

Oregon Department of Transportation

Lighting Policy and Guidelines

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OREGON DEPARTMENT of TRANSPORTATION
HIGHWAY DIVISION
TECHNICAL SERVICES
TRAFFIC MANAGEMENT SECTION
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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 Oregon Transportation Commission has adopted the American Association of State Highway and Transportation Officials (AASHTO) policy *An Informational Guide for Roadway Lighting* (1984) for the state of Oregon. Therefore, the remainder of this policy document will address items not included in the AASHTO guide or provide clarification on included items.

2.0 ROADWAY LIGHTING WARRANTS

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 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 must consider the following to justify lighting:

2.1.1 Interchanges

Lighting will usually not be considered in those locations that do not meet the minimum AASHTO volume warrants. For those that do, partial interchange lighting is the standard design method on freeways. Additional interchange lighting may be considered on facilities 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. High levels of pedestrian or bicycle activities during times of darkness.
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.

2.1.2 Lineal Sections

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

1. Outside or median shoulders of the roadway do not meet standard minimum widths in the AASHTO Policy on Geometric Design of Highways and Streets (2001).
2. Vertical or horizontal alignments are such that lighting may be beneficial to driver safety.
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 is above the statewide average for similar roadway character.
4. There are three or more successive interchanges with full interchange lighting located one mile or less between adjacent interchanges.
5. A significant length of the facility passes through a developed area where the presence of off-highway lighting affects visibility on the mainline.

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 warranted 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 is above the statewide average for similar roadway character.

2.2.2 *Spot Locations*

A spot location may be considered for lighting when at least thirty-percent of crashes occur at night or the ratio of the night crash rate to the day crash rate is at least 1.5 or higher. Crash rates for spot locations should be calculated on per million entering vehicle basis. Engineering judgment and other factors should be considered.

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. An exception to this policy is possible if a city or county wants to illuminate an intersection where the state is to install traffic signals since joint use poles may be advantageous. Signal design provisions should include the required extra pole length and any special fittings on the pole or wiring in the pole required for the luminaire. The luminaire arm, pole extension, luminaire, electrical energy cost, etc. are the financial responsibility of the local agency to furnish, install and maintain.

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 usually will be replaced as a part of the new construction.

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 **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 frequent nighttime pedestrians may be justification for bridge lighting. If a local jurisdiction wants lighting for historic or aesthetic purposes, they must assume the financial responsibilities for its installation, power 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.

3.2 Pedestrian Lighting

Pedestrian lighting for crossing a state highway at night will be investigated on a case-by-case basis. Generally, pedestrian lighting inside the city limits is the responsibility of the local agency, especially pedestrian scale and ornamental lighting.

3.3 Rest Area or Park-and-Ride Lots

ODOT policy is to provide sufficient illumination for public safety purposes at both rest areas and park-and-ride lots.

3.4 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.

3.5 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.

3.6 Tower Lighting

The design and installation of tower (high mast) lighting is more complex and presents unique maintenance issues in comparison to conventional lighting. Tower lighting requires justification and 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. 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. A condition of the permit may document that ODOT is not responsible for the lighting design, installation, maintenance or the electrical service. 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

An Informational Guide for Roadway Lighting. American Association of State Highway and Transportation Officials (AASHTO), Washington D.C., 1984.

American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets*, Washington, D.C., 2001.

Traffic Lighting Design Manual. Oregon Department of Transportation, Salem, OR, November 2002

Walton, NE., *Roadway Lighting Handbook*, Report IP 78-15, Federal Highway Administration, U.S.D.O.T., Washington D.C, December 1978.

Janoff, MS., Freedman, M, Decina, LE., *Partial Lighting of Interchanges*, NCHRP Report 256, Transportation Research Board, Washington D.C., December 1982.

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

Policy Statement for Cooperative Traffic Control Projects. Oregon Department of Transportation, Traffic Management Section, Salem, OR, June 2002.