# TABLE OF CONTENTS

1.0 GENERAL .......................................................................................................................... 1

2.0 ROADWAY LIGHTING WARRANTS .................................................................................. 1

2.1 Freeways and Freeway-Like Facilities (Expressways) With Full Access Control .......................................................................................................................... 2

2.1.1 Interchanges .................................................................................................................. 2

2.1.2 Lineal Sections .............................................................................................................. 2

2.2 Highways Outside City Limits (Non-Freeways) .............................................................. 3

2.2.1 Lineal Sections .............................................................................................................. 3

2.2.2 Intersections .................................................................................................................. 3

2.3 Highways Inside City Limits (Non-Freeways) ................................................................. 3

2.4 Replacement of Existing Lighting .................................................................................... 4

3.0 SPECIAL LIGHTING APPLICATIONS ............................................................................ 4

3.1 Lighting on Signalized Intersections ................................................................................ 4

3.2 Bridge Lighting .................................................................................................................. 4

3.3 Pedestrian and Bicyclist Lighting .................................................................................... 5

3.4 Rest Area or Park-and-Ride Lots ..................................................................................... 5

3.5 Roadway Sign Lighting .................................................................................................... 5

3.6 Temporary Lighting .......................................................................................................... 5

3.7 High Mast Lighting .......................................................................................................... 5

4.0 DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE .................................. 6

4.1 Freeways, Freeway-like Facilities (Expressways) With Full Access Control .................. 6

4.2 Highways Outside City Limits (Non-Freeways) ............................................................. 6

4.3 Highways Inside City Limits (Non-Freeways) ............................................................... 6

5.0 REFERENCES .................................................................................................................. 6
1.0 GENERAL

The Oregon Department of Transportation (ODOT) is generally responsible for providing the design, installation, and maintenance of roadway lighting on the state highway system. Individuals and/or local agencies may request to provide for the design, installation, and maintenance of a lighting system on state highways.

The purpose of the Lighting Policy and Guidelines is to assist in the lighting design of future construction and reconstruction projects on state highways. It is not intended that existing lighting systems be modified as a result of this policy. For detailed design practices, please refer to the Traffic Lighting Design Manual.

This policy draws from several sources, which are documented in the Reference section. The American Association of State Highway and Transportation Officials (AASHTO) provides general lighting policy Roadway Lighting Design Guide (2005) for the national standards. Therefore, the remainder of this policy document will address items not included in the AASHTO guide or provide additional information on included items.

2.0 ROADWAY LIGHTING WARRENTS

ODOT does not use specific lighting warrants to determine whether lighting is to be provided on a project. The decision to install lighting on a project is made after an investigation is conducted. ODOT utilizes engineering judgement of local conditions considering such factors as traffic and crash data, roadway characteristics, and availability of funds, to support lighting installation decisions. AASHTO provides the threshold or minimum conditions of when to consider lighting.

In order to conserve energy while providing necessary lighting for motorist safety, crash rates and geometric layouts are the primary considerations for warranting lighting. Traffic volumes are a supplemental measure in evaluating warrants for lighting. Engineering judgment should be used in instances where an operational or safety concern is not indicated by the crash rate. The type and circumstances of crashes should also be considered in an investigation. The investigation should include consideration of non-motorized modes such as pedestrians and bicyclists safety as well as motor vehicle safety.

For luminaire selection, LED (Light Emitting Diode) luminaires are the preferred choice for improved energy efficiency and low maintenance requirements. LED luminaires are now ODOT standard for new lighting installations on state highways. HPS (High Pressure Sodium) lighting may be installed when the project work replaces and matches the existing lighting system. Detailed specifications for LED luminaires are in the Oregon Standard Specification for Construction (2018) and project specific Special Provisions.
The warranting conditions for specific facility types are described in the following sections. Meeting these warranting conditions does not obligate ODOT to provide lighting nor is it a requirement for installation of lighting in special circumstances.

2.1 **Freeways and Freeway-Like Facilities (Expressways) With Full Access Control**

Highways that are freeway or freeway-like facilities with full access control should consider the following to justify lighting:

2.1.1 **Interchanges**

Lighting will usually be considered in the interchange locations that meet the minimum AASHTO warranting conditions. For those that do, Partial Interchange Lighting is the standard design method on freeways. Additional interchange lighting may be considered with one or more of the following characteristics:

1. Ramps, interchange alignments, or grades are complex or unusual. This includes ramps with substandard deceleration or acceleration lanes.
2. Where high levels of pedestrian or bicyclist activities are present or expected during times of darkness and where pedestrian and bicycle route connections are nearby.
3. Important decision point(s) or existing roadside hazard areas that would not be covered with partial interchange lighting.
4. An operational analysis indicates the need for lighting. Volume and crash data should be used to support the analysis.
5. Where mainline sections have full lineal lighting.
6. Where Roundabouts are installed at highway sections or ramp terminals.

2.1.2 **Lineal Sections**

Lineal lighting may be considered on facilities with one or more of the following characteristics:

2. High traffic-volume sections with vertical or horizontal alignments are such that lighting would be beneficial to drivers and bicyclists at night time.
3. A crash analysis indicates that both 1) at least thirty-percent of crashes occur at night, and 2) the total crash rate for the section exceeds the critical crash rate as defined in the Highway Safety Manual (HSM).
4. A crash analysis indicates a higher than expected frequency of nighttime crashes and the analysis indicates that lighting would be a cost effective measure.
5. There are three or more successive interchanges with Complete Interchange Lighting located one mile or less between adjacent interchanges.

6. Sections adjacent to a developed area where the presence of off-highway lighting affects visibility on the mainline.

7. Where a new pedestrian/bikeway crossing is installed in Expressway.

2.2 Highways Outside City Limits (Non-Freeways)

Highways that are not freeway or freeway-like facilities with full access control must consider the following to justify lighting:

2.2.1 Lineal Sections

Lighting may be considered if a crash analysis indicates that both 1) at least thirty-percent of crashes occur at night, and 2) the total crash rate for the section exceeds the critical crash rate as defined in the Highway Safety Manual (HSM). As an alternative, HSM methods may be used to analyze frequency of night-time crashes for the evaluation and selection process of the project. Also, high-speed high-volume sections with pedestrian/bikeway facilities may be considered for lighting installation.

2.2.2 Intersections

An intersection without traffic signal may be considered for lighting when at least thirty-percent of crashes occur at night and the total crash rate for the section exceeds the critical crash rate, or when crash data show higher-than-usual occurrence of pedestrians/bicyclists involvement at night time. Crash rates for intersections should be calculated on per million entering vehicle basis. Engineering judgment and other factors such as total lighting cost and fund availability should be considered. Also, intersections with high traffic volume or higher levels of pedestrians/bicyclists activity at night time may be considered for lighting installation.

For the signalized intersections, see section 3.1 in this document.

2.3 Highways Inside City Limits (Non-Freeways)

It has been ODOT policy not to provide lighting inside city limits on state highways for new construction. Relocation of existing lighting may be provided by project funding if it is disturbed by the construction. An entire system may, under unusual circumstances, be upgraded.

Providing new lighting is the responsibility of the city or county according to their lighting plans. An exception to this policy is possible if the state is to install traffic signals and joint use of signal and illumination pole is advantageous. Signal design should provide illumination details in signal plans. The energy cost and maintenance are the responsibility of the local agency. When illumination is
installed at intersection, it should be designed to provide lighting for pedestrians crossing as well as vehicle traffic safety.

2.4 Replacement of Existing Lighting

If a lighting system that was designed and installed by ODOT on a state highway is removed because of a road construction project, it should be replaced as a part of the new construction, unless current ODOT Lighting Policy does not support the replacement of the lighting.

3.0 SPECIAL LIGHTING APPLICATIONS

Other lighting needs are identified for the highway user and for those that interact with motorists in and adjacent to the roadway.

3.1 Lighting on Signalized Intersections

When installing new traffic signal poles or replacing all existing signal poles at an intersection on state highways, lighting on signal poles shall be included as a standard practice. This requirement does not intend to require lighting installation on existing signal poles that don’t have lighting and are not being replaced.

When replacing fewer than all signal poles at an intersection, the designer should evaluate lighting condition and use engineering judgement to determine whether lighting is to be added to the replacement poles or not. Additional light poles may be installed for the intersection to meet the recommended light levels.

Luminaire locations and specifics for the intersection lighting on signal poles shall be planned with proper lighting design process and in accordance with the direction of the Region Traffic Manager/Engineer. Approaching highway sections and turning lanes adjacent to the intersection may be considered for additional lighting as necessary.

The designer for the intersection lighting should coordinate with local jurisdiction, if it is within the boundary of local jurisdiction.

3.2 Bridge Lighting

Bridges are investigated for lighting as other lineal highway sections and may be justified for safety reasons. Physical constraints such as narrow travel lanes with no sidewalks and/or frequent nighttime pedestrians/bicyclists may be justification for bridge lighting. If a local jurisdiction wants lighting for historic or aesthetic purposes, they must take the financial responsibilities for its installation, energy cost and maintenance. Aviation and/or navigational warning lights are warranted according to state and federal requirements. Other situations require approval of the State Traffic Engineer.
3.3 **Pedestrian and Bicyclist Lighting**

Pedestrians and bicyclists may benefit from illumination at marked crosswalks, especially where they are at uncontrolled locations. Engineering judgement is used to determine whether or not a crosswalk needs illumination. Consideration should be given to number of lanes, traffic volumes, night time crash history, posted speeds, presence of transit stops and other pedestrian generators.

Generally, pedestrian and multi-use path lighting inside the city limits is the responsibility of the local agency, especially pedestrian scale and ornamental lighting. When lineal lighting is installed on state highways, it should be designed to provide appropriate lighting for pedestrians and bicyclists safety as well as for the vehicles traffic safety.

3.4 **Rest Area or Park-and-Ride Lots**

ODOT policy is to provide recommended illumination for public safety purposes at both rest areas and park-and-ride lots. Chain-up area may also be considered for illumination.

3.5 **Roadway Sign Lighting**

ODOT policy is to use wide angle prismatic legend or sheeting on all over head mounted signs. Sign lighting will only be considered when adverse vertical or horizontal alignment requires its use. When Sign lighting luminaire is installed, the luminaire should be aimed downwards to avoid glares and trespassing.

3.6 **Temporary Lighting**

Construction activities often create conditions on or near the project that are hazardous at night. Engineering judgment should be used when considering temporary lighting. The illumination designer and traffic control designer should jointly determine the need for temporary lighting. In addition, the construction project manager should be consulted about general requirements or special needs of temporary lighting. Temporary lighting should provide appropriate lighting for the movement of pedestrians/bicyclists through construction zones at night time.

3.7 **High Mast Lighting**

The design and installation of High Mast lighting is more complex and presents unique maintenance issues compared to conventional lighting. Illumination design using High Mast lighting will need justification and the designer will need approval from the State Traffic Engineer at the scoping stage of the project development.
4.0 DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

As stated in the introduction, ODOT is generally responsible for providing the design, installation, and maintenance of roadway lighting on the state highway system except the highway sections as stated in section 4.3 in this document. Individuals or local agencies may request to provide for the design, installation, and maintenance of a lighting system on state highways. These functions will be reviewed by ODOT and a permit to occupy or operate on a state highway is required. This section describes the design, construction, operation, and maintenance policy for each facility type.

4.1 Freeways, Freeway-like Facilities (Expressways) with Full Access Control.

ODOT is responsible for the design, contract, inspection, energy cost, and maintenance for warranted lighting on State-owned freeways and expressways.

4.2 Highways Outside City Limits (Non-freeways)

ODOT will ordinarily be responsible for the design, contract, inspection, energy cost and maintenance if ODOT agrees to the necessity of lighting. Cost sharing with other jurisdictions may be negotiated in accordance with the Policy Statement for Cooperative Traffic Control Projects approved by the Oregon Transportation Commission.

4.3 Highways Inside City Limits (Non-freeways)

The city is responsible for the design, contract, inspection, energy cost and maintenance. On exception, ODOT may assume some or all these responsibilities for roadway lighting through an inter-governmental agreement. Cost sharing is determined in accordance with the Policy Statement for Cooperative Traffic Control Projects.

5.0 REFERENCES


Traffic Lighting Design Manual. Oregon Department of Transportation, Salem, OR, (the current edition)


Oregon Revised Statues, Title 59 810.010 "Road Authorities (Jurisdiction)" State of Oregon, 1999 Edition.