



Montana

LIGHTING SERVICES GUIDE

MONTANA'S LED STREET AND YARD LIGHTING PROJECT

NorthWestern Energy started a four-year program to replace existing streetlights and yard lights in communities across our Montana service territory with energy-efficient LED (light-emitting diode) lights in 2018. About 43,000 NorthWestern-owned streetlights and 30,000 yard lights will be replaced by the end of 2022.

BENEFITS

Less energy

- LEDs use 50% less electricity than traditional high pressure sodium (HPS) lights.

Reduced light pollution

- With LEDs, NorthWestern is offering a full range of dark sky friendly options.
- With LEDs, the light can be better directed to where it is needed – on the street and adjacent sidewalks.
- Through smart technology additions, one day we could dim streetlights when no one is in the area, since the LEDs will have dimming capability.

Improved visibility

- Old HPS lighting produces an orange-yellow light that does not render colors well. LEDs, on the other hand, output a fuller light spectrum that renders colors accurately.
- NorthWestern chose “warm light” LEDs which are easier on the eyes than “cool white” LEDs.

Lower operation costs

- Because LEDs are more efficient, they last longer and need to be replaced less often than HPS streetlights.
- LEDs require less energy.

Improved safety and security

- The new lights give increased safety at night through greater visibility and fewer streetlight outages.

ABOUT THE PROJECT

Why now? – NorthWestern has been evaluating LED streetlights for several years. Recent price decreases have made them more cost effective. Also, manufacturers of current HPS products have indicated those products may not be readily available in the future with the increasing popularity of LEDs. NorthWestern has done its homework to select LED fixtures that will result in just and reasonable rates for customers while maintaining an appropriate amount of light for safety and minimizing light pollution.

Will all streetlights be replaced? – No. The NorthWestern Energy LED project will not affect customer-owned streetlights. For example, streetlights owned by cities or other local government entities and those owned by the Montana Department of Transportation will not be upgraded by NorthWestern.

What about yard lights? – About 30,000 yard lights and several thousand home owners association lights will be replaced in the coming years.



Are the new LED streetlights Dark-Sky compliant? – Wherever possible, we are using lights that are dark-sky compliant, and the vast majority of the new LED lights are dark-sky compliant. They also meet any local lighting ordinances. The International Dark Sky Association’s guidance is to use LED products with a “warmer color,” 3000K (kelvin) or less because “3000K LED lighting saves energy and lowers costs, protects health and human safety, conserves nocturnal wildlife, and protects nightscapes.”

All 70- and 100-watt cobra head fixtures will be 2700K going forward. Conversions of lights greater than 100 watts will continue to be replaced with 3000K lights.

Most street lighting in the United States is 4000K. However, both the American Medical Association and the Dark Sky Association recommend a color temperature not to exceed 3000K, which is why NorthWestern is using 2700K and 3000K lights.

For more information on dark sky standards, visit darksky.org.

Cost of project – The cost of the streetlight project is expected to be about \$24 million, with the cost of the yard light project estimated to be about \$9 million. Existing fixtures will be replaced on a one-to-one basis with equivalent LED products.

Project timeframe – We began converting streetlights in 2019 and yard lights in 2020. Both projects will continue through 2022.

Tree Trimming – In some cases, tree trimming may be required to allow our technicians access to the lighting fixture. We have professional arborists under contract who will respect your trees and will treat them with care, all the while ensuring safety as our top priority.

Recycling old lights – NorthWestern is recycling the old high-pressure sodium lights through Four Corners Recycling in Bozeman. Four Corners recycles all parts of the old lights, including the metal heads, the glass lenses and the bulbs, some of which contain mercury. The recycling program was initiated by employees in a 2018 leadership program.



NORTHWESTERN ENERGY LED LIGHTING SERVICES

At NorthWestern Energy, we are committed to providing quality lighting services to our customers. Outdoor lighting includes parking, street and general area lighting. Customers sometimes install their own outdoor lighting in parking lots or cities install their own streetlights, and those installations are not part of NorthWestern’s lighting services. However, NorthWestern does provide unmetered outdoor lighting as an option for customers. Our lighting is available for a variety of applications including:

- **Area Lighting (AL)** – Refers to lighting services NorthWestern installs for individual customers to light areas such as parking lots, parks, private property areas, school/college campus, etc. Area lighting is also sometimes referred to as ‘lot’ or ‘parking lot’ lighting for installations that illuminate parking areas, etc.
- **Street Lighting (ML - Municipal Lighting)** – Refers to lighting services installed to provide lighting on public streets, through Special Improvement Lighting Districts (SILD), Special Improvement and Maintenance Lighting Districts (SILMD) or Rural Special Improvement Districts (RSID).
- **Yard Light/Lawn Lighting (YL)** – Refers to the installation of individual lights in customers’ yards and generally includes Lawn Lighter (residential) and Yard Light style lights (residential, commercial or rural).

NEW CONSTRUCTION LIGHTING OFFERINGS

NorthWestern is now installing only LED (Light Emitting Diode) lighting fixtures for our new lighting installations. LED lighting uses about 50 percent less electricity than traditional High Pressure Sodium (HPS) lights and lasts two to three times longer. The type of LED lighting fixtures and wattage necessary for proper light levels depends on the location and application (i.e. parking lot or street). For example, there are specific guidelines for proper lighting of streets and parking areas, and NorthWestern's Construction Department engineers will assist you in determining the correct lighting product and wattage for your specific project.

In addition, your community may have implemented outdoor lighting ordinances (Dark Sky Friendly), which restrict certain types of lights and those must be reviewed before the utility can install the LED fixtures. If a community has a lighting ordinance, they typically require full cut-off fixtures, but some communities have additional requirements. NorthWestern's construction engineers will research this to insure our lighting installations meet local ordinances.

NorthWestern Energy's current new construction LED lighting fixtures standard offerings are described on the following pages and are subject to change. LED products are referred to as wattage equivalent to existing HPS lights. NorthWestern will only install standard offerings. If customers request non-standard lighting products, by tariffs, non-standard lighting must be customer owned and metered. NorthWestern's lighting services and costs are governed by Montana Public Service (PSC) approved tariffs.

CONTACT

Customers considering NorthWestern lighting services need to contact the Construction Departments at 833-672-8453 or at www.northwesternenergy.com/account-services/new-construction.

You can also contact the Construction Center nearest to your project:

Billings - ccbillings@northwestern.com

Bozeman - ccbozeman@northwestern.com

Butte - ccbutte@northwestern.com

Great Falls - ccgreatfalls@northwestern.com

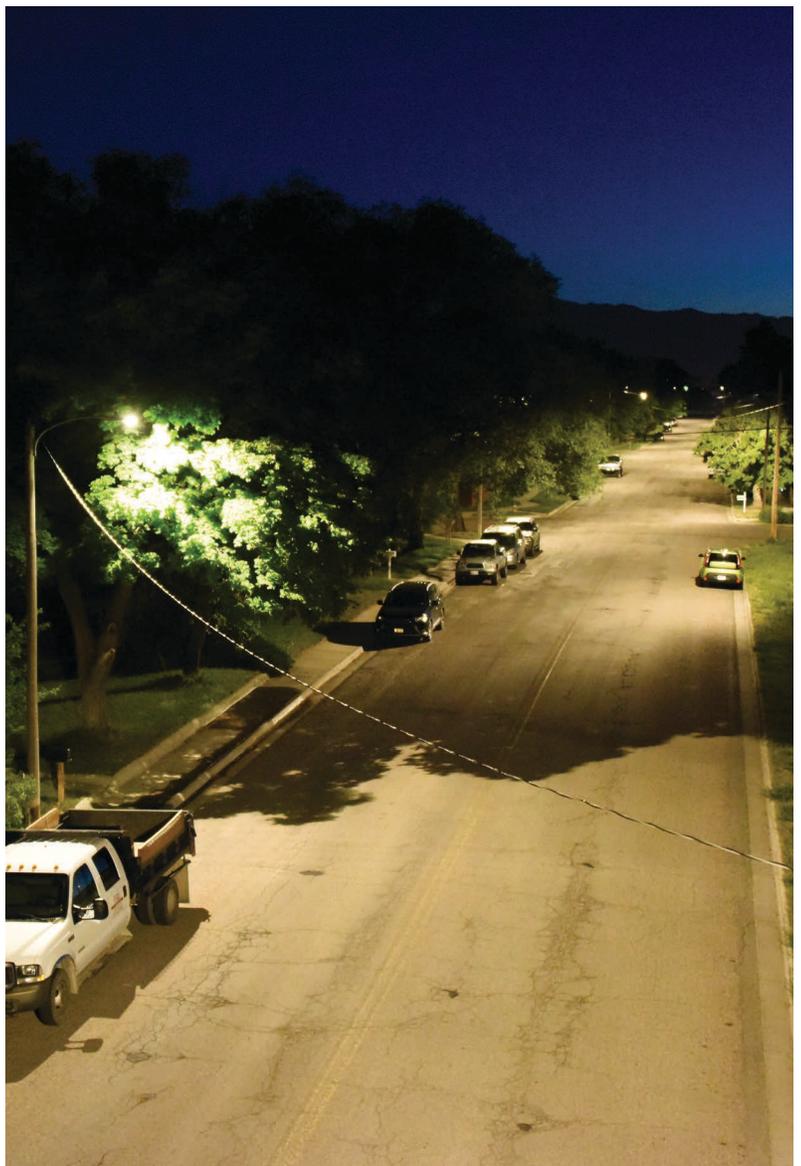
Havre - cchavre@northwestern.com

Kalispell - cckalispell@northwestern.com

Livingston - cclivingston@northwestern.com

Helena - cchelena@northwestern.com

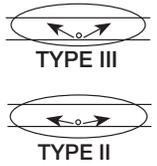
Missoula - ccmissoula@northwestern.com



NORTHWESTERN ENERGY LED LIGHTING PRODUCTS

COBRA HEADS (ROADWAY)

EXISTING HPS COBRA HEADS – NorthWestern’s existing High Pressure Sodium (HPS) cobra heads lights are 70, 100, 200, 250 and 400-watt HPS fixtures that are generally semi-cutoff or medium cutoff fixtures, Light Pattern Type III. They are installed on a variety of pole types including dedicated wood, distribution wood, steel, fiberglass, and served with overhead or underground wiring. Cobra heads are generally used in commercial applications, parking lots and street lighting applications. They are also referred to as Roadway lighting.



LED COBRA HEADS – LED fixtures are referenced as HPS wattage equivalent, and available in 70, 100, 200, 250 and 400-watts HPS equivalents. Cobra heads are considered full cutoff and generally meet dark sky friendly ordinances.

- The 70 and 100-watt have a 2700K Color Temperature and are available in Type II or III lighting pattern distribution. Type II is considered for cities with strict light trespass ordinances where the overall road width is narrow. (A Type II pattern has less forward light but may have more back light than a Type III.) If there are any concerns with backlight, a shield can be installed on the fixture.
- The 200, 250 and 400-watt HPS equivalent LEDs are 3000K Color Temperature and Light Pattern Type III.

Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Cobra – Roadway – 70 W HPS	B	Type III	2700 K	32 W	11
Cobra – Roadway – 100 W HPS	C	Type II or Type III	2700 K	42 W	15
Cobra – Roadway – 200 W HPS	E	Type III	3000 K	93 W	33
Cobra – Roadway – 250 W HPS	F	Type III	3000 K	126 W	44
Cobra – Roadway – 400 W HPS	J	Type III	3000 K	189 W	66

EXISTING HPS COBRA HEAD



LED COBRA HEAD



SHOEBOX

EXISTING HPS SHOEBOX – NorthWestern’s existing 250 and 400-watt HPS shoebox fixtures are served with underground wiring and are Light Pattern Type III. Shoebox fixtures are mounted at 20-, 25- and 30-foot mounting heights.



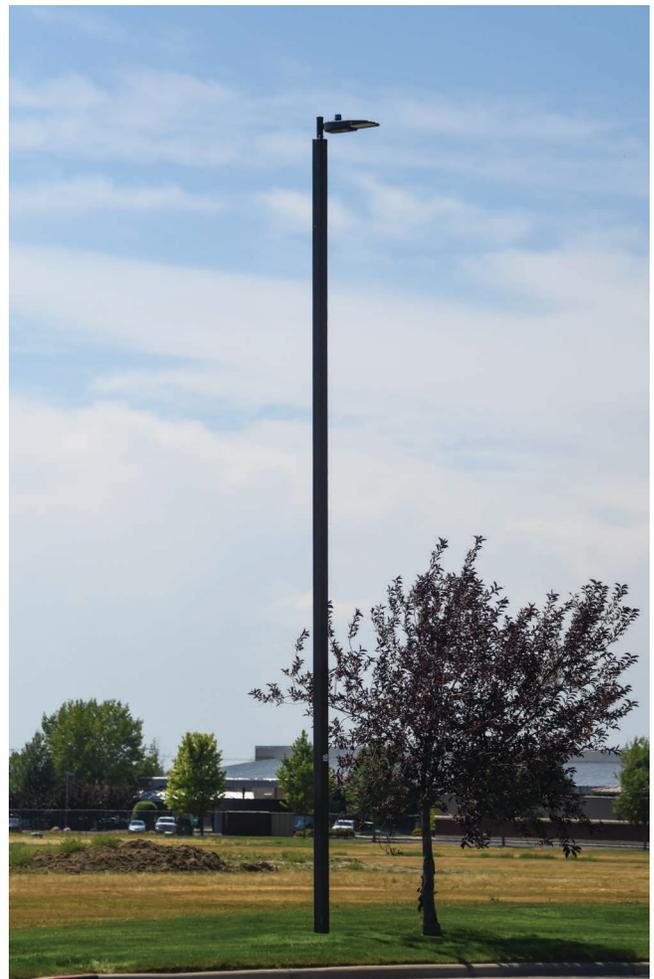
LED SHOEBOX – Shoebox style LEDs are available as 250, 400-watt HPS equivalent, 3000K Color Temperature, and Light Pattern Type III. Because of the higher light output, these lights are generally only installed in commercial applications or as street lighting in commercial areas. For residential area applications, there is a 100-watt HPS equivalent LED shoebox available, 2700K Color Temperature, and Light Pattern Type III. Shoebox lights require underground wiring. An LED shoebox is generally considered a full cut-off fixture and should meet dark sky friendly requirements.

Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Shoebox - 100 W HPS	C	Type III	2700 K	42 W	15
Shoebox - 250 W HPS	F	Type III	3000 K	126 W	44
Shoebox - 400 W HPS	J	Type III	3000 K	189 W	66

EXISTING HPS SHOEBOX



LED SHOEBOX



YARD LIGHT

EXISTING HPS YARD LIGHT – NorthWestern’s existing yard lights are generally installed in alleys or in rural areas, as 100-watt HPS on wood poles and Light Pattern Type V. They are also installed on customer properties in yards, next to driveways or in commercial parking areas. They are generally served with overhead wire, but can be installed with underground wiring and steel poles.



Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Yard Light – 100W HPS Eaton w/Reflector	C	Type V	2700 K	42 W	15
Yard Light – 100W Eaton w/o Reflector, Dark Sky Friendly	C	Type V	2700 K	42 W	15
Yard Light - 100W GE w/ Refractor	C	Type V	2700 K	42 W	15

LED YARD LIGHT – LED yard lights are either an Eaton Caretaker-2 or a GE, 100-watt HPS equivalent, 2700K Color Temperature and Type V Light Pattern. The Eaton LED is available as a full cut-off, dark sky friendly version. If needed, a drop house side shield can be installed in front/back/left/right positions on the Eaton LED models that are with or without a refractor.

EXISTING HPS YARD LIGHT

LED YARD LIGHTS



POST TOP LIGHTING

Post Top Lighting (PTL) – is a general category reference for decorative style of lighting fixtures and poles installed in area lighting or in street lighting applications (generally residential areas). The luminaries are mounted on shorter poles ranging from 12 to 20 feet depending on lamp style. Standard post top styles include Acorn, Contemporary, Lexington, and Pendant style. To be streetlights they generally need to have the fixture head mounted at a minimum of 14 or 16 feet to meet Illuminating Engineering Society (IES) standards for roadway lighting in residential areas SILDs.

ACORNS

EXISTING ACORNS – NorthWestern’s existing HPS Acorns are 100-watt HPS with Light Pattern Type III and 14-foot black poles. They are only installed with underground wiring.



LED ACORNS – The LED Acorn equivalent to 100-watt HPS available are from two different manufactures, GE or Acuity. These LED Acorns are generally not considered a full cut-off fixture, so not applicable in communities with dark sky friendly requirements for full cut-off fixtures. For dark sky friendly requirements, NorthWestern is offering a King Acorn that should meet full-cutoff dark sky friendly requirements. Also, in a few communities, NorthWestern has substituted a Lexington fixture head for Acorn to meet full cut-off requirements. NorthWestern will consult with communities regarding local lighting ordinances as to what light can be installed. These lights require underground wiring.

Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Acorn - 100 W HPS (GE Cutoff)	C	Type III	3000 K	42 W	15
Acorn - 100 W HPS (Acuity w/ Down Reflector)	C	Type III	3000 K	42 W	15
King Acorn - 100 W HPS (StressCrete)	C	Type III	2700 K	42 W	15

EXISTING HPS ACORNS



LED ACORNS



CONTEMPORARY

EXISTING HPS CONTEMPORARY – NorthWestern’s existing Contemporary post-top lights are 100-watt HPS fixtures mounted at 16 feet on fiberglass poles, served underground, and have Light Pattern Type V.



LED CONTEMPORARY – For new installations, the standard LED Contemporary fixture 100-watt HPS equivalent is not considered a full cut-off fixture. A full cut-off Contemporary is available to meet dark sky requirements. (In some communities, to meet dark sky friendly requirements, NorthWestern has substituted a Lexington LED head without the lens in retrofit applications to meet local ordinances. If substituting Lexington for Contemporary to meet ordinances, community must be notified in advance.) These lights require underground wiring.

Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Contemporary (Standard) – 100 W HPS	C	Type V	2700 K	50 W	17
King Luminaire Contemporary (Dark Sky) – 100 W HPS	C	Type V	2700K	42 W	15

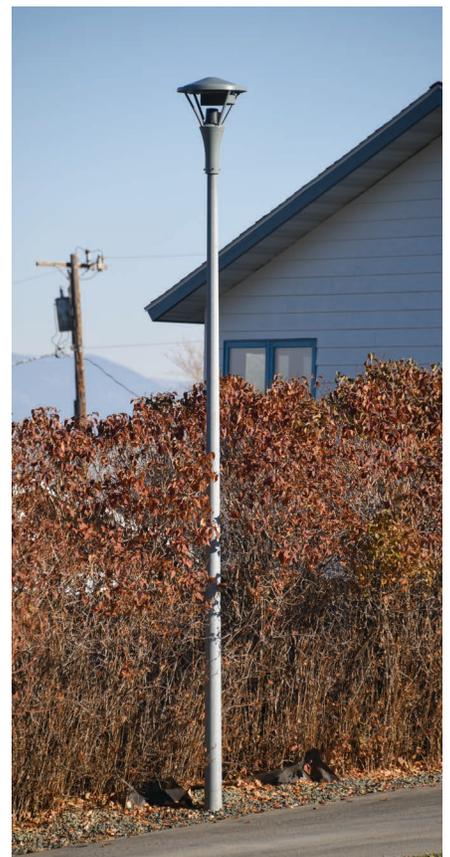
EXISTING HPS CONTEMPORARY



LED CONTEMPORARY (STANDARD)



KING LUMINARE CONTEMPORARY (DARK SKY)



LEXINGTON

EXISTING HPS LEXINGTON – NorthWestern’s existing HPS Lexington lights are generally 100-watt HPS fixtures, mounted on black fiberglass poles, served underground, and Light Pattern Type III. They are used in residential street lighting applications and individual lighting installations.



Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Lexington – 100 W HPS w/o Refractor (Dark Sky Friendly - No Lens)	C	Type III	2700 K	42 W	15
Lexington – 100 W HPS (with lens)	C	Type III	2700 K	42 W	15

LED HPS LEXINGTON - Two types of LED Lexington fixtures are available, one with a lens and one without a lens. The LED version without the lens is considered a full cut-off and should meet local lighting ordinances requiring full cut-off. (In some communities with dark sky friendly, full cut-off requirements, NorthWestern has replaced HPS Contemporary, and in some applications, Acorn heads with the dark sky friendly Lexington fixtures. Local communities need to be consulted if fixture heads are changed to a different style. These lights require underground wiring.)

EXISTING HPS LEXINGTON



LED LEXINGTON



PENDENT

EXISTING HPS PENDENT - NorthWestern's existing HPS Pendants are 100-watt HPS, mounted at 20 feet on black or bronze decorative poles, single or double mounting, served underground, and Light Pattern Type III. Existing HPS Pendants do not have an LED replacement head, but replacements are being evaluated.



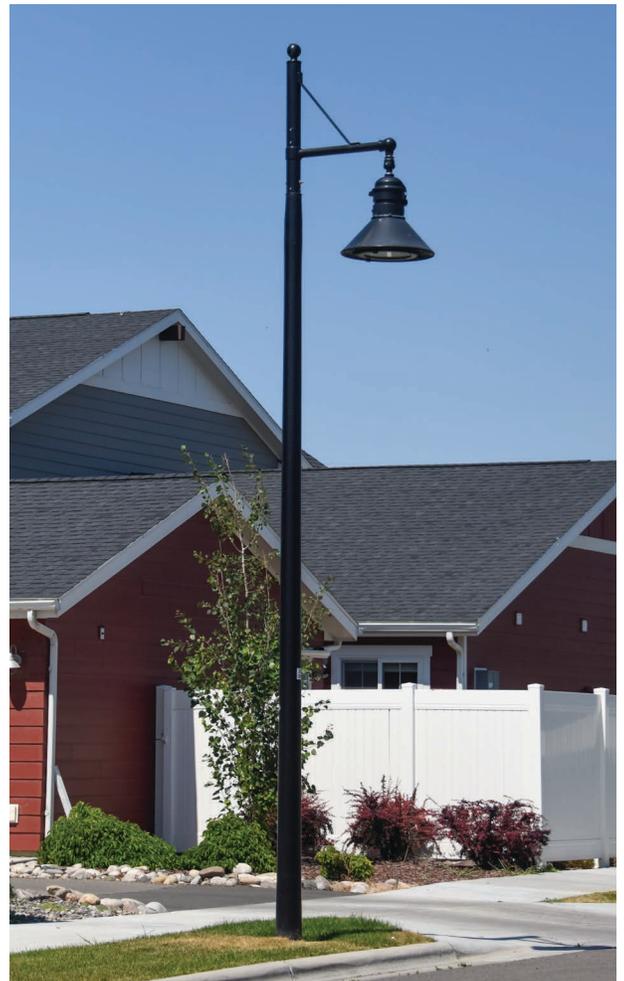
Light Type/HPS wattage Equivalent	LED Code	Distribution Lighting Pattern	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Pendant – 100 W HPS (New Only)	C	Type III	3000 K	42 W	15

LED PENDENT - For new installations only, NorthWestern has the American Electric Lighting GELF2 series pendant. Generally installed only in residential areas. These lights are considered full cut-off, and should meet dark sky friendly requirements. These lights require underground wiring.

EXISTING HPS SPECIALITY PENDANT



LED NEW INSTALLATION PENDANT



MISCELLANEOUS LED LIGHTING (GENERAL NOT USED IN STREET LIGHTING)

LAWN LIGHT

EXISTING HPS LAWN LIGHT – NorthWestern’s existing HPS Lawn Lights are 50-watt HPS, mounted on 8-foot black fiberglass poles, served underground and Light Pattern Type V. Generally only used in residential applications.



LED LAWN LIGHT - Two types of GE LED Lawn Lights are available. LED with standard lenses (not considered full-cut off) and a full cut-off, dark sky friendly LED version with no lenses for communities with lighting ordinances. These lights require underground wiring.

Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Lawn Light - 50 W HPS – Available w/o Refractor (Dark Sky Friendly) OR with lenses	A	Type V	2700 K	26 W	9

EXISTING HPS LAWN LIGHT



LED LAWN LIGHT



UTILITY FLOOD

EXISTING HPS UTILITY FLOOD – NorthWestern’s existing flood lights are 250 & 400-watt HPS or Metal Halide. Used as area lighting in commercial applications, generally mounted on wood poles, and served with overhead wiring. Not generally used for street lighting.

LED UTILITY FLOOD - LED floodlights are available from several manufactures. Floodlights do not meet full-cut off requirements and are not considered dark sky friendly, so some communities do not allow installation.

Light Type/HPS wattage Equivalent	LED Code	Distribution Pattern Type	Correlated Color Temperature (CCT)	LED Watts (W)	LED Monthly kWh Usage Per Light
Utility Flood – 250 W HPS or MH	F	NEMA 6 X 6	3000 K	126 W	44
Utility Flood – 400 W HPS or MH	J	NEMA 6 X 6	3000 K	189 W	66

EXISTING HPS UTILITY FLOOD



LED UTILITY FLOOD



LED LIGHTING PRODUCT HEIGHT COMPARISON FOR UNDERGROUND INSTALLATIONS

Cobra heads

Mounting Heights 25'
29.5' & 34' - Gray Poles

Shoebox

Mounting Height 20', 25' and 30'
Bronze Pole

Pendent

Mounting Height 20'
Bronze Pole

Lexington

Mounting Height 16'
Black Pole

Contemporary

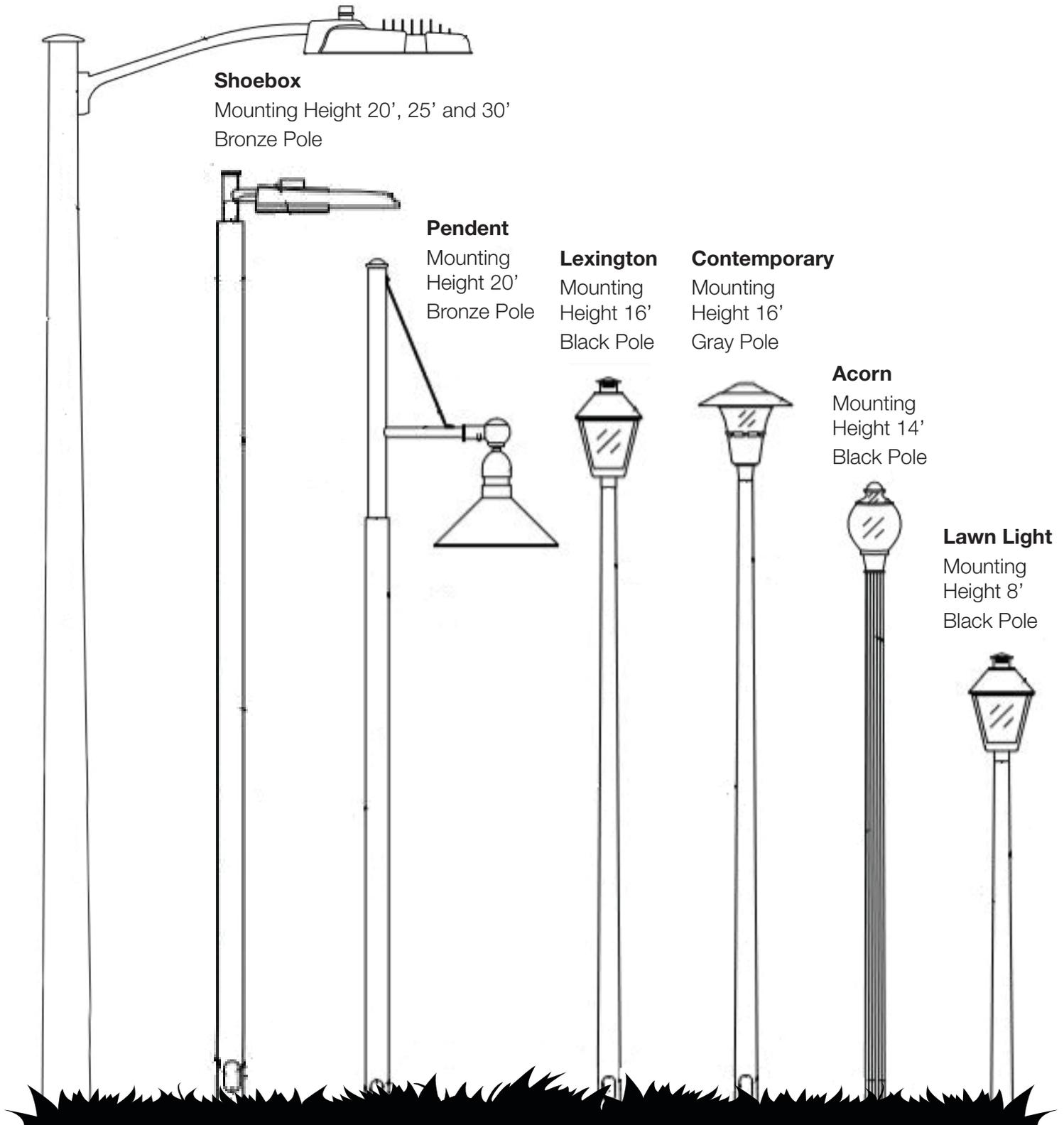
Mounting Height 16'
Gray Pole

Acorn

Mounting Height 14'
Black Pole

Lawn Light

Mounting Height 8'
Black Pole



Commercial
or Residential

Commercial
or Residential

Residential

Residential

Residential

Residential

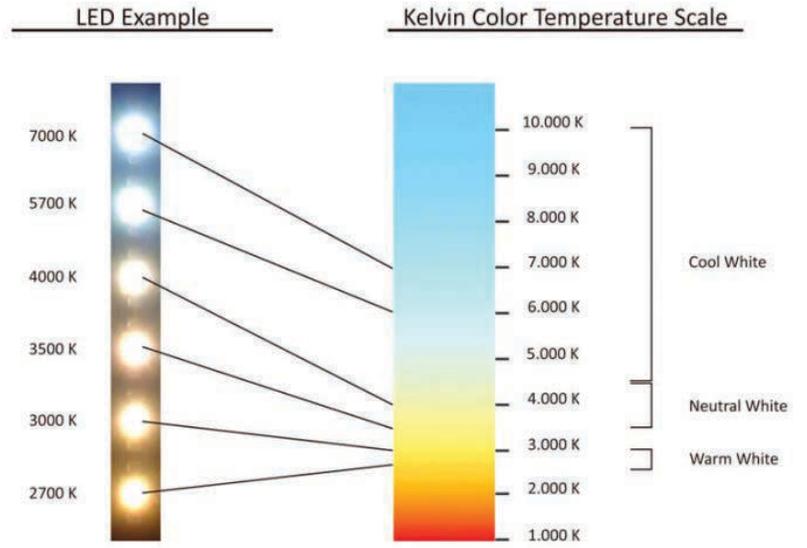
Residential

These drawings are not to scale, but are reflective of height differences between different types of fixtures.

LIGHTING TERMINOLOGY

Correlated Color Temperature (CCT)

-- A measure in degrees Kelvin (°K) on a scale of 1,000 to 10,000 of light's warmness or coolness. Lamps with a CCT of less than 3,200 °K are pinkish and considered warm. Lamps with a CCT greater than 4,000 °K are bluish-white and considered cool. 'Warm' colors appear tinged with yellow and generally feel soft and cozy. Cool colors are tinged with blue and appear whiter. Typically, Kelvin temperatures for commercial and residential lighting applications fall somewhere on a scale from 2000K to 6500K. NorthWestern Energy is specifying 3000K for most LED products other than 2700K for 70 and 100-watt equivalent products.



Cutoff -- Refers to the aiming of light down onto the street or area and reducing of light that is seen from above. Full cutoff refers to streetlights that direct no light above their mounting level or "Zero intensity at or above horizontal 90 degree plane". Non-cutoff refers to streetlights with little or no aiming of light. Semi-cutoff refers to streetlights with a reflector that aims most of the light downward.

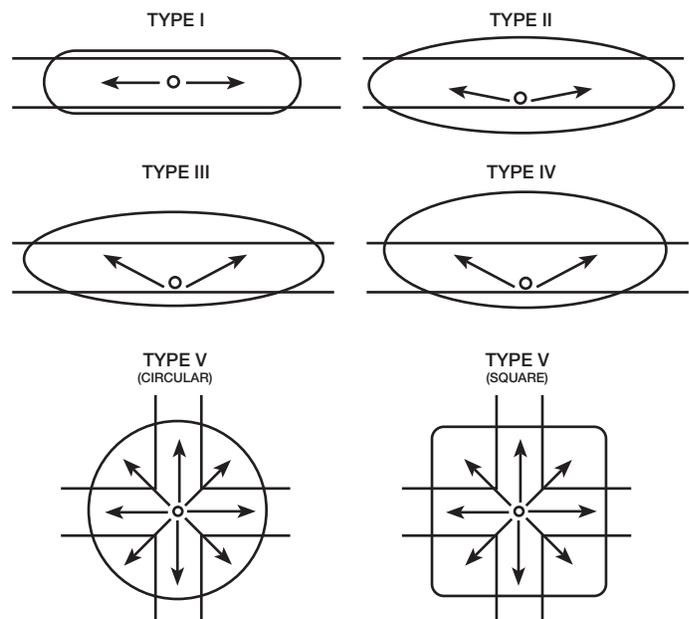
Dark Sky Friendly -- International Dark Sky Associations indicates outdoor lighting fixtures as being Dark Sky Friendly, meaning that they minimize glare while reducing light trespass and sky glow. Products are required to minimize the amount of blue light in the nighttime environment.

Kilowatt-hour (kWh) -- A unit of energy equal one kilowatt (1,000 watts) of power operating for one hour.

LED Code -- NorthWestern lettering system to code the LED wattage equivalent to existing HPS wattage lamps.

Lighting Patterns -- Lighting distributions plays an important role in lighting design and outdoor luminaires have five different patterns for the way the light casts on the ground: Type I, Type II, Type III, Type IV and Type V. Type III and Type V are the most common type of light distribution patterns NorthWestern uses for outdoor lighting.

- Type I light distribution provides very wide illumination intended for narrow walkways and bike paths.
- Type II light distribution is preferable for wider sidewalks and bike paths and narrow roadways.
- Type III is an asymmetric lighting distribution typically used in roadway and parking lot applications. NorthWestern's Standard offering Type III fixtures: Roadway/Cobra head, Shoebox, Acorn and Lexington lights.
- Type IV distribution is the preferred distribution for perimeter and wall mounted outdoor lighting.
- Type V is a symmetric light distribution and typically used for area lighting applications. NorthWestern Standard offering for Type V fixtures: Contemporary, Lawn Light & Yard Light.





Non-Standard Lighting -- Refers to lighting equipment not offered by the utility as a standard lighting fixture style, wattage, or bulb type. By Montana PSC tariffs, non-standard lighting shall be 'customer owned'. ELS-1 Electric Lighting Delivery Service, Special Terms and Conditions Tariff. 6. Special Facilities: The Utility shall install, at its expense, only those facilities, which are deemed necessary to render service in accordance with this Rate Schedule. When Customer requests facilities, which are in addition to, or in substitution of, the standard facilities, which the Utility would normally install, the entire installation shall be installed, owned, operated and maintained by Customer.

Ordinance (Outdoor Lighting) -- A local community or municipality rules or building codes related to outdoor lighting installations on buildings, parking lots, landscaping, signage and street lighting. May require use of 'full cut-off' heads for street lighting and area/yard lighting. Some cities may have additional requirements related to Dark Sky friendly or compliance.

Overhead (OH) -- Outdoor lighting where the service wire to the luminaire is external and strung from pole to pole. Also referred to as External Wiring, where the current-carrying wires emerge from the luminaire and strung through the air from lighting structure to lighting structure.

Underground (UG) -- UG is abbreviation for underground wiring service to lighting units.

LED LIGHTING PRODUCTS GENERAL INFORMATION SUMMARY SHEET

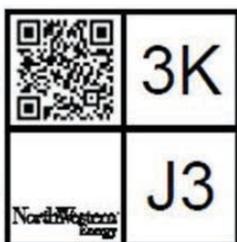
HPS & LED WATTAGE COMPARISONS							ENERGY SAVINGS				
General Fixture Photo*	Light Type	HPS Equivalent Wattage	LED Watts	LED Code	Distribution Pattern Type	Correlated Color Temperature Kelvin	HPS Monthly kWh at 350 hrs/month per Light	LED Monthly kWh at 350 hours/month per Light	Monthly kWh Savings LED over HPS Per Light	Pole Types	Typical Pole Mounting Height
	Cobra – Roadway	70W	32	B	3	2700	29	11	18	Steel, Fiberglass, Wood & Distribution Wood	Mounting Heights 25', 29.5' & 34' (Audits may indicate 25, 30 or 40' poles)
	Cobra – Roadway (Bozeman*)	100W	42	C	2*	2700	41	15	26		
	Cobra – Roadway	100W	42	C	3	2700	41	15	26		
	Cobra – Roadway	200W	93	E	3	3000	80	33	47		
	Cobra – Roadway	250W	126	F	3	3000	99	44	55		
	Cobra – Roadway	400W	189	J	3	3000	162	66	96		
	Shoebbox	100W	42	C	3	2700	41	15	26	Steel (Bronze)	20', 25' & 30'
	Shoebbox	250W	126	F	3	3000	99	44	55		
	Shoebbox	400W	189	J	3	3000	162	66	96		
 With Refractor Dark Sky Friendly	Yard Light – Eaton - with Refractor (Glass)	100W	42	C	5	2700	41	15	26	Wood & Distribution (Occasionally Steel)	
	Yard Light – Eaton - No Refractor (Dark Sky Friendly)	100W	42	C	5	2700	41	15	26		
	Yard Light - GE – with Refractor	100W	42	C	5	2700	41	15	26		
	Acorn (GE Cutoff)	100W	42	C	3	3000	41	15	26	Steel or Fiberglass (Black)	14'
	Acorn (Acuity w/Reflector)	100W	42	C	3	3000	41	15	26		
	King Acorn (StressCrete)	100W	40	C	3	2700	41	15	26		
	Contemporary	100W	50	C	5	2700	41	17	24	Steel or Fiberglass (Gray Pole)	16'
	Contemporary (Dark Sky)	100 W	42	C	5	2700	41	15	26		
	Lexington (with lens)	100W	42	C	3	2700	41	15	26	Fiberglass (Black)	16'
	Lexington (without lens)	100W	42	C	3	2700	41	15	26		
	Pendant (New Installs only)	100W	42	C	3	3000	41	15	26	Steel or Fiberglass (Bronze or Black)	20'

THE FOLLOWING LIGHTS ARE GENERALLY NOT USED AS STREET LIGHTING. FLOOD LIGHTS OCCASIONALLY USED IN ALLEYS AS STREET LIGHTS.

	Lawn Light (standard Offering)	50W	26	A	5	2700	20	9	11	Steel or Fiberglass (Black)	8'
	Lawn Light (Dark Sky No Lens)	50W	26	A	5	2700	20	9	11		
	Utility Flood	250W	126	F	NEMA 6 X 6	3000	99	44	55	Wood, Distribution or Steel	
	Utility Flood	400W	189	J	NEMA 6 X 6	3000	162	66	96		

* 70W & 100W HPS ORDERD IN JANUARY/FEBRUARY WERE ORDERED AS TYPE 2 PATTERN. ORDERS PLACED LATER IN 2020 ARE NOW TYPE 3 PATTERN, EXCEPT FOR IN BOZEMAN AREA THEY WILL BE TYPE 2.

* The photos are general fixture photos, but some dark sky LED products may have a slightly different look.



CORRELATED COLOR TEMPERATURE (CCT)
30K = 3000K

NWE LED CODE / LIGHTING DISTRIBUTION TYPE
J = 400 WATT
HID EQUIVALENT
3 = TYPE III LIGHTING DISTRIBUTION

LED COLOR TEMPERATURE 30K NWE STANDARD 2700 K for Cobrahead 70 W & 100 W HPS equivalent new.

QR CODE - Manufacturer Name, Fixture Type, Actual Wattage, Light Color Temperature, NWE LED Code, Distribution Type

Form 4089 10/23

LED PATTERNS 2, 3 & 5		
Type 2 - ASYMETRIC LIGHTING DISTRIBUTION. Only used in 100W HPS Equivalent LED Cobra heads in certain areas (like Bozeman) with Dark Sky Ordinances.	Type 3 - ASYMETRIC LIGHTING DISTRIBUTION. Typically roadway and parking lot applications. NWE Standard offering Type III fixture:	Type 5 - SYMMETRIC LIGHTING DISTRIBUTION. Typically used for area or yard lighting applications. NWE Standard offering Type V fixtures are:
100W HPS LED Cobrahead	Roadway/Cobrahead	Yard Light
	Shoebbox	Contemporary
	Acorn	Lawn Light
 TYPE II	Lexington  TYPE III	 TYPE V