construction permits.
3. Establish lighting zones for existing development and ensure all future development follows the goals and aims of this *Policy*.
4. Provide exceptions for certain intermittent activities such as construction and holiday lighting, while ensuring the goals and principles of this *Policy* remain intact.
5. Develop and implement plans to retrofit existing outdoor lighting owned by the Town to ensure its compliance with this *Policy*.
6. Work with private entities to retrofit lighting on land not owned by the Town to achieve the overall goal of a reduction in light pollution and light trespass in town.
7. Adopt new light efficient standards within the Engineering Services Standards applicable to all zones and land uses.

The role of **Operations** is to:

1. Update lifecycle programs to reflect the principles of this *Policy* and related Schedules as it relates to outdoor lighting.
2. Replace non-conforming luminaires with conforming luminaires anytime repair or replacement to outdoor facility lights is required.
3. Introduce automatic time switches to new and existing facility lights so that luminaires are only lit when facilities are in use.
4. Develop and implement plans to replace non-conforming luminaires with conforming luminaires when upgrading any Town infrastructure.

The role of **Arena, Parks, and Recreation** is to:

1. Update the Open Space and Recreation Facilities Strategy to reflect the principles of this *Policy*.
2. Replace non-conforming luminaires with conforming luminaires when upgrading outdoor lights in public parks and trails, or any time major repair or replacement is required.

The role of **Economic Development and Tourism** is to:

1. Incorporate the principles of this *Policy* into the Economic Development Strategy.
2. Develop a communications plan to create awareness of this *Policy* and ensure compliance with this *Policy* by the business community.

The role of **Communications** is to:

1. Develop a Communications Plan and education strategy to create awareness of this *Policy* in the community. This may include:
  - a. A Light Efficient Community education program for Town staff.
  - b. A website for public education highlighting responsible lighting, the benefits of the *Policy*, and links to further responsible lighting information.



- c. Planning of community events to encourage public participation in adopting the mindset of becoming a Light Efficient Community.
- d. Materials regarding responsible lighting practices and methods to distribute within the community.