

# Chapter 24

This chapter establishes standards for outdoor illumination.

## Outdoor Lighting

### 24.1 Scope and Purpose

**24.1.1 What is “outdoor lighting”?** Outdoor lighting includes any outdoor illuminating device, lamp, light, reflective surface, luminous tube, or similar device, permanently installed or portable, used for illumination, decoration, or as part of a sign.

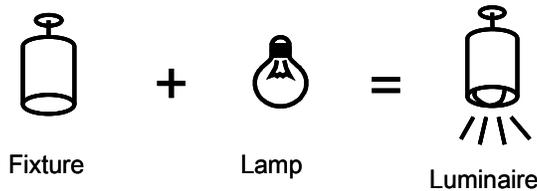
**24.1.2 What is the purpose of these standards?** The purpose of this chapter is to allow for outdoor lighting that enhances the safety, security, and nighttime use of property while minimizing the obtrusive effects of outdoor lighting on neighboring parcels, public ways, and the night sky. These standards seek to direct appropriate amounts of light to where it is needed, when it is needed; to increase the use of energy-efficient light sources; and to reduce the waste of light and glare from overlighting and poorly shielded or inappropriately directed lighting fixtures.

#### Lighting Terminology

A **fixture** is the assembly that houses a lamp or lamps. It may include mounting brackets; a ballast; lamp socket; a reflector, mirror, or refractor; lens, and/or a shield.

A **lamp** is the component of a luminaire that produces the actual light. One example is an incandescent light bulb.

A **luminaire** is a complete lighting system, including the lamp or lamps and fixture.



A **lumen** is a unit used to measure the amount of light emitted by lamps. For example, a basic 60-watt incandescent bulb and a 15-watt compact florescent bulb both emit approximately 900 lumens when new. For the purposes of this bylaw, the lumen output shall be the initial lumen output of a lamp, as rated by the manufacturer.

A **foot-candle** is a unit of light intensity equal to one lumen per square foot. Foot-candles can be measured using a light meter. Unless otherwise specified in this bylaw, foot-candles shall be measured horizontally at grade level.

A **pole** is a more or less vertical support that holds a luminaire at a specified mounting height.

### 24.2 Applicability

**24.2.1 Does my outdoor lighting have to meet the requirements of this chapter?** Yes. Unless it is specifically exempted by WDB 24.2.3, new and replacement outdoor lighting must comply with the standards of this chapter.

**24.2.2 Do I have to get a permit to install outdoor lighting?** An administrative permit is required to install outdoor lighting that is not exempted by WDB 24.2.3. The installation of outdoor lighting without a permit is a violation of this bylaw, subject to enforcement, as provided by WDB 7.4-7.6. Outdoor lighting must also be shown on applications for discretionary permits, as required by WDB 24.3.

**24.2.3 Are there types of outdoor lighting for which no permit is required?** Yes.

24.2.3.1 Emergency Lighting. No permit is required for temporary emergency lighting used by the fire, police, and public works departments or other emergency service agencies.

24.2.3.2 Residential Lighting. No permit is required for outdoor lights that are installed at one and two family dwellings and that are rated at 1,200 initial lumens or less per lamp, as long as the maximum lumen output per dwelling set by Table 24.A (5,500 initial lumens) is not exceeded. Floodlights rated less than 1,200 initial lumens are included in this exception; however, all floodlights must adhere to the installation guidelines of WDB 24.5.1.

<p><b>What does 1,200 initial lumens actually mean?</b> 1,200 lumens initial output is approximately equivalent to one 75-watt incandescent bulb or one 20-watt compact fluorescent bulb.</p>
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24.2.3.3 Holiday Lighting. Temporary, seasonal holiday lighting is not subject to review or compliance with this chapter, if (and only if) the following conditions are met:

- Seasonal holiday lighting must not constitute a traffic hazard or a nuisance to neighboring properties.
- Seasonal holiday lighting may be displayed for no more than 60 days.

**24.2.4 Are some types of outdoor lighting prohibited?** Yes.

24.2.4.1 Uplighting. Lighting directed upwards (above horizontal) to illuminate flags, buildings, signs or landscaping is prohibited. The only exception to this standard is that one U.S. flag per parcel may be uplit with luminaires of less than 2,500 lumens total (all lamps).

24.2.4.2 Laser and Search Lights. Laser-source lights and search lights, sweeping or stationary, are prohibited for all but emergency purposes.

24.2.4.3 Moving Lights. Flashing, flickering, moving, or otherwise animated lighting (other than seasonal holiday lighting meeting the requirements of WDB 24.2.3.3) is prohibited.

24.2.4.4 Mercury Vapor. The use of mercury vapor lighting is prohibited.

24.2.4.5 Bands of Light. Lighting fixtures containing lighting elements that form a band of light are not allowed. The use of internally illuminated bands of color and/or light on building exteriors is prohibited.

**24.2.5 Must existing outdoor lighting be brought into compliance when I apply for a permit?** Yes. Existing outdoor lighting that does not comply with the standards established in this chapter has a right to continue as a nonconforming use. As provided by WDB 2.8, however, the DRB may condition approval of a permit required by this bylaw on the removal of nonconforming outdoor lighting.

## 24.3 Lighting Plans

**24.3.1 What must be submitted with my Discretionary Permit, Administrative Permit, or Sign Permit application in order to approve my outdoor lighting?** The lighting plans called for by the Discretionary Permit Checklist must include a lighting plan that presents the information listed here. Applications for administrative permits, including sign permits, that propose outdoor lighting must include as much of the information listed here as is necessary to demonstrate compliance with the standards of this chapter.

24.3.1.1 Lighting Levels. All applications must show the total lumens per acre or lumens per dwelling in all areas that will be illuminated, including both existing and proposed outdoor lighting. Lighting plans that are part of applications for discretionary permits must include a point-by-point analysis of anticipated illumination levels in all areas that would be illuminated. This lighting grid must be based on the proposed luminaires and their mounting heights. The proposed maximum, minimum, and average illumination levels, and uniformity ratios shall be calculated for each area proposed to be illuminated.

24.3.1.2 Lighting Locations. The lighting plan must outline the area(s) to be illuminated (thus documenting the basis of the calculations called for by WDB 24.3.1.1), and show the locations and mounting heights of all proposed luminaires.

24.3.1.3 Lighting Specifications. The lighting plan include the manufacturer's specifications for all proposed luminaires. There must be sufficient detail to demonstrate compliance with the standards of this chapter, including shielding details and initial lumen outputs.

**24.3.2 May the Administrator refer lighting plans that accompany applications for administrative permits to the HAAC for review?** Yes. Where the proposed lighting has not been reviewed as part of an application for a discretionary permit, the Administrator may refer that proposed lighting to the HAAC for a review of its impacts on neighboring properties, public ways, and the night sky before taking action on the application for an administrative permit.

## 24.4 Lamp and Fixture Types - Shielding

**24.4.1 What types of lamps are allowed for outdoor lighting in Williston?** The types of lamp allowed include incandescent, compact fluorescent, metal halide, light-emitting diode (LED), and high and low pressure sodium. As per WDB 24.2.4.4, the use of mercury vapor lamps is prohibited. The use of other types of lamps may be approved by the DRB where it finds that they will comply with the standards established in this chapter.

**24.4.2 What types of lighting fixtures are allowed?** Except where specifically exempted in this bylaw, all lighting fixtures must be fully shielded. This means that the fixture is constructed so that all the light emitted by the lamp (including indirect reflection off reflectors) is projected below horizontal. Only low lumen lighting (less than 1,200 lumens per lamp) may be unshielded and Table 24.A sets a stringent limit on the total amount of light that can be generated by unshielded fixtures.

**Where can I find fully shielded lighting fixtures?** The International Dark-Sky Association ([www.darksky.org](http://www.darksky.org)) maintains lists of manufacturers and distributors of fully-shielded lighting fixtures.

## 24.5 Lighting Zones and Cumulative Light Output

**24.5.1 Are there different lighting standards for different parts of Williston?** Yes. This chapter establishes somewhat different lighting standards for each of the four Lighting Zones listed below.

24.5.1.1 Lighting Zoning 1, which consists of the Agricultural/Rural Zoning District (ARZD);

24.5.1.2 Lighting Zone 2, which consists of the Residential Zoning District (RZD);

24.5.1.3 Lighting Zone 3, which consists of the Village Zoning District (VZD); and

24.5.1.4 Lighting Zone 4 – which encompasses all other zoning districts established in this bylaw.

**24.5.2 Are there limits on the total amount of outdoor light any one parcel can generate?** Yes. Maximum light outputs, as measured in initial lumens per acre of surface to be lit or lumens per residential unit, are specified in Table 24.A.

24.5.2.1 Nonresidential All non-residential uses of lighting must adhere to the lumen/acre maxima of Table 24.A

24.5.2.2 Residential uses are allowed up to 5,500 lumens/residential unit, or the lumen/acre maximum, whichever is less. Of the total allowable lumen output per parcel, only that portion specified in the third column of Table 24.A may originate from luminaires that do not have fully shielded fixtures.

**Table 24.A Maximum Total Lumen Output from Outdoor Lighting**

Lighting Zone	Maximum Allowable Total Lumen Output	Maximum Allowable Unshielded Lumens
1 – ARZD	50,000 lumens/acre or 5,500 lumens/residential unit	4,000 lumens/acre of surface to be lit
2 – RZD	100,000 lumens/acre or 5,500 lumens/residential unit	10,000 lumens/acre of surface to be lit
3 – VC	100,000 lumens/acre or 5,500 lumens/residential unit	10,000 lumens/acre of surface to be lit
4 - All Other	200,000 lumens/acre or 5,500 lumens/residential unit	10,000 lumens/acre of surface to be lit

**24.5.3 Are there any types of lighting that are exempt from total lumen/acre maximums?** Yes. Outdoor recreational facility lighting, temporary lighting for special events, and seasonal holiday lighting are exempt from lumen/acre maxima, but this chapter establishes specific requirements for those types of lighting.

**24.5.4 Are there limits to how long my outdoor lights can be on?** Yes, this is another way of limiting light output. Unless otherwise specified in this bylaw - the hours of illumination for some specific

uses are addressed in WDB 24.7 - businesses must turn off outdoor lights, including those illuminating signs, within one half hour after the close of business or 10:00PM whichever is later. Outdoor lights may be turned on one half hour prior to opening. There are some exceptions to this standard.

24.5.4.1 Event Lighting. Recreational or social events requiring outdoor lighting may utilize exterior lighting during the event or activity, but it must be turned off after the event ends.

24.5.4.2 Motion-Activated Lighting. Motion-activated lighting is allowed to be on at all times, provided the lights are programmed to turn off no more than five (5) minutes following the last detectable motion.

## 24.6 Luminaire Orientation and Mounting Height

**24.6.1 *Are there limitations on how and where I can place or orient outdoor lighting on my property?*** Yes.

24.6.1.1 Shielding Must be Maintained. Luminaires must be installed so that the full shielding of the fixture is maintained. A fixture cannot be angled so that light is directed above horizontal.

24.6.1.2 Interior Orientation is Required. Light from outdoor luminaires may not be directed beyond the parcel boundaries onto adjacent properties or public ways.

24.6.1.3 Floodlights. Floodlights or spot lamps must be aimed no higher than 45 degrees above straight down (half way between straight down and straight to the side). Floodlight lamps may not be directly visible from adjacent parcels or public ways.

**24.6.2 *Are there limitations on the mounting height of outdoor lighting?*** Yes. The mounting height of outdoor lighting fixtures may not exceed 25 feet above finished grade. Except outdoor lighting fixtures mounted on the façade of buildings described in WDB 24.7.4 may not exceed 15 feet above finished grade, from which the DRB may allow an exception to this standard where the pole and luminaire assemblies are more than 250' from the nearest parcel boundary, even in the case of an exception; however, no fixture may be mounted at a height greater than that of the tallest building on the site.

\* The average illumination of ground level areas shall be measured horizontally at grade level and computed only over the area designated as being illuminated in the security plan. Average illumination shall not exceed maximums listed in Table 3 for each lighting zone.

\*\* The average illumination level of vertical surfaces shall be measured at a height of 5 feet above grade and computed over the area of surface designated to be illuminated in the security plan. Average illumination shall not exceed maximums listed in Table 3 for each lighting zone.

## 24.7 Specific Outdoor Lighting Standards

**24.7.1 *Are there specific standards for the lighting of convenience store and gas station canopies?*** Yes.

24.7.1.1 Lighting Level. Areas around pump islands and under canopies shall be illuminated so that the minimum light level at finished grade is at least 1.0 foot-candle, but no more than 5.5 footcandles. Areas on the apron away from the canopy shall be considered parking lots,

and must meet the lighting standards for parking lots set by WDB 24.7.3. Where there are no gasoline pumps, the entire apron shall be treated as a parking lot.

24.7.1.2 Canopy Lighting. No light fixtures shall be mounted on the top or sides of a canopy, which shall be opaque and not illuminated. Lighting under canopies shall utilize flat lenses and be fully recessed into the lower surface of the canopy or otherwise fully shielded.

24.7.1.3 Light Output. All lighting around pump islands and under canopies shall be included in the total lumen/acre output cap set by Table 24.A.

24.7.1.4 Fleet Fueling Facilities. Fleet fueling facilities should provide motion sensitive canopy and/or pump island lighting that does not exceed 5.5 footcandles, while otherwise maintaining the same light level as a parking lot after business hours (see WDB 24.7.3.4).

**24.7.2. Are there specific standards for the lighting of outdoor recreational facilities?** Yes. A variety of outdoor recreation facilities may be illuminated to allow nighttime use, including tennis courts, ball fields, driving ranges, swimming pools, outdoor skating rinks, and ski areas. The regulations in this section are intended to allow the necessary illumination of such facilities while minimizing adverse impacts such as glare, skyglow, and light trespass on nearby properties.

24.7.2.1 Lighting Levels. The lighting plan for an outdoor recreation facility must demonstrate that only the minimum level of illumination required for the proposed activity or activities will be provided. The DRB may independently determine the minimum illumination level required for any activity and impose that level as a condition of approval.

24.7.2.2 Internal Orientation. Fixtures must be mounted and aimed so that their beams fall within the primary playing area and its immediate surroundings. the visibility of light sources from nearby properties and public ways must be minimized. No direct illumination may be aimed off the site.

24.7.2.3 Hours of Illumination. Lights on outdoor recreational facilities shall be turned off except when the facilities are in use or being maintained.

**24.7.3 Parking Lot Lighting**. Parking lot lighting shall be designed to provide the minimum lighting necessary to ensure adequate vision and safety, and to prevent glare or direct illumination onto adjacent properties or public ways.

24.7.3.1 Lighting Levels. Illumination levels in parking areas must meet the requirements set forth for each Lighting Zone in Table 24.B. Parking areas in the ARZD shall not be illuminated unless the DRB finds that specific conditions exist which make that illumination necessary. In such cases, the lighting shall meet the standards for parking areas in the RZD.

**Table 24.B. Maximum Average Illumination and Uniformity Ratios Required for Parking Lots in each Lighting Zone**

<b>Lighting Zone</b>	<b>Average Illumination* shall not exceed:</b>	<b>Uniformity Ratio^ shall not exceed</b>	<b>Maximum Illumination of any point shall not exceed</b>
ARZD	Parking lot illumination discouraged	Parking lot illumination discouraged	Parking lot illumination discouraged
RZD	1.0 footcandles	20:1	5.0 footcandles
VC	1.0 footcandles	20:1	5.0 footcandles
All Other	1.2 footcandles	20:1	5.0 footcandles

\* Average illumination shall be measured horizontally at grade level, computed over the area of the parking lot.

^ Uniformity ratio is a measure of the consistency of light levels across a given area. It is expressed as maximum : minimum illumination levels.

24.7.3.2 **Shielding.** All lighting serving parking lots must be fully shielded. The DRB may permit a limited exception to this standard in the VZD, as provided by WDB 24.7.3.3.

24.7.3.3 **In the VZD.** Alternatives to fully shielded lighting fixtures may be permitted in the VZD in order to accommodate fixtures of a particular “period” design or architectural style, but those alternatives must comply with this standard.

- If alternative fixtures are not fully shielded, the maximum initial lumens generated by each fixture shall not exceed 1,200 (equivalent to a 75-watt incandescent bulb).
- The mounting height of such fixtures shall not exceed 20 feet.

24.7.3.4 **Hours of Illumination.** Parking area illumination must be reduced by at least 75% within ½ hour of the close of the business(es) the parking area serves. This reduced lighting level can be achieved by turning off at least 75% of the parking lot lighting fixtures or by dimming lighting levels by 75%. This standard does not require that lighting levels be reduced below 0.2 footcandles as measured horizontally at finished grade level.

**24.7.4 Building Façade Lighting.** The lighting of building facades shall be designed to accentuate the architectural features of the building and the building entry or entries. Lighting fixtures must be located, aimed and shielded so that the light is directed downward towards the ground and not onto adjacent roads, sidewalks or properties. Lighting fixtures on building facades shall not be mounted at a height exceeding 15 feet above average finished grade.

**24.7.5 Pedestrian Ways.** The lighting standards for pedestrian ways will generally be the same as for parking lots. The DRB may, however, permit elevated lighting levels to highlight the entrances to buildings or particular pedestrian spaces. The DRB may also permit elevated lighting levels in areas, like passenger loading areas, where pedestrians and cars will be in close proximity.

**24.7.6 Security Lighting.** All night lighting for security surveillance will be minimized. The use of motion-activated lights and alarms will be encouraged as an alternative. All applications for discretionary permits that propose security lighting shall include a security plan which delineates the

area/s to be illuminated for security purposes and outlines the need for and purposes of the security lighting.

24.7.6.1 Referral. The Administrator may refer security lighting plans to the Williston Police Department for comment.

24.7.6.2 Light Levels. Security lighting must not exceed the light levels established in Table 24.C.

24.7.6.3 Standards. Security lighting is subject to all standards, including shielding, light orientation, etc. established in this chapter.

**Table 24.C. Maximum average illumination levels for security lighting on horizontal (grade level) and vertical surfaces**

<b>Lighting Zone</b>	<b>Average* Horizontal Illumination Level at Grade</b>	<b>Average** Vertical Illumination at 5' Above Grade</b>
ARZD	Discouraged	Discouraged
RZD	Shall not exceed 1.0 footcandles	Shall not exceed 1.0 footcandles
VC	Shall not exceed 1.0 footcandles	Shall not exceed 1.0 footcandles
All Other	Shall not exceed 1.5 footcandles	Shall not exceed 1.5 footcandles

\* The average illumination of ground level areas shall be measured horizontally at grade level and computed only over the area designated as being illuminated in the security plan. Average illumination shall not exceed maximums listed in Table 3 for each lighting zone.

\*\* The average illumination level of vertical surfaces shall be measured at a height of 5 feet above grade and computed over the area of surface designated to be illuminated in the security plan. Average illumination shall not exceed maximums listed in Table 3 for each lighting zone.

24.7.6.4 Perimeter Lighting. Security lighting designed to illuminate a perimeter of a property (such as along a fence) must include motion sensors designed to stay off unless triggered by an intruder located within 5 feet of the perimeter. Pole-mounted security lighting must be installed no more than 10 feet from the perimeter of the designated area being illuminated, and poles cannot be located outside the parcel boundaries.

**24.7.7 Sign Illumination.** See Chapter 25 of this bylaw.

**24.7.8 Street Lighting.** Street lights must comply with the *Williston Public Works Standards*.