Oregon Department of Transportation
and
Oregon Traffic Control Devices Committee

Red Light Running (RLR) Camera Guidelines
For State Highways

2015

OREGON DEPARTMENT of TRANSPORTATION
TRANSPORTATION OPERATIONS DIVISION
TECHNICAL SERVICES
TRAFFIC MANAGEMENT SECTION
http://www.odot.state.or.us/traffic
-RLR Camera Guidelines 2015
Approved by the State Traffic-Roadway Engineer, in consultation with the Oregon Traffic Control Devices Committee for use on State Highways and adopted by the Oregon Traffic Control Devices Committee as a guide to assist Oregon cities in the deployment of Red Light Running (RLR) Cameras.

Bob Pappe
State Traffic-Roadway Engineer
March, 2015
Major Revisions included in this version:

1. Revised Legislative Report requirement from “Regular Session” to “Odd-numbered year” to reflect legislative change in 2013.

Major Revisions included in previous versions:

1. New bullets in the Crash History requirements for the Safety and Operations Report
2. New Section- Future Changes to the Intersection
3. Various Changes in the section Procedure for State Highways to clarify the procedure
4. New section - Removal Procedure for Red Light Running Cameras
5. New Section – Conditions of Approval
6. New Appendix with web link to the Red Light Running Toolbox
7. Removed the requirement that the Oregon Department of Transportation provide an executive summary of evaluations of the systems to the Oregon Legislature.
8. Added a requirement that each city that operates cameras present an evaluation of the use and administration of the cameras to the Oregon Legislature.
Red Light Running (RLR) Camera Guidelines

TOPIC........................................................................PAGE
Introduction...............................................................................................................................1
Supporting Legislation ........................................................................................................1
RLR Camera System Justification ......................................................................................1
RLR Camera System Implementation .................................................................................2
Public Information Campaign and Sign Requirements .....................................................2
Operational Considerations ...............................................................................................3
Site Considerations ...........................................................................................................3
Safety and Operations Report ............................................................................................4
  • Crash History
  • Safety Concerns
  • Design, Operations, and Maintenance Issues
  • Public Information Campaign
  • Budget
  • PE Certification
Future Changes to the Intersection ..................................................................................5
Approval Procedure for State Highways ..........................................................................6
Removal Procedure for State Highways ............................................................................8
RLR Camera Enforcement Installation Checklists .........................................................10
  • Non-State Highway
  • State Highway
Conditions of Approval ......................................................................................................12
Appendix A Red Light Running Toolbox .........................................................................13
Red Light Running (RLR) Camera Guidelines

Introduction

This document has been prepared by the Oregon Department of Transportation (ODOT) and the Oregon Traffic Control Devices Committee (OTCDC) to assist local jurisdictions in the deployment of Red Light Running (RLR) Cameras on State Highways. Local jurisdictions should follow this guidance for installation of RLR cameras off state highways or develop their own guidance for application.

Supporting Legislation

In response to what appeared to be a growing disrespect for traffic laws in general and disobeying red traffic signal indications in particular, the Oregon Legislature enacted a law in 1999 to help Oregon communities effectively enforce and reduce red light running. The law was revised and expanded several times since. These guidelines are based on Oregon Revised Statutes (ORS) 810.434 through 810.436. The Oregon legislature last revised ORS 810.434 and 810.436 in 2013.

RLR Camera System Justification

In 2007 almost 900 people were killed and an estimated 153,000 were injured in crashes that involved red light running in the US. About half of the deaths in red light running crashes are pedestrians and occupants in other vehicles who are hit by the red light runners. Studies have reported that red light cameras reduce angle and turning crashes, but can increase rear-end crashes. Because the types of crashes prevented by red light cameras tend to be more severe than rear-end crashes, research has shown there is also a reduction in the severity of crashes.

The Highway Safety Manual (published by AASHTO) quantifies the expected crash reductions of different measures. These measures are only included if there is known statistical stability and reliability. The Highway Safety Manual\(^1\) lists the expected crash effects for installation of red-light cameras as a 26 percent crash reduction in right-angle and left-turn crashes and an 18 percent increase in rear-end crashes.

RLR Cameras are not a panacea for intersection safety problems and should be installed only after other means have failed to solve the problems (see appendix A - RLR Toolbox). RLR Cameras have the potential to reduce the number and severity of crashes, but because of the concern for increasing rear-end crashes, RLR Cameras should be installed only where a crash problem within the last 5 years can be documented. When used, they should be a part of a process that considers education, enforcement and engineering, which are essential to any traffic safety program. Enhanced traffic safety is the principal aim of RLR Camera enforcement programs.

The following are means of improving intersection safety prior to RLR Cameras the jurisdiction should consider:

1. Proper sight distance;
2. Speed zones are consistent with engineering practice;
3. The number, size and location of vehicle heads are consistent with the MUTCD and ODOT’s “Traffic Signal Policy and Guidelines”;
4. Proper yellow change and red clearance intervals are consistent with ODOT’s “Traffic Signal Policy and Guidelines” or other jurisdiction’s adopted policy;
5. Corridor progression timing does not contribute to red light running;
6. Enforcement “tattle-tale” lights; and
7. The traffic signal timing is consistent with traffic volume, speed and specific intersection design elements.

**RLR Camera System Implementation**

RLR Cameras monitor both the flow of traffic at the stop location and the condition (or color) of the traffic signal indication on the approach. Special detectors, commonly loops cut into the pavement, check for the passage of vehicles into the intersection and if the traffic signal phase condition is red, cause pole mounted cameras to record pictures of the vehicle position, license plate and driver. Upon verification by a police officer, the vehicle owner is issued a citation through the mail. RLR Camera systems should differentiate between vehicles running a red light and those vehicles stopping slightly beyond the stop bar or those vehicles, after stopping, making a legal turn against a red indication.

Typically RLR Camera Systems are installed under contract, by a commercial firm that specializes in such systems. These contracts cover the furnishing, installation and operation of the RLR Cameras. The firm may also prepare the evidence for verification by local law enforcement and mail the citation. As compensation, the firm usually collects a predetermined fee for this service when the citation fine is received.

Costs that the local jurisdiction must cover include internal expenses for engineering plan review, site evaluation and field engineering during the installation phase of the RLR Camera System. Local jurisdictions also can purchase, install and operate RLR Camera Systems or can enter into agreements with other jurisdictions to provide all or a portion of this service.

**If the candidate location is at a state highway intersection or on a state highway approach, application to and approval of the Oregon Department of Transportation is required.**
Public Information Campaign and Sign Requirements

Oregon Law requires that cities provide a public information campaign to inform local drivers about the use of RLR Cameras before citations are actually issued. Educating the public is a critical step in reducing red light running. In order to effectively change poor driving habits, drivers must be made aware that RLR Cameras are in use. It is recommended that cities hold well-publicized kickoff events and issue periodic press releases about the effectiveness of RLR Camera enforcement within their jurisdictions.

Oregon law also requires that signs be posted, so far as practicable, on all major routes entering the jurisdiction indicating that compliance with traffic control devices is enforced through cameras. The law further requires that signs indicating that a camera may be in operation be posted near each intersection where a camera is installed.

Signs should be of appropriate size so as to be easily readable at the posted speed. Signs should be placed in such a manner that the motorist can easily see them, without undue visual clutter or obstruction.

Operational Considerations

- RLR Cameras shall not affect the display or the operation of the traffic signal.
- Power for RLR Camera equipment may be provided from the traffic signal cabinet and should be on its own clearly identified circuit breaker.
- Contact closures, as may be required for red and yellow indications on RLR Camera approaches, should be electrically isolated from traffic signal equipment.
- Detection loops for RLR camera equipment should not be wired through the traffic signal cabinet, associated electrical conduit, or junction boxes and shall not interfere with the operation of detector loops used for traffic signal operation. At state highway intersections, segregated wiring is required.
- Traffic signal timing changes shall not be made to increase the possibility of vehicles running red lights. If a review of traffic signal timing prior to RLR Camera installation identifies inappropriate yellow change and red clearance interval values that require adjustment, these adjustments shall be made prior to operation of the RLR Camera system.
- Traffic signal timing changes may be made in response to substantial changes in approach speed, significant changes to traffic patterns, routine timing reviews, design changes, etc.
- Plans showing the location of all proposed and existing equipment shall be prepared.
- Signs at each City Limit, informing the public that compliance with traffic control devices is enforced through the use of cameras, shall be provided if not already in place. A RLR Camera sign on each covered approach shall be installed and should be shown on or as an attachment to the signal plans. Refer to the Manual on Uniform Traffic Control Devices and the Oregon Adopted Supplements for guidance on signs that should be posted.
Site Considerations

RLR Cameras may not be appropriate at locations where:
- Recent geometric or traffic signal design changes have been made. Supporting crash records may not be applicable in the new configuration.
- Traffic signals have been installed within the previous year. Crash history may be too short to support RLR Camera use.
- Geometric or traffic signal design changes are scheduled and an engineering evaluation indicates such changes may substantially alter the need for RLR Camera enforcement.
- Road or utility work is anticipated during the first year of RLR operation.
- Traffic pattern changes resulting from development, construction detours or similar events are anticipated during the first year of RLR operation.
- An electrical interconnect with “railroad active warning devices” is provided on the approach.
- Design, operation or maintenance is inconsistent with state or local standards and practices.

Safety and Operations Report

A Safety and Operations Report is required for all RLR Camera Systems to be installed at intersections on state highways and is strongly recommended for all other locations since it can provide the basis for the process and outcome evaluation required in ORS 810.434(3)(b). It may be desirable to secure the services of a Professional Engineer to conduct the necessary study.

In addition to a general project narrative, the Safety and Operations Report should address to the extent practical the following:

Crash History - An engineering study of the crash experience at the intersection should be conducted.
- Target crashes for reduction at a RLR installation are angle crashes where the driver of one of the vehicles disregarded the traffic control device. Oregon crash records include codes for driver error and crash cause that describe these crashes (code for Participant Error code 020: "DISREGARDED TRAFFIC SIGNAL” and Crash Cause code 04: “DISREGARDED R-A-G TRAFFIC SIGNAL”).
- Target crashes coded to driver attention may also be included in the study.
- The study should identify the relative crash problem of the intersection and each approach or movement of the intersection based on nearby intersections of similar volume, geometry, and traffic control.
- The study shall identify the approaches and movements to the intersections the applicant is requesting to be monitored by a RLR camera.
- Approaches should be those that have target crashes identified.
- Right turn approaches may have a high rate of violation but typically result in low severity or low crash occurrence and should not be included unless there is associated evidence of a significant crash history of high severity.
Safety Concerns - Documentation detailing other safety concerns may be included in the report. Concerns may be supported by any of the following (or other relevant data):

- Traffic citation data
- Complaints
- Enforcement observations
- Speeds, traffic volumes and grades
- Traffic signal spacing
- Proximity to freeway or expressway ramp terminals

Design, Operations, and Maintenance Issues – Copies of signal plans showing the location of all proposed and existing equipment should be included. A description of how the RLR Camera System will be operated and maintained should be provided. Any design, operations, or maintenance issues that could affect the potential effectiveness of a RLR Camera System should be identified.

Public Information Campaign – The public information requirements as outlined in ORS 810.434 (3)(a) should be addressed.

Budget – A budget for system implementation and operation should be developed.

PE Certification – The jurisdiction proposing to install a RLR Camera System should secure the services of a Professional Engineer (PE) to attest that the traffic signal is operated and maintained in accordance with the MUTCD and appropriate state and local guidelines. This certification should be made available to the enforcing jurisdiction.

**Future Changes to the Intersection**

While every effort should be made to determine appropriate modifications and changes to the signal system prior to the installation of RLR cameras, land use and traffic patterns may change over time. Such changes may require a road authority to make changes to the signal system that may impact the operations of the RLR Cameras equipment. At no time shall the presence of RLR cameras obstruct an agency from making necessary changes to improve the safety of the driving public or the operation of the traffic signal.

When problems affecting the safety of the public arise (whether part of the signal system or are attributed to the operation of the RLR cameras) and traffic solutions to improve geometry, remove or add lanes or change the operational characteristics of the signal system are identified, the RLR camera operations and the associated costs of changing the RLR cameras shall not be taken into account as the reason for not making such changes. Any changes to the RLR cameras and associated costs shall be the responsibility of the commercial firm under contract for operation of the RLR cameras and the jurisdiction overseeing the operation of the RLR camera system, depending on their agreements.
Biennial Report Requirement

Oregon Law requires that once each biennium all cities using RLR Camera Systems must conduct a process and outcome evaluation that includes:

- The effect of the use of cameras on traffic safety
- The degree of public acceptance of the use of cameras
- The process of administration of the use of cameras

Regardless of the jurisdiction in the position of road authority, the jurisdiction overseeing the operation of a RLR Camera System shall prepare the Biennial Report and submit the report by March 1st of the year of each regular session to the Legislative Assembly. The Biennial Report should include the following information:

- Name, address, and phone number of person who will be the main RLR contact for this jurisdiction.
- Date of implementation.
- Number of intersections at which RLR Cameras are installed.
- RLR contractor name.
- Crash data specific to RLR locations for the 3-year period prior to RLR Camera installation and post RLR camera installation data to identify average crash rate and annual change.
- Public information surveys (if available) regarding jurisdiction's use of RLR Cameras.
- Copies of media releases sent as a part of the public RLR awareness program.
- Description of areas of concern or difficulty in administering the RLR Camera enforcement program.
- Available information on the local courts ability to handle the increase in citations.
- “Success stories" to share with the legislature about local RLR program such as major reductions in serious injuries and fatalities in the local jurisdiction due to RLR Camera systems.

Each city that operates a camera system is responsible for presenting a report to the Legislative Assembly by March 1st of the odd-numbered year.

Approval Procedure for State Highways

State Traffic-Roadway Engineer approval is required for RLR Camera installation and operation at all State-owned intersections regardless of operation or maintenance responsibilities. The following procedure should be followed:

- The Applicant:
  - Submits letter to ODOT Region requesting authorization to install and operate a RLR Camera at a specific State-owned intersection and specific movements monitored.
  - The letter shall identify a responsible party to whom an ODOT permit will be issued and the point of contact responsible for the construction, operation, and public information requirements.
  - The letter shall be accompanied by:
2. A statement of consistency with the Operational Considerations.
3. A statement of agreement with the Conditions of Approval

- **Region Traffic:**
  - Reviews RLR design and supporting documents and works with applicant to ensure the RLR Camera Enforcement Installation Checklist (see page 11) is complete.
  - If supportive of the proposal, prepares all documents for the State Traffic-Roadway Engineer with a recommendation to approve.
  - Receives State Traffic-Roadway Engineer response of approval or denial of the RLR camera and any conditions.
  - Leads development of an Intergovernmental Agreement (IGA), laying out terms of agreement as to the responsibilities and obligations of each jurisdiction for the RLR camera.

- **The District Office:**
  - Establishes an account number through ODOT Financial Services identifying responsible party and budget in an Order to Render Service.
  - Establishes the amount of deposit to be paid by the applicant. If cost are more than the deposit the applicant will charged for the additional cost, if less then reimbursed.
  - Issues Miscellaneous Permit to applicant stating conditions of approval. Conditions include the need for State Traffic-Roadway Engineer approval.

- **The Applicant:**
  - Signs the permit, acknowledging the conditions of approval.
  - Agrees to pay for all actual costs incurred by ODOT relating to the installation, inspection, or repair, and any incidental costs.
  - Pays a monetary deposit as determined by the District office. Below are examples of typical costs and services:
    1. Plan review by the Traffic-Roadway Section estimated between $200 and $1000 per RLR Camera installation.
    2. Traffic signal cabinet and intersection modifications required to protect ODOT equipment and provide proper communication to RLR equipment estimated at $1000 per intersection.
    3. Sign installation estimated at $200 per sign, $600 for sign and post.
    4. Relocation or repair of existing traffic control devices resulting from the installation of RLR equipment (costs are based on time and materials plus any damages).
    5. Inspection of installation estimated between $200 and $1000.

- **The District Office:**
  - Upon receipt of signed permit and deposit, forwards plans and supporting documents to the Region Traffic Manager.
  - Notify the Electrical Crew responsible for the traffic signal and arranges for inspections of permit work.

State Traffic-Roadway Engineer approval will be based on review of supporting documents and completion of final, ODOT approved plans and may stipulate further conditions of approval. The State Traffic-Roadway Engineer will specify which movements are approved to receive RLR Cameras.
Removal Procedure for State Highways

When considering removal of a RLR camera, a study should be performed to determine if the RLR Camera should be removed or remain. A RLR camera may be ordered removed by the State Traffic-Roadway Engineer for an intersection or a particular approach to an intersection or a particular movement at an intersection.

If for instance the study shows there is little or no reduction in the number, severity or targeted crashes (i.e., angle crashes) or if similar results can be obtained from engineering countermeasures such as improving sight distance, conspicuity of the signal heads, signal timing or installation of “tattle tale” lights the Region Traffic Engineer may recommend removal to the State Traffic-Roadway Engineer.

Intersections where engineering or geometric improvements are proposed may require study of the new intersection geometry and may result in a request to remove RLR camera equipment. The study may include a determination of changes in conflicts, phasing changes to traffic signals, addition of turn lanes or diversions of traffic patterns that change the operations of the traffic signal.

The following procedure should be followed when considering removal of RLR cameras:

- ODOT Region Traffic shall conduct a study.
  - The study shall determine the safety effectiveness of the RLR camera at reducing crashes, severity of crashes and/or types of crashes (especially as they relate to angle crashes vs. rear-end crashes).
  - The study shall recommend continued operation of the camera, removal of the camera and/or modifications to the operation of the camera or intersection.
  - Other safety concerns such as changes in violations and compliance rates may be considered but are not the primary measure of safety.
  - The study shall also consider the extent to which other countermeasures had been implemented prior to implementation of the RLR cameras or proposed changes to the intersection.
  - Other considerations may include traffic volumes and delay, unusual or unique geometry, signal timing, operation and cycle lengths, driver behavior, and other engineering countermeasures to improve safety.
  - The study shall include any proposed changes to the intersection such as engineering or geometric improvements that reduce or eliminate conflicts or change the operations of the traffic signal.

- If the recommendation is to remove the RLR Camera, ODOT should work together with the Jurisdiction responsible for the RLR cameras to come to agreement for how to proceed with the recommendations of the study.

- Additional input may include the public and/or enforcement to determine support or opposition to the removal.

- Whether or not an agreement can be reached, ODOT Region Traffic will submit a recommendation to the State Traffic-Roadway Engineer along with the study.

- The Jurisdiction responsible for the RLR camera may submit a recommendation with supporting
documentation to the State Traffic-Roadway Engineer.

- The State Traffic-Roadway Engineer decisions will be based on review of the study, the recommendations submitted and any other input received.

- The State Traffic-Roadway Engineer may hold a meeting of interested parties to go over the issues.

The State Traffic-Roadway Engineer may approve removal of the RLR Camera, may approve the RLR camera remaining, and/or require engineering countermeasures or other changes to the intersection or roadway or cameras. The State Traffic-Roadway Engineer’s decision is final and will be based primarily on safety.

Upon request of the jurisdiction responsible for the RLR Camera the State Traffic-Roadway Engineer may approve removal of the RLR Camera without study of the intersection. Typically this occurs under special conditions such as the vendor of the equipment goes out of business, a political entity passes an ordinance to remove the RLR Camera or other circumstances as determined by the State Traffic-Roadway Engineer.
RLR Camera Enforcement Installation Checklist
Non-State Highway

Location Information

File Code: ___________________
Acct. No.: ___________________

Street Name: _____________________________________________

Intersecting Street: _________________________________________

RLR Camera Approaches: _______________________________________

☐ Traffic safety need based on crash history and safety concerns has been documented.
☐ A public information contact has been identified.

Contact Name: _____________________________________________ Email: ___________________
Address: _____________________________________________ Telephone: ___________________

☐ Location approaches and movements have been clearly identified.

☐ Traffic signal indications on the approach are clearly visible from an adequate distance based on field observation. Current MUTCD signal visibility standards are met.

☐ Yellow change and red clearance intervals are displayed for at least the recommended time.

☐ No significant improvement (project) is scheduled or planned that would substantially alter the need for a RLR Camera.

☐ Signs indicating that compliance with traffic control devices is enforced through cameras are posted (or will be provided by this project) on all major routes entering the jurisdiction.

☐ Signs indicating that a camera may be in operation will be posted on all approaches where a camera is to be installed.

☐ No known reason why a RLR Camera should not be installed.

Checklist completed by: ___________________________ Date: ___________________________
RLR Camera Enforcement Installation Checklist  
State Highway

Location Information

File Code: ________________  
TSSU Location ID: _______ Region: ______ District: ______ Acct. No.: ________________

Street Name: ________________________________________________________________

Intersecting Street: ___________________________________________________________

RLR Camera Approaches: _______________________________________________________

Applicant (City/County): _______________________________________________________  
☐ Local jurisdiction has documented traffic safety need based on crash history, and safety concerns.

☐ A local jurisdiction point-of-contact has been identified.

Contact Name: __________________________ Email: __________________________
Address: ______________________________ Telephone: _______________________

☐ Location and approaches have been clearly identified.

☐ Traffic signal indications on the approach are clearly visible from an adequate distance based on field observation. Current MUTCD signal visibility standards are met.

☐ Yellow change and red clearance intervals are displayed for at least the recommended time.

☐ Existing traffic signal coordination with adjacent traffic signals is in place and properly timed.

☐ No significant improvement (project) is scheduled or planned that would substantially alter the need for a RLR Camera.

☐ Signs indicating that compliance with traffic control devices is enforced through cameras are posted (or will be provided by this project) on all major routes entering the jurisdiction.

☐ Signs indicating that a camera may be in operation will be posted on all approaches where a camera is to be installed.

☐ No known reason why a RLR Camera should not be installed.

Checklist completed by: ______________________________ Date: ______________________
Conditions of Approval

The applicant agrees:

1. The cost of any required changes to the RLR camera equipment as a result of changes or modifications to the intersection, regardless of who implements the changes, shall be the responsibility of the applicant and/or any commercial firm under contract for operation of the RLR cameras.

2. When problems affecting the safety of the public arise whether part of the signal system or the RLR cameras, ODOT has the discretion to modify geometry, remove or add traffic lanes or change the operating characteristics of the intersections to protect the safety of the public, up to and including the ordering of the removal of the RLR camera systems or the removal of cameras for particular movements.

3. When ODOT desires to modify an intersection with a RLR camera to improve operations or safety it may do so without consideration to the cost of changes to the RLR camera system or impact to revenue generation on RLR camera system or agreements between the applicant and any commercial firm operating the camera system. ODOT shall not be subject to any costs for changes, modifications, or removals of the RLR camera system.

4. Applicant shall make available to ODOT all reasonable requests for records concerning the operations of the RLR cameras and the intersection, including but not limited to, number of violations by particular cameras or movements, total violations, distribution of violations, percentages of violations within specific time periods, crash records and/or operating parameters of the RLR camera.

5. Applicant shall ensure that signs at each City Limit, informing the public that compliance with traffic control devices is enforced through the use of cameras, are provided if not already in place. A RLR Camera sign on each covered approach shall be provided and shown on or as an attachment to the signal plans.

6. Applicant shall ensure a method for ODOT staff to turn off the camera system to perform routine maintenance of the signal system, including cabinet or controller replacement or timing changes.

7. Failure to comply with any of the conditions of approval listed herein or stipulated by the State Traffic-Roadway Engineer shall be sufficient reason for the State Traffic-Roadway Engineer to order removal of the RLR camera system.
Appendix A – Red Light Running Toolbox

See the following website: