Oregon Department of Transportation

TRAFFIC MANUAL

Traffic-Roadway Section | Delivery & Operations Division

March 2020 Edition

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Oregon Department of Transportation

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Preface

The Traffic Manual provides guidance on traffic engineering policies, establishes uniform methods and procedures, and communicates vital information about traffic engineering and operations on state highways. The intent is to support ODOT's mission of providing a safe and reliable multimodal transportation system that connects people and helps Oregon's communities and economy thrive. The Traffic-Roadway Section publishes the Traffic Manual under the authority delegated to the State Traffic-Roadway Engineer under Delegation Order EB-06.

This edition supersedes previous editions of the Traffic Manual effective **March 1, 2020**. New content presented in this edition does not imply that existing ODOT facilities, including but not limited to traffic control devices, are unsafe, nor does it mandate the initiation of improvement projects unless otherwise specified.

The Traffic Manual supports and complements the application of sound engineering judgement by transportation professionals. The intended audience of the Traffic Manual is transportation professionals practicing traffic engineering on Oregon state highways.

The Traffic Manual refers to subject-specific ODOT publications when appropriate instead of duplicating information. The Traffic Manual does not contain roadway design policies and practices; see the Highway Design Manual for that information.

The State Traffic Investigations Engineer maintains the Traffic Manual. Send comments or questions on this document to eric.s.leaming@odot.state.or.us, or

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Preface

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Introduction

Organization

See **Table 1** for general organization of the Traffic Manual.

Table 1: Traffic Manual Organization

Part	Category	Example Sections
100	General Procedures, Authorities, and Concepts	Delegated Authority, Traffic Manual Updates
200	Safety	Crash Analysis, Safety Corridors, Sight Distance
300	Traffic Control Devices & Features	MUTCD, Interim Approvals, Signs, Markings
400	Intersection Traffic Control & Operations	Intersection Control Evaluation, STOP Signs
500	Other Traffic Operations	Speed-Related Features, Parking, Road Closures
600	Miscellaneous	Legislature, Naming Highway Facilities
Appendices	Appendices	Publications, ODOT Traffic Engineering Structure

Individual sections use a format adapted from NCHRP Report 600. This layout provides a consistent display of information in a concise manner. Some sections build on the information contained in other sections in order to keep information focused and brief for the benefit of the reader and reduce redundancy. A cross reference subsection is included, where needed, listing other topics that the current section is related to.

Main elements include:

Subject Heading

The main topic of the section is at the top of each page.

Introduction

Briefly introduces the subject, including definitions of terms needed to understand the section's content.

Standards & Guidelines

This subsection gives the standards, guidelines, and/or options for the subject using the verbs "shall," "should," and "may." This subsection also typically refers to other ODOT publications that contain standards or guidelines on the subject.

Process & Required Approvals

This subsection lists any needed approvals and processes related to the subject. This includes any State Traffic-Roadway Engineer approvals or Region Traffic Engineer approvals.

Special Considerations

This subsection presents special considerations associated with the subject, if needed. If approvals are required related to the subject, this subsection will include items typically addressed in the engineering investigation for that approval process. These special considerations may include design goals from the perspective of other disciplines (e.g. signal, signing, roadway, etc.), interactions with other subjects, special difficulties associated with the subject's conceptualization or measurement, or special performance implications associated with the subject.

Support

This subsection briefly summarizes the rationale behind the Standards and Guidelines and other information in the section. In particular, the support subsection explains the logic, premises, assumptions, and related literature associated with development of the section. The focus is on information relevant to the subject. The support subsection can take many forms, including a brief review of applicable literature, references to traditional design practice, or an analysis of relevant information.

The support subsection primarily helps readers understand, explain, and justify the Standards and Guidelines. Also, because sections are expected to be revised as national standards are revised and as additional research results become available, this subsection will be useful in future revisions of the Traffic Manual. In particular, the support subsection helps future developers determine how new information can or should be integrated into the Traffic Manual.

The support subsection is for information only and does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition.

Cross References

This subsection lists the subject titles and section numbers of other sections within the Traffic Manual that are relevant to the subject.

Key References

This subsection lists the references cited in the section. Each of these references have an assigned reference number used to note it within the section. The appendix includes a complete list of all references used in the Traffic Manual.

Section Management

This subsection is a table at the end of the section listing key file codes from the ODOT Standard Filing System Manual, when the Traffic-Roadway Section last updated or validated the section, and brief notes related to an update or validation.

Definitions

Appendix I includes definitions of terms used in the Traffic Manual

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State Traffic-Roadway Engineer 100.0

The Oregon Transportation Commission has delegated the authority to approve installation of traffic control devices on state highways to the State Traffic-Roadway Engineer through OAR 734-020-0410. The Chief Engineer has also delegated authority to the State Traffic-Roadway Engineer through Delegation Order EB-06 to 1) approve and implement traffic and roadway design standards for state highways and 2) implement standards for traffic control devices.

Due to the scope of these responsibilities, the State Traffic-Roadway Engineer might consult with various individuals or groups to provide expert or professional advice on a matter before making a final decision.

Standards & Guidelines

01 Devices and features listed in **Table 100.0-A** shall have State Traffic-Roadway Engineer approval to be installed on the State Highway System unless otherwise specified.

02 The State Traffic-Roadway Engineer retains the authority to require modifications to any traffic control device on the State Highway System, including traffic signals, when deemed necessary for the safety of road users.

03 In the event there are conflicting approvals from the State Traffic-Roadway Engineer, the most recent approval shall take precedence.

Process & Required Approvals

Requests for State Traffic-Roadway Engineer approval follow this process:

1. The project team provides supporting information and justification to the Region Traffic Engineer for review.
2. The Region Traffic Engineer sends a request with supporting information and recommendations (via a request form) to the State Traffic-Roadway Engineer.
3. Traffic-Roadway Section staff reviews the request and makes recommendations to the State Traffic-Roadway Engineer.
4. The State Traffic-Roadway Engineer makes a decision on the request.
5. The Traffic-Roadway Section files documents related to the request in FileNet.

The Traffic-Roadway Section's goal is to acknowledge receiving the request within three business days of receiving the request and resolve the request or respond with questions within 10 business days. Time to resolve a request depends on how complex the request is, how complete the supporting documentation is, how many other requests are in the queue, and the current workload of Traffic-Roadway Section staff.

New approval letters have a unique approval number and are stored in FileNet.

Table 100.0-A: Devices & Features Requiring STRE Approval

#	Subject	Device or Feature	Details of Approval Requirements
S01-01	General	Fixed Photo Radar Camera Installations	Section 500.4
S01-02	General	Freeway Median Crossovers	Section 510.0
S01-03	General	Permanently installed gates for temporary road closures.	Includes gates for weather/event closures. Includes manually controlled gates and ITS gates. Does not include railroad gates.
S02-01	Crosswalks	Crosswalk Closure or opening an officially closed crosswalk	Section 310.8
S02-02	Crosswalks	Marked Crosswalks across Uncontrolled Approaches on State Highways	Sections 310.0-310.8
S02-03	Crosswalks	Pedestrian Hybrid Beacons	Section 310.6
S02-04	Crosswalks	School Crossings and School Zones	Section 310.4, 500.3
S02-05	Crosswalks	Textured/Colored Crosswalks	Section 310.7
S03-01	Illumination	Bridge lighting for beautification	Lighting Policy & Guidelines (*1*)
S03-02	Illumination	Bridge lighting on linear sections	Lighting Policy & Guidelines (*1*)
S03-03	Illumination	Use of High Mast Lighting	Lighting Policy & Guidelines (*1*)
S03-04	Illumination	Deviations from standards/policies in Illumination Policy & Guidelines	Section 311.0
S04-01	ITS	Highway Advisory Radio signs	Section 302.3
S04-02	ITS	Public Service Announcements on VMS	Section 302.1
S04-03	ITS	Traffic Control Devices with ITS elements.	Includes ITS curve warning systems, road condition warning systems with active signing, overlength warning systems, etc.
S04-04	ITS	Variable Message Signs	Section 302.1
S04-05	ITS	Variable Speed Signs	Section 500.1
S05-01	Markings	2-Stage Bicycle Turn Box	Section 300.1
S05-02	Markings	Certain applications of Shared Lane Markings	Traffic Line Manual (*2*)
S05-03	Markings	Colored Pavements	Section 310.7
S05-04	Markings	Deviations from standards in the Traffic Line Manual	Traffic Line Manual (*2*)
S05-05	Markings	Red raised pavement markers	Traffic Line Manual (*2*)

#	Subject	Device or Feature	Details of Approval Requirements
S05-06	Markings	Red-Colored Pavement when applied according to IA-22	Section 300.1
S06-01	Operations	Designation of through Highways at Intersections of the State Highway	ORS 810.110
S06-02	Operations	YIELD signs controlling State Highway approaches.	Section 401.0
S06-03	Operations	STOP signs controlling State Highway approaches, multiway STOP applications, and modifications to STOP configurations.	Section 402.0
S06-04	Operations	Roundabouts – Conceptual and Design Approval	Section 403.0
S06-05	Operations	Channelized Right-Turn Lanes	Section 405.2
S06-06	Operations	Right Turn Acceleration Lanes	Section 405.3
S06-07	Operations	Median Acceleration Lanes	Highway Design Manual (*3*)
S06-08	Operations	Shared (or combined) Bicycle and Right Turn Lanes	Section 405.4
S06-09	Operations	Transit Exceptions to Turn Lanes	Section 405.5
S06-10	Operations	Dual Right or Left Turn Lanes	Section 405.6
S06-11	Operations	Turn Prohibitions	Section 405.7
S06-12	Operations	Truck Routes and Truck Prohibitions	Section 506.0
S06-13	Operations	One-Way Operation for Trucks and Buses	Section 507.0
S07-01	Rumble Strips	Certain exceptions to justify omitting longitudinal rumble strips	Section 303.1
S07-02	Rumble Strips	Certain Transverse Rumble Strip applications.	Section 303.1
S08-01	Signals	Adding speed enforcement to a Red Light Running Camera System	Section 304.1
S08-02	Signals	Authorizing Emergency Service Providers and Public Transit Authorities to use emergency preemption and bus priority systems	Section 404.0
S08-03	Signals	Bicycle Signal Heads	Traffic Signal Policy & Guidelines (*4*)

#	Subject	Device or Feature	Details of Approval Requirements
S08-04	Signals	Deviations from standard railroad preemption sequence	Signal Design Manual (*5*) Railroad Preemption Design and Operation Guide (*6*) Traffic Signal Policy and Guidelines (*4*)
S08-05	Signals	Exceptions to the Traffic Signal Policy and Guidelines	Section 404.0
S08-06	Signals	Installation and removal of traffic signals and certain modifications to traffic signals.	Sections 304.0, 404.0
S08-07	Signals	Intersection Bicycle Boxes	Section 300.1
S08-08	Signals	New approaches to existing signalized intersections	OAR 734-020-0485
S08-09	Signals	Red Light Running Camera Installations	Section 304.1
S08-10	Signals	Traffic signal split phasing	Traffic Signal Policy & Guidelines (*4*)
S08-11	Signals	U-turns at signalized intersections	Section 404.2
S08-12	Signals	Warning beacon supplementing an Emergency Signal sign.	Section 304.2
S08-13	Signals	Bicycle/pedestrian activated warning systems (including at crosswalks, bridges, tunnels, etc. E.g.: RRFB)	Sections 300.1, 309.1, 310.6
S08-14	Signals	PREPARE TO STOP WHEN LIGHTS FLASH (OW15-14) sign installations	Traffic Signal Design Manual (*5*)
S09-01	Signs	Logos for ENTERING CITY/COUNTY or WELCOME TO signs	Sign Policy & Guidelines (*7*)
S09-02	Signs	RIGHT TURN PERMITTED WITHOUT STOPPING (RTPWS) signs	Section 402.1
S09-03	Signs	TRUCKS RIGHT TWO LANES ONLY (OR4-5) signs	Sign Policy and Guidelines (*7*)
S09-04	Signs	UNMUFFLED ENGINE BRAKING PROHIBITED (OR22-10 and OR22-11) signs	Sign Policy and Guidelines (*7*)
S09-05	Signs	Signs for city ordinances on state highways	Sign Policy and Guidelines (*7*)
S10-01	Speed	Speed Zones	Section 500.0, 500.1, 500.2, 500.3

Requesting Approval

Submit traffic-related STRE approval requests in a request form. Submittal instructions are on each form.

- Crosswalk Closures ..... Form 734-5150
- Work Zone Speed Reductions ..... Form 734-2874
- Maintenance Work one Speed Reduction Requests ..... Form 734-5223
- All other speed zoning requests ..... See the Speed Zone Manual (*8*)
- Temporary Transverse Rumble Strips ..... Form 734-2886
- All other traffic requests ..... Form 734-5175

Traffic Signals

Oregon Administrative Rules (OAR) 734-020-0400 through -0500 establishes the approval process for installation, modification, or removal of traffic signals under the authority of ODOT. See the ODOT Traffic Signal Policy and Guidelines (*4*) for more information.

Depending on the type of modification, either the State Traffic-Roadway Engineer or the Region Traffic Engineer must approve modifications to existing traffic signals on state highways. A "modification" is a change in the operational function of a traffic signal and includes the addition or deletion of signal phases, modifications which provide or remove split phase operation, addition of equipment not normally a part of a traffic signal design, and the addition or removal of through vehicle lanes or pedestrian crossings at the intersection. Signal revisions and normal maintenance activities such as the replacement of detectors, poles, or controllers and timing adjustments that do not affect operation do not constitute a "modification."

Intelligent Transportation System (ITS) Devices

All ITS traffic control device requests must be:

- Reviewed by both Region Traffic Unit and Intelligent Transportation Systems Unit, and
- Approved by the State Traffic-Roadway Engineer, unless the Region Traffic Engineer approves the device according to **Section 100.1**.

The Region Traffic Engineer sends a request for approval to the State Traffic-Roadway Engineer. Traffic-Roadway Section staff will coordinate with the ITS Unit. The State Traffic-Roadway Engineer will only consider requests for ITS traffic control devices that have concurrence from both the Region Traffic Engineer and the Senior ITS Engineer.

New Bicycle/Pedestrian Activated Warning System Installations

Contact the Region Traffic Unit on any project considering a bicycle/pedestrian warning system. The Region Traffic Unit will assist the project with preliminary analysis of the location and proposed device and request State Traffic-Roadway Engineer approval according to the process above.

Special Considerations

Approval is required for items listed in this section (by STRE) and **Section 100.1** (by RTE) after careful consideration of the pertinent factors, even if the items are listed in an ODOT-approved document (including but not limited to transportation system plans, land use documents, corridor plans, development permits, or other agreements). Other special funding sources – including the Oregon Transportation Commission's approval of STIP projects – does not mean traffic control devices in the project are approved.

State Traffic-Roadway Engineer approvals generally expire if the approved changes are not advanced to construction within 5 years of approval because conditions that inform approval decisions can change over time. If needed, the approval letter specifies this as a condition of approval.

See the Special Considerations section of each section for typical information needed to support a request for State Traffic-Roadway Engineer approval. Requests also generally need to answer the following questions:

- What is the problem you are trying to solve?
- What is the solution you are proposing?
- What alternatives have you considered and why is this solution the best?
- What data and/or research support your solution?
- Do you plan to deviate from any standards, policies, or guidelines? If so, why?
- Have you worked with a local transportation agency, maintenance district, law enforcement, other agencies, groups, etc. to reach your solution? If so, how?
- If there are agreements associated with the solution (such as an Intergovernmental Agreement), what are the agreement numbers?

Support

The goal of the approval process is to ensure statewide uniformity and road user understanding of traffic control devices and promote safety and reliability for all users.

ORS 810.210 grants authority over the placement, construction, maintenance, and operation of traffic control devices on state highways to the Oregon Transportation Commission (OTC). Other statutes grant authority over matters concerning traffic control devices to the Director of

Transportation. The OTC and Director delegate the authorities listed in **Table 100.0-B** to the State Traffic-Roadway Engineer through OARs or delegation orders.

Table 100.0-B: State Traffic-Roadway Engineer Authorities

Authority	**Citations**
Approve the installation of traffic control devices on state highways.	ORS 810.210 OAR 734-020-0410
Approve design and construction of a traffic signal on the State Highway System, regardless of funding source.	ORS 810.200, 810.210 OAR 734-020-0430
Approve installation of traffic signals at locations where ½ mile spacing is inappropriate or infeasible.	ORS 810.200, 810.210 OAR 734-020-0470
Require traffic signal progression analysis based on signal spacing.	ORS 810.200, 810.210 OAR 734-020-0480
Approve removal of traffic signals.	ORS 810.200, 810.210 OAR 734-020-0500
Establish parking or turn prohibitions on state highways for statewide consistency.	ORS 810.160, 810.210 OAR 734-020-0020
Review an interstate highway speed limit.	ORS 810.180 OAR 734-020-0010 (4-c)
Various authorities related to speed zones.	ORS 810.180 OAR 734-020-0015 thru -0018
Approve the types of locations, size, shape, lighting, and other characteristics of logo, tourist, and motorist information sign panels desired to be placed by Travel Information Council on state highway right-of-way.	ORS 377.805 Delegation Order DIR-03 #A25 Delegation Order HWY-04 #A10 Delegation Order EB-06 #A5
Take appropriate action for the administration and enforcement of orders and rules adopted by Travel Information Council regarding motorist information signing.	ORS 377.835 Delegation Order DIR-03 #A26 Delegation Order HWY-04 #A11 Delegation Order EB-06 #A6
Approve signs which may be placed in an established scenic area such as underground cable and other warning signs of a public utility and community identification signs. (Signs on highway right-of-way must comply with the standards adopted by the Commission under ORS 810.200.)	ORS 377.510 Delegation Order DIR-03 #A34 Delegation Order HWY-04 #A13 Delegation Order EB-06 #A7
Approve and implement traffic/roadway design standards for state highways.	ORS 366.205 Delegation Order OTC-01 #8 Delegation Order DIR-02 #1 Delegation Order EB-06 #B1

Authority	Citations
Implement standards for traffic control including the marking and signing of state highways adopted by the Commission under ORS 810.200.	ORS 810.200 Delegation Order OTC-01 #19 Delegation Order DIR-02 #1 Delegation Order EB-06 #B2

Cross References

Key References

1. Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
3. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
4. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
5. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
6. Oregon Department of Transportation. *Railroad Preemption Design and Operation*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Railroad-Preemption-Design-Operation-Guide.pdf.
7. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
8. Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed-Zone-Manual.pdf.

File Code	Updated	Notes
COM 04, ORG 05	March 2020	Added S05-06 to Table 100.0-A.

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Region Traffic Engineer 100.1

The Oregon Transportation Commission has delegated the authority to approve the installation of traffic control devices on state highways to the State Traffic-Roadway Engineer through OAR 734-020-0410.

Due to the scope of this responsibility, Region Traffic Engineers are responsible to approve the installation of specific traffic control devices on state highways within their respective region. The State Traffic-Roadway Engineer assigns this responsibility to Region Traffic Managers who are Registered Professional Engineers. Region Traffic Managers may assign this responsibility to senior-level engineers within their respective region traffic unit. Engineers assigned the responsibility of Region Traffic Engineer shall be members of the Traffic Operations Group. Actual position titles might vary from region to region.

In addition, the Oregon Transportation Commission has delegated to Region Traffic Engineers the authority to establish parking or turn prohibitions on state highways within their respective regions through OAR 734-020-0020.

Standards & Guidelines

01 Devices and features listed in **Table 100.1-A** shall have Region Traffic Engineer approval to be installed on the State Highway System unless otherwise specified.

02 In the event there are conflicting approvals from the Region Traffic Engineer, the most recent approval shall take precedence.

03 Devices and features approved by the Region Traffic Engineer shall conform to the principles outlined in the edition of the MUTCD (*1*) and Oregon Supplement to the MUTCD (*2*) adopted by OAR 734-020-0005 and applicable ODOT policies and guidelines.

04 The State Traffic-Roadway Engineer retains the authority to require modifications to any traffic control device on the State Highway System, including traffic signals, when deemed necessary for the safety of road users.

Process & Required Approvals

The Region Traffic office documents and files Region Traffic Engineer approvals according to ODOT records management policies.

State Traffic-Roadway Engineer approval is required for devices and features listed in **Table 100.1-A** not conforming to ODOT policies, MUTCD (*1*) standard statements, or standard statements in the Oregon Supplement to the MUTCD (*2*).

The Region Traffic Engineer may consult with the State Traffic-Roadway Engineer prior to establishing parking prohibitions. The Region Traffic Engineer must notify the State Traffic-Roadway Engineer of parking prohibitions (OAR 734-020-0020).

Table 100.1-A: Devices & Features Requiring RTE Approval

#	Subject	Device or Feature	Details of Approval Requirements
R01-01	General	Wrong-way treatments	Section 406.1
R03-01	Illumination	Roadway illumination	Section 311.0
R04-01	ITS	Messages other than PSAs on Variable Message Signs	Section 302.1
R04-02	ITS	Non-standard Portable Changeable Message Sign (PCMS) messages	Oregon PCMS Handbook (*4*); authority also extended to Resident Engineers
R04-03	ITS	Vehicle speed feedback sign	Section 302.2
R05-01	Markings	Marking style for crosswalks approved by State Traffic-Roadway Engineer (transverse vs. continental).	Traffic Line Manual (*5*)
R05-02	Markings	Advance stop bars	Traffic Line Manual (*5*)
R05-03	Markings	Bicycle lanes	Section 309.0
R05-04	Markings	No passing zones	Traffic Line Manual (*5*)
R05-05	Markings	Green colored pavement when applied according to IA-14.	Traffic Line Manual (*5*)
R05-06	Markings	Bull nose in Two-Way Left Turn Lane	Section 405.8
R06-01	Operations	Left and right turn lanes at unsignalized intersections	Sections 405.0, 405.1
R06-02	Operations	Parking prohibitions or restrictions	Section 501.0
R06-03	Operations	STOP Sign applications on cross streets that are not State Highways	Section 402.0
R06-04	Operations	Turn lanes – Left-turn lanes, conventional right turn lanes, certain channelized right-turn lanes.	Sections 405.0, 405.1, 405.2
R06-05	Operations	Turn prohibitions	Section 405.7
R06-07	Operations	YIELD sign applications on cross streets that are not State Highways	Section 401.0
R07-01	Rumble Strips	Permanent Transverse Rumble Strips associated with Stop Ahead (W3-1) warning signs.	Section 303.1
R07-02	Rumble Strips	Certain exceptions to justify omitting longitudinal rumble strips.	Section 303.1
R07-03	Rumble Strips	Temporary Transverse Rumble Strips	TCP Design Manual (*6*)

#	Subject	Device or Feature	Details of Approval Requirements
R08-01	Signals	Addition or removal of emergency preemption and bus priority systems at existing traffic signals based on prior approval of an Emergency Service Provider or Public Transit Authority by the State Traffic-Roadway Engineer to use such systems.	Traffic Signal Policy & Guidelines (*7*)
R08-02	Signals	Addition or removal of left-turn lanes, conventional right-turn lanes, or through lanes at existing signalized intersections	Sections 304.0, 404.0
R08-03[A]	Signals	Audible pedestrian signals	Traffic Signal Policy & Guidelines (*7*) See Footnote A
R08-04[A]	Signals	Lane use signing at signalized intersections	Sign Design Manual (*8*) See Footnote A
R08-05[A]	Signals	Left and right turn phase modifications, except split phasing	Sections 304.0, 404.0 See Footnote A
R08-06[A]	Signals	Overlap phasing	Traffic Signal Policy & Guidelines (*7*) See Footnote A
R08-07	Signals	Ramp meters	Section 404.1
R08-08[A, B]	Signals	Replacement of signal poles	See Footnotes A and B
R08-09[A]	Signals	Signal heads - change out protected left green arrow only to all arrow, move or realign, programmed, supplemental	See Footnote A
R08-10[A, B]	Signals	Signal timing	Section 404.0 See Footnotes A and B
R08-11	Signals	Intersection Control Beacon	Traffic Signal Dsgn. Man. (*9*)
R08-12	Signals	Speed limit sign beacon	Section 304.2
R08-13	Signals	Stop beacons	Section 304.2
R08-14	Signals	Warning beacon	Section 304.2
R08-15[A, B]	Signals	Work zone modifications to signals – phasing, signal head locations, etc.	Traffic Signal Dsgn. Man. (*9*) See Footnotes A and B
R08-16[A]	Signals	Red-Signal Enforcement Lights	Section 304.1 See Footnote A

#	Subject	Device or Feature	Details of Approval Requirements
R09-01	Signs	Custom Historic Trail Signs	Sign Policy & Guidelines (*10*)
R09-02	Signs	Deviations from curve advisory speed guidance	Technical Bulletin TR15-01(B) (*11*)
R09-03	Signs	Recreational symbol signs	Sign Policy & Guidelines (*10*)
R09-04	Signs	Sign Flag Boards in some cases	Sign Policy & Guidelines (*10*)
R09-05	Signs	Signs designed by private parties for temporary events	Sign Policy & Guidelines (*10*)
R09-06	Signs	Special sized SCHOOL DAYS with time of day sign	Sign Policy & Guidelines (*10*)
R09-07	Signs	Special sized SCHOOL SPEED LIMIT 20 sign	Sign Policy & Guidelines (*10*)
R09-08	Signs	Use of Fluorescent Yellow-Green for bicycle/pedestrian warning signs	Sign Policy & Guidelines (*10*)

[A] May be approved by the Region Traffic Engineer's designee instead of the Region Traffic Engineer. RTE's designee shall be a licensed Professional Engineer. Send documentation to the Traffic-Roadway Section justifying the type of planned modification.

[B] Signal revisions and normal maintenance activities such as the replacement of detectors, poles, or controllers and timing adjustments that do not affect operation do not constitute a "modification" and do not require RTE approval.

Requesting Approval

Submit RTE approval requests in a request form. Submittal instructions are on the form.

- Parking prohibition ..... Form 734-2804
- All other requests ..... Form 734-5228

Support

The Oregon Transportation Commission delegated the authorities listed in **Table 100.1-B** to the Region Traffic Engineer through administrative rule.

Table 100.1-B: Region Traffic Engineer Authorities

Authority	Citations
Establish parking or turn prohibitions on state highways within their respective regions. The Region Traffic Engineer will notify the State Traffic-Roadway Engineer of the prohibition.	ORS 810.160, 810.210 OAR 734-020-0020

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.

3. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
5. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
6. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
7. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
8. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
9. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
10. Oregon Department of Transportation. *Technical Bulletin TR15-01(B): State-wide Policy for Installing Chevrons, Arrows and Advisory Speed Plaques*. Oregon Department of Transportation, Salem, Oregon, 2015. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TR15-01b.pdf.
11. Oregon Department of Transportation. Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less. http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf. Accessed February 1, 2013.

File Code	Updated	Notes
COM 04	January 2020	Updated content from Chapter 5 in previous editions.

Publications 101.0

Table 101.0-A is a list of traffic-related publications from the Traffic-Roadway Section by subject. These are available on ODOT's Engineering Manuals internet page; some publications are only available internally. Check the ODOT Engineering Manuals page often to ensure you are using the latest editions.

Table 101.0-A: Traffic-Roadway Section Publications

Subject	Title	TRS Contact
General	A Guide to School Area Safety (*1*)	Traffic Active Modes Engineer
General	Oregon Supplement to the MUTCD (*2*)	State Traffic Investigations Engineer
General	Traffic Manual (*3*)	State Traffic Investigations Engineer
Illumination	Lighting Policy and Guidelines (*4*)	State Traffic Illumination Engineer
Illumination	Traffic Lighting Design Manual (*5*)	State Traffic Illumination Engineer
Markings	Pavement Marking Design Guidelines (*6*)	Traffic Pavement Marking Engineer
Markings	Traffic Line Manual (*7*)	Traffic Pavement Marking Engineer
Safety	Highway Safety Improvement Program Guide (*8*)	State Traffic Safety Engineer
Safety	Highway Safety Investigations Manual (*9*)	State Traffic Safety Engineer
Safety	Safety Priority Index System and Oregon Adjustable Safety Index System User Guide (*10*)	Traffic Safety Coordinator
Signals	2002 Policy Statement for Cooperative Traffic Control Projects (*11*)	State Traffic Signal Engineer
Signals	Red Light Running (RLR) Camera Guidelines (*12*)	State Traffic Services Engineer - Unit Manager
Signals	Traffic Signal Design Manual (*13*)	State Traffic Signal Engineer
Signals	Signal Inspector's Manual (*14*)	State Traffic Signal Engineer
Signals	Standard Specification for Microcomputer Signal Controller (*15*)	State Traffic Signal Engineer
Signals	Traffic Signal Drafting Manual (*16*)	Traffic Signal Coordinator
Signals	Traffic Signal Policy and Guidelines (*17*)	State Traffic Signal Operations Engineer
Signs	Guidelines for the Operation of Highway Advisory Radio and Traveler's Advisory Radio on State Highways (*18*)	Traffic Active Modes Engineer
Signs	Guidelines for the Operation of Permanent Variable Message Signs on State Highways (*19*)	Traffic Active Modes Engineer
Signs	Sign Inventory Database User's Guide	Traffic Asset Coordinator
Signs	Sign Inventory Field Handbook	Traffic Asset Coordinator

Subject	Title	TRS Contact
Signs	Sign Policy and Guidelines for the State Highway System (*20*)	State Traffic Sign Engineer
Signs	Standards for Accessible Parking Places (*21*)	State Traffic Sign Engineer
Signs	Traffic Sign Design Manual (*22*)	State Traffic Sign Engineer
Speed Zones	Fixed Photo Radar (FPR) Camera Guidelines (*23*)	State Traffic Services Engineer - Unit Manager
Speed Zones	Speed Zone Manual (*24*)	Traffic Investigations Coordinator
Structures	Traffic Structures Design Manual (*25*)	State Traffic Structures Engineer
Work Zones	Oregon Portable Changeable Message Sign Handbook (*26*)	State Traffic Work Zone Engineer
Work Zones	Oregon Temporary Traffic Control Handbook (*27*)	State Traffic Work Zone Engineer
Work Zones	Traffic Control Plans Design Manual (*28*)	State Traffic Work Zone Engineer
Work Zones	Transportation Management Plan (TMP) Guidance Manual (*29*)	State Traffic Work Zone Engineer
Work Zones	Work Zone Traffic Analysis Manual (*30*)	Traffic Work Zone Analyst

Key References

1. Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. *Traffic Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Traffic-Manual.pdf.
4. Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.
5. Oregon Department of Transportation. *Traffic Lighting Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Design-Manual.pdf.
6. Oregon Department of Transportation. *ODOT Pavement Marking Design Guidelines*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Pavement-Marking-Design-Guide.pdf.
7. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

8. Oregon Department of Transportation. *Highway Safety Improvement Program Guide*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety_HSIP-Guide.pdf.
9. Dixon, K. K., and C. M. Monsere. *Highway Safety Investigation Manual for the Oregon Department of Transportation*. Oregon Department of Transportation, Salem, Oregon, 2011. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety-Investigation-Manual.pdf.
10. Oregon Department of Transportation. *Safety Priority Index System and Oregon Adjustable Safety Index System User Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-User-Guide.pdf.
11. Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.
12. Oregon Department of Transportation & Oregon Traffic Control Devices Committee. *Red Light Running (RLR) Camera Guidelines for State Highways*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Red-Light-Camera-Guidelines.pdf.
13. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
14. Oregon Department of Transportation. *Inspector's Manual for Signal Construction*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Construction/Doc_TrafficSignal/00_master_signal_inspector.pdf.
15. Oregon Department of Transportation. *Standard Specification for Microcomputer Signal Controller*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signals.aspx.
16. Oregon Department of Transportation. *Traffic Signal Drafting Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Drafting-Manual.aspx.
17. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
18. Oregon Department of Transportation. *Guidelines for the Operation of Highway Advisory Radio and Other Travelers Information Stations on State Highways*. Oregon Department of Transportation, Salem, Oregon.
19. Oregon Department of Transportation. *Guidelines for the Operation of Permanent Variable Message Signs*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/VMS-Guidelines.pdf.
20. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
21. Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.
22. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
23. Oregon Department of Transportation & Oregon Traffic Control Devices Committee. *Fixed Photo Radar (FPR) Camera Guidelines for State Highways*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed_Fixed-Photo-Radar-Camera-Guidelines.pdf.
24. Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed-Zone-Manual.pdf.

25. Oregon Department of Transportation. *Traffic Structures Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Structures-Design-Manual.pdf.
26. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
27. Oregon Department of Transportation. Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less. http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf. Accessed February 1, 2013.
28. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
29. Oregon Department of Transportation. *Transportation Management Plan (TMP) Project Level Guidance Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/TMP-Manual.pdf.
30. Oregon Department of Transportation. *Web-Based Work Zone Traffic Analysis Tool Users' Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone-Analysis-Manual.pdf.
31. Oregon Department of Transportation. *Railroad Preemption Design and Operation*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Railroad-Preemption-Design-Operation-Guide.pdf.

File Code	Updated	Notes
Unassigned	January 2020	Updated list, added TRS Contacts

Traffic Manual Updates 103.0

The Traffic-Roadway Section regularly updates the Traffic Manual to stay current with engineering best practices and ODOT policies, practices, plans, and goals.

Standards & Guidelines

01 Traffic Manual content should be updated following the Normal Update Process in **Table 103.0-A**.

02 Traffic Manual content may be updated at any time when changes are required due to legislation, litigation, direction from regulatory agencies with compliance dates (state or federal), MUTCD Interim Approvals (*1*) (new interim approvals and termination of existing interim approvals), or other situations determined by the State Traffic-Roadway Engineer. These updates should go through the next scheduled Normal Update Process for complete review and comment.

03 Traffic Manual content may be updated at any time to make minor corrections that do not change the intent of what is being edited. The scope of these corrections include, but are not limited to, formatting, spelling, updated names and contact information or web links, or other corrections determined by the State Traffic Investigations Engineer.

04 A proposed change to the Traffic Manual should support ODOT's Mission, Vision, Values, Policies, and adopted plans and be documented with supporting information from one or more of the following sources, in order of preference:

a. National and Oregon state transportation engineering policies and manuals (e.g. MUTCD, A Policy on Geometric Design of Highways and Streets, Highway Safety Manual, ODOT Highway Design Manual, ODOT Traffic Signal Policy & Guidelines, etc.).
b. Recommended practices and guides published by AASHTO, Transportation Research Board, the Institute of Transportation Engineers, or USDOT.
c. Cooperative Research Program reports from the Transportation Research Board (e.g. NCHRP, TCRP).
d. Peer-reviewed articles published in transportation engineering or transportation safety journals (e.g. Transportation Research Record).
e. Other publications from the Transportation Research Board, AASHTO, Institute of Transportation Engineers, or USDOT.
f. Research reports published by a state department of transportation.
g. Research reports published by other universities/colleges in the United States with transportation engineering programs.
h. An engineering study.
i. Engineering judgement.
j. Research reports and manuals from international agencies and universities.
k. Other published research.

Process & Required Approvals

The State Traffic-Roadway Engineer sets traffic engineering standards per Delegation Order EB-06. The State Traffic Investigations Engineer maintains the Traffic Manual under the authority of the State Traffic-Roadway Engineer. Technical resources contribute based on their area of expertise.

Changes to the Traffic Manual are proposed and documented in a Problem Statement and Proposed Solution form, available from the State Traffic Investigations Engineer.

Updates require approval from the State Traffic-Roadway Engineer per Delegation Order EB-06 except for minor corrections that do not change the intent of the edited content. The Traffic Operations Group advises the State Traffic-Roadway Engineer as part of the Normal Update Process.

Table 103.0-A: Normal Update Process

Stage		Approximate Duration	Approximate Schedule
1	Develop proposed changes	As needed to develop the proposal and pass through working groups (if needed)	Throughout the year
2	Submit proposed changes to State Traffic Investigations Engineer	Milestone	Accepted throughout the year. Deadline for next update cycle: April 15
3	Proposals open for comments from Traffic Operations Group	4 weeks	May
4	Edit based on comments	4 weeks	June
5	Revised proposals open for comments from other disciplines (e.g. Maintenance, Roadway, Active Trans.)	4 weeks	July
6	Final edit based on comments	4 weeks	August
7	Revised proposals open for Traffic Operations Group review	3 weeks	September
8	Changes discussed at Traffic Operations Group meeting	Milestone	October Traffic Operations Group meeting
9	State Traffic-Roadway Engineer decides on proposal	Milestone	October
10	Final formatting/compiling	4 weeks	October
11	Publication	Milestone	First working day of November
12	Adapting period	8 weeks	November-December
13	Changes effective	Milestone	January 1

Special Considerations

The Traffic-Roadway Section cannot update the whole Traffic Manual every year due to the scope of the manual and limited time available for staff to develop updates. Sections are reviewed on a schedule as resources allow so content can be maintained; the latest Traffic Manual edition each section was last updated or validated is shown at the end of each section. Updates might need to be limited in scope and not make a comprehensive review of the content as resources allow.

Support

The Traffic Manual contains the general policies, standards, guidelines, options, and process for traffic engineering at ODOT and affects a wide variety of business lines. Decisions are made based on its contents at high levels and very detailed levels. Contents are also often brought up in litigation. Because of this, the Traffic-Roadway Section typically shares proposed changes across ODOT disciplines, groups, or individuals following the principles of the ODOT Change Framework Process.

Past updates to different traffic design manuals have shown that if an update is not regular but advertised with sufficient time for comment, some stakeholders still will not comment because it can be difficult to plan workloads around unpredictable comment periods. Feedback from those update processes suggested a predictable comment period would benefit statewide stakeholders.

After publication, there is a 2-month adapting time for manual users to adjust their processes, designs, assumptions, etc. before the new policies and guidelines become effective.

There will be times when the Traffic-Roadway section must update the Traffic Manual outside the normal schedule. Examples include action required from legislation, litigation, direction from regulatory agencies (state or federal) with compliance dates, MUTCD (*1*) Interim Approvals (new IAs and termination of existing IAs), etc. Flexibility to publish quick updates fills this need until changes can go through the Normal Update Process to allow for full comment and review.

After publication, there may be times when minor edits are need. This includes minor corrections to formatting, spelling, changes to contact information, or web links, etc. that do not change the intent of what is being edited. These changes do not go through the normal process because of the need to make quick updates with a very limited scope.

Cross References

Traffic Manual Updates 103.0

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	New	Notes
Unassigned	January 2020	

Litigation 105.0

Claims and lawsuits may result from a crash or construction and maintenance activities.

Process & Required Approvals

If a claim for damages involving ODOT is filed against the State, Risk Management conducts an investigation to determine whether the claim should be approved or denied. In some instances, the Risk Management Specialist in charge of processing the claim will contact one of the Traffic-Roadway Section's investigators to request a recommendation and/or documentation, or to clarify a policy. If documentation is required, the Risk Management Specialist coordinates with ODOT sections or other public agencies to produce copies of the necessary documents.

Similarly, the Traffic-Roadway Section sometimes acts as a liaison for the Oregon Department of Justice when a request is made for information and documents by an Assistant Attorney General who is defending ODOT in a lawsuit. The Traffic-Roadway Section also assists in gathering the information to support ODOT in these claims.

In addition to collecting documents and other evidence, the Traffic-Roadway Section may coordinate the acquisition of expert witnesses for testimony at trial. On occasion, a Traffic-Roadway Section employee may be required to testify, if he or she possesses specialized knowledge in a relevant area. At the request of the Department of Justice attorney, the Traffic-Roadway Section may also produce courtroom displays using mounted photo enlargements, graphics or video presentations.

Special Considerations

The State of Oregon is self-insured through the Risk Management Division of the Department of Administrative Services.

When there is damage to ODOT facilities, such as a bridge damaged in a crash, ODOT may pursue damages from the party determined to be at fault.

Support

The most effective way to reduce ODOT liability in litigation is to conform as closely as possible to standards, policies, and good engineering in the course of design, construction, inspection and maintenance, and then to thoroughly document such conformance.

Cross References

File Code	Updated	Notes
LEG 04	December 2006	Reformatted January 2020.

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Land Use and Transportation 107.0

The *Oregon Highway Plan* (*1*) encourages compact development in urban areas while supporting mobility on designated highways segments. Expressway classification supports mobility on designated highways and highway segments by providing for high speed and high volume traffic with minimal interruption. Special Transportation Areas (STAs) promote community vitality and livability in downtown areas by encouraging compact development and reducing local trips on the state highway and encouraging more opportunity for walking, bicycling or transit use. Urban Business Areas (UBAs) and Commercial Centers improve the connection between the use of the highway and commercial activity and are used in conjunction with STAs and expressways to balance mobility and livability.

Cross References

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*, 2015 ed. Oregon Department of Transportation, Salem, Oregon, 1999. https://www.oregon.gov/odot/planning/pages/plans.aspx.

File Code	New	Notes
Unassigned	March 2001	Reformatted January 2020.

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Highway Safety Engineering 200.0

Process & Required Approvals

ODOT has placed the responsibilities of Highway Safety Program management with the Traffic-Roadway Section. ODOT Regions are responsible for fund management within their own Regions and gathering information in support of the annual reporting process required by federal HSIP funding.

The Highway Division set up the Highway Safety Engineering Committee (HSEC) to guide and give direction for highway safety engineering needs within ODOT. The HSEC is responsible for reviewing and making recommendations for strategies and/or projects to be included in the State Strategic Highway Safety Plan and the ODOT Highway Safety Program. The committee also makes recommendations on emphasis areas to fund, approves regional safety funding allocation strategies, provides oversight on discretionary highway safety funding, and approves enhancements to Safety Management System tools such as SPIS, Oregon Adjustable Safety Index System (OASIS), Crash Summary Report, CRF, and B/C analysis tools.

Special Considerations

All Roads Transportation Safety (ARTS) Program

The mission of the All Roads Transportation Safety (ARTS) Program is to carry out safety improvement projects on all public roads to achieve a significant reduction in traffic fatalities and serious injuries. The ARTS website documents program philosophy and the application process for all Highway Safety funding. For purposes of programming Highway Safety funds in the Statewide Transportation Improvement Program (STIP), all safety infrastructure improvement projects follow the ARTS guidelines regardless of funding type (federal or state).

Highway Safety Improvement Program (HSIP)

The federal Highway Safety Improvement Program (HSIP) funds that comprise a majority of the funding for ODOT Highway Safety Engineering projects originally came from the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Congress slightly increased HSIP funding under the subsequent federal transportation reauthorization bill known at the Moving Ahead for Progress in the 21st Century Act (MAP-21). HSIP funding will continue in the recently signed Fixing America's Surface Transportation (FAST) Act that replaced MAP-21 in 2016 and extends federal transportation funding through 2020.

HSIP funds are primarily intended for infrastructure safety improvements on state highways, county roads, and city streets. Non-infrastructure highway safety improvements such as education and enforcement programs are administered by the ODOT Transportation Safety Division and are typically funded with separate funding from the

National Highway Traffic Safety Administration (NHTSA), the Federal Highway Administration (FHWA), or state funds.

State Strategic Highway Safety Plan

ODOT developed the State Strategic Highway Safety Plan (SSHSP, a federal requirement) to address engineering, management, operation, education, enforcement and emergency services elements of highway safety. The SSHSP identifies opportunities to improve highway safety by addressing engineering, management, operations, education, enforcement, and emergency management in order to focus resources on areas of greatest need and coordinate with other highway safety programs. The SSHSP may identify programs of projects, strategies, or other key factors to reduce or eliminate safety hazards. The priorities in the SSHSP should be used to address all Safety and HSIP projects.

In response to the SSHSP requirement, Oregon has adopted the Oregon Transportation Safety Action Plan (TSAP) (*1*). The TSAP in conjunction with the safety projects included in the Statewide Transportation Improvement Program (STIP) comprise Oregon's SSHSP.

Safety Priority Index System (SPIS)

The Safety Priority Index System (SPIS) is a method developed in 1986 by ODOT for identifying potential safety problems on state highways and FHWA accepted SPIS as fulfilling the requirements of the HSIP. When Oregon began developing its Safety Management System in response to the 1991 ISTEA, it identified SPIS as one of several essential building blocks. SPIS has been recognized as an effective flagging tool for evaluating state highways for segments with higher crash histories. More information on SPIS is available in the SPIS and OASIS User Guide (*2*).

Cross References

Crash Analysis 201.0
Safety Corridors 202.0
Sight Distance 203.0
Rumble Strips 303.1
Illumination 311.0

Key References

1. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.
2. Oregon Department of Transportation. *Safety Priority Index System and Oregon Adjustale Safety Index System User Guide*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-User-Guide.pdf.

File Code	Updated	Notes
TRA 10-22-01	January 2020	Added reference to SPIS & OASIS User Guide.

Crash Analysis 201.0

Crash data is used by transportation engineers to identify and analyze high crash locations, evaluate engineering measures, and identify trends in crash occurrences to develop solutions that improve safety. The data can be used to develop a better understanding of the performance of traffic control measures or to study specific sites where a safety problem may exist.

Standards & Guidelines

01 See the ODOT Safety Investigations Manual (*1*).

Process & Required Approvals

When locations are identified for crash analyses the first step is to gather all crash data relevant to the location. Several reports or tools exist to assist in this step (See Special Considerations subsection). These reports allow data to be summarized by different characteristics, such as date and time, roadside culture, weather conditions, type of crash, types of vehicles, and other information. Preparing collision diagrams to identify patterns can assist the analyst in analyzing the situation. Collecting other data such as volumes and operating speeds can also be helpful.

Site visits and video logs can assist with familiarizing the analyst with physical features, roadway geometry and other site characteristics. Crash and fatality rates for the section should be compared to the statewide average for similar types of highways.

The Traffic-Roadway Section routinely performs crash analysis for environmental documents and corridor studies and can help in the evaluation of specific sites or trends. Contact the Highway Safety Engineering Coordinator for assistance.

Special Considerations

When the analyst has identified and completed analysis of the specific site, they can evaluate which corrective actions might be beneficial and cost effective. Several sources exist which are helpful including: Synthesis of Safety Research Related to Traffic Control and Roadway Elements (*2*) and Safety Effectiveness of Highway Design Features (*3*), both published by the Federal Highway Administration.

The following discussion identifies data sources for crash analysis. The statistical treatment of the data and other reference material is contained in the Safety Investigations Manual (*1*). Crash Analysis is an important traffic engineering tool used to answer questions about road design, maintenance, and operations. Crash analysis can also be used to learn what questions to ask. The choice and arrangement of the data depend heavily upon the nature of the question, availability of pertinent data, and time available.

Crash data sources readily available to ODOT employees include:

Oregon Motor Vehicle Traffic Crash Database

This is the main database compiled and maintained by the Crash Analysis and Reporting Unit. It covers all state, county, and city roadways. All crashes reported to DMV and forwarded to the Crash Analysis and Reporting Unit are entered into the database if there is property damage exceeding a minimum dollar amount, or if there are any injuries. These data can be queried directly by the Crash Analysis and Reporting Unit to provide lists that meet very selective criteria.

The most recent ten years of crash data can be accessed on the ODOT Intranet as part of the Oregon Transportation Management System (OTMS).

Oregon Traffic Crash Summary

This extract from the main database listed above, has been published annually by the Crash Analysis and Reporting Unit of the Transportation Data Section since 1994. Previously, these reports were published by Driver and Motor Vehicle Services Division. These tables provide selected crash tallies for statewide, countywide, and, in some cases, citywide coverage. Subsets for truck, pedestrian, bicycle, and motorcycle crashes were published until 1987. From 1987 to 1996, the subsets were not published, but printouts were provided directly to the Traffic-Roadway Section. Beginning in 1989, additional subsets were generated for crashes on state highways and for fatal crashes only. The Oregon Traffic Crash Summary book has included all the subsets since 1996. A separate publication of crash rates on state highways is also available.

Crash Summary Report

This has been produced annually since 1990. This is a database/software combination that generates reports at the request of the user. The summaries generated by this program are frequently helpful because the answers are often sufficient, or time may be too short to permit more detailed analysis. Each set contains three years of simplified crash data for the entire state highway system, plus estimates of traffic volume for each mainline crash site, plus information on SPIS sites. The crash data are extracted from the main database listed above. Traffic volume estimates come from the mileage control tape for the middle year of the three years covered. SPIS numbers are imported and assigned to each rated milepost.

These three-year databases are coupled with a summary program to produce a summary tally that includes an estimate of the crash rate and traffic volume for the selected section. Each summary must be for one continuous portion of one highway for all three years. The estimate of traffic volume is a simple average of all the volume estimates for each crash site. When a short part of the section specified has high volumes and many crashes but the remainder has low volumes and few crashes, the estimated crash rate will be too low. When appropriate, the crash rate should be corrected manually on the face of the printout using a

better estimate of overall volume. Alternatively, separate summaries could be generated for each dissimilar segment.

TransGIS Mapping Tool

The TransGIS mapping tool was developed in order to provide a graphical method to display Category 1-5 segment information, SPIS locations, crash data, street and road information, and Average Daily Traffic (ADT) information. TransGIS displays this information on a state map. The user can choose the information that is displayed and can zoom into the map to increase detail, as well as display city and county maps behind this data.

Crash Graphing Tool

The Crash Graph Tool was created to automatically create graphs and summary tables of ODOT crash data in Microsoft Excel directly from the "Direction (Vehicle)" report from the State Highway Crash Reports on the ODOT Intranet. The tool is a Microsoft Excel Add-in and can be downloaded from the ODOT Intranet. External customers interested in obtaining the Crash Graph Tool should contact the Traffic-Roadway Section's Highway Safety Engineering Coordinator for additional information.

Hardcopies

These have been generated by the Crash Analysis and Reporting Unit over the years for the State Highway System. These books are extracts of data from the main database listed above. Working libraries of these reports are maintained by the Traffic-Roadway Section and other offices. These books contain lists of crash data for one or five years, and lists of various crash rates for one or five years. These books are the normal source of data for those years no longer available directly from the main database.

Crash Rate Tables

These have been published annually by the Crash Analysis and Reporting Unit since at least 1948. Tables in the front of the book list statewide crash rates for several categories of the State Highway System. More tables list the crash rates for selected sections of each state highway, as well as a rural/urban breakout. Additional tables list intersection crash data and fatal crash data.

Traffic Volume Tables

These have been published annually by the Transportation Data Section since at least 1939. There are no crash data in this book. It contains volume estimates for the entire state highway system. These volumes can be used for calculating crash rates. Information provided for automatic traffic recorders can be used in some instances to learn about seasonal or about weekend vs. weekday crash rates.

Cross References

Key References

1. Dixon, K. K., and C. M. Monsere. *Highway Safety Investigation Manual for the Oregon Department of Transportation*. Oregon Department of Transportation, Salem, Oregon, 2011. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety-Investigation-Manual.pdf.
2. Federal Highway Administration. *Synthesis of Safety Research Related to Traffic Control and Roadway Elements*. Federal Highway Administration, Washington, D.C., 1982. https://trid.trb.org/view/192558.
3. Federal Highway Administration. *Safety Effectiveness of Highway Design Features*. Washington, D.C., 1992.

File Code	Updated	Notes
TRA 03-00-01	August 2004	Reformatted January 2020.

Safety Corridors 202.0

Safety Corridors are stretches of state and local highway with a history of higher traffic crash rates than the statewide average for similar roadways. These include "Safety Corridor," "Truck Safety Corridor," or similar signs. In the case of a "Truck Safety Corridor," the incidence of commercial vehicle involvement is high, due to either truck or passenger vehicle error.

Standards & Guidelines

01 See the Oregon Safety Corridor Program Guidelines (*1*).

Process & Required Approvals

Typically, ODOT designates a Safety Corridor based on a consensus decision by the Transportation Safety Division, Traffic-Roadway Section and the local ODOT Region and District. The Transportation Safety Division is responsible for program and policy development, law enforcement coordination and oversight as well as media coordination and driver education. The Traffic-Roadway Section participates in the data analysis and tracking. The Region Traffic Unit conducts engineering investigations for any engineering measures that may be appropriate and coordinates with the local ODOT District on the selection and implementation of the engineering measures. Safety Corridor coordination is also the responsibility of the Region Transportation Safety Coordinator. They play a key role in bringing stakeholders together for decisions involving the safety corridor effort as well as coordination of overall implementation.

Analysis of the safety corridor occurs annually. See the Oregon Safety Corridor Program Guidelines (*1*) for more information on this annual review.

Special Considerations

Typical actions taken in safety corridors to increase safety include enforcement that is more frequent, low cost engineering improvements, and education efforts such as media events, brochures, and poster distribution. The intent is to apply a broad spectrum of immediate and low-cost effort and improvements until the crash rate drops below the statewide average.

A safety corridor designation is an interim solution until such time that the crash rate can be reduced and sustained, or until major improvements are funded. If enforcement becomes unavailable, or local agencies do not maintain substantial commitment, ODOT might remove the safety corridor.

For further information regarding the ODOT Safety Corridor Program, contact the Transportation Safety Division.

Cross References

Key References

1. Oregon Department of Transportation. *Oregon Safety Corridor Program Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Documents/SafetyCorridorGuidelines.pdf.

File Code	Updated	Notes
TRA 10-18	January 2020	Added reference to Safety Corridor Program Guidelines.

Sight Distance 203.0

Sight distance is necessary to ensure safe vehicle operations required for stopping, intersection movements and passing situations. Simply defined, it is the length of roadway visible to the driver, either ahead or on intersecting roads.

Standards & Guidelines

01 A Policy on the Geometric Design of Highways and Streets (*1*) details the processes for determining sight distances for stopping sight distance, decision sight distance, and intersection sight distance. The MUTCD (*2*) and Traffic Line Manual (*3*) detail the process for determining passing sight distance.

Special Considerations

Stopping sight distance is the distance required for a driver to recognize an object that requires a stop, plus the distance required to stop the vehicle.

Decision sight distance is the distance required for a driver to detect and recognize a situation, make a navigation decision and complete the maneuver.

Passing sight distance is the distance necessary to complete normal passing maneuvers safely.

Intersection sight distance is the unobstructed line of sight sufficient to allow approaching drivers to anticipate and avoid potential conflict situation at intersections. Improving intersection sight distance can be one of the most effective safety improvements for intersections with poor sight distance.

Cross References

Key References

1. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 6th ed. Washington, D.C., 2011.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
DES 03	January 2018	Added ref to MUTCD & TOM for PAD. Reformatted 1/2020.

Uniform Traffic Control Devices 300.0

ORS 810.200 and OAR 734-020-0005 require traffic control devices installed on highways and public roadways under the jurisdiction of cities and counties to conform to the Manual on Uniform Traffic Control Devices (MUTCD) (*1*) and Oregon Supplement to the MUTCD (*2*).

Standards & Guidelines

01 Devices installed or replaced after the publication date of the Oregon Supplement to the MUTCD (*2*) shall conform to the MUTCD (*1*) and Oregon Supplement to the MUTCD (*2*) upon installation. Unless noted otherwise, existing devices that do not conform shall be replaced at the end of their useful life.

02 Additional design details for signs, markings, and traffic signals are available in the Sign Policy and Guidelines for the State Highway System (*3*), the Traffic Line Manual (*4*), the Traffic Signal Policy and Guidelines (*5*), and the FHWA Standard Highway Signs and Markings publication (*6*).

Process & Required Approvals

The MUTCD (*1*) and Oregon Supplement to the MUTCD (*2*) are adopted through the OAR process and approved by the FHWA.

Special Considerations

The Oregon Supplement to the MUTCD (*2*) supplements the current edition of the MUTCD as adopted by Oregon in OAR 734-020-0005. Consult both the Oregon Supplement (*2*) and the MUTCD (*2*) when researching traffic control issues.

The Oregon Supplement (*2*) conforms to the organization and section numbering of the MUTCD. The two documents interact as follows:

- Unless otherwise noted, language in the Oregon Supplement (*2*) is added to the end of the referenced MUTCD (*1*) section.
- In other cases, the MUTCD (*1*) language is deleted and/or the Oregon Supplement (*2*) language inserted as directed by the instructions in italics.

The MUTCD (*1*) is available on the internet. Printed copies of the MUTCD and cost information are available from the American Association of State Highway and Transportation Officials (AASHTO), the Institute of Transportation Engineers (ITE), and the American Traffic Safety Services Association (ATSSA).

There are no exceptions to the MUTCD. FHWA adopts changes to the MUTCD (*1*) (see Section 1A.10 in the MUTCD (*1*) for the process to request a change). Requests to experiment include consideration of testing or evaluating new traffic control devices (see Section 1A.10 in the MUTCD (*1*)).

Support

The intent of the MUTCD (*1*) is to enhance road safety and operation by requiring uniform, understandable, and effective traffic control devices on Oregon highways.

Deviations to the MUTCD (*1*) are published in the Oregon Supplement to the MUTCD (*2*) and made for justifiable reasons such as instances where Oregon law deviates from the MUTCD (*1*).

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
5. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
6. Federal Highway Administration. *Standard Highway Signs and Markings*. Federal Highway Administration, Washington, D.C. https://mutcd.fhwa.dot.gov/ser-shs_millennium.htm.

File Code	Updated	Notes
TRA 16-09-02 (Sup.) TRA 16-09-05 (Rev.)	September 2010	Reformatted January 2020.

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Interim Approvals 300.1

Interim Approvals allow the interim use, pending official rulemaking by FHWA, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in the MUTCD (*1*).

Standards & Guidelines

01 See MUTCD (*1*) Section 1A.10 and the conditions in each Interim Approval.

Process & Required Approvals

Any jurisdiction that wishes to use an Interim Approval must request approval from FHWA to use the Interim Approval. ODOT, through the State Traffic-Roadway Engineer, can request to use an Interim Approval on behalf of all jurisdictions in the state. The State Traffic-Roadway Engineer might seek input from the Oregon Traffic Control Devices Committee before making such a request on behalf of all jurisdictions. **Table 300.1-A** lists current FHWA Interim Approvals granted to ODOT.

If FHWA grants interim approval for a device to ODOT, State Traffic-Roadway Engineer Approval might be required to use the device on state highways. **Sections 100.0** and **100.1** specify which of these devices require approval from the State Traffic-Roadway Engineer or Region Traffic Engineer to be installed.

Table 300.1-A: Current Oregon Interim Approvals

IA #	Description	Scope	Additional Guidance
IA-13	Electric Vehicle Charging Symbol Sign	Statewide	Sign Policy & Guidelines (*2*)
IA-14	Green colored Pavement for Bike Lanes	Statewide	Traffic Line Manual (*3*)
IA-16	Bicycle Signal Face	Statewide	Signal Policy & Guidelines (*4*) Signal Design Manual (*5*)
IA-17	3-Section Flashing Yellow Arrow Signal Face	Statewide	Signal Policy & Guidelines (*4*) Signal Design Manual (*5*)
IA-18	Intersection Bicycle Boxes	Statewide	Traffic Line Manual (*3*) Tech Bulletin TR17-02(B) (*6*)
IA-20	2-Stage Bicycle Turn Boxes	Statewide	Traffic Line Manual (*3*)
IA-21	Rectangular Rapid Flashing Beacons	Statewide	Traffic Manual Section 310.6
IA-22	Red-Colored Pavement for Transit Lanes	Statewide	Traffic Line Manual (*3*)

Support

State Traffic-Roadway Engineer approval is typically required to use an Interim Approval because:

- The device or use of the device is new and typically needs more attention until it is institutionalized, and
- A standard condition to have Interim Approval from FHWA is to track installations of Interim Approval devices. Approval records can serve as an inventory on the state highways.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
5. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
6. Oregon Department of Transportation. *Technical Bulletin TR17-02(B): Policy for Intersection Bicycle Boxes*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TR17-02B.pdf.

File Code	Updated	Notes
TRA 16-09	March 2020	Added IA-22 to Table 300.1-A.

New Products 300.2

Process & Required Approvals

Testing of many new products is performed in conjunction with the ODOT Construction Section, Federal Highway Administration, and/or manufacturers. The Traffic Systems Services Unit, Traffic Standards and Asset Management Unit, and the Traffic Engineering Services Unit tests products and evaluates traffic control devices and equipment. Manufacturers and suppliers can contact the Traffic-Roadway Section for information related to the proper process to obtain product approvals.

Special Considerations

All products approved for traffic signal construction are contained in the Blue (*1*)and Green (*2*)sheets. The Blue sheets contain field-qualified equipment and materials while the *Green* sheets list conditional qualified controller equipment.

The Traffic Standards and Asset Management Unit reviews new traffic signal products in cooperation with other units and adds new products to the Blue (*1*) or Green (*2*) sheets with related special provisions amended as necessary. The Blue and Green sheets for signal equipment are available from the State Traffic Signal Engineer of the Traffic Standards and Asset Management Unit.

Cross References

Key References

1. Oregon Department of Transportation. Blue Sheets: Prequalified Products and Submittals for Qualification of Electrical Equipment and Materials. *Signal Design Guidance Materials*, https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/BlueSheets.pdf. Accessed June 21, 2019.
2. Oregon Department of Transportation. Green Sheets: Conditionally Prequalified Products and Submittals for Conditional Qualification of Controller Equipment. *Signal Design Guidance Materials*, https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/GreenSheets.pdf. Accessed June 21, 2019.

File Code	Updated	Notes
MAT 00-02	December 2006	Reformatted January 2020.

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Traffic Control Device Visibility 300.3

Standards & Guidelines

01 Traffic control devices should be placed so that they do not obscure each other or are hidden by obstructions. Traffic control devices requiring decisions by the driver should be visible from a sufficient distance or placed sufficiently prior to the decision point so the required decision may be made and safely acted upon.

02 More information, standards, and guidance on vertical clearance are available in Highway Directive TRA 07-15 (*1*) and Tech Bulletin RD17-02(B) (*2*).

Special Considerations

Where visibility requirements of the MUTCD (*3*) cannot be met, suitable supplemental devices might be used to warn the approaching traffic.

Visibility distance and sight distance for traffic control devices are closely related and are the primary consideration for placement of traffic control devices. The MUTCD (*3*) contains visibility requirements for many traffic control devices. Although there are some set criteria for visibility of traffic control devices, it is still more of an art than a science.

There are many considerations when placing traffic control devices. Critical elements are vertical and lateral placement, as determined by typical driver eye position. The geometry of the roadway, including vertical and horizontal alignments, design speed for the facility and obstructions should all be considered.

Cross References

Key References

1. Oregon Department of Transportation. *Highway Directive TRA 07-15: Vertical Clearance*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TRA07-15d.pdf.
2. Oregon Department of Transportation. *Technical Bulletin RD17-02(B): Overhead Structures and Update to Vertical Clearance Standards and Guidance*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/RD17-02(B).pdf.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
Unassigned	January 2018	Added ref. to vert. clearance bulletin & dir. Reformat 1/2020.

Signs 302.0

Signs are traffic control devices intended to communicate specific information to road users through word, symbol, and/or arrow legends. Signs do not include highway traffic signals, pavement markings, delineators, or channelization devices.

Standards & Guidelines

01 See Part 2 of the MUTCD (*1*), the ODOT Sign Policy and Guidelines (*2*), and ODOT Sign Design Manual (*3*).

Process & Required Approvals

See the ODOT Sign Policy and Guidelines (*2*), the ODOT Sign Design Manual (*3*), and **Section 100.0** and **100.1** for signs that require State Traffic-Roadway Engineer and Region Traffic Engineer approval.

The Region Traffic Unit reviews and designs special signs requested by their District sign crew supervisors. The Region Traffic Unit approves orders and sends them to the sign shop for fabrication.

Special Considerations

ODOT is responsible for furnishing and maintaining directional, regulatory, warning, and informational signs on the state highway system. ODOT's sign policy is a combination of Oregon Revised Statutes (ORS), Oregon Administrative Rules (OAR), Federal Highway Administration (FHWA) rules and guidelines, and engineering judgment. The Oregon Transportation Commission (OTC) has adopted the MUTCD (*1*), Oregon Supplement to the MUTCD (*4*), and Oregon Temporary Traffic Control Handbook (*5*) as the sign manuals for the State of Oregon. The Sign Policy and Guidelines for the State Highway System (*2*) deal exclusively with items not included in the MUTCD (*1*) or items that need further clarification with respect to their use on the state highway system.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
3. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
4. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
5. Oregon Department of Transportation. Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less. http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf. Accessed February 1, 2013.

File Code	Updated	Notes
TRA 16-04	January 2020	Content moved to ODOT sign-specific publications

Variable Message Signs 302.1

A variable message sign (VMS) is a traffic control device (permanent or portable) whose message can be changed to provide motorists with information about traffic congestion, traffic crashes, travel time, maintenance operations, adverse weather conditions, roadway conditions, organized events, or other highway features.

Standards & Guidelines

01 For permanent VMS, see the ODOT Guidelines for the Operation of Variable Message Signs on State Highways (*1*).

02 For temporary changeable signs, see the Oregon Portable Changeable Message Sign Handbook (*2*).

Process & Required Approvals

According to OAR 734-020-0410, the State Traffic-Roadway Engineer is responsible for exercising authority with respect to the use of traffic control devices. Since variable message signs are traffic control devices, their operation is under the authority of the State Traffic-Roadway Engineer.

Installation and location of a permanent VMS on state highways requires consultation with the Intelligent Transportation Systems Unit, Region Traffic Engineer, and the approval of the State Traffic-Roadway Engineer. For new installations including signs associated with Variable Speed Zones, approval of the State Traffic-Roadway Engineer should be obtained by DAP. If a VMS is part of a project, the project shall not be released for construction under any circumstance without State Traffic-Roadway Engineer approval to install the VMS. Permanent signs may also display public service messages with approval from the State Traffic-Roadway Engineer.

Once the State Traffic-Roadway Engineer receives a request for installation of a permanent VMS, Traffic-Roadway Section staff will coordinate review with Intelligent Transportation Systems Unit staff and will make a recommendation to the State Traffic-Roadway Engineer. If the information provided is insufficient, the State Traffic-Roadway Engineer may request additional information from both the Region Traffic Unit and Intelligent Transportation Systems Unit before any approval decision.

If the VMS is planned to be part of a Variable Speed Zone system (i.e. to inform road users of road conditions, in addition to the variable speed signs), the submittal to the State Traffic-Roadway Engineer shall include all requirements found in the Variable Speed Zones section of this manual (**Section 500.1**).

The Region Traffic Engineer has the responsibility to approve messages displayed on permanent VMS in his or her region; however, the State Traffic-Roadway Engineer has retained the authority to approve public services messages, which may be displayed on permanent variable message signs only.

Special Considerations

The following considerations that should be addressed in the approval request submitted to the State Traffic-Roadway Engineer. These considerations should not be interpreted as pass/fail criteria for installation of a permanent VMS. Rather, they have been identified as important considerations to take into account when proposing permanent VMS installations on state highways:

- Signs should be placed far enough in advance of a decision point (e.g. interchange, major intersection, merge section at the end of a passing lane, etc.) to allow drivers enough time to read and understand the message before having to refocus their attention on the driving task. As a general rule, signs should be located at least 1 mile in advance of decision points on non-freeway installations and 1½ to 3 miles for freeway installations. In urban contexts, VMS locations might need to be more closely spaced to decision points.
- The availability of power and communications should be noted in all requests for permanent VMS installations.

A full matrix color VMS is capable of displaying advisory or regulatory information that replicates static signs in accordance with Chapter 2L of the MUTCD (*3*). Applications include displaying advisory or adjusted regulatory speeds based on congestion, weather, and/or road surface conditions.

Cross References

Key References

1. Oregon Department of Transportation. *Guidelines for the Operation of Permanent Variable Message Signs*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/VMS-Guidelines.pdf.
2. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.

3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TSO 04, TSO 05	January 2020	Clarified differences between permanent & portable VMS.

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Vehicle Speed Feedback Signs 302.2

The MUTCD (*1*) allows the option of using changeable message signs in conjunction with a Speed Limit sign or a School Speed Limit Assembly (See Parts 2 and 7 of the MUTCD (*1*)) to display the speed at which approaching drivers are traveling. ODOT refers to these signs as Vehicle Speed Feedback Signs to avoid confusing this sign with other types of changeable message signs.

Standards & Guidelines

01 The decision to install a Vehicle Speed Feedback Sign should be based on an engineering study.

02 A Vehicle Speed Feedback Sign may be used with advisory speed signs and with temporary signs in temporary traffic control zones.

03 See the Sign Design Manual (*2*) and Sign Policy and Guidelines (*3*) for design and installation details of vehicle speed feedback signs.

Process & Required Approvals

The installation of a Vehicle Speed Feedback Sign requires approval by the Region Traffic Engineer.

A Vehicle Speed Feedback Sign may be installed by a local jurisdiction on a state highway if the local jurisdiction agrees to enter into an Inter-Governmental Agreement with ODOT and assumes responsibility for all costs associated with the Vehicle Speed Feedback Sign including installation and maintenance.

Special Considerations

The following criteria should be considered in the engineering study for a Vehicle Speed Feedback Sign installation:

- Crash experience within the past three years.
- 85th percentile speed within the area (Note: For a proposed Vehicle Speed Feedback Sign in conjunction with a School Speed Limit sign, the 85th percentile speed should be measured during the hours children are arriving or leaving school grounds).
- Roadside environment factors such as pedestrian activity, roadside character, and land use within the area.

When used in conjunction with School Speed Limit signs, Vehicle Speed Feedback Signs are generally more effective when they display speeds only when children arrive to and leave from school.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
3. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.

File Code	Updated	Notes
TRA 16-04	January 2020	Moved sign design and installation info to sign publications.

Highway Advisory Radio 302.3

The Federal Communications Commission (FCC) licenses state and local agencies and government-affiliated agencies, such as airport authorities, to use low-power roadside transmitters to provide motorists with up-to-the-minute travel information via their AM/FM radios. These systems, which the FCC calls Travelers Information Stations (TIS), can provide warnings, advisories, directions, or other non-commercial material of importance to motorists. The FCC issues these licenses and ODOT must operate the licenses in compliance with federal rule 47 CFR Chapter I, Part 90.242.

TIS operated by ODOT are Highway Advisory Radio (HAR). ODOT utilizes HAR to supplement messages provided on standard highway signs or variable message signs.

Standards & Guidelines

01 These signs must be installed in accordance with the guidelines given in ODOT's Sign Policy and Guidelines for the State Highway System (*1*) .

02 The "Guidelines for the Operation of Highway Advisory Radio and Traveler's Advisory Radio on State Highways" (*2*) provides all of the guidelines and requirements for installing and operating HAR stations on state highways.

Process & Required Approvals

For ODOT HAR, the ITS Unit works with the Wireless Group of the Maintenance and Operations Branch to obtain and maintain the required FCC licenses. A license is specific to a transmitter location and broadcast area for permanent HAR installations.

The FCC requires an area license for temporary HAR, which allows use on any state highway or for a specific corridor. ODOT does not maintain any license for temporary HAR; any temporary installations must obtain the required FCC license.

For TIS operated by other state agencies and local agencies with an established FCC license, advance signs may be posted on a state highway with State Traffic-Roadway Engineer approval.

Special Considerations

HAR are permanently installed at locations where communication with travelers may be critical and may be temporarily installed in some work zones to provide travelers with timely information about a construction or maintenance project. Advance signs are posted to inform motorists about the availability of a HAR.

Messages, which are usually less than a minute in length, are recorded for continuous repetition. The message length is adjusted to permit the driver to receive the message at least twice while passing through the station's coverage zone.

Examples of TIS uses other than for state highway information include severe weather alerts, Port traffic instructions, event management and local road construction or other detours.

Cross References

Key References

1. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
2. Oregon Department of Transportation. *Guidelines for the Operation of Highway Advisory Radio and Other Travelers Information Stations on State Highways*. Oregon Department of Transportation, Salem, Oregon.

File Code	New	Notes
TRA 27-08	March 2008	Reformatted January 2020.

Horizontal Alignment Signs 302.4

Standards & Guidelines

01 See Part 2 of the MUTCD (*1*), the ODOT Sign Policy and Guidelines (*2*), and Technical Bulletin TR15-01(B) (*3*).

Process & Required Approvals

See Technical Bulletin TR15-01(B) (*3*).

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
3. Oregon Department of Transportation. *Technical Bulletin TR15-01(B): State-wide Policy for Installing Chevrons, Arrows and Advisory Speed Plaques*. Oregon Department of Transportation, Salem, Oregon, 2015. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TR15-01b.pdf.

File Code	Updated	Notes
TRA 16-04	January 2020	Updated title and file code.

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Pavement Markings 303.0

The traveling public relies heavily on pavement markings for guidance, positioning, and navigation. Uniform application of pavement markings improves roadway safety and efficiency. Road users have limited attention and ability to process information, and they primarily respond to markings based on what they have previously experienced; design standards can enhance learned behavior expectations (*1*) (*2*). Pavement markings have some limitations, but they have the advantage of communicating information to road users without diverting their attention away from the roadway.

Standards & Guidelines

01 The Traffic Line Manual (*3*) contains the ODOT policy and guidelines for installation of pavement markings. See the Pavement Marking Design Guidelines (*4*) and Traffic Line Manual (*3*) for information on developing pavement marking plans.

Process & Required Approvals

See the Traffic Line Manual (*3*) for specific processes and approval requirements related to pavement markings.

Special Considerations

The Pavement Marking Design Guidelines (*4*), based on the Oregon Standard Specifications for Construction and ODOT project delivery process, provide information to assist designers in the preparation of striping plans.

Cross References

Key References

1. Campbell, J. L., M. G. Lichty, J. L. Brown, C. M. Richard, J. S. Graving, J. Grahm, M. O'Laughlin, D. Torbic, and D. Harwood. *NCHRP Report 600: Human Factors Guidelines for Road Systems*. Transportation Research Board of the National Academies, Washington D.C., 2012. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_600second.pdf.
2. American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Oregon Department of Transportation. *ODOT Pavement Marking Design Guidelines*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Pavement-Marking-Design-Guide.pdf.

File Code	Updated	Notes
TRA 16-02	January 2020	Removed sections covered in the Traffic Line Manual.

Rumble Strips 303.1

Longitudinal rumble strips are an engineering treatment designed to alert drivers of a lane departure through vibration and noise created when a vehicle's tires contact the rumble strip.

Transverse rumble strips, placed perpendicular to the direction of travel, enhance other traffic control devices and warn road users of an unusual situation.

Standards & Guidelines

01 See the Traffic Line Manual (*1*) for standards and guidelines on longitudinal and permanent transverse rumble strips.

02 Longitudinal rumble strips shall be installed on STIP projects according to the Traffic Line Manual (*1*).

03 When installing new or modifying existing rumble strips, public outreach should be completed explaining the purpose of the rumble strip installation.

04 See the Traffic Control Plan Design Manual (*2*) for standards and guidelines on temporary transverse rumble strips.

Process & Required Approvals

Construction Section's Pavement Services Unit shall be contacted early in the project planning process for all rumble strip installations to evaluate impacts to pavements. The Pavement Services Unit will develop pavement-related recommendations on the installation of rumble strips in collaboration with the District Manager and the Region Traffic Engineer.

Pavement-related recommendations should consider road user safety as the top priority; pavement condition, potential impacts on pavement condition and/or increased risk of pavement failure by installing rumble strips are additional considerations.

Funding sources for longitudinal rumble strip work on STIP projects is listed in **Table 303.1-A**.

Table 303.1-A: Longitudinal Rumble Strip Funding on STIP Projects

Work	**Funding Source**
Initial installation of Rumble Strips during STIP paving projects.	Eligible to use safety funds. Projects must engage the ARTS project selection process to qualify for safety funds.
Initial installation of pavement markings placed over new or reinstalled edge line and centerline rumble strips.	Eligible to use safety funds. Projects must engage the ARTS project selection process to qualify for safety funds.
Reinstallation of rumble strips during STIP projects.	Project primary funding source (in the same manner as pavement markings that are removed and reinstalled due to preservation work).

Region Traffic Engineer approval is required to omit longitudinal rumble strips or adjust minimum clear shoulder widths in certain circumstances detailed in the Traffic Line Manual (*1*). State Traffic-Roadway Engineer approval is required to omit longitudinal rumble strips or adjust minimum clear shoulder widths in circumstances not detailed in the Traffic Line Manual.

Region Traffic Engineer approval is required for installation of permanent transverse rumble strips associated with a Stop Ahead (W3-1) warning signs on State Highways or local public road approaches to a State Highway. State Traffic-Roadway Engineer approval is required for all other permanent transverse rumble strips on State Highways.

Region Traffic Engineer approval is required to use temporary portable transverse rumble strips in short term stationary work zones. The State Traffic-Roadway Engineer must approve all other temporary transverse rumble strip applications on State Highways (Form 734-2886). See the Traffic Control Plan Design Manual (*2*) for more information on process and required approvals for temporary transverse rumble strips.

Special Considerations

Permanent milled-in *transverse* rumble strips can be used on new or existing bituminous pavement where crash history indicates a large number of intersection crashes that would be treatable with transverse rumble strips. To retrofit transverse rumble strips on existing pavement, the pavement should be in sufficiently good condition to accept the milling process without raveling or deteriorating. Otherwise, the pavement should be upgraded prior to milling. If installed near residential areas, consider the noise impacts.

Support

Longitudinal Rumble Strips

A roadway departure crash occurs after a vehicle crosses an edge line or a centerline or otherwise leaves the traveled way. Roadway departure crashes are the most common type of fatal and serious injury crash on Oregon's rural highways. Between 2009 and 2013, approximately 53 percent of all fatal and serious injury crashes in Oregon included a roadway departure, contributing to 1,188 fatalities and 3,745 serious injuries. About 73 percent of these crashes were in a rural environment (*3*).

Rumble strips are a highly effective and cost efficient method of reducing roadway departure crashes. See **Table 303.1-B** for NCHRP Report 641 (*4*) estimates of safety effectiveness for rumble strips based on roadway functional classification:

Table 303.1-B: Estimated Crash Reduction using Rumble Strips

Facility Type	Rumble Strip Location	All Roadway Departure Crashes	Fatal & Injury Roadway Departure Crashes
Rural Freeway	Shoulder	11% (SE=6)	16% (SE=8)
Rural Multi-Lane Divided Highway	Shoulder	22% (SE not reported)	51% (SE not reported)
Rural 2-Lane Highway	Shoulder	15% (SE=7)	29% (SE=9)
Rural 2-Lane Highway	Centerline	30% (SE=5)	44% (SE=6)
Urban 2-lane Highway	Centerline	40% (SE=17)	64% (SE=27)

The objective of ODOT's rumble strip policy is to reduce lane departure crashes by installing rumbles strips on as many rural state highways as practical. Implementation of this policy for new rumble strips is incremental as STIP projects address highway sections and as safety funds through the All Roads Transportation Safety (ARTS) program allow. See the Traffic Line Manual (*1*) for additional supporting information.

Transverse Rumble Strips

Transverse rumble strips help make drivers aware of an approaching condition, but the rumble strips themselves do not communicate what action the driver needs to make in response to the condition (*5*).

Milled-in transverse rumble strips can be effective at reducing fatal and serious injury crashes at minor road stop-controlled intersections (*6*). These rumble strips might increase property-damage-only crashes, though the reason for this increase is not clear (*6*). One theory is the rumble strips increase speed variability, which might increase rear-end crashes (*5*) (*7*).

Transverse rumble strips generally do not have a practical effect on reducing vehicle speed at approaches to stop-controlled intersections (≤1-2 mph) (*5*) (*8*) (*9*) and in speed transition zones (*10*).

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
3. Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.
4. Torbic, D. J., J. M. Hutton, C. D. Bokenkroger, K. M. Bauer, D. W. Harwood, D. K. Gilmore, J. M. Dunn, J. J. Ronchetto, E. T. Donnell, H. J. Sommer III, P. Garvey, B. Persaud, and C. Lyon. NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips. Transportation Research Board of the National Academies, Washington, D.C., ISBN 978-0-309-11799-9, 2009. DOI: https://dx.doi.org/10.17226/14323
5. Brian, R., W. Kittleson, J. Knudsen, B. Nevers, P. Ryus, K. Sylvester, I. Potts, D. Harwood, D. Gilmore, D. Torbic, F. Hanscom, J. McGill, and D. Stewart. *NCHRP Report 613: Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections*. Transportation Research Board of the National Academies, Washington, D.C., 2008. http://www.trb.org/Publications/Blurbs/160046.aspx.
6. Srinivasan, R., J. Baek, and F. Council. Safety Evaluation of Transverse Rumble Strips on Approaches to Stop-Controlled Intersections in Rural Areas. in *2010 Annual Meeting of the Transportation Research Board*, Washington, D.C., September 2010.
7. Isebrands, H., S. Hallmark, and N. Hawkins. Effects of Approach Speed at Rural High-Speed Intersections: Roundabouts Versus Two-Way-Stop Control. *Transportation Research Record: Journal of the Transportation Research Board Online*, Vol. 2402, 2014, pp. 67-77. http://trrjournalonline.trb.org/doi/abs/10.3141/2402-08. DOI: https://doi.org/10.3141/2402-08
8. Thompson, T. D., M. W. Burris, and P. J. Carlson. Speed Changes Due to Transverse Rumble Strips on Approaches to High-Speed Stop-Controlled Intersections. *Transportation Research Record: Journal of the Transportation Research Board Online*, Vol. 1973, 2006, pp. 1-9. http://trrjournalonline.trb.org/doi/abs/10.3141/1973-03. DOI: 10.3141/1973-03
9. Yang, L., H. Zhou, L. Zhu, and H. Qu. Operation Effects of Transverse Rumble Strips on Approaches to High-Speed Intersections. *Transportation Research Record: Journal of the Transportation Research Record Online*, Vol. 2602, 2016, pp. 78-87. http://trrjournalonline.trb.org/doi/abs/10.3141/2602-10. DOI: 10.3141/2602-10
10. Torbic, D. J., D. K. Gilmore, K. M. Bauer, C. D. Bokenkroger, D. W. Harwood, L. M. Lucas, R. J. Frazier, C. S. Kinzel, D. L. Petree, and M. D. Forsberg. *NCHRP Report 737: Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways*. Transportation Research Board of the National Academies, Washington, D.C., 2012. http://www.trb.org/Publications/Blurbs/168309.aspx.

File Code	Updated	Notes
RES 08-02	January 2020	Incorporated Tech Bulletin TR17-03(B).

Traffic Signals 304.0

Standards & Guidelines

01 See the Traffic Signal Policy and Guidelines (*1*) and Signal Design Manual (*2*).

Process & Required Approvals

Before proceeding to the traffic signal approval process, complete a comprehensive Intersection Traffic Control Study. The study must compare reasonable alternatives to a traffic signal such as stop control, roundabout, intersection relocation or reconfiguration, and possibly grade separation. Traffic signal projects being considered for inclusion in the STIP should be identified as an "intersection improvement" project rather than a traffic signal, roundabout, or other type of traffic control until such time that an Intersection Traffic Control Study has been conducted and consensus has been reached on the proper traffic control solution for the intersection.

The State Traffic-Roadway Engineer has been delegated the authority through Administrative Rule to approve the installation of traffic control devices on state highways. The traffic signal approval process is established in OAR 734-020-0400 through 734-020- 0500. The State Traffic-Roadway Engineer must approve the installation of all temporary and permanent traffic signals on state highways, including those in the STIP or any other funding source.

All submittals for approval of a traffic signal on a state highway should come through the Region Traffic Engineer. The Region Traffic Engineer should submit a letter with an Intersection Traffic Control Study to the State Traffic-Roadway Engineer. Traffic-Roadway Section staff will review the request. One or more of the warrants identified in Part 4 of the MUTCD (*3*) must be met unless the traffic signal meets the criteria for special applications. The satisfaction of a warrant or warrants, however, is not in itself justification for a traffic signal. The Intersection Traffic Control Study must indicate that the installation of a traffic signal will improve the overall safety and operation of the intersection and be the preferred intersection control alternative.

If approved, the Region Traffic Engineer will receive a letter of approval signed by the State Traffic-Roadway Engineer. The letter will include guidance regarding the proposed lane configuration and phasing. If a traffic signal is not advanced to construction within five years after approval, the approval is automatically rescinded.

Whether ODOT staff or a consultant under contract to ODOT or another public or private entity designs a signal, all signals planned for construction on a state highway must meet all applicable MUTCD (*3*) and ODOT standards. The signal design must be consistent with specific elements outlined in the operational approval.

The Traffic-Roadway Section must still approve the signal plans and specifications for all work on State Highways. Submit design plans to the Traffic Standards and Asset Management Unit for review at all major milestones (i.e.: DAP, preliminary, advanced, plans-in-hand). That unit must approve the final design.

Modifications

An Intersection Traffic Control Study that includes the applicable elements is required to support a modification request sent to the State Traffic-Roadway Engineer. Traffic Signal Modifications approved by the Region Traffic Engineer (see Region Traffic Engineer Authority **Section 100.1**) should be documented and a copy of the documentation forwarded to the State Traffic-Roadway Engineer.

Removal

A request to remove an existing traffic signal should be documented in an engineering investigation or Intersection Traffic Control Study. Removal of a signal requires a review of warrants, public notification and interim control of the intersection. Other conditions may be applicable. See the Traffic Signal Policy and Guidelines (*1*) for details.

Temporary Traffic Signals

Temporary traffic signals are short-term installations, yet their appearance, design, and operation follow the same standards as permanent signals. The State Traffic-Roadway Engineer must approve temporary signals. The installation of temporary signals must meet all applicable MUTCD (*3*) and ODOT standards. See the Traffic Signal Design Manual (*2*) for details.

Turn Lanes at Signalized Intersections

Policies and guidance for turn lanes at signalized intersections are included in both the Traffic Signal Policy and Guidelines (*1*) and in other sections of the Traffic Manual. Please refer to the Left-Turn Lanes, Multiple Turn Lanes, and Right-Turn Lanes sections of this manual.

Audible Pedestrian Signals

Region Traffic Engineer approval is required to install audible pedestrian signals. Follow the policies set forth in the Traffic Signal Policy and Guidelines (*1*). The State Traffic-Roadway Engineer must approve exceptions to the policy.

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-06	January 2020	Updated to match current OAR.

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Traffic Signal Enforcement 304.1

The two primary safety countermeasures used to reduce red-light running crashes are Red-Signal Enforcement Lights and Red-Light Cameras.

Standards & Guidelines

01 See the Red-Light Running Camera Guidelines for State Highways (*1*). Refer to ORS 810.434 through 810.437 for legal requirements concerning red light cameras. See the Sign Policy and Guidelines for the State Highway System (*2*) and the MUTCD (*3*) for signs associated with red light cameral installations.

02 Red-Signal Enforcement Lights shall be colored white in order to avoid confusion with traffic signal control indications.

03 The local law enforcement agency should be committed to an enforcement plan and obtain judicial support for prior acceptance of the citations given based on the operation of enforcement lights to ensure effectiveness prior to the deployment of Red-Signal Enforcement Lights.

04 Red-Signal Enforcement Lights shall be positioned to be visible to downstream enforcement officers while not visible on the upstream approach. Ideal locations would allow officers to see the intersection's upstream stop bar from the downstream staging location.

05 Red-Signal Enforcement Lights should be high enough to be seen over tall vehicles and out of reach of vandals.

Process & Required Approvals

State Traffic-Roadway Engineer approval is required for Red Light Running Camera installation and operation at all State-owned intersections, including adding speed enforcement to an existing RLR installation, regardless of operation or maintenance responsibilities. See the Red Light Running Camera Guidelines for State Highways (*1*) for approval procedures on state highways.

Region Traffic Engineer approval is required to add Red-Signal Enforcement Lights at a traffic signal.

Special Considerations

Red-Light Running Camera systems are used primarily to reducing red-light running crashes. Oregon law also allows these camera systems to enforce speed limits, though this functionality is secondary to reducing red-light running crashes.

Red-Signal Enforcement Lights are only effective when combined with red-light running enforcement efforts.

Red-Signal Enforcement Lights have many other names including red light indicators, signal indicator lights, enforcement lights, white enforcement lights, rat lights, or tattletale lights.

The Red-Signal Enforcement Light activates simultaneously with the red signal phase, providing an enforcement officer located downstream from an intersection with a visible indication of the upstream red phase so they can determine when a vehicle has violated the red phase. The enforcement lights are mounted on the rear of a traffic signal and are directly wired into the signal head for accurate red-signal indication.

The Oregon Standard Details give installation details for Red-Signal Enforcement Lights.

Support

Red light running is a serious intersection safety issue in Oregon. According to the Oregon Intersection Safety Implementation Plan (*4*), from 2005-2010 there were more than 55,000 reported crashes at signalized intersections resulting in 145 fatalities and 1,452 serious injuries. The Insurance Institute for Highway Safety (IIHS) reports that half of the people killed in red-light running crashes are not the signal violators. They are drivers and pedestrians hit by red-light runners (*5*) . The following statistics further amplify why red-light running is an issue that requires attention:

- 97% of drivers feel that other drivers running red lights are a major safety threat (*6*).
- 1 in 3 people claim they personally know someone injured or killed in a red-light running crash (*7*).

Red-Signal Enforcement Lights can enhance safety at signalized intersections by improving red-light compliance when combined with an aggressive enforcement strategy, resulting in a reduction of red-light running violations. They are auxiliary lights connected to a traffic-control signal to help law enforcement officers more efficiently and safely issue citations for drivers who violate the red phase of the signal.

Cross References

Key References

1. Oregon Department of Transportation & Oregon Traffic Control Devices Committee. *Red Light Running (RLR) Camera Guidelines for State Highways*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Red-Light-Camera-Guidelines.pdf.

2. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
4. Oregon Department of Transportation. Oregon Intersection Safety Implementation Plan. Salem, Oregon, 2012. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Intersection_Safety_Implementation_Plan.pdf.
5. Insurance Institute for Highway Safety. Red Light Cameras in Philadelphia All But Eliminate Violations. *Status Report*, Vol. 42, no. 1, January 2007. http://www.iihs.org/iihs/sr/statusreport/article/42/1/1.
6. Royal, D. Volume II: Findings: National Survey of Speeding and Unsafe Driving Attitudes and Behavior. The Gallup Organization, Washington, D.C., DOT HS 809 688, 2003. https://www.nhtsa.gov/people/injury/drowsy_driving1/speed_volII_finding/SpeedVolumeIIFindingsFinal.pdf.
7. Porter, B. E., T. D. Berry, J. Harlow, and T. Vandecar. A Nationwide Survey of Red Light Running: Measuring Driver Behaviors for the "Stop Red Light Running" Program. Old Dominion University, Norfolk, Virginia, 1999. https://trid.trb.org/view/636152.

File Code	Updated	Notes
TRA 16-30-31	January 2020	Updated ORS references, added reference for approval.

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Flashing Beacons 304.2

Flashing beacons include Intersection Control Beacons, Warning Beacons, Speed Limit Sign Beacons, and Stop Beacons.

Standards & Guidelines

01 See Part 4 of the MUTCD (*1*) and the Signal Design Manual (*2*).

Process & Required Approvals

The installation or removal of a Warning Beacon as a supplemental emphasis to existing warning signs (except for Emergency Signal signs) requires Region Traffic Engineer approval. The installation or removal of a Warning Beacon as a supplement to Emergency Signal signs requires the approval of the State Traffic-Roadway Engineer.

Special Considerations

All Flashing Beacons are supplemental to the appropriate warning or regulatory signing.

Intersection Control Beacon

ODOT takes a conservative approach to installing an Intersection Control Beacon at intersections with a history of crashes involving disregard of existing STOP or YIELD signs. A Warning Beacon installed as supplemental emphasis to an Intersection Warning or Stop Ahead sign may be more effective in warning traffic of an upcoming intersection than an Intersection Control Beacon. In addition, a Stop Beacon installed above the STOP sign on a stop-controlled side street approaching the state highway is an effective and less costly safety measure to install when compared to an Intersection Control Beacon.

Several research studies have tried to establish the effectiveness of an Intersection Control Beacon in reducing crashes at intersections. All such studies have been inconclusive. Some States have established policies for removing an Intersection Control Beacon at a two-way stop-controlled intersection due to confusion for drivers approaching the intersection from the stop-controlled side street. Drivers from the stop-controlled side street can see that all approaches of traffic have an indication, but cannot see the color of the indications for the other approach directions. Therefore, drivers from the stop-controlled side street might assume that all approaches have red indications and must stop. Regardless, it does not appear the installation of an Intersection Control Beacon alone is an effective safety measure.

Installation of an Intersection Control Beacon should only be considered if safety improvements at an intersection still leave some doubt as to the visibility of the intersection or type of intersection control.

Warning Beacon

See Part 4 of the MUTCD (*1*) for typical applications of Warning Beacons and the Standards, Guidance, and Options that apply to such installations.

Speed Limit Sign Beacon

ODOT has limited use of the Speed Limit Sign Beacon on state highways to only those conditions covered by School Speed Limit Assemblies in Part 7 of the MUTCD (*1*) and in accordance with Oregon Revised Statute 811.111. Further guidance on the use of Speed Limit Sign Beacons is contained in A Guide to School Area Safety (*3*). While use of a Speed Limit Sign Beacon to indicate children arriving at or leaving school does not require the approval of the State Traffic-Roadway Engineer, the use of a Speed Limit Sign Beacon may be required as a condition of the School Speed Zone by the State Traffic-Roadway Engineer.

Stop Beacon

Use of a Stop Beacon installed above the STOP sign on a stop-controlled side street approaching the state highway can be an effective and less costly safety measure to install when compared to an Intersection Control Beacon. Consult Part 4 of the MUTCD (*1*) for Standards associated with the installation of a Stop Beacon.

Cross References

State Traffic-Roadway Engineer 100.0
Region Traffic Engineer 100.1
Uniform Traffic Control Devices 300.0
Signs 302.0
Traffic Signals 304.0
Active Warning Signs at Bridges and Tunnels 309.1
Pedestrian Activated Warning Lights/Beacons 310.6
STOP Sign Applications 402.0
School Speed Zones 500.3

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.

File Code	Updated	Notes
TRA 16-06-42	January 2020	Added reference to Signal Design Manual.

Temporary Traffic Control 306.0

The primary function of temporary traffic control is to provide safe and efficient movement of road users through or around work zones while protecting workers and emergency response personnel.

Standards & Guidelines

01 See the MUTCD (*1*) and the following publications:

a. Traffic Control Plan Design Manual (*2*),
b. Work Zone Traffic Analysis Handbook (*3*),
c. Oregon Temporary Traffic Control Handbook (*4*),
d. Transportation Management Plan Guidance Manual (*5*),
e. Oregon Portable Changeable Message Sign Handbook (*6*),
f. Traffic Signal Policy and Guidelines (*7*),
g. Traffic Signal Design Manual (*8*),
h. Sign Policy and Guidelines (*9*), and
i. Mobility Procedures Manual (*10*).

Process & Required Approvals

The Traffic-Roadway Section serves as an internal consultant on temporary traffic control by providing recommendations on lane usage, detours, signal timing, staging, and feasibility of project plans. See the Traffic Control Plan Design Manual (*2*) for processes and approvals related to temporary traffic control on state highways. See the Oregon Portable Changeable Message Sign Handbook (*6*) for approval requirements for use of PCMS and messages displayed on PCMS.

Some elements of a temporary traffic control plan require State Traffic-Roadway Engineer approval. These include:

- Temporary or portable signals
- Temporary pedestrian activated beacons (e.g. RRFB)
- Work zone speed reduction, and
- Temporary transverse rumble strips.

See the Traffic Control Plan Design Manual (*2*) for considerations of these elements.

Temporary modifications to existing signals for temporary traffic control, including but not limited to phasing, timing, and signal head locations, requires Region Traffic Engineer approval.

Portable traffic signals are subject to testing by the Traffic Systems Services Unit and shall be certified as having passed ODOT laboratory tests. The Region Traffic Engineer must approve timing of all signal intervals.

Special Considerations

Typical Deliverables

Traffic control plans will vary depending on project complexity. However, every traffic control plan for an ODOT project (developed internally or externally) typically includes the following deliverables:

Temporary Pedestrian Accessible Route Plan (TPARP)

The TPARP is a written and drawn plan within the Temporary Traffic Control Plan that identifies requirements for providing safe, effective, and accessible routes for pedestrians through or around the work zone. See Technical Directive TSB17-01(D) (*11*) for more information about TPARPs, including what projects require a TPARP.

Work Zone Decision Tree (WZDT)

The WZDT is a decision matrix to help temporary traffic control designers vet design considerations. See Highway Directive TRA 10-16 (*12*), Oregon Work Zone Safety Executive Steering Committee Guiding Principle (*13*), and the TCP Design Manual (*2*) for more information about the WZDT.

Transportation Management Plan (TMP)

A TMP is a documented set of coordinated transportation management strategies used to manage the impacts of work zones. See Highway Directive TRA 10-16 (*12*), TCP Design Manual (*2*), and TMP Project Level Guidance Manual (*5*) for more information about TMPs.

Work Zone Traffic Analysis

A WZTA is an estimate of work zone impacts to traffic flow (e.g. during lane closures, shoulder closures, and detours). See the Work Zone Traffic Analysis Handbook (*3*) for more information about WZTA.

Oregon Temporary Traffic Control Handbook

The Oregon Temporary Traffic Control Handbook (OTTCH) (*4*) provides a reference for the principles and standards for temporary traffic control zones in place continuously for three days or less on public roads in Oregon. It is based on the principles set forth in Part 6 of the MUTCD (*1*) and is officially recognized as the standard for temporary traffic control zones of three days or less in Oregon in accordance with OAR 734-020-0005.

For work requiring devices in place longer than three days, a site-specific traffic control plan based on the principles in Part 6 of the MUTCD (*1*) and the publications listed in the

Standards and Guidelines subsection is required. In addition, OR-OSHA has the authority to set and enforce worker safety standards.

The OTTCH (*4*) is applicable to all public roads in Oregon. Each road jurisdiction (City, County, or State) may have additional or more restrictive requirements, and will generally require permits to work in their public right of-way. Contact the appropriate road jurisdiction prior to planning or beginning any work within their jurisdiction.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.
3. Oregon Department of Transportation. *Web-Based Work Zone Traffic Analysis Tool Users' Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone-Analysis-Manual.pdf.
4. Oregon Department of Transportation. Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less. http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf. Accessed February 1, 2013.
5. Oregon Department of Transportation. *Transportation Management Plan (TMP) Project Level Guidance Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/TMP-Manual.pdf.
6. Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.
7. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

8. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
9. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
10. Oregon Department of Transportation. *Mobility Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/MCT/Documents/MobilityProcedureManual.pdf.
11. Oregon Department of Transportation. *Technical Services Directive TSB17-01(D): Traffic Control Plan Design*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TSB17-01D.pdf.
12. Oregon Department of Transportation. *Highway Directive TRA 10-16: Guiding Principle for Work Zone Safety*. Oregon Department of Transportation, Salem, Oregon, 2016. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TRA10-16d.pdf.
13. Oregon Department of Transportation; Oregon Trucking Associations, Inc.; Associated General Contractors Oregon Columbia Chapter; Oregon State University; AAA; Oregon State Police. Oregon Work Zone Safety Executive Steering Committee Guiding Principle. December 7, 2015. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone_Guiding-Principle.pdf. Accessed May 31, 2019.

File Code	Updated	Notes
TRA 10-16	January 2020	Removed redundant content. Added deliverables subsection.

Railroad Crossings 308.0

Standards & Guidelines

01 See the Traffic Signal Design Manual (*1*), Traffic Signal Policy and Guidelines (*2*), Traffic Line Manual (*3*), and Oregon Supplement to the MUTCD (*4*) for design and operation details for railroad crossings.

Process & Required Approvals

Railroad crossings and traffic control devices used within the crossing area are under the jurisdiction of the ODOT Rail & Public Transit Division. A Railroad Crossing Order for each public road grade crossing summarizes the obligations, including but not limited to, design, cost, maintenance, signals, signs, and operational requirements for all involved parties.

An additional lane constitutes an alteration (OAR Ch. 741) to the grade crossing, which requires ODOT Rail & Public Transit Division approval as included in a Crossing Order. The following is the procedure for the investigation of added stop lanes for at-grade railroad crossings. The purpose is to determine the need for additional stopping lanes at railroad at-grade crossings of a state highway when such crossings become involved in a major reconstruction project.

1. The Project Leader determines an at-grade railroad crossing will exist within the project limits and requests an investigation from the Region Traffic Engineer.
2. A Field Diagnostic Review through the ODOT Rail & Public Transit Division determines the need for adding stopping lanes or justifying the omission of such lanes from the location project. If the existing facility has paved shoulders of adequate width to accommodate vehicles that must come to a stop at a rail crossing, added stopping lanes might not be needed. The Field Diagnostic Review may perform a traffic engineering study considering at a minimum the following data: average daily traffic volumes, number of train movements, an estimate of the number of vehicles required to stop, a gap study, posted speed or 85th percentile speed, physical characteristics, alignment, terrain, and sight distance. The Diagnostic Team prepares a report and makes a recommendation to the ODOT Rail & Public Transit Division Manager for inclusion in the Crossing Order if a stopping lane is required. If not required, all parties should be so informed.
3. The Rail & Public Transit Division Manager considers information submitted by the Region Traffic Engineer for the required crossing order. Rail & Public Transit Division must have ample opportunity to provide input and assure proper coordination with the affected railroad company, and forward copies of Crossing Order to all interested parties.
4. The Project Leader complies with the terms of the Crossing Order, contacts Region Traffic Engineer (if any questions arise), and proceeds to develop appropriate plans.

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
2. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Oregon Department of Transportation. *Oregon Supplement to the 2009 MUTCD*, 2009 ed. Oregon Department of Transportation, Salem, Oregon, 2011. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.

File Code	Updated	Notes
Unassigned	January 2020	Added reference to Line Manual and MUTCD Supplement.

Bicycle Facilities 309.0

Standards & Guidelines

01 ODOT has adopted the AASHTO publication, Guide for the Development of Bicycle Facilities (*1*), to establish bikeway design and construction standards, to establish traffic control devices guidelines for bikeways, and recommend illumination standards.

02 Refer also to Sign Policy and Guidelines for the State Highway System (*2*), Traffic Line Manual (*3*), Oregon Bicycle and Pedestrian Plan, and OAR 734 Division 56.

Special Considerations

Bicycle facilities are covered by OAR 734-020-0055 and OAR 734-020-0060.

Cross References

Key References

1. American Association of State Highway and Transportation Officials. *Guide for the Development of Bicycle Facilities*. American Association of State Highway and Transportation Officials, Washington, D.C.
2. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	New	Notes
LOC 03	September 1997	Reformatted January 2020.

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Active Warning Signs at Bridges and Tunnels 309.1

Standards & Guidelines

01 An active warning system for bicyclists on a bridge should be considered when an engineering study demonstrates their need and the location meets the following criteria:

a. There are inadequate shoulders or separation from traffic:
   1. For Bicyclists: the shoulders are less than 4 feet
   2. Other situations where motor vehicles may encroach on bicycle space

b. There is demonstrated bicycle or pedestrian usage (at least 10 pedestrians and/or bicycles per hour for any four hours of the day is the minimum threshold suggested).

c. Public support has been demonstrated by a request from a local government body.

d. There is no other available/practical/safe route, or one cannot be provided at a reasonable cost.

e. Operational techniques (e.g. signing, restriping) cannot improve the situation, or construction measures are not practical or too expensive (e.g. adding sidewalks or providing a separate bridge).

f. A combination of the following criteria create traffic conditions unacceptable to pedestrians and/or cyclists on the bridge:
   1. Speed;
   2. Motor vehicle volume (include percentage of trucks, and peak hour, when pedestrians and/or bicyclists may be using the bridge);
   3. Sight distance; and
   4. Length of bridge.

g. Funding and maintenance have been agreed upon between the District and locals as to who will pay for maintenance and power.

Process & Required Approvals

The Region Traffic Unit should conduct an investigation and analysis of the criteria and considerations as well as any other pertinent information. Written documentation of the investigation as well as a recommendation should be provided. Submit preliminary design plans to the Traffic-Roadway Section for review by the State Traffic Signal Engineer detailing proposed locations of signs, push buttons, or other detection system and electrical connections. Support of the Region Traffic Engineer and approval of the State Traffic-Roadway Engineer is required before installation of the signs.

Special Considerations

If the location meets all the above criteria, consider the following factors when providing a flashing warning system:

Historic Character of the Bridge

ODOT classifies many older narrow bridges as historic, and the placement of a large warning sign may have a negative aesthetic impact. Contact Environmental Section as needed.

Sign Placement

Can the sign be placed in such a way that it is visible to motorists for them to adequately see, understand, react and adjust their speed? Can it be placed in a maintainable location (these devices may require annual preventative maintenance in addition to other maintenance issues)? For Freight Routes in the Oregon Highway Plan (OHP), strong consideration should be given to mounting the sign overhead on a mast arm for bridges or above the tunnel portal to enhance visibility of the sign. If overhead mounting is not possible, then dual signs on opposite sides of the highway should be considered. For other routes, a single sign mounted on the side of the highway may be used.

Detection System Placement

Can pedestrians and/or cyclists access the detection system (e.g. push button) easily and see that the warning lights are active?

Pedestrians

Will pedestrians be crossing the bridge on either side, coming from both directions? If so, push buttons should be placed in all four quadrants at the bridge ends.

Beyond the Bridge

Do pedestrians and/or cyclists have safe and convenient access to the approach roads? This is especially applicable to freeway interchanges and bridges that terminate at intersections.

Local Education

Local Education of the pedestrian and/or bicyclists on the meaning and use of the devices may be needed.

Support

ODOT has installed active warning signs at the entrance to tunnels and on narrow bridge approaches at specific locations on state highways that meet the Criteria and Considerations listed in this section. Standard designs for these active warning signs are in the Sign Policy and Guidelines for the State Highway System (*1*). The signs have Flashing Beacons that are activated when bicyclists push a button as they enter the tunnel or cross the bridge. The device is timed for the average cyclist to travel the required distance before the beacons stop flashing. Tunnel applications have been limited due to the low number of tunnels on state highways in Oregon. Requests for applications on narrow bridges have been more frequent in recent years. However, there has been concern over the widespread application of these devices on bridges since Oregon has many bridges and this could represent significant installation and maintenance costs (from $5,000 to more than $20,000 for each).

Cross References

State Traffic-Roadway Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Flashing Beacons 304.2
Bicycle Facilities 309.0

Key References

1. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.

File Code	Updated	Notes
TRA 16-06	January 2020	Reformatted, generalized detection system references.

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Marked Crosswalks on State Highways 310.0

The Traffic-Roadway Section issued a technical bulletin in April 2006 (TR 06-02(B), now rescinded) to provide direction to project delivery teams and District Managers relating to the establishment of marked crosswalks at uncontrolled locations on state highways as part of Statewide Transportation Improvement Program (STIP) and Oregon Transportation Investment Act (OTIA) projects and each District's pavement marking maintenance program.

An uncontrolled location is a location on the state highway that lacks a STOP sign, YIELD sign, or Traffic Signal for controlling and stopping traffic.

Standards & Guidelines

01 Crosswalks shall be marked across all signalized approaches at intersections unless the crossing is closed by official action (See **Section 310.8**).

02 Marked crosswalks may be established across stop-controlled approaches at intersections (at stop signs) or across channelized right turn lanes.

03 Crosswalks shall be marked at established school crossings.

04 Crosswalks should be marked at all urban roundabouts.

05 In rural locations where pedestrian activity is minimal, marked crosswalks at roundabouts are optional and their use may be based on engineering judgment.

06 Marked crosswalks should only be considered at uncontrolled approaches (other than channelized right turn lanes) when an engineering study demonstrates their need (See **Sections 310.2** thru **310.4**). These include criteria and considerations for the determination of when a pedestrian crossing should be marked with a crosswalk.

Process & Required Approvals

An engineering study and State Traffic-Roadway Engineer approval are required before establishing marked crosswalks at locations other than signalized approaches at intersections, stop signs, channelized right turn lanes, or at roundabouts.

Highway Division personnel such as Project Leaders and Consultant Project Managers, whose duties include project delivery, are expected to coordinate engineering investigations of marked crosswalks at uncontrolled locations with the Region Traffic Engineer to ensure timely delivery of project designs. District Managers are expected to verify that the marked crosswalks at uncontrolled locations being maintained by the Region striping crew in their particular District have received proper approval by the State Traffic-Roadway Engineer.

Project delivery teams shall identify all marked crosswalks at uncontrolled locations during the preliminary scoping process for projects. The project delivery team shall coordinate an engineering investigation with the Region Traffic Engineer. The investigation shall document which marked crosswalks were previously approved by the State Traffic-Roadway Engineer

and which new or previously unapproved crosswalks are consistent with the guidelines set forth in the Traffic Manual. Any previously unapproved marked crosswalks to be included in the project shall be submitted by the Region Traffic Engineer to the State Traffic-Roadway Engineer for consideration of approval.

District Managers or Striping Supervisors should identify existing crosswalks in advance of re-striping activities and coordinate with either the Region Traffic Office or the Traffic-Roadway Section to assess whether the crosswalks have been approved and who has the responsibility for maintenance.

Crosswalks in Local Jurisdictions

Agencies wishing to mark and maintain crosswalks on state highways within their jurisdiction are required to submit an engineering study justifying the marking of each crosswalk to the Region Traffic Engineer.

Local Jurisdiction Installs

When a local jurisdiction installs marked crosswalks on State Highways, they should be in substantial compliance with these guidelines and obtain prior approval of ODOT. Ordinarily a local jurisdiction may install marked crosswalks if the local jurisdiction agrees to enter into an Inter-Governmental Agreement with ODOT and assumes responsibility for all costs associated with the marked crosswalks including maintenance.

ODOT Installs

When a local jurisdiction requests ODOT to install marked crosswalks on State Highways other than at signals and school crossings, they shall be in substantial compliance with these guidelines and must be approved by ODOT. Ordinarily, ODOT will agree to install the crosswalk if the local jurisdiction agrees to enter into an Inter-Governmental Agreement with ODOT and assumes responsibility for all costs associated with the crosswalks including installation and maintenance.

Textured/Colored Crosswalks

Ordinarily ODOT does not install textured or colored crosswalks. A local jurisdiction may request to install textured or colored crosswalks on State Highways. ODOT may agree to the installation of a textured or colored crosswalk if the local jurisdiction agrees to enter into an Inter-Governmental Agreement with ODOT and assumes responsibility for all costs associated with the crosswalk including installation and maintenance. See **Section 310.7** for more information on textured or colored crosswalks.

ODOT Maintains

ODOT may choose to install and maintain crosswalks within a local jurisdiction at selected locations other than signalized intersections and school crossings. Generally, this will be at locations that meet all criteria and there has been a demonstrated problem at the location, such as a crash history.

Intergovernmental Agreement (IGA)

When an IGA specifies the crosswalk is the responsibility of the jurisdiction to maintain, it will describe how this is done either by local jurisdiction resources or by reimbursement of ODOT striping crews. The IGA will require the local jurisdiction to properly maintain the crosswalk to an acceptable standard. If the agency fails to maintain the marked crosswalk or the crosswalk becomes a safety problem, ODOT may remove it or bring the crosswalk up to standard at the expense of the local jurisdiction.

ODOT Responsibility

When ODOT has signed an agreement with a local jurisdiction, and an ODOT construction project or maintenance activity removes previously approved crosswalk markings, ODOT will replace them at no cost to the local jurisdiction.

Special Considerations

Traffic-Roadway Section Staff and the Traffic Operations Group will closely monitor implementation of this policy. Any revisions will be based on feedback from the Region Technical Centers, the Maintenance Leadership Team, and the Traffic Operations Group.

Engineering Studies

The following considerations should be addressed in an Engineering Study for a marked crosswalk:

1. Marked crosswalks at other than signalized intersections or stop-controlled approaches should be used selectively. Allowing a proliferation of marked crosswalks may reduce the overall effectiveness of marking crosswalks.
2. Consideration must be given to concerned citizens, civic groups, and neighborhood organizations; balancing engineering judgment with perceived public need.
3. The roadway design features that influence the pedestrians' ability to cross the street (e.g. street width, presence of a median, one-way versus two-way operation, and geometrics of the highway or intersection being crossed) all need to be included in the planning of the crosswalk. Other pedestrian design improvements such as curb extensions and pedestrian refuges should be encouraged to increase the safety of the crossing.

4. A three to five-year pedestrian crash history should be obtained.
5. The walking path of the pedestrian. Will marking crosswalks encourage pedestrians to use a single point of crossing rather than choosing random crossing points?
6. There should be opportunities for crossing (sufficient gaps in traffic).
7. Uncontrolled marked crosswalks should be accompanied by other enhancements such as pedestrian refuge islands, bulb-outs, pedestrian signs etc.
8. There should be adequate sight distance for the motorist and the pedestrian, or it can be obtained. This includes examination of on-street parking, street furniture (e.g., mailboxes, utility poles, newspaper stands), and landscaping. Corrective measures should be taken wherever possible.
9. All crosswalk locations should be investigated for adequate illumination where there is prevalent nighttime pedestrian activity.
10. Mid-block and school crossings must be supplemented with crosswalk signs.
11. Mid-block crosswalks should not be located immediately down-stream from bus stops.
12. For mid-block crosswalks: are there more reasonable locations pedestrians could cross, i.e., no more than a block (300 feet) from a location being considered?

Crossing Strategies

The need for convenient, practical and safe pedestrian crossings of highways is a high priority for virtually all cities. Dispersed land use and long distances between intersections make it impractical in most cases to provide grade separation (over/underpasses) or positive traffic controls (signals). Another common request is for marked crosswalks.

There are many reasons pedestrians have difficulty crossing a highway:

- High traffic volumes
- Lack of adequate gaps
- High traffic speeds
- Long crossing distances
- Multiple travel lanes
- Poor visibility

The first two obstacles (high traffic volumes and lack of adequate gaps) are difficult to resolve with a simple crossing strategy, but there are several ways to mitigate the other factors. The following measures should be instituted before a crosswalk is marked at a location other than a traffic signal:

Lower Traffic Speeds

Most conventional "traffic-calming" methods are not appropriate on state highways, but there are measures a jurisdiction can undertake to alert drivers they are entering an area with expected pedestrian activity. These include, but are not limited to, sidewalks, street trees, median islands, bike lanes, visually narrowing the cross-section with better lane definition, bringing buildings closer to the back of sidewalks, maintaining on-street parking, etc.

Reduce Crossing Distances

Using good design practices, the roadway cross-section can be reduced by selectively narrowing or even eliminating unnecessary roadway elements (i.e. travel lanes, turning lanes, bike lanes or parking). Where on-street parking is present, curb extensions should be considered.

Add Refuge Islands

Assessing a safe and adequate gap in traffic becomes more difficult as the number of travel lanes increases. Islands can break up the crossing into discrete steps, so the pedestrian has to deal with fewer conflicts at a time. If the crossing point is at an intersection with a right-turn lane, an island between the right-turn lane and the through lanes enables the pedestrian to cross just the turning lane first. This breaks the crossing into more manageable parts.

The most important island to provide is in the median. This enables a pedestrian to cross traffic in one direction only, in two steps. It can be up to 5-7 times easier to cross a 4-lane road in two steps than all at once.

Improve Visibility

Pedestrians rarely knowingly step in front of moving traffic, and drivers do not purposely hit a pedestrian they could see and react to in time. Measures to address visibility include removal or relocation of obstructions (signs, signal boxes, etc.), curb extensions (where on-street parking is present), and illumination. Curb extensions allow pedestrians to better see on-coming traffic, and drivers to better see pedestrians about to cross. Approximately 60% of pedestrian crashes occur at night, which is out of proportion to exposure. Illumination should be provided at all designated crossing points.

Note: providing visibility should not be carried to extremes; for example, removing all on-street parking, trees and other vertical elements may have the negative effect of increasing travel speeds, which is potentially a greater hazard to safe crossing.

Before a crosswalk is considered at a location other than a controlled location (i.e., signalized intersection), all the following issues should be addressed:

- **Speed** – ODOT and the local jurisdiction should work at slowing traffic speeds in a realistic manner;
- **Crossing distance** – Review roadway width and reduce cross-section where possible;
- **Multiple travel lanes** – Provide median and/or channelization islands
- **Visibility** – Remove sight obstruction, provide curb extensions (where possible) and provide illumination if warranted. Pedestrian crossing signs, or improved signs - larger size and/or better reflectivity – should be considered

Only after all of the above issues have been adequately addressed should a marked crosswalk be considered on a busy, multi-lane highway.

Other issues that might deserve special attention include:

- Reducing conflicts by use of appropriate access management techniques;
- Considering the special needs of vulnerable or at-risk pedestrians; and
- Proper signing of pedestrian crossings.

In slower-speed, two-lane environments, it may be more acceptable to mark crosswalks without all of these elements in place, though visibility is always important. The needs of the aging pedestrian should be addressed as well including the increased time needed to cross similar roadway widths.

A 2006 research report jointly sponsored by TCRP and NCHRP (TCRP 112 and NCHRP 562 – Improving Pedestrian Safety at Unsignalized Crossings (*1*)) summarizes engineering treatments to improve safety for pedestrian crossings at unsignalized intersections, in particular high-speed high volume roadways served by public transportation. The research developed recommended guidelines for selecting pedestrian crossing treatments, summaries of pedestrian treatments (including many noted within this manual), and possible revisions to the MUTCD (*2*) for pedestrian warrants.

Support

The Oregon Transportation Commission has delegated the State Traffic-Roadway Engineer with the authority to designate pedestrian crossings on state highways. In 2006, the Traffic Operations Leadership Team (TOLT) became concerned that many local agencies chose to mark crosswalks across state highways at uncontrolled locations without a proper engineering investigation or review by the Region Traffic Engineer and State Traffic-Roadway Engineer.

Additionally, the increased use of consultants to provide roadway and traffic engineering services has resulted in varying levels of quality in striping plans. Some consultants have produced striping plans placing marked crosswalks across the state highway at all intersections within the project limits regardless of whether an engineering investigation has been conducted or not. Such over-use of crosswalks is a violation of our standard practice, creates a potential liability exposure to ODOT, and creates a definite increase in maintenance costs. Locations that do not meet the criteria listed in this manual should be recommended for removal.

While the MUTCD (2) does not provide any specific warrants for establishing marked crosswalks, ODOT has established certain criteria for marking crosswalks across State Highways under various conditions based on information in the MUTCD (2) and on research conducted by the Transportation Research Board (TRB).

There is conflicting evidence as to the effectiveness of marked crosswalks on motorist behavior and pedestrian safety. ODOT has followed a practice of reluctance to mark crosswalks at locations other than controlled locations (i.e., signals and stop signs) and school crossings. Numerous studies (San Diego, 1972; Long Beach, 1986; Brigham Young, 1996; Santa Anna, 1999) have shown that marking crosswalks at uncontrolled locations can increase crash risk for pedestrians. In contrast, some studies show higher rates of motor vehicle yielding to pedestrians at marked crosswalks.

Wider (multi-lane) or higher volumes (above 10,000 ADT) contribute to higher crash risk for marked crosswalk vs. unmarked crosswalks (2). The study also found that the presence of a raised median was associated with a lower crash risk. Another study (Knoblauch, 1999) documented that pedestrians and motorists did not exhibit observable unsafe behaviors in marked crosswalks, in fact observable pedestrian behavior actually improved. The previous study commented that one possible explanation to higher crash rates in marked crosswalks is that a marked crosswalk may attract a higher percentage at-risk pedestrians, children and older adults (2).

From the pedestrian's point of view, a crosswalk is large and clearly marked. Crosswalks are far less visible to the drivers than to the pedestrians. At speeds greater than 45 mph, crosswalks are indiscernible at the distance a driver needs to begin braking to safely stop for pedestrians. It is important to ensure that the crosswalk markings and pedestrians are highly visible to motorists.

Marked crosswalks are routinely requested to increase the safety of crossing the highway. The function of the marked crosswalk is to provide guidance to the proper crossing location and to serve to alert motorists of a pedestrian crossing point. However, unjustified or poorly located crosswalks may not increase safety. Marking crosswalks unnecessarily or in locations where there are few pedestrians may lead motorists to disrespect the marking.

A driver who passes over crosswalks marked at every intersection or a location that rarely has pedestrians may be conditioned to not expect pedestrians and thus loses respect for crosswalk marking. These crosswalks may increase the crash risk to pedestrians and motorists alike.

Most experts agree that on a busy highway, marking a crosswalk alone is rarely an effective safety measure and in some cases may actually increase the pedestrian’s crash risk. Other measures such as median refuge islands, curb extensions, and illumination should be considered before a crosswalk is marked. Other improvements include improving sight distance, better access management to reduce conflicts with driveways, pedestrian signs, etc. Consideration should also be given to the overall environment in which the pedestrian crossing occurs, beyond the immediate vicinity of the proposed crosswalk, i.e. sign clutter and visual distractions.

Cross References

Key References

1. Fitzpatrick, K., S. Turner, M. Brewer, P. Carlson, B. Ullman, N. Trout, E.S. Park, J. Whitacre, N. Lalani, and D. Lord. TCRP Report 112/NCHRP Report 562: Improving Pedestrian Safety at Unsignalized Crossings. Transportation Research Board of the National Academies, Washington, D.C., ISSN 1073-4872, 2006. http://www.trb.org/Publications/Blurbs/157723.aspx. DOI: https://dx.doi.org/10.17226/13962
2. Zegeer, C. V., J. R. Stewart, H. H. Huang, P. A. Lagerwey, J. Feaganes, and B. J. Campbell. Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled. Federal Highway Administration Office of Safety Research & Development, Washington, D.C., Final Report FHWA-HRT-04-100, 2005. https://www.fhwa.dot.gov/publications/research/safety/04100/04100.pdf.

File Code	Updated	Notes
TRA 07-11	January 2012	Reformatted January 2020.

Marked Crosswalks at Signalized Intersections 310.1

Standards & Guidelines

01 Marked crosswalks are required across all signalized approaches to an intersection, unless the crosswalk is closed by official action (See **Section 310.8**).

02 Pedestrian signal heads shall be installed at all signal-controlled crosswalks unless the crosswalk is closed by official action.

03 Pedestrian push buttons shall be accessible according to ODOT's ADA-related design standards, design exceptions, and inspection process.

04 Crosswalks should be marked at channelized turn-lanes controlled by a traffic signal or stop sign where there are crosswalks marked across the other controlled approaches.

05 If the channelized turn lane is controlled by a YIELD sign or uncontrolled, marking of pedestrian crosswalks may still be considered (See **Section 310.0**).

06 See the Traffic Line Manual (*1*) for standards and guidelines related to crosswalk markings at signalized intersections, including marking style and crosswalk markings across channelized right-turn lanes.

Process & Required Approvals

State Traffic-Roadway Engineer approval is required to close a crosswalk. See **Section 310.8** for more information.

Support

The crosswalk marking, either standard transverse lines or stop bar before longitudinal lines (continental style), serve as the indication of where vehicles are required to stop at a signalized approach.

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
TRA 07-11	January 2020	Updated Accessibility language.

Marked Crosswalks at Uncontrolled Approaches to Intersections 310.2

Standards & Guidelines

01 In situations where the pedestrian volumes justify marking crosswalks (well above minimum threshold levels) additional safety measures (i.e., pedestrian refuges) should be considered above and beyond marking.

02 Marked crosswalks should only be considered at uncontrolled approaches when an engineering study demonstrates their need and the location meets the following criteria:

a. There is good visibility of the crosswalk from all directions, or it can be obtained. Stopping sight distance is a minimum.

b. There is no reasonable alternative crossing location.

c. There is established pedestrian usage. Considerations include: volume of pedestrians, opportunity for safe crossing (i.e., sufficient gaps in traffic), percentage of elderly or young children, and the nature of the attraction (See ITE suggested pedestrian volume thresholds in **Figure 310.2-1**). Lower pedestrian volumes would be acceptable for areas where there is greater proportion of less experienced and less agile pedestrians (e.g., near schools and/or elderly housing areas)

d. Posted speeds should be 40 mph or less.

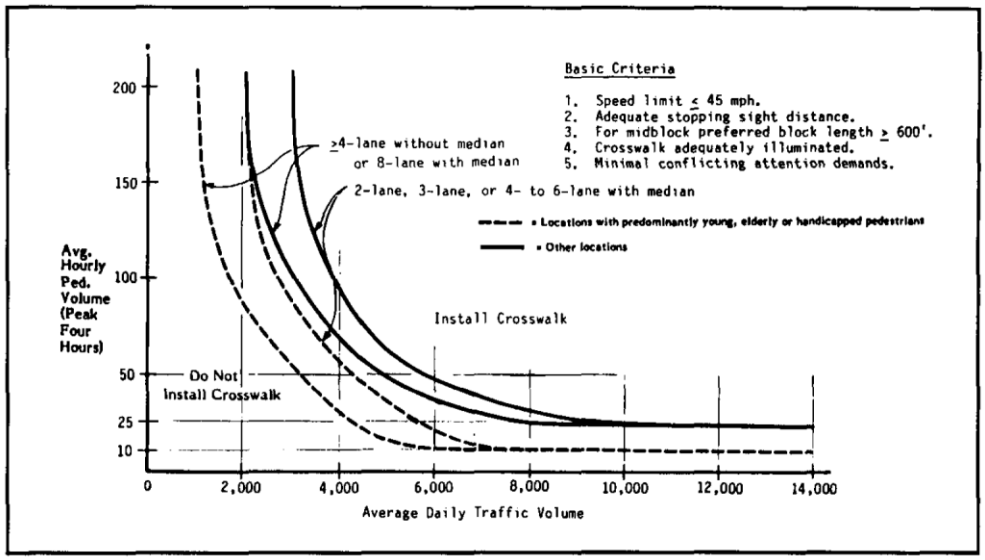
e. Traffic Volumes should be 10,000 or less ADT. If above 10,000 ADT raised median islands should be included.

f. On multi-lane highways, pedestrian crossing enhancements (curb extensions and/or pedestrian refuges) should be considered.

Process & Required Approvals

See **Section 310.0** for details on process and required approvals.

Figure 310.2-1: Suggested Pedestrian Volume Thresholds



Source: ITE Journal, August 1989 (*1*)

Support

Installation of a marked crosswalk will not, in and of itself, increase the level of safety for pedestrians. Generally marked crosswalks are discouraged at uncontrolled approaches due to a concern that they may not improve safety and may, if inappropriate, put a pedestrian more at risk. The criteria are primarily restrictions on marking crosswalks in locations that would be potentially hazardous.

Cross References

Key References

1. Ranck, F. Walk Alert: The New National Pedestrian Safety Program. *ITE Journal*, August 1989, pp. 37-40.

File Code	Updated	Notes
TRA 07-11	January 2012	Reformatted January 2020.

Marked Crosswalks at Mid-block Locations 310.3

Standards & Guidelines

01 Mid-block crosswalks should only be considered when an engineering study demonstrates their need and the location meets the following criteria:

a. There is good visibility of the crosswalk from all directions or it can be obtained. Stopping sight distance is a minimum.

b. There is not a reasonable alternative to a stop-controlled intersection.

c. There is established pedestrian usage. Considerations include volume of pedestrians, opportunity for safe crossing (i.e., sufficient gaps in traffic), percentage of elderly or young children, and the nature of the attraction (see ITE suggested pedestrian volume thresholds in **Figure 310.3-1**). Lower pedestrian volumes would be acceptable for areas where there is greater proportion of less experienced and less agile pedestrians (e.g. near schools and/or elderly housing areas).

d. Posted vehicular speeds should be 40 mph or less.

e. Locations should be more than 300 feet to nearest crossing or marked crosswalk.

f. Traffic Volumes should be less than 10,000 ADT or if above 10,000 ADT raised median islands should be included.

g. Pedestrian crossing enhancements (curb extensions and/or pedestrian refuges) should be considered.

02 Mid-block crosswalks may be considered:

a. Where a marked crosswalk can concentrate or channelize multiple pedestrian crossings to a single location.

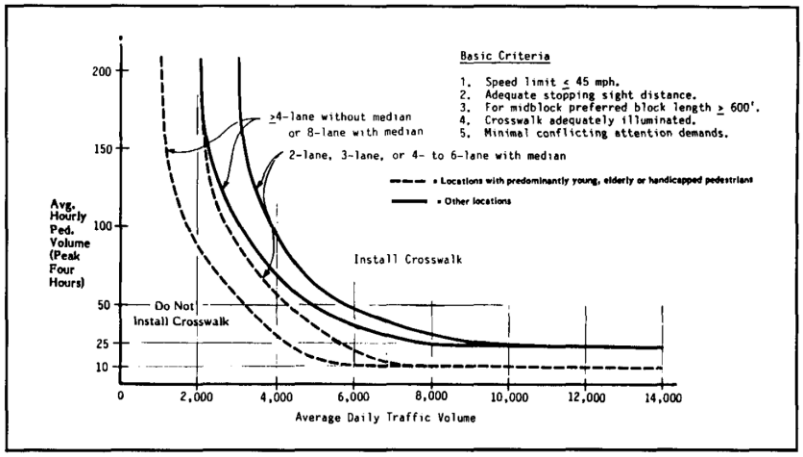
b. Free turning movements or other operational considerations inhibit pedestrian crossing opportunities at the nearest intersection.

c. Established bus stops where riders need access to the opposite side of road from the bus stop where the stop cannot be relocated.

Process & Required Approvals

See **Section 310.0** for details on process and required approvals.

Figure 310.3-1: Suggested Pedestrian Volume Thresholds



Source: ITE Journal, August 1989 (*1*)

Support

Installations of mid-block crosswalks are discouraged for the same reasons uncontrolled approaches are discouraged. Mid-block crosswalks often do not get good compliance from motorists.

Cross References

Key References

1. Ranck, F. Walk Alert: The New National Pedestrian Safety Program. *ITE Journal*, August 1989, pp. 37-40.

File Code	Updated	Notes
TRA 07-11	January 2012	Reformatted January 2020.

Marked School Crossings at Uncontrolled Locations 310.4

Standards & Guidelines

01 When establishing marked school crossings across uncontrolled locations the applicable criteria for marking crosswalks should be followed.

02 Where existing traffic controls are not available and it is not feasible to require children to walk out of direction a marked crosswalk may be established.

03 The number and age of the students using the crossing should be taken into consideration.

04 Adult crossing guards should be considered for established school crossings at uncontrolled locations where gaps are not sufficient to permit a reasonably safe crossing.

Process & Required Approvals

See **Section 310.0** for details on process and required approvals.

Special Considerations

Generally, school crossings are established based on School Route Plans and are sited to take advantage of existing traffic controls such as traffic signals.

Cross References

File Code	New	Notes
TRA 07-11	October 2004	Reformatted January 2020.

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Pedestrian Activated Warning Lights/Beacons 310.6

Examples of Pedestrian Activated Warning Lights/Beacons at marked crosswalks include Warning Beacons (MUTCD (*1*) Section 4L.03) as supplemental emphasis to a crossing warning sign; Rectangular Rapid Flashing Beacons (RRFBs); In-Roadway Lights; and Pedestrian Hybrid Beacons.

Drivers tend to yield to pedestrians more frequently at these devices if they are installed with a refuge island (*4*).

Standards & Guidelines

01 Where used permanently, RRFBs and Warning Beacons supplementing crossing warning signs shall be placed according to **Table 310.6-A**. Where used permanently, Pedestrian Hybrid Beacons shall be placed according to the MUTCD (*1*).

02 If drivers approaching the crosswalk do not have a continuous view of an RRFB or Warning Beacon supplementing a crossing warning sign for at least the minimum distance shown in MUTCD (*1*) Table 4D-2, an additional beacon should be installed on that approach to the crosswalk.

03 Where minimum sight distance shown in MUTCD (*1*) Table 4D-2 is available, an additional beacon may be installed on an approach in advance of the crosswalk as a pedestrian-actuated conspicuity enhancement.

04 If advance warning beacons are used as a supplemental conspicuity enhancement on the approach to a crosswalk, they should be located according to MUTCD (*1*) Table 2C-4.

05 Speed Limit Sign Beacons and RRFBs/Warning Beacons supplementing a crossing warning sign should be installed at least 200 feet apart.

06 RRFBs activated before December 21, 2017:

a. Shall be reprogrammed as resources allow to operate using the flashing sequence specified in Interim Approval IA-21 (*2*) Condition 5(b) no later than when the unit is serviced or when the existing signs are replaced, whichever comes first.
b. May remain in place without modification, except for the flashing sequence, until the unit reaches the end of its useful life. Replacement RRFBs shall meet all Conditions of Interim Approval in IA-21 (*2*).

07 RRFBs activated on or after December 21, 2017 shall operate using the flashing sequence specified in Interim Approval IA-21 (*2*) Condition 5(b).

08 See the Traffic Signal Policy & Guidelines (*3*) and MUTCD (*1*) Chapter 4F for standards and guidelines related to Pedestrian Hybrid Beacons.

09 See **Sections 310.0**, **310.2**, **310.3**, and **310.4** for additional standards and guidelines related to marked crosswalks across state highways.

Table 310.6-A: Beacon Placement on Uncontrolled Approach

Total Motor Vehicle Lanes Crossed	Refuge Island Included?	Left Side	Refuge Island	Overhead[1]	Right Side
1	N/A	Required	N/A	Optional	Required
2 or 3	Yes	Optional	Recommended[2]	Optional	Required
	No	Required	N/A	Optional	Required
4	Yes	Optional	Recommended[3]	Optional	Required
	No	See note 2	N/A	See note 2	Required
5+	Yes	Optional	Recommended[3]	Optional	Required
	No	Required	N/A	Required	Required

[1] If using an overhead RRFB, minimum of one overhead beacon is required on the approach and should be located over the approx. center of the lanes of the approach or where optimum visibility can be achieved.

[2] If beacon is not installed on a refuge island, it shall be installed on the left side or overhead. The decision on which to use is based on engineering judgement. Optional to use both left side and overhead. If there is an island, consider including conduit to add a push button on the island to accommodate future ADA requests.

[3] If beacon is not installed on the refuge island, it shall be installed overhead. Optional to place beacons on both the refuge island and overhead. Consider conduit to add a push button on the island for future ADA requests.

Process & Required Approvals

State Traffic-Roadway Engineer approval is required for installation or removal of Pedestrian Activated Warning Lights/Beacons at new or existing marked crosswalks on State Highways. See **Sections 310.0**, **310.1**, and **310.2** for more information.

If an Intergovernmental Agreement (IGA) is associated with a Pedestrian Activated Warning Light/Beacon installation, include the IGA number in the STRE approval request.

Special Considerations

Cost estimates for these devices vary depending on the width of the roadway and type of device used, ranging from low-end treatments for $10,000 to a Pedestrian Hybrid Beacon for nearly the cost of a full signal. Passive detection systems add to the cost. Because of this, their use is generally limited to locations where they can have the greatest benefits to pedestrian safety and mobility. ODOT might require a local jurisdiction to pay for all installation, operations, and maintenance costs.

Engineering Investigation Considerations

Address the following considerations for Pedestrian Activated Warning Lights/Beacons in the engineering investigation submitted to the State Traffic-Roadway Engineer. These considerations are not warrants nor pass/fail criteria.

1. Will other proven pedestrian safety countermeasures be installed with the Pedestrian Activated Warning Lights/Beacons (i.e. a refuge island (*4*) (*5*), curb extensions, road reconfiguration)? These warning lights/beacons produce higher levels of yielding when installed with a refuge island (*4*).
2. Are other safety treatments feasible, sufficient, or likely to achieve the goals of the project? Other treatments could include an in-street sign, raised crosswalk, or other crosswalk visibility enhancements. Would the location meet applicable warrants for a Pedestrian Hybrid Beacon (MUTCD (*1*) Section 4F)?
3. Is the crossing mid-block, is there a history of pedestrian crashes, or will there be a high percentage of pedestrians using the crosswalk who are young, elderly or have mobility challenges?
4. Does the crosswalk cross a multi-lane roadway (more than one lane in each direction) with more than 8000 Average Daily Traffic (ADT) volume (6000 ADT if high percentage of pedestrians who are young, elderly, or have mobility challenges)?
5. Is there another crosswalk, traffic signal or stop sign on the same roadway within 250 feet of the crosswalk?
6. Is the posted speed 40 mph or less?
7. Does the crosswalk have an average of 25 pedestrians per hour (10 pedestrians per hour with high percentages of pedestrians who are young, elderly, or have mobility challenges) for any four hours of the day? Does the crosswalk have nighttime pedestrian activity (at least half the volumes above for any two hours during the nighttime)?
8. If the device type (e.g. PHB, In-Roadway Warning Light) is not in common use in the area, is there local commitment to education of road users on the meaning and use of the device?

Other considerations include the effectiveness of the devices as safety improvements, maintenance costs, potential liability, driver compliance, and effectiveness over longer periods. Due to these factors, ODOT typically considers using these devices with other safety improvement measures such as pedestrian refuge islands or curb extensions.

Types of Pedestrian Activated Warning Lights/Beacons

Warning Beacons as supplemental emphasis to the Pedestrian sign

Until RRFBs were common, standard Warning Beacons supplementing the W11-2 Pedestrian sign was the most common type of pedestrian activated device used at marked crosswalks (MUTCD (*1*) Chapter 4L). See the Oregon Standard Details for examples of this type of beacon. RRFBs are generally preferred over this type of beacon at new installations.

Rectangular Rapid Flashing Beacons (RRFB)

When activated, the RRFB flashes rectangular, high-intensity LED-based indications rapidly in a combination wigwag and simultaneous flash pattern. The Federal Highway Administration (FHWA) issued Interim Approval for the optional use of RRFBs on all Oregon roads on April 5, 2018 under Interim Approval IA-21 (*2*).

In-Roadway Lights

In-Roadway Lights are a type of flashing beacon installed in the roadway surface (MUTCD (*1*) Chapter 4N). See the Support subsection for information on why ODOT does not use In-Roadway Lights on State Highways.

Pedestrian Hybrid Beacon (PHB)

The PHB is used to warn and control traffic at a crosswalk using yellow and red indications (MUTCD (*1*) Chapter 4F). An approval request for a PHB should show that an RRFB has been considered and evaluated in comparison to the PHB.

Support

PHBs and RRFBs are generally associated with reduced pedestrian crash risk and improved motorist yielding behavior (*4*). The effectiveness of these devices depends largely on the context of the crossing (*4*) (*6*). For example, the effectiveness of RRFBs depends on a number of factors including the number of lanes crossed, approach speed, the presence of a refuge island, visibility of the beacons, presence of advance stop bars on multi-lane approaches, and road user understanding of the device (*4*). RRFBs produce higher levels of yielding when installed on a refuge island (*4*).

MUTCD (*1*) sight distance standards for signals are used to determine when an advance RRFB or Warning Beacon is needed because Interim Approval IA-21 (*2*) leaves this determination to

engineering judgement and there is limited research (*7*) (*8*) (*9*) on the effectiveness of supplemental advance RRFBs when there is sufficient sight distance to the crosswalk.

The RRFB had interim approval under Interim Approval IA-11 from 2008 to December 21, 2017, when FHWA terminated IA-11 because a private company had patented the concept of the RRFB (*11*). Shortly after that, the private company abandoned the patents and FHWA issued a new interim approval (Interim Approval IA-21 (*2*)). IA-21 changed the RRFB flash pattern and included guidance on updating the flash pattern for RRFBs installed under IA-11.

The Sign Policy and Guidelines for the State Highway System (*10*) and MUTCD (*1*) Section 7B.15 recommend a minimum spacing of 200 feet between a SCHOOL SPEED LIMIT 20 WHEN FLASHING sign and the crosswalk warning sign.

ODOT does not use In-Roadway Warning Lights on State Highways because of relatively high installation costs, potentially high maintenance costs, unproven safety record (*12*), and availability of more effective and less maintenance-intensive treatments. While there is some supporting evidence that stopping compliance and driver awareness may increase (*13*), there is no confirmation that these devices reduce crash risk to pedestrians. These lights can be difficult to see under normal daylight conditions and are only visible to the first driver in a platoon (*4*). These devices tend to have a more significant effect when it is dark, rainy, or foggy.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Knopp, M. C. *MUTCD - Interim Approval for Optional Use of Pedestrian-Actuated Rectangular Rapid-Flashing Beacons at Uncontrolled Marked Crosswalks (IA-21)*. Federal Highway Administration, Washington, D.C., 2018. https://mutcd.fhwa.dot.gov/resources/interim_approval/ia21/index.htm.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

4. Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N. J. Thirsk, C. Lyon, B. Persaud, J. Zegeer, E. Ferguson, and R. Van Houten. NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Washington, D.C., ISBN 978-0-309-44626-6, 2017. http://www.trb.org/Main/Blurbs/175381.aspx.
5. Federal Highway Administration. *Safety Benefits of Raised Medians and Pedestrian Refuge Islands*. Federal Highway Administration, Washington, D.C., 2010. https://safety.fhwa.dot.gov/ped_bike/tools_solve/medians_brochure/.
6. Fitzpatrick, K., S. Turner, M. Brewer, P. Carlson, B. Ullman, N. Trout, E.S. Park, J. Whitacre, N. Lalani, and D. Lord. TCRP Report 112/NCHRP Report 562: Improving Pedestrian Safety at Unsignalized Crossings. Transportation Research Board of the National Academies, Washington, D.C., ISSN 1073-4872, 2006. http://www.trb.org/Publications/Blurbs/157723.aspx. DOI: https://dx.doi.org/10.17226/13962
7. Foster, N., C. M. Monsere, and K. Carlos. Evaluating Driver and Pedestrian Behaviors at Enhanced, Multilane, Midblock Pedestrian Crossings: Case Study in Portland, Oregon. *Transportation Research Record: Journal of the Transportation Research Board of the National Academies*, Vol. 2464, January 2014, pp. 59-66. DOI: https://doi.org/10.3141/2464-08
8. Shurbutt, J., and R. Van Houten. Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks. Psychology Department, Western Michigan University, McLean, Virginia, FHWA-HRT-10-043, 2010. https://www.fhwa.dot.gov/publications/research/safety/pedbike/10043/10043.pdf.
9. Ross, J., D. Serpico, and R. Lewis. Assessment of Driver Yielding Rates Pre- and Post-RRFB Installation, Bend, Oregon. Research Section, Oregon Department of Transportation, Salem, Oregon, FHWA-OR-RD 12-05, 2011. https://rosap.ntl.bts.gov/view/dot/23683.
10. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
11. Knopp, M. C. MUTCD - Interim Approval for Optioanl Use of Rectangular Rapid Flashing Beacons (IA-11) - TERMINATION. December 21, 2017. https://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/terminationmemo/ia11_termination_memo.pdf. Accessed August 16, 2019.
12. Fitzpatrick, K., R. Avelar, I. Potts, M. Brewer, J. Robertson, C. Fees, J. Hutton, L. Lucas, and K. Bauer. Investigating Improvements to Pedestrian Crossings With an Emphasis on the Rectangular Rapid-Flashing Beacon. Texas Transportation Institute, Texas A&M University, McLean, Virginia, FHWA-HRT-15-043, 2015. http://www.fhwa.dot.gov/publications/research/safety/15043/15043.pdf.
13. Whitlock & Weinberger Transportation, Inc. An Evaluation of a Crosswalk Warning System Utilizing In-Pavement Flashing Lights. State of California Office of Traffic Safety, 1998. https://www.lightguardsystems.com/wp-content/uploads/2014/11/Whitlock-Weinberger-Report-1998.pdf.

File Code	Updated	Notes
TRA 07-11	March 2020	Corrected grammar.

Textured & Colored Crosswalks 310.7

Textured Crosswalk: A surface material at a crosswalk such as brick, concrete pavers, or stamped asphalt, which produces small, constant changes in vertical alignment and aesthetically enhances the crosswalk.

Colored Crosswalk: A pavement marking or proprietary product at a crosswalk that contrasts with adjoining paved areas and aesthetically enhances the crosswalk. ODOT does not consider unpigmented Portland Cement Concrete and Asphalt Concrete to be colored pavements, even when installed as a contrasting treatment within a crosswalk.

Standards & Guidelines

01 If textured or colored crosswalks are used, they should be made of durable non-slip materials, such as stamped concrete, with minimal beveling. The textured surface should be built to adequate strength, with a good base resulting in low maintenance.

02 Colored crosswalks should consist of materials that are red, rust, brown, burgundy, clay, tan, or similar earth tone equivalents, should not degrade the contrast of white transverse pavement markings establishing the crosswalk, and should otherwise conform to FHWA's MUTCD Official Ruling 3(09)-24(I) (*1*).

03 Yellow, blue, and purple shall not be used in colored crosswalks because the MUTCD (*2*) reserves these colors for other purposes.

04 All textured or colored crosswalks shall be supplemented with white crosswalk markings to increase their visibility to motorists.

05 Texturing or coloring should not be used at locations where crossings are not established because they might indicate a crossing to pedestrians (i.e., mid-block between alleys).

06 Safety funds should not be used for coloring or pavement texturing of crosswalks.

Process & Required Approvals

Agencies wishing to texture/color crosswalks on state highways within their jurisdiction are required to submit justification for crosswalk texturing or coloring to the Region Traffic Engineer for review. On the state highway system, approval of the State Traffic-Roadway Engineer is required.

ODOT typically enters into an Intergovernmental Agreement (IGA) with the local jurisdiction to specify who installs and maintains these treatments. The IGA should be established with the local jurisdiction prior to letting any contracts for work involving the installation or maintenance of textured/colored crosswalks. Where textured/colored crosswalks have been installed without such an IGA, ODOT should negotiate either 1) entering into an IGA with the local jurisdiction to cover ongoing maintenance and replacement costs OR 2) removal.

Project delivery teams shall coordinate an engineering review with the Region Traffic Engineer for all proposed textured and colored crosswalks. The review shall document the proposed coloring, materials, pattern, funding source, installation, and maintenance requirements including consistency with this section's Standards & Guidelines.

The Region Traffic Engineer shall submit a request to the State Traffic-Roadway Engineer for consideration of approval of any previously unapproved textured or colored crosswalks to be included in a project.

District Managers or Striping Supervisors should, whenever possible, identify existing textured and colored crosswalks in advance of re-striping activities and coordinate with the Region Traffic Office to assess whether the treatment has State Traffic-Roadway Engineer approval and who has maintenance responsibilities.

Special Considerations

ODOT does not install textured or colored crosswalks; however, sometimes a local agency wants to install them across a state highway. The perception is often times that the textured or colored crosswalk alone will be more visible than standard crosswalk markings. Oftentimes that is not the case; textured or colored crosswalks can actually be LESS visible than conventional marked crosswalks (red brick tends to fade to black, especially at times of low visibility) (*1*).

Textured crosswalks can be rough, making it difficult for pedestrians using wheelchairs and walkers to use the crosswalk. They can become uneven, presenting a tripping hazard, especially the sight impaired. Textured or colored crosswalks typically need more maintenance attention and some materials can become slick creating a slipping hazard. Installation costs are also high in comparison to conventional marked crosswalks.

Colored truck aprons follow the same coloring guidelines as above. However, where crosswalks traverse new colored truck aprons, ODOT does not typically apply the coloring within the crosswalk so the crosswalk's color remains consistent for people with visual disabilities.

Support

Textured or colored crosswalk enhancements do not improve safety at crossings (*1*). Such use of safety funds to pay for textured and colored crosswalks is inappropriate and reduces the availability of these funds to pay for other proven pedestrian safety countermeasures such as curb extensions, raised median islands, illumination, and proper signing.

Portland Cement Concrete (PCC) and Asphalt Concrete (AC) are standard roadbuilding materials, and ODOT does not consider them colored pavements when coloring is not added to those materials.

Cross References

Key References

1. Lindley, J. A. (2013, August) MUTCD - Official Ruling 3(09)-24(I) - Application of Colored Pavement. [Online]. https://mutcd.fhwa.dot.gov/resources/interpretations/3_09_24.htm.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 07-11	January 2020	Updated Colored Crosswalk content.

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Crosswalk Closures & Removals 310.8

ODOT has adopted goals (*1*) related to crosswalks, including

- provide a complete pedestrian network that reliably and easily connects to destinations and other transportation modes;
- support people who walk or use mobility devices to move easily on the system;
- enhance community and economic vitality through walking networks that improve people's ability to access jobs, businesses, and other destinations; and,
- eliminate pedestrian fatalities and serious injuries, and improve the overall sense of safety of those who walk.

A decision to close a crosswalk affects ODOT's progress toward achieving these adopted goals. Closing a crosswalk removes a link from the surrounding pedestrian network by prohibiting pedestrians from crossing at that location.

Removing a crosswalk means removing the markings and making it an unmarked crosswalk.

Standards & Guidelines

01 Closure treatments shall be installed at closed crosswalks according to the State Traffic-Roadway Engineer's crosswalk closure approval (see Crosswalk Closure Treatments).

Process & Required Approvals

Removing or closing any crosswalk on the State Highway System requires State Traffic-Roadway Engineer approval. All requests for crosswalk closures or removals shall be submitted from the Region Traffic Engineer to the State Traffic-Roadway Engineer on Form 734-5150. This should be submitted as early as practical in the project development process (up to the Design Acceptance Phase (DAP) during STIP projects) because crosswalk closure decisions affect pedestrian routes, curb ramp design, and the project's footprint, among other impacts.

A crosswalk closure request shall document:

a. A geometric design or operational condition that significantly degrades pedestrian safety and cannot be reasonably mitigated.

b. Other solutions explored to mitigate the condition, why these solutions are not feasible, and why closing the crosswalk is the preferred alternative.

c. How closing the crosswalk affects
   1. ODOT crossing frequency targets discussed in the Blueprint for Urban Design, and
   2. the local bicycle and pedestrian plan, if a plan exists.

d. An alternate pedestrian path between the two points of the proposed closure and assess obstacles along the alternate path (e.g. a sidewalk with a utility pole in the middle of the sidewalk between two curb ramps that might necessitate relocation of the utility pole).

See **Table 310.8-A** for the process to close a crosswalk, keep a crosswalk closed, or open a closed crosswalk.

Table 310.8-A: Process for Crosswalk Closures

Current Status	Desired Outcome	Process
Open	Close the crosswalk	**Requires STRE approval.** Region Traffic Engineer submits request on Form 734-5150.
Closed by signs installed before STRE approval was required to close a crosswalk (2001) (Check with Region Traffic Unit for closure status)	Keep the crosswalk closed	**Requires STRE approval.** Even though crosswalk closure signs may be in place, Region Traffic assesses the closure according to the current approval process. Region Traffic Engineer submits a request on Form 734-5150.
	Open the crosswalk at a signalized intersection	**Does not require STRE approval**, but notify the Traffic-Roadway Section of the decision. On the Preliminary Signal Operations Design form sent to the Traffic-Roadway Section, note which crosswalk is being opened in the Recommended Signal Design section.
	Open the crosswalk at an unsignalized intersection	**Does not require STRE approval**, but notify the Traffic-Roadway Section of the decision. Send a letter from the Region Traffic Engineer to the State Traffic Investigation Engineer (cc ADA Statewide Asset Specialist Lead) stating Region will open a crosswalk that was closed by signs that were installed before STRE approval was required to close the crosswalk. Include the following information: • Location (LRM, MP), and • Aerial map or plan showing which crosswalk(s) will be opened. If the opened crosswalk will be marked, approval is required to mark the crosswalk according to Section 310.0.
Approved by STRE to be closed.	Open the crosswalk	**Requires STRE approval.** Send a request from the Region Traffic Engineer on Form 734-5175. Include justification for opening the crosswalk considering why the crosswalk was officially closed.

Special Considerations

Considerations for Closing a Crosswalk

Conditions for closing crosswalks are considered on a case-by-case basis. The presence of one or more conditions does not mean the crosswalk should be closed. Examples of conditions where a crosswalk might be considered for closure could include but are not limited to where:

- Sight distance is less than the minimum desired for conditions and cannot be reasonably mitigated.
- A project proposes significant enhancements for only one crosswalk at an intersection (e.g. activated warning beacon with refuge island and illumination), and conditions at the opposite crosswalk make the enhanced crossing the safer crossing

at the intersection. For example, the opposite leg carries significantly more turning traffic or crosses more motor vehicle lanes, and the opposite leg does not appear to connect pedestrian trip generators or attractors such as transit connections.

- Physical restrictions on one side of the roadway hinder pedestrian activity on that side of the roadway. Typical examples include "T" intersections where railroad right-of-way, a drainage canal, expressway, or some other type of obstacle that runs across the top of the "T" where pedestrian activity is discouraged and/or prohibited. An exception is where pedestrian trip generators or attractors, including but not limited to transit connections, are on the opposite side of the roadway.
- There are no pedestrian destinations between intersections and closing a crosswalk does not affect the shortest walking path between destinations, such as an interchange area.

Crosswalk Closure Treatments

Visual and detectable treatments communicate to pedestrians that a crosswalk is closed. ORS 810.080 requires signs, such as a CROSSWALK CLOSED (OR22-7) sign, to close a crosswalk; this is the visual crosswalk closure treatment. Visual treatments are typically placed so they are visible to a pedestrian as he or she faces the closed crosswalk.

Detectable closure treatments are typically used at a closed crosswalk where there is a sidewalk and an intersecting pedestrian route. Detectable closure treatments include but are not limited to features such as landscaped buffer strips, railings, ODOT's standard crosswalk closure support (see Oregon Standard Drawings), or other approved treatment.

Closing a crosswalk might require removal or reorientation of curb ramps. For example, a curb ramp that only serves the closed crosswalk will need to be removed. Similarly, a curb ramp that serves another crosswalk (diagonal ramp) might need to be rebuilt and reoriented to only serve the remaining crosswalk.

Attributes of Detectable Closure Treatments

Detectable closure treatments generally:

- Contrast visually with the sidewalk.
- Are detectable with a white cane used by people who have limited or no vision.
- Do not have protruding edges or corners that could result in an injury to passing pedestrians or bicyclists.
- Are placed to allow at least 4 feet of clear passage for the adjacent pedestrian routes.
- Are positioned so there is not an accessible route around the treatment to access the closed crosswalk.
- Are positioned to minimize the risk of tripping.
- Are crashworthy.
- Are supported by the District for maintenance.

For example, non-traversable tactile surfaces that are 2 feet wide or wider, such as landscaped buffer strips, are a form of detectable barrier.

Crosswalk closure supports are also a form of detectable barrier. These are generally limited to sidewalks and other paved pedestrian areas and are generally discouraged in vegetated and unpaved areas due to a greater likelihood of being struck by maintenance equipment, obscured by vegetation, or becoming a sight obstruction for road users. In some locations, crosswalk closure supports can be difficult to align so they are detectable with an intersecting pedestrian route. See the Sign Policy and Guidelines (*3*) for additional guidance on signs OR22-7 and OR22-8, and the Oregon Standard Drawings for details of the crosswalk closure support.

Choosing Crosswalk Closure Treatments

Visual and detectable crosswalk closure treatments are site-specific and generally selected for each corner based on the attributes described above. After considering the site's needs in coordination with Region Traffic, the State Traffic-Roadway Engineer's crosswalk closure approval specifies the crosswalk closure treatments.

Support

ODOT can close a crosswalk using signs according to ORS 810.080. The State Traffic-Roadway Engineer approves installation of these traffic control devices for ODOT (see **Section 100.0**).

Cross References

State Traffic-Roadway Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Traffic Signals 304.0
Marked Crosswalks on State Highways 310.0
Marked Crosswalks at Signalized Intersections 310.1
Multiple Turn Lanes 405.6

Key References

1. Oregon Department of Transportation. *Oregon Bicycle and Pedestrian Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Pages/Plans.aspx#OBPP.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
3. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.

File Code	Updated	Notes
TRA 07-11-06	January 2020	Added Table 310.8-A & closure treatment content. Other updates.

Illumination 311.0

Standards & Guidelines

01 All illumination on State Highways (both temporary and permanent) shall follow policy set forth in the ODOT Lighting Policy and Guidelines (*1*).

02 Additional guidance on illumination design is provided in the ODOT Traffic Lighting Design Manual (*2*).

Process & Required Approvals

The Region Traffic Unit reviews permanent illumination for policy agreement and statewide consistency before going to the engineer-of-record for incorporation into project plans. Any deviation from statewide policies or standards must be reviewed by the Traffic-Roadway Section and submitted to the State Traffic-Roadway Engineer for approval.

Determining the need for temporary illumination on construction projects is part of the illumination design process. The engineer-of-record submits requests to the Region Traffic Engineer on highway construction projects where illumination for temporary protection and direction of traffic is recommended. Staff from the Region Traffic Unit investigate and approve the amount of illumination needed based on ODOT Lighting Policy and Guidelines (*1*). Any deviation from statewide policies or standards must be reviewed by the Traffic-Roadway Section and submitted to the State Traffic-Roadway Engineer for approval.

Special Considerations

Temporary Illumination

A consistent and systematic approach is used which considers, at a minimum, the cost, safety (vehicle traffic, pedestrian and construction worker), traffic volume and speed, geometric conditions, crash history, weather, length of contract, and the amount and complexity of stage construction. Attention is given to installing proposed permanent lighting as soon in the construction project as practical to serve for temporary protection and direction of traffic purposes.

Permanent Illumination

Roadway lighting warrants are covered in the ODOT Lighting Policy and Guidelines (*1*). ODOT does not use specific illumination warrants to determine whether lighting is provided on a project.

An investigation is conducted and ODOT utilizes engineering judgment of local conditions, considering such factors as availability of funds, traffic and crash data, roadway characteristics, etc., in determining when and where lighting is to be provided.

Lighting maintenance, energy and construction costs are evaluated when recommending illumination. Policy for illumination cost sharing with cities and counties on state highways is published in the 2002 Policy Statement for Cooperative Traffic Control Projects (*3*). Region Traffic Unit staff identify locations for illumination in the project development process for incorporation into the State Transportation Improvement Program (STIP).

The Safety Priority Index System (SPIS) and the crash database are used as tools to identify potential locations. The percentage of nighttime crashes and total crash history is considered in the benefits of installing illumination. Sometimes, improvements in traffic control devices, and/or geometric designs, will also serve to cut down on nighttime crashes and lighting may not be needed.

Cross References

Key References

1. Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Lighting Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Design-Manual.pdf.
3. Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.

File Code	Updated	Notes
TRA 16-01	March 2008	Added introduction section. Reformatted January 2020.

Accessible Parking Spaces 312.0

Standards & Guidelines

01 See the OTC Standards for Accessible Parking Places (*1*).

Special Considerations

In accordance with ORS 447.233, the Oregon Transportation Commission adopted Standards for Accessible Parking Spaces, which took effect on January 22, 1992.

Support

The standards comply with 28 CFR Part 36 published by the Department of Justice in the Federal Register.

Cross References

Key References

1. Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.

File Code	Updated	Notes
TRA 16-02	January 2020	Reworded reference to OTC Standards.

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Intersection Control Evaluation 400.0

The purpose of an Intersection Control Evaluation study is to determine the most appropriate form of traffic control at an intersection given the benefits of each alternative and the right-of-way, environmental, cost, and other constraints.

Standards & Guidelines

01 An Intersection Traffic Control Study should be completed when significant changes to an intersection are under consideration. An investigation of safety and operations issues should be performed for every proposed new approach to the state highway system and for existing approaches where a change in the type of traffic control for a particular intersection is being considered as part of a State Transportation Improvement Program (STIP) project or operational improvement to the intersection.

02 Potential intersection projects being considered for inclusion in the STIP should be identified as an "intersection improvement" project rather than a roundabout, traffic signal, or other type of traffic control until such time that an Intersection Traffic Control Study has been conducted and consensus has been reached on the proper traffic control solution for the intersection.

03 Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP or YIELD control, alternatives to traffic signals should be considered even if one or more of the warrants and other minimum conditions are satisfied.

04 The following does not represent an exhaustive list of considerations but contains the essential elements that should be included in the study.

a. Diagram of Existing Intersection and Traffic Volumes
b. Signal Warrants Analysis
c. Conceptual Design
d. Safety Analysis
e. Operational Analysis
f. Transportation Plan Consistency
g. Other Agency Support
h. Justification
i. Application for State Highway Approach

Process & Required Approvals

Region Traffic staff or the applicant requesting the traffic control device may complete the engineering study. If the Region Traffic Engineer concurs with the study, the Region Traffic Engineer documents concurrence and submits a request for State Traffic-Roadway Engineer approval with a detailed cover letter.

Special Considerations

One of the common mistakes made in scoping intersection safety and operational improvements is deciding on a solution before a thorough alternatives analysis has been completed. The potential improvements to safety and operations need to be weighed against not only the construction costs but also the ongoing operations and maintenance costs for the expected life of the improvement through a benefit/cost (B/C) analysis.

See Part 4 of the MUTCD (*1*) for a list of possible alternatives to traffic signals. The range of alternatives should address the primary justification for consideration of a traffic signal. The Traffic Manual contains information related to several of common alternatives to traffic signals including:

- Roundabouts (**Section 403.0**);
- Traffic Signals (**Section 304.0**); and
- STOP Sign Applications (**Section 402.0**).

Refer to these sections for detailed information on ODOT practices for that specific type of intersection traffic control keeping in mind that several alternatives should be considered before deciding on a final solution.

The following does not represent an exhaustive list of considerations but contains the essential elements that should be included in the study.

Diagram of Existing Intersection and Traffic Volumes

Using a diagram of the intersection as it currently exists, provide vehicular and pedestrian volumes for the intersection for which the traffic signal is being requested and intersections in the surrounding area. Peak AM and PM traffic volumes, based on 16-hour count data should be provided. Describe the traffic that is actually present or certain to be present when the traffic signal is operational. Estimate future traffic for at least a 20-year period.

Signal Warrant Analysis

If a traffic signal is being included as an alternative, include the results of a traffic signal warrants analysis (for warrants see Part 4 in the MUTCD (*1*)). Satisfaction of each MUTCD (*1*) warrant should be evaluated. Warrants 1-8 should be evaluated for existing conditions and traffic that is actually present or certain to be present when the traffic signal is operational. Satisfaction of Warrant 7, Crash Experience, should be based on the three most recent calendar years for which crash data is available. Only those crash types susceptible to correction by traffic signal control should be considered. The Traffic Signal Warrant Analysis form should be utilized.

When a traffic signal is part of a roadway improvement project, the request should be based on projected volumes developed according to the methodology in the Analysis Procedures Manual (*2*). The Preliminary Traffic Signal Warrant Analysis form should be utilized. The

analysis should demonstrate that Warrant 1 would be met within three years after construction.

According to the MUTCD (*1*), the traffic signal warrants are *minimum* conditions under which installing traffic signals might be justified. A traffic control signal should not be installed unless the Traffic Signal Engineering Investigation indicates that installing a traffic signal will improve the overall safety and/or operation of the intersection.

See the Traffic Signal Policy and Guidelines (*3*) for a description of MUTCD (*1*) warrants and additional considerations that may support installation of a traffic signal for special applications.

Conceptual Design

Include diagrams or plans of the layout of the traffic control alternatives under consideration. Include the following:

- For traffic signal alternatives, proposed lane usage and signal phasing based on analysis of current and projected volumes, traffic patterns, and safety and operational considerations. Refer to the Traffic Signal Policy and Guidelines (*3*).
- Current and expected posted speed after construction.
- Sight distances.
- Bicycle and pedestrian facilities.
- Conflicting accesses to be moved or closed.
- Current and proposed land uses of the area.
- Railroad or light rail within 500 feet.

Safety Analysis

Identify any safety concerns and explain how they will be resolved, e.g., sight distances, alignment, prevailing speeds (design speed for new construction or posted speed if on system), crash histories, railroad crossings, nearby access movements, etc. Include a qualitative or quantitative assessment of each alternative's anticipated safety performance.

Operational Analysis

Conduct a capacity analysis, queuing analysis, and other types of operational analysis as appropriate for each traffic control alternative. See the Analysis Procedures Manual (*2*) for methodology. Consider the ability to accommodate a variety of users from transit buses, bicycles, pedestrians, and trucks.

If the intersection is within 500 feet of a highway-rail grade crossing, provide information on the impacts of the intersection operations at the crossing. This should include a traffic impact analysis of present and future traffic queues affecting the crossing. Current requirements for crossing safety improvements can be obtained from the Rail & Public

Transit Division, Crossing Safety Section. The Rail & Public Transit Division should be contacted early in project development.

If the proposed location is within ½ mile of an existing or possible future traffic signal, include a traffic signal progression analysis as described in OAR 734-020-0480.

Elements of a traffic signal progression analysis include the following for each requested period:

- A diagram showing the volumes used at each intersection with the year of the projection and the hour covered
- A time space diagram labeled with the cycle length, the distance between traffic signals, the year of projected volumes, and the hour covered. The diagram should show the green bands for the highway and the progression speeds.
- Supporting documentation showing the green splits and v/c ratio for each of the movements at each of the traffic signals in the system. The inputs such as saturation rate, heavy vehicles, etc. should also be available. This information should be labeled to correspond with the correct time space diagram.
- A statement of the results of the study.

Transportation Plan Consistency

Provide information from pertinent transportation plans (local, regional, and state) to demonstrate consistency between the plan and the proposed intersection improvements. Explain discrepancies between the plans and the proposed improvements.

Other Agency Support

Provide evidence of support of other agencies for the proposed improvements. Provide a description of the proposed funding and maintenance agreements. Include a description of the public input process and any key correspondence with local jurisdiction representatives.

Justification

The study should contain a clear and supported statement of the need for the selected traffic control device. Primary considerations used to select the recommended form of traffic control should be explained.

Application for State Highway Approach

If the request is for a traffic control device at a location subject to Division 51 administrative rules relating to state highway access, include a copy of the Application for State Highway Approach, a statement regarding the status of the application, and a copy of the Traffic Impact Study, if one is required.

Support

Intersections are planned points of conflict on the state highway system. When the different crossing and entering movements by drivers, pedestrians, and bicyclists interact, it is easy to see why an intersection is one of the most complex traffic situations that highway users encounter. Dangers are compounded when we add the element of highway users disregarding the traffic controls in place at a particular intersection.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

File Code	New	Notes
Unassigned	July 2009	Reformatted January 2020.

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YIELD Sign Applications 401.0

YIELD signs can be used to assign right-of-way at low volume intersection where a STOP sign is not necessary.

Standards & Guidelines

01 YIELD signs should be placed in accordance with Part 2 of the MUTCD (*1*).

Process & Required Approvals

The State Traffic-Roadway Engineer has delegated authority, in consultation with the Region Traffic Engineer, to approve installation or removal of YIELD signs on state highways. The Region Traffic Engineer may authorize the installation or removal of YIELD signs on cross street that are not state highways.

Special Considerations

Engineering judgment, based on an engineering study, is an important part in the determination of when to use a YIELD sign. There should be sufficient sight distance on the minor street approach to allow a vehicle to take appropriate action at the intersection. Sight triangles for turning left or right from the minor street and for crossing the major street need to be investigated. AASHTO's A Policy on Geometric Design of Highways and Streets (*2*) contains methods for calculating sight triangles at intersections. In addition to looking at the sight distance for an intersection, traffic engineers should also consider the volumes on the major and minor streets, the approach speeds of the intersection, and the crash history of the intersection.

Cross References

State Traffic-Roadway Engineer 100.0
Region Traffic Engineer 100.1
Crash Analysis 201.0
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Signs 302.0
Intersection Control Evaluation 400.0
STOP Sign Applications 402.0
Right Turn Permitted Without Stopping 402.1
Channelized Right Turn Lanes 405.2

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 6th ed. Washington, D.C., 2011.

YIELD Sign Applications 401.0

File Code	New	Notes
TRA 16-04	August 2004	Reformatted January 2020.

STOP Sign Applications 402.0

Standards & Guidelines

01 The MUTCD (*1*) contains guidelines and criteria for the use of STOP signs in Part 2.

Process & Required Approvals

Region Traffic Engineer approval is required to install or remove STOP signs on roads intersecting a state highway (i.e., city streets, county roads, or private roads). State Traffic-Roadway Engineer approval is required to install or remove STOP signs on a state highway, for multi-way stop applications, or for modifications to stop configurations.

Before requesting approval for installation of STOP signs on state highways, complete a thorough Intersection Traffic Control Study showing that a STOP sign was a viable alternative when compared to other types of intersection traffic control. Refer to **Section 400.0** for more detail on how to conduct this type of analysis.

Requests for installation of STOP signs on state highways should originate from the Region Traffic Engineer. Requests should include an investigation stating warrants for the STOP control, crash history, safety concerns, alternatives or any other considerations concerning the proposed installation.

Special Considerations

STOP signs are normally posted on the minor street to stop the lesser flow of traffic. The multi-way stop installation is useful as a safety measure at some locations, including where volumes are approximately equal.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-04-08-01	January 2020	Updated approval req. for current authority delegations.

Right Turn Permitted Without Stopping 402.1

Standards & Guidelines

01 Refer to the Sign Policy and Guidelines for the State Highway System (*1*).

Process & Required Approvals

A RTPWS sign requires the approval of the State Traffic-Roadway Engineer for installation at an intersection on a State Highway. If the intersection's volumes or movements change significantly, the use of the RTPWS sign should be reconsidered.

Special Considerations

In some cases, the consideration of a YIELD sign may be appropriate (see Part 2 of the MUTCD (*2*)), where there is a separate or channelized right-turn lane or the conflicting movements are uncontrolled.

Engineering judgment, based on an engineering study, is an important part in the determination of the location for establishing RTPWS. Consideration may be given to RTPWS at intersections where the higher volume approaches are at right angles to each other and the conflicting movements are generally stop controlled. The intersection volumes should generally be less than 18,000 ADT and conflicting movements to the RTPWS should be predominantly local traffic. Generally, a RTPWS sign should be used only when the approach has a separate right-turn lane.

All the following criteria should be met when considering the RTPWS (volume criteria generally refers to daily volumes):

1. If the intersection approach with the right-turn is a single lane approach (right, through and left from a single lane), the right-turn volume should be at least 50% of the total volume for that approach. No minimum volume is necessary if the approach has a separate right-turn only lane.
2. The right-turn volume should be at least twice the volume of all conflicting movements.
3. The existing right-turn volume should be 25% or more of the total intersection entering volume within any eight hours of a day.
4. An engineering study must support the installation of an RTPWS.

Support

"Right-Turn Permitted Without Stopping" (RTPWS) signs have been used in Oregon since the 1950's. Research has shown that the RTPWS signs do not contribute to an increase in crashes and are a viable and safe method of reducing delay at stop sign controlled intersections with a predominant right-turn movement. The demonstrated safe operation justifies its use to reduce

delay at appropriate stop controlled intersections. Motorists increasingly disregard traffic controls more restrictive than necessary for the situation. Allowing free movement for the predominant move will improve the credibility of stop signs where they are needed for safe operation.

Cross References

Key References

1. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
2. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	New	Notes
TRA 16-04	March 2001	Reformatted January 2020.

Roundabouts 403.0

Standards & Guidelines

01 The primary guidance document for roundabouts on state highways is Highway Division Directive DES 02 (*1*).

Process & Required Approvals

Before proceeding to the Roundabout Selection Criteria and Approval Process, a thorough alternatives analysis should have been completed in the form of an Intersection Traffic Control Study (**Section 400.0**) showing that a roundabout was a viable alternative when compared to other types of intersection traffic control.

In accordance with the Highway Division Directive (*1*), the State Traffic-Roadway Engineer has been delegated the authority to approve the installation of roundabouts on State Highways once the expectations and processes outlined in the Highway Division Directive (*1*) have been met. Requests for roundabout evaluation shall be made through the Region Traffic Engineer in collaboration with the Technical Services Roadway Manager. All roundabout requests shall be accompanied by an Engineering Investigation and address the Considerations as described in the subsections below.

The State Traffic-Roadway Engineer must approve exceptions to the minimum Design Life. Exceptions may be granted where analysis shows a single-lane roundabout meets most of the Design Life and only fails in the outer years at which time expanding the roundabout into a multi-lane roundabout may be desired.

Once the State Traffic-Roadway Engineer receives a request, Traffic-Roadway Section staff will coordinate review with other Technical Services staff and will make a recommendation to the State Traffic-Roadway Engineer. If the information provided is insufficient or not appropriate methodology, the State Traffic-Roadway Engineer may request further analysis.

The approval process for Roundabouts is divided into two phases: Conceptual Approval and Design Approval. The State Traffic-Roadway Engineer will make the decision whether Roundabouts will receive Conceptual Approval and move to the next phase. Conceptual Approval must follow ODOT procedures that assure the roundabout can accommodate freight movement on the highway and this requires the Region to have a process in place to start conversations with the freight industry through the freight mobility committee's review process (OAR Chapter 731, Division 12). The State Roadway Engineer will make the final decision on the approval of the geometric design in the Design Approval phase.

Conceptual Approval

Conceptual Approval will constitute official approval under the Delegated Authorities of the State Traffic-Roadway Engineer for a roundabout to be used as traffic control at a particular intersection. For Conceptual Approval, an Intersection Traffic Control Study

addressing all of the Considerations and a Conceptual Design of the intersection as described previously in this section shall be submitted to the State Traffic-Roadway Engineer for review by Traffic-Roadway Section staff. Conceptual Approval will not be granted until Traffic-Roadway Section staff verifies that the Region has committed to follow the ODOT procedures related to accommodating oversized commercial vehicles found in Highway Division Directive DES 02 (*1*).

Design Approval

Design Approval will constitute the final approval phase of the roundabout at a particular intersection. The geometrics of roundabout designs (including channelization plans) must be submitted to the State Roadway Engineer for review and approval. The approval package should be submitted to the State Roadway Engineer no later than final plans.

Special Considerations

The FHWA has published several useful guidance documents that can be found on their roundabout internet site. The second edition of the publication entitled Roundabouts: An Informational Guide was published as NCHRP Report 672 in 2010 (*2*). For proposed roundabouts on state highways in Oregon, staff should familiarize themselves with NCHRP Report 672 (*2*), the Highway Design Manual (*3*), and the Roundabout Selection Criteria and Approval Process.

If a roundabout project is being considered for inclusion in the STIP or other planning-level document it should be identified as an "intersection improvement" project rather than a roundabout, traffic signal, or other type of traffic control until such time that the Intersection Traffic Control Study has been conducted and consensus has been reached on the proper traffic control solution for the intersection. Refer to **Section 400.0** for more detail on how to conduct this type of analysis.

Engineering Investigation

A comprehensive Intersection Traffic Control Study shall be prepared. Details of crash history, traffic volumes, analysis of roundabout operation, and other safety concerns should be included. The investigation should also include comparisons of alternative intersection control (i.e. stop controlled, signal control, etc.) taking into account the operational aspects, life-cycle costs, and other considerations.

For normal STIP projects use a 20-year Design Life from the date of construction. For development review a minimum 10-year Design Life will be used.

A scale drawing showing the Conceptual Design of the proposed roundabout should be included to assure appropriate geometry and layout elements can be obtained. Horizontal and vertical geometry must be clearly identified. Surrounding topography and approximate R/W should also be included.

ODOT has developed a list of considerations that should be addressed in the Engineering Investigation that is submitted for proposed roundabout locations. These Considerations should not be interpreted as roundabout warrants nor pass/fail criteria for installation of a roundabout. Rather, they have been identified as important Considerations to take into account when proposing roundabout intersections on state highways.

- Freight mobility needs should be sufficiently defined and addressed prior to Conceptual Approval.
- Non-motorized user mobility needs such as the ability for bicyclists and pedestrians to safely move through the roundabout intersection should be balanced with the mobility needs of other motorized vehicles. Bicyclists should be given the option to use either the circulatory roadway with other vehicles or the pedestrian crossings outside the circulatory roadway. Special design consideration should be given for the pedestrian crossings at the entrances and exits on all legs of the roundabout where vehicles are either decelerating to enter the roundabout or accelerating to exit the roundabout.
- Roundabout design should consider the needs and desires of the local community including speed management and aesthetics.
- Intersection safety performance should be a primary consideration when pursuing a roundabout for intersection control. Predicted reductions in fatal and serious injury crashes should be compared with other types of intersection control such as traffic signals or other alternatives supported by crash modification factors (CMF) found in the Highway Safety Manual (*4*).
- Roundabout entrance geometry, circulating geometry, and exit geometry should be designed to allow the design vehicle to traverse the roundabout in a reasonable and expected manner commensurate with best design practices as shown in NCHRP Report 672 (*2*) and the Highway Design Manual (*3*). This design should utilize a representative template of the design vehicle and the vehicle path should be demonstrated using computer generated path simulation software.
- Roundabouts should meet acceptable v/c ratios for the appropriate Design Life. (See the Design Life subsection for possible exceptions to this consideration.)
- Roundabouts proposed for state highways with posted speeds higher than 35 mph will require special design considerations (e.g. longer splitter islands, landscaping, reversing curves approaching the roundabout) to transition the roadside environment from higher to lower speeds approaching the roundabout intersection.
- For Roundabouts with more than four approach legs, special design considerations should be made for the layout of the approach legs.

- Roundabout proposals should address how roundabout operations would affect the corridor immediately upstream and downstream from the roundabout intersection. (If the proposed roundabout is in a location where exiting vehicles would be interrupted by queues from signals, railroads, drawbridges, ramp meters, or by operational problems created by left turns or accesses, the Engineering Investigation should address these problems.)

Design Approval Submittal Package

The following items should be in the Design Approval submittal package:

1. Channelization plans, completed per ODOT's guidance for roundabout striping found in the Traffic Line Manual (*5*) and for splitter islands found in the Highway Design Manual (*3*).
2. A summary of documented decisions including how the requirements of Highway Division Directive DES 02 (*1*) are being met.
3. Identified deviations from design standards where design exceptions might be needed.
4. Roundabout geometric data, including:
    a. Approach design speeds for all approach legs including any bypass legs for right-turning vehicles. Bypass legs should be designed for speeds no more than 5 mph greater than the design speed of the circulatory roadway in order to accommodate bicycles and pedestrians crossing the bypass leg.
    b. The design vehicle for each movement.
    c. A table or drawing summarizing the roundabout design details, including inscribed diameter, central island diameter, truck apron designed to accommodate the appropriate design vehicle for the roundabout, and cross slope of the circulating roadway.
    d. Detailed drawings showing the fastest path for each movement, with speed and radius for each curve.
    e. A table summarizing stopping and intersection sight distance on each leg.
    f. Auto turn paths showing design vehicle and largest oversize vehicle movements (The Highway Division Directive DES 02 (*1*) process will help identify the oversized loads that could be expected).
5. Detailed drawings of the splitter islands on each leg.
6. Preliminary signing and illumination plans.

Support

Roundabouts have been proven as a viable and sustainable alternative to Traffic Signals at many intersections. Compared to other types of intersection traffic control, roundabouts have demonstrated significant safety improvements including (*6*):

- Reductions in fatalities of more than 90%;
- Reductions in injuries of 76%;
- Reductions in all crashes of 35%; and
- Increased pedestrian safety due to slower vehicle speeds.

Roundabouts also reduce congestion and delay. They can be efficient during both peak and non-peak hours. Other distinct advantages of roundabouts include the following (*6*):

- Reduced pollution and fuel use through fewer stops and hard accelerations;
- Significant life-cycle cost savings when compared to Traffic Signals due to no signal equipment installation, power, or maintenance costs; and
- Supports urban and rural community values through quieter operation and by providing a traffic control solution that is both functional and aesthetically pleasing.

Cross References

Key References

1. Oregon Department of Transportation. *Highway Directive DES 02: Roundabouts on State Highway System*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/DES_02.pdf.
2. Rodegerdts, L., J. Bansen, C. Tiesler, J. Knudsen, E. Myers, M. Johnson, M. Moule, B. Persaud, C. Lyon, S. Hallmark, H. Isebrands, R. B. Crown, B. Guichet, and A. O'Brien. *NCHRP Report 672: Roundabouts: An Informational Guide*, 2nd ed. Transportation Research Board of the National Academies, Washington, D.C., 2010. http://www.trb.org/Main/Blurbs/164470.aspx.
3. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
4. American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.

5. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
6. Federal Highway Administration. *Roundabouts: A Safer Choice*. https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/fhwasa08006/fhwasa08006.pdf.

File Code	Updated	Notes
TRA 16-10	June 2015	Added reference to DES 02. Reformatted January 2020.

Traffic Signal Operations 404.0

Standards & Guidelines

01 See the Traffic Signal Policy and Guidelines (*1*) and the Traffic Signal Design Manual (*2*).

02 Signal timing should be reevaluated on a regular basis. Reviews should be conducted approximately every three years or more frequently if significant development has occurred, if new signals in the immediate area have been added, or if complaints are received from the public or ODOT staff.

Process & Required Approvals

For operational approvals of traffic signals, see **Section 304.0**.

The State Traffic-Roadway Engineer must approve exceptions to the Traffic Signal Policy and Guidelines (*1*).

Initial timing of traffic signals and any subsequent change in permanent timing is the responsibility of the Region Traffic Engineer. Traffic-Roadway Section staff may assist if requested.

Certified ODOT personnel can make temporary timing changes to compensate for sudden changes in traffic conditions or malfunctioning traffic signal equipment that cannot be repaired or replaced immediately. Record all temporary timing changes according to the Traffic Signal Policy & Guidelines (*1*). Notify the Region Traffic Engineer of any temporary timing changes as soon as possible.

Turn On

The Oregon Standards Specifications for Construction (*3*) covers turn-on procedures during construction projects. The Traffic Systems Services Unit and the Region Traffic Manager coordinate the turn on of new or modified traffic signals. Following construction and prior to scheduling the turn-on, ODOT electricians and a Certified Traffic Signal Inspector (CTSI) must complete an inspection of all signal equipment. Before turn on, the contractor will be responsible for all necessary corrections prior to the signal being placed in service.

The traffic signal turn on consists of a series of tests and checks to ensure that the signal is ready to be activated. Once the tests are satisfactorily completed, timing data is installed and the signal is put into operation. Operation is observed during different traffic conditions and adjustments are made as necessary.

Each ODOT Region may have specific procedures with regard to signal turn on. The Traffic-Roadway Section may electronically provide preliminary and/or final timing if requested. The Traffic-Roadway Section expects Regions to provide sufficient advance notice to allow for the preparation of all timing.

Occasionally the Traffic-Roadway Section provides traffic engineering functions, at the request of the Region Traffic Engineer or Traffic Signal Operations Specialist, when a new traffic signal is placed in service. Such personnel should work closely with the Traffic Systems Services Unit technicians and project inspectors to assure all elements of the plans have been executed. This, in addition to proper signal timing, includes proper sign legends, correct sign placement, proper crosswalk locations, adequate pavement markings, etc. The correct operation of the signal should be observed for the appropriate period(s) of the day.

Maintenance

The ODOT Traffic Systems Services Unit generally maintains traffic signals on state highways, except in Region 1. Services include annual preventive maintenance inspections of all ODOT maintained traffic signals. Inspection checklist items guide technicians through a systematic evaluation of the traffic signal control cabinet and its operational components that include field sensors, poles, signals, pushbuttons, signs and striping. Checks inside the cabinet include power management components, controller timing and operation including communication, sensor operation, signal output relays, and safeguards to prevent equipment malfunctions. Equipment inventories are updated and entered into the designated electronic database, which ODOT uses to determine fleet age and locations of features such as those slated for obsolescence.

Signals on state highways within city limits or county boundaries are maintained in accordance with agreements between ODOT and the city or county. The agreements define which agency is responsible for maintenance costs. Signals installed by a private organization are maintained in accordance with an agreement or permit. Some cities do not have the capability to maintain traffic signals. At the request of the signal owner, ODOT may provide regular maintenance for these signals.

See also 2002 Policy Statement for Cooperative Traffic Control Projects (*4*).

Special Considerations

Traffic Signal Policy and Guidelines

The Traffic Signal Policy and Guidelines (*1*) are for the use of individuals involved in the design, operation, or maintenance of traffic signals on the state highway system.

Timing

The official timing record is programmed in the controller in the cabinet at the intersection.

Preemption Systems

Traffic signal preemption systems are traffic control devices that interrupt the normal operation of traffic signals to give priority or preference to special vehicles (trains,

emergency vehicles, buses, etc.). Two types of preemption systems are employed in Oregon: failsafe systems and signal preemption device systems.

Failsafe systems are hard wired to the signal controller and operate independently of any other signal function. The default state of a failsafe system is preemption. These systems are used by heavy rail and drawbridge operations, and have priority over signal preemption device systems.

Signal preemption device systems require the installation of a signal preemption device at the intersection that reacts to a traffic control signal-operating device fixed to, or carried within, a vehicle. The default state of a signal preemption device system is normal traffic signal operation. Emergency, transit, and traffic signal maintenance vehicles use signal preemption device systems.

Details can be found in the Traffic Signal Policy and Guidelines (*1*) and OAR 734-020-0300 through OAR 734-020-0330.

Certified Traffic Signal Inspectors (CTSI)

Effective April 1, 2005, all traffic signal and electrical construction (e.g. illumination, VMS, RWIS, video cameras, other ITS) on state highways requires construction inspection by personnel certified by ODOT as Certified Traffic Signal Inspectors (CTSI) (*5*). The CTSI are in addition to and do not eliminate the need for certified electrical inspection in compliance with electrical permits issued by local agencies.

Background

ODOT Traffic-Roadway Section provides Traffic Signal Inspector Certification training to ODOT staff, local agency staff, and consultants. Those who successfully complete the class are certified for three years.

- Traffic-Roadway Section offers training February through April each year.
- Class locations vary according to demand, but classes are always held in Salem and Portland, each year
- Typically 100 to 150 people are certified each year

The ODOT Technician Certification Program website (*6*) has a current listing of Certified Traffic Signal Inspectors.

Consultant Inspected Projects (Non-Permit Projects)

Consultant inspectors must be CTSI certified for electrical installations. The contract between ODOT and the Consultant should contain language requiring CTSI certified inspectors. Amendments to current contracts should be made to include this requirement.

Installation by Permit for Local Agencies and Developers

Local Agency or Consultant inspectors must be CTSI certified for electrical installations. This requirement should be included in the permit given by ODOT. The District Permitting Office shall verify this requirement prior to construction. Review the permit fee to cover the electrician's supplemental inspection.

Support

The Traffic Signal Policy and Guidelines (*1*) provide guidance on standard and optional practices relating to signal design and operations. The Traffic Signal Design Manual (*2*) provides specific guidance on plan layout including Oregon Standard Drawings, and checklists.

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.
3. Oregon Department of Transportation. *Oregon Standard Specifications for Construction*. Oregon Department of Transportation, Salem, Oregon.
4. Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.
5. Oregon Department of Transportation. Traffic Signal Inspector Certification. https://www.oregon.gov/ODOT/Construction/Pages/Signal-Inspector-Cert.aspx. Accessed July 8, 2019.
6. Oregon Department of Transportation. Technician Certification Program. https://www.oregon.gov/ODOT/Construction/Pages/Technician-Certification-Program.aspx. Accessed July 8, 2019.

File Code	Updated	Notes
TRA 16-06	January 2020	Updated to resolve conflicts with TSP&G.

Ramp Meters 404.1

The purposes of freeway entrance ramp control (ramp metering) include 1) reducing merge area turbulence by regulating vehicle flow entering the facility, and 2) regulating total freeway traffic flow through downstream bottlenecks.

Standards & Guidelines

01 Ramp meters may be provided at any freeway entrance ramp regardless of traffic volumes.

02 The Traffic Signal Policy and Guidelines (*1*) provide guidance on standard and optional practices relating to ramp meter design and operations. The Traffic Signal Design Manual (*2*) provides specific guidance on plan layout including Oregon Standard Drawings.

Process & Required Approvals

The Region Traffic Engineer decides whether to install ramp metering on freeway entrance ramps. However, the design process should be a collaborative effort between the Region Technical Center, the Intelligent Transportation Systems Unit, and the Traffic Standards and Asset Management Unit. The Traffic Standards and Asset Management Unit should be involved in plan development and design review for all ramp metering projects to insure the plans are consistent with ODOT policies and standards.

Special Considerations

There are currently no warrants for freeway entrance ramp traffic control signals, however the MUTCD (*3*) (Chapter 4I) identifies general guidelines for successful application of ramp control. The engineering study for ramp meter installation should include discussion of pertinent geometric elements; ramp and mainline traffic volumes; crash history; and operating speeds, travel time and delay on the freeway and alternate surface routes.

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
2. Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.

3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-06	January 2012	Updated roles & responsibilities. Reformatted January 2020.

U-Turns at Signalized Intersections 404.2

ORS 811.365 prohibits U-turns at signalized intersections unless otherwise posted.

Standards & Guidelines

01 Refer to the Traffic Signal Policy and Guidelines (*1*) for guidelines and criteria for approval.

Process & Required Approvals

The State Traffic-Roadway Engineer has been delegated the authority to designate specific signalized intersections at which U-turns may be permitted. Investigations into permitting U-turns at signalized intersections should be provided by ODOT Region offices.

Special Considerations

U-turns are often considered in areas where access management goals require closure of highway medians. Provision for U-turns can minimize out-of-direction travel.

Cross References

State Traffic-Roadway Engineer 100.0
Uniform Traffic Control Devices 300.0
Traffic Signals 304.0
Turn Prohibitions 405.7
Access Management 502.0

Key References

1. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

File Code	Updated	Notes
TRA 16-04-51	July 2009	Redirect to Signal Policy & Guidelines. Reformatted 1/2020.

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Left Turn Lanes 405.0

Standards & Guidelines

01 Left-turn treatments should be considered where turning volumes, crash experience or general safety is of concern. For safety reasons, exclusive left-turn bays should be considered at all high-speed rural intersections.

02 See the Highway Design Manual (*1*) for guidance on the design of turn treatments.

03 The current criteria for left turn lanes is available from the Transportation Planning Analysis Unit in the Analysis Procedures Manual (*2*) which presents criteria and considerations for when left-turn lanes may be appropriate.

04 The Traffic Signal Policy and Guidelines (*3*) provide guidance for left-turn signalization and warrants for phasing at intersections (see Left-Turn Signal Modes).

Process & Required Approvals

Left turn lanes at intersections and driveways, and left turn phase modifications at signals, requires Region Traffic Engineer approval. See the Multiple Turn Lanes **Section 405.6** for process and required approvals for multiple turn lanes (e.g. double left turn lanes).

Support

Left turning vehicles can cause delay, have a major impact on intersection operations, and be a source of conflict with other maneuvers. Left-turn treatments range from prohibiting such movements, to shared lanes, to exclusive left-turn bays and two-way left-turn lanes.

Traffic studies have shown exclusive left-turn bays increase safety at most intersections. On rural facilities, exclusive left-turn bays can greatly reduce rear end collisions and reduce delay to through traffic.

Separate signal phases for left-turn movements reduce the amount of green time available for other movements and so requires careful analyses.

Cross References

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

File Code	Updated	Notes
Unassigned	January 2012	Reformatted January 2020.

Right Turn Lanes 405.1

Right-turn improvements are commonly categorized into three designs:

- Conventional Right-Turn Lanes
- Channelized Right-Turn Lanes (see **Section 405.2**)
- Right-Turn Acceleration Lanes (see **Section 405.3**).

Conventional Right-Turn Lanes are standard turn lanes without a channelizing island or a separate right-turn roadway.

Standards & Guidelines

01 An engineering investigation should be conducted for each site where Right-Turn Lanes are being considered or where existing Right-Turn Lanes might be modified through mitigation resulting from access management actions or as part of STIP project.

02 Right-Turn Lanes should not be installed at uncontrolled intersections in the following situations:

a. High speed highways (posted speeds of 45 mph or greater) with high traffic volumes where there are frequently insufficient gaps for side street traffic to judge whether or not they can safely cross or turn onto the main highway,

b. Low speed urban arterials with multi-modal activity such as high bicycle and pedestrian volumes and/or transit use. These can be existing or planned uses,

c. Multiple driveways or side streets are located in the Right-Turn Lane,

d. The skew angle of the side street leads to high speed right turns, or

e. The Right-Turn Lane contributes to a right-of-way constraint that leads to less than adequate bicycle, pedestrian, or transit facilities.

03 Existing Right-Turn Lanes that meet the criteria in Paragraph 02 should be evaluated for removal if they are within the limits of a STIP project.

04 See the Traffic Line Manual (*1*) and Oregon Standard Drawings for guidance on the design of turn treatments. Criteria for Right-Turn Lanes can be found in the Analysis Procedures Manual (*2*). The Traffic Signal Policy and Guidelines (*3*) provides guidance for right turn signalization and warrants for phasing at intersection (see Right Turn Signal Warrants).

05 For criteria for Conventional Right-Turn Lanes, refer to the Analysis Procedures Manual (*2*). Both the Highway Design Manual (*4*) and the Traffic Line Manual (*1*) give design and striping guidance for Conventional Right-Turn Lanes.

Process & Required Approvals

Conventional right turn lanes at intersections and driveways, and right turn phase modifications at signals, requires Region Traffic Engineer approval. See the Multiple Turn

Lanes section for process and required approvals for multiple turn lanes (e.g. double right turn lanes).

Special Considerations

Adding Right-Turn Lanes can reduce motor vehicle crashes and the time motorists are delayed in traffic. However, Right-Turn Lanes also lead to increased conflicts between motor vehicles and bicyclists as motor vehicles must weave across the path of bicycles as they enter the right-turn lane when a bike lane transitions from the curb or shoulder to the left of the right-turn lane in advance of the intersection. Right-Turn Lanes also lengthen pedestrian crossing distances and left turn movements for vehicles entering the highway from a side street.

The engineering investigation should include a crash history and identification of the type of crash that might be occurring, as well as an examination of design speed, target speed and prevailing speeds, pedestrian volumes and crossing times, bicycle volumes, and the percent of turning traffic in the total approach volume. The engineering investigation should address how conflicts between bicyclists and motor vehicles would be addressed for new Right-Turn Lanes or modifications to existing Right-Turn Lanes. If a safety analysis using Highway Safety Manual (HSM) (*5*) methodologies shows that either installation of a new right-turn lane or modification of an existing right-turn lane would degrade safety at or in the vicinity of the intersection, the right-turn lane should be not be installed or, if existing, shall be considered for removal. Whether signalized or unsignalized, the engineering investigation should take into account traffic operations with and without the right turn lane. Sight distance, alignment, and cross-section of the roadway may also be factors to consider in the engineering investigation. Turning volumes, functional class of vehicle, and expected queue length in the through travel lane(s) are the main consideration for the queue storage length of the turn lane.

Support

Right-Turn Lanes are often considered in the geometric design of intersections and as possible mitigation for development impacts near a congested intersection. Such lanes provide storage as well as a deceleration area for vehicles prior to making the turn or, in the case of Right-Turn Acceleration Lanes (**Section 405.3**), an acceleration area to merge into traffic after negotiating the turn. The storage function is particularly useful at railroad grade crossings during preemption of the traffic signal by rail operations.

Cross References

Key References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.
4. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
5. American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.

File Code	Updated	Notes
Unassigned	January 2016	Revised for conflicts at right turn lanes. Reformat Jan 2020.

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Channelized Right Turn Lanes 405.2

A channelized right-turn lane is a lane for the exclusive use of right turning vehicles that uses a channelizing island (raised or painted) at the intersection.

Standards & Guidelines

01 Channelized Right-Turn Lanes should be:

a. Signal controlled at signalized intersections.

b. Stop controlled for Channelized Right-Turn Lanes from Minor Street (stop controlled) onto Major Street (free flow).

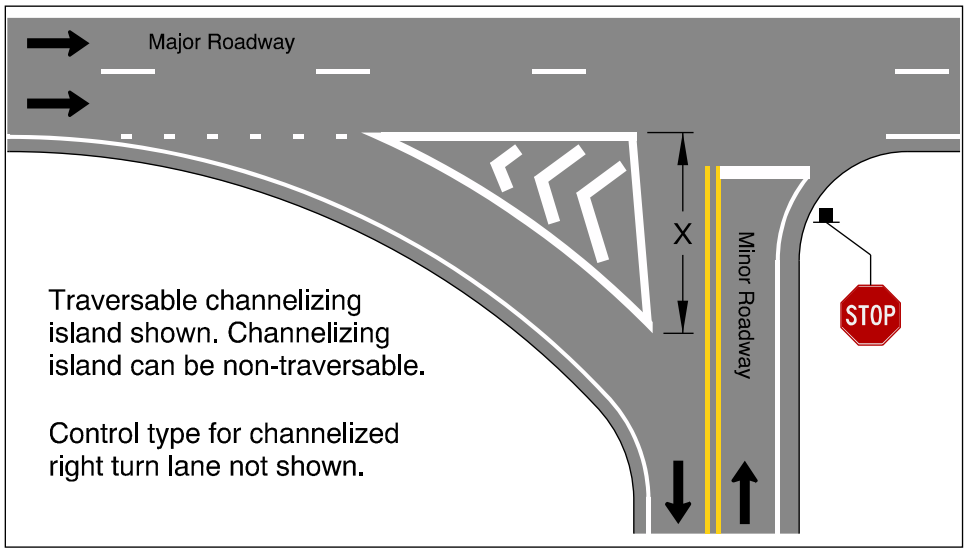
c. Uncontrolled for Channelized Right-Turn Lanes from Major Street (free flow) onto Minor Street (stop controlled). Yield control is recommended if the "X" distance in **Figure 405.2-1** exceeds 100 feet or an engineering study indicates need for yield control.

02 Stop control is an option for Channelized Right-Turn Lanes at signalized intersections if the Channelized Right-Turn Lane is separated from the adjacent travel lanes by a channelizing island and the turn lane is not controlled by a signal.

03 Yield control (as permitted by the MUTCD (*1*)) is an option for Channelized Right-Turn Lanes from Minor Street (stop controlled) onto Major Street (free flow) if deemed appropriate by an engineering study.

04 Stop control is an option for Channelized Right-Turn Lanes from Major Street (free flow) onto Minor Street (stop controlled) only if deemed appropriate by an engineering study.

Figure 405.2-1: Example of a Channelized Right Turn Lane



Process & Required Approvals

The decision to use signal, yield, or stop control shall be documented by an engineering study that takes into consideration the requirements of Sections 2B.04 and 4D.34 of the MUTCD (*1*). See Traffic Line Manual (*2*) for typical layouts.

Channelized Right-Turn Lanes at Signalized Intersections

State Traffic-Roadway Engineer approval is required for all Signalized Channelized Right-Turn Lanes. The engineering study should be included in the signal approval request.

Channelized Right-Turn Lanes from Minor Street (stop controlled) onto Major Street (free flow)

State Traffic-Roadway Engineer approval is required for yield control. The Region Traffic Engineer may approve the stop control condition.

Channelized Right-Turn Lanes from Major Street (free flow) onto Minor Street (stop controlled)

State Traffic-Roadway Engineer approval is required for both yield and stop control.

Special Considerations

Well-designed Channelized Right-Turn Lanes slow turning vehicles, allow drivers and pedestrians to easily see each other, reduce pedestrian exposure in the roadway, reduce the complexity of an intersection by breaking it into manageable parts, and allow drivers to see oncoming traffic as they merge into the receiving roadway. Channelized Right-Turn Lanes can be detrimental to pedestrian safety when they allow motorists to maintain high speeds through the turn, do not optimize sight lines to the crosswalk, and do not reduce the crossing distance for pedestrians.

Channelized Right-Turn Lanes are most appropriate at signalized intersections where geometrics (e.g., intersections with a significant skew angle beyond 90 degrees) make right turns infeasible for the design vehicle without substantially increasing pedestrian crossing distances. Channelized Right-Turn Lanes can also benefit signal hardware placement allowing use of mast arms instead of span wire at certain locations if the signal pole is placed inside the raised island separating Channelized Right-Turn Lanes from general-purpose lanes.

An engineering study shall document the type of traffic control used in conjunction with Channelized Right-Turn Lanes. Sections 2B.04 and 4D.34 of the MUTCD (*1*) outline exceptions where YIELD or STOP signs could be used at a signalized intersection.

Well-designed Channelized Right-Turn Lanes include several key features (*3*):

- The island (sometimes referred to as the "pork chop") that forms the channelized right-turn lane is raised and large enough to accommodate waiting pedestrians and accessibility features, such as curb ramps or a cut-through).
- As they enter the right-turn lane, drivers can easily see pedestrians crossing or about to cross the right-turn lane, and have enough space to stop completely once a pedestrian is spotted.
- The right-turn lane is as narrow as possible while still enabling the design vehicle to make the turn. Edge lines with cross-hatching can narrow the perceived width of the lane while still accommodating larger vehicles.
- The crosswalk is oriented at a 90-degree angle to the right-turn lane to optimize sight lines, and is positioned one car length back from the intersecting roadway to allow drivers to move forward and wait for a gap in oncoming traffic after clearing the crosswalk.
- High-visibility crosswalk striping and/or signage enhances the visibility of the crosswalk to drivers.
- The angle at which the right-turn lane intersects the cross street is relatively low (e.g., closer to 110 percent, rather than 140 percent). This feature lowers motor vehicle speeds and makes it easier for drivers to see oncoming traffic.
- Good design can be recognized by the long "tail" on the island (i.e. long tail means slower turning speed; short tail means faster turning speed).
- Acceleration lanes are not provided where the right-turn lane intersects the cross street. Acceleration lanes enable drivers to navigate the channelized right-turn lane at higher speeds than would be possible if drivers had to yield to cross street traffic.
- The needs of visually impaired pedestrians should be considered as part of the design.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
3. Federal Highway Administration. Pedestrian Safety Guide and Countermeasure Selection System. http://www.pedbikesafe.org/pedsafe/. Accessed January 14, 2019.

File Code	Updated	Notes
Unassigned	January 2020	Removed content covered in Traffic Line Manual.

Right Turn Acceleration Lanes 405.3

A right-turn acceleration lane is an added lane for right-turning vehicles joining the traveled way of the highway from a side street to enable drivers to make the necessary change between the speed of operation on the highway and the lower speed of the turning movement.

A rural expressway is a subset of state highway classifications defined in the Oregon Highway Plan (OHP) (*1*) and located outside of city limits. Their purpose is to provide for high speed, high volume travel between cities and connections to ports and major recreation areas with minimal interruptions.

Volume to Capacity (V/C) Ratio is the ratio of traffic flow rate to capacity of the road to handle that traffic flow, calculated using the Analysis Procedures Manual (*2*) methodology.

Standards & Guidelines

01 The posted speed on the main highway shall be 45 MPH or greater.

02 The V/C ratio of the right-turn movement without the acceleration lane shall exceed the maximum value listed in Tables 6 and 7 of the OHP (*1*) for the corresponding highway category and location.

a. Exception 2a: If trucks represent at least 10% of all right-turning vehicles entering the highway, then the V/C criteria may be waived.

b. Exception 2b: If substandard sight distance exists at an intersection or right-turning vehicles must enter the highway on an ascending grade of greater than 3%, then the V/C criteria may be waived.

c. Exception 2c: If crash data in the vicinity of the intersection shows a history of crashes at or beyond the intersection attributed to right-turning vehicles entering the highway, then the V/C criteria may be waived.

03 The peak hour volume of right-turning vehicles from the side street onto the state highway shall be at least 10 vehicles/hour for Rural Expressways and 50 vehicles/hour for all other highways.

04 No other access points or reservations of access shall exist on either side of the highway within the design length, taper, and downstream from the end of the taper within the decision sight distance, based on the design speed of the highway. If positive separation between opposing directions of traffic exist such as raised medians or concrete barriers, then access control is only needed in the direction of the proposed acceleration lane.

05 Special consideration should be given to cyclists and pedestrians. Acceleration lanes create an unexpected condition for both pedestrians and cyclists. Every reasonable effort should be made to create conditions that make the crossing safer and easier for pedestrians and cyclists.

06 The acceleration lane shall be designed in accordance with the drawing "Right Turn Acceleration Lane from At Grade Intersection" found in the Highway Design Manual (*3*).

07 The pavement markings for the acceleration lane shall be according to standards found in the Traffic Line Manual (4).

08 Free-flow acceleration lanes may be considered in rural or suburban areas provided the turning radius is tightened and the angle of approach is kept as close to a right angle as possible. These combined elements will force right-turning drivers to slow down and look ahead, where pedestrians and bicyclists may be present, before turning and accelerating onto the roadway.

Process & Required Approvals

The State Traffic-Roadway Engineer shall determine if a right-turn acceleration lane proposal meets the above criteria. Proposals should be submitted to the State Traffic-Roadway Engineer and include an engineering investigation with data supporting the above criteria and a drawing encompassing the intersection and design length of the acceleration lane showing all access points and reservations of access to the highway. The State Traffic-Roadway Engineer will only consider proposals for right-turn acceleration lanes from public streets. If the State Traffic-Roadway Engineer determines that a right-turn acceleration lane proposal meets the above criteria, the proposal will be forwarded to the State Roadway Engineer for consideration of design standards.

Traffic-Roadway Section staff, TOG, and RPG will closely monitor implementation of this policy. Any revisions will be based on feedback from the Region Technical Centers, the TOG, and RPG.

Support

The Traffic-Roadway Section issued a technical bulletin in November 2007 (TR07-11(B), now rescinded) concerning criteria for consideration of right-turn acceleration lanes on state highways. At the time, project teams had been requesting design exceptions for non-standard acceleration lanes as part of STIP and OTIA projects. Additionally, developers had been requesting right-turn acceleration lanes as mitigation to traffic impacts associated with residential and commercial development along state highways. The Traffic-Roadway Section developed criteria for right-turn acceleration lanes in response to these requests.

Cross References

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.
2. Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.
3. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
4. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	New	Notes
TRA 16-04-08	January 2020	Consolidated supporting history.

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Shared (or Combined) Bike and Right Turn Lane 405.4

Several cities in Oregon have been using shared bike and right-turn lanes with good results, and ODOT has been experimenting with them.

Standards & Guidelines

01 On preservation projects with bike lanes, where it may be outside the scope of the project to widen the intersection, shared lanes may be considered to carry the bicycle lane through the intersection.

Process & Required Approvals

Shared lanes at state highway intersections require Region investigation and approval by the State Traffic-Roadway Engineer.

Special Considerations

A shared lane is not the preferred design, but it provides some direction to both motorists and bicyclists.

Shared bike and right turn lanes are used where widening an intersection is not possible due to physical, right-of-way or financial constraints. The use of the shared lanes is generally limited to locations where right-turn speeds and volumes are low. In locations with higher volumes and speeds of turning vehicles, widening the intersection to include bike lane to the left of the right-turn lane may be necessary.

Consider the following factors:

- The shared lanes may not be suitable for use at signalized intersections and should not be used where there is separate right-turn signalization.
- The use of the shared lanes should be limited to locations where turning vehicle speeds are close to the speed of the bicycles.

Cross References

File Code	New	Notes
Unassigned	March 2001	Reformatted January 2020.

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Transit Exceptions to Turn Lanes 405.5

ORS 810.130 allows the designation of locations where public transit vehicles may proceed in a direction prohibited to other traffic (see **Figure 405.5-A**).

Process & Required Approvals

ORS 810.130 requires an engineering study indicating that the movement may be made safely in the designated area. State Traffic-Roadway Engineer approval is required for transit exceptions to turn lanes.

Figure 405.5-A: Example of Transit Exception to Right Turn Lane

Special Considerations

The typical application is at intersections with exclusive right-turn lanes and bus stops near the intersection. Transit vehicles will block the exclusive right-turn lane while stopped to load and unload passengers at a nearside bus stop or will use the exclusive right-turn lane as a queue bypass to go straight through the intersection to a far-side bus stop. In either case, an exception is needed and proper signing installed to allow the transit vehicle to make the movement otherwise prohibited by the lane control signing.

The engineering study does not need to be extensive but should at a minimum document existing conditions, identify proposed signing changes, and provide enough information for the Region Traffic Engineer to evaluate the location for a transit exception request. For additional information on what is required for an engineering study, refer to the definitions section of the MUTCD (*1*).

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	New	Notes
Unassigned	January 2012	Reformatted January 2020.

Multiple Turn Lanes 405.6

Standards & Guidelines

01 Multiple right or left turn lanes shall only be authorized based on an engineering study to review any safety problems that might result.

Process & Required Approvals

The installation of multiple turn lanes requires the approval of the State Traffic-Roadway Engineer. The Traffic-Roadway Section maintains files on all new approved locations. Proposed locations involving traffic on the side streets at the approach to state highways will have as a part of the file a written notification of intent to the local agency.

Special Considerations

Multiple left or right turns are generally installed in response to capacity or queuing deficiencies. There are drawbacks such as increased intersection width, signal phasing considerations, and an increased risk of sideswipe crashes as drivers navigate the turn side-by-side.

The study may include the following:

- A capacity analysis that clearly demonstrates an improved level of service with multiple turning movements and/or with other considerations not to lower the level of service.
- An assessment of the vehicle delay or queuing on the approach under consideration without implementation of multiple turn lanes. The approach may be that of the local agency street or roadway system at the intersection of the state highway.
- Consideration of truck or other wide turning path vehicles and adequate multiple turning lane widths.
- Consideration of special striping or raised pavement markers (RPM) to delineate the multiple turning movement and placement of advance signing as required.

Other considerations include the following:

- Roadway Design requires the receiving roadway to have a minimum receiving width of 30 feet; a width of 36 feet is preferred.
- In most cases, multiple left turn lanes require protected-only left-turn phasing.
- The design of multiple turn lanes and their interaction with pedestrian crosswalks should be carefully considered. Such consideration may include special traffic signal displays, non-conflicting phase assignments or crosswalk closure.
- The local jurisdiction should be notified of any multiple turn lane proposals involving roadways under their jurisdiction.

Cross References

File Code	Updated	Notes
Unassigned	January 2020	Removed redundant content.

Turn Prohibitions 405.7

Standards & Guidelines

01 OAR 734-020-0020 describes the warranting conditions for turn prohibitions and the MUTCD (*1*) describes the use of turn prohibition signs.

02 Advance notice of an impending traffic control change should be posted when making changes to existing intersections.

Process & Required Approvals

OAR 734-020-0020 requires an engineering investigation to establish turn prohibitions.

The State Traffic/Roadway Engineer (STRE) has been delegated the authority to establish turn prohibitions on state highways to ensure statewide consistency. The Region Traffic Engineer may establish turn prohibitions on state highways within their respective Region provided they follow the warranting conditions in OAR 734-020-0020 and notify the STRE of the prohibitions. These prohibitions include designating intersections where turns are prohibited in any direction, signalized or unsignalized, but do not include intersections where raised medians are used as a positive means of enforcing the allowable movements.

When the turn prohibition is linked to access management action, the Region Access Management Engineer, in consultation with the Region Traffic Engineer, may designate unsignalized intersection turn prohibitions consistent with the authority delegated to the Region Access Management Engineer under Division 51 of Chapter 734 of the Oregon Administrative Rules. The State Traffic-Roadway Engineer approval is required for turn prohibitions at signalized intersections linked to access management action.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
Unassigned	January 2020	Removed language that belonged in the Traffic Line Manual.

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Two-Way Left Turn Lanes 405.8

A two-way left turn lane (also known as a TWLTL, special left turn lane or continuous two-way left-turn lane, CTWLTL) is a type of median reserved for the exclusive use of vehicles turning left.

Standards & Guidelines

01 On facilities with existing TWLTL's, the median should not be converted to a painted median until all private accesses have been removed. This is generally only true on limited access highways.

02 See the Highway Design Manual (*1*) and Traffic Line Manual (*2*) for standards and guidelines related to TWLTLs.

Process & Required Approvals

Region Traffic Engineer approval is required for use of a striped bull nose in a two-way left turn lane at a minor T-intersection (see Traffic Line Manual (*2*)).

Special Considerations

ORS 811.345 and 811.346 prohibit passing and overtaking or travel by a driver in a TWLTL except to make a left turn.

TWLTL's are used in areas where crashes, primarily caused by left turning vehicles, are correctable or where turning movements from the through lane are decreasing capacity of the facility. These areas are usually characterized by frequent accesses. If TWLTL's are considered in higher speed areas, caution should be taken to assure that vehicles using the TWLTL are unlikely to meet head-on at high speeds (spacing and location of accesses are critical). TWLTL's emphasize access and can encourage direct connections to the highway. A non-traversable median with openings at select local streets can encourage private access to the local street system. See the Highway Design Manual (*1*) for further discussion of medians.

In most cases a non-traversable (curbed or depressed medians) are superior to a TWLTL in terms of safety and operation. On arterials with higher volumes (above 20,000 ADT) and frequent access, it may be advantageous to consider a non-traversable median, rather than a TWLTL. On higher volume or higher speed roadways the TWLTL loses much of its safety advantage, which the non-traversable medians retain.

Cross References

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
TRA 07-08, LEG 10	January 2020	Added HDM & TLM reference, removed redundant content.

Interchange Modification Requests 406.0

Federal policy requires an Interchange Modification Request (IMR) to justify any new or revised access point on the Interstate System, regardless of funding source.

Standards & Guidelines

01 Interchange Modification Request procedures are outlined in the Highway Design Manual (*1*).

Process & Required Approvals

The Federal Highway Administration (FHWA) has the authority to approve all new or revised access points to the Interstate System. Requests for new or revised access points on the Interstate System may be associated with planning work and typically requires Region Traffic and TPAU support, which may ultimately result in an Interchange Modification Request.

Region Traffic staff typically participates in the documentation of the policy points that must be addressed in all Interchange Modification Requests. Interchange Modification Request submittals are coordinated by and sent to FHWA through the Roadway Engineering Unit of the Traffic-Roadway Section.

Special Considerations

An informational guide is available from FHWA (*2*). Contact the Interchange Engineer for questions or clarification regarding ODOT IMRs.

Cross References

Intersection Control Evaluation 400.0
Wrong-Way Treatments 406.1
Access Management 502.0

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Federal Highway Administration Office of Infrastructure. *Interstate System Access Information Guide*. Federal Highway Administration, Washington, D.C., 2010. https://www.fhwa.dot.gov/design/interstate/pubs/access/access.pdf.

File Code	New	Notes
Unassigned	June 2015	Added to clarify new federal policy. Reformatted Jan. 2020.

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Wrong-Way Treatments 406.1

Standards & Guidelines

01 See Parts 2 and 3 of the MUTCD (*1*), the Sign Design Manual (*2*), and the Traffic Line Manual (*3*) for information on design policies and guidelines for signing and pavement markings to prevent wrong way crashes.

Process & Required Approvals

See the Sign Design Manual (*2*) and Traffic Line Manual (*3*) for element-specific processes and approvals.

Special Considerations

If a freeway on-ramp or other road is suspected of frequent wrong way movements the following steps should be taken:

1. Verify the extent of the problem by reviewing the crash history, looking primarily for head on or sideswipe collisions.
2. Check signing to ensure that MUTCD (*1*) and Sign Design Manual (*2*) policies and guidelines are met.
3. Determine if additional signing either at the ramp or on the approach to the ramp or intersection could provide additional guidance.
4. Evaluate the geometric design of the intersection: (i.e. Entrance radii, offset ramp terminals) and determine if modifications should be considered. (See Highway Design Manual (*4*) for further discussion).
5. Consider the need for additional illumination in the area.
6. Check pavement markings to ensure the MUTCD (*1*) and Traffic Line Manual (*3*) policies and guidelines are met.
7. Exit and entrance ramp terminals on the crossroad should be offset to encourage drivers to use the entrance ramps and discourage wrong way moves. (See Highway Design Manual (*4*) for further discussion).
8. Consider installation of red reflectors on the backside of guideposts in situations where sign and illumination improvements have not been effective.
9. Due to limited success and maintenance costs of bi-directional raised pavement markers, consider use of these markers only in exceptional circumstances. These markers require the approval of the State Traffic-Roadway Engineer, in consultation with the Region Traffic Engineer.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
TRA 03-01-26, TRA 16-02-04-04, TRA 16-04-76	January 2018	Reference other sections of the MUTCD and ODOT manuals. Reformatted January 2020.

Speed Zones – General 500.0

Process & Required Approvals

Speed limits are covered in ORS 810.180 (Designation of speed limits), and ORS 811.100 through ORS 811.111. The establishment of speed zones under normal conditions is described in OARs 734-020-0014, -0015, -0016, and -0017. The rules for establishing Interstate Speeds are covered under OAR 734-020-0010. Those speeds are defined in OAR 734-020-0011.

In Oregon, the decisions regarding speed zones are made jointly by the Department of Transportation and the road authority, for example, a city or county.

ODOT has the responsibility to investigate roads for establishing new speed zones or changing existing speed zones. These investigations are performed at the request of a city, a county, an agency with a road authority or a private citizen if the request is for a rural state highway. For rural state highways, requests for an investigation should be made in writing to the Region Traffic Engineer.

If the recommended speed is of mutual agreement between the Department and the local road authority, the speed zone is established. If mutual agreement cannot be reached, the speed zone decision is referred to the Speed Zone Review Panel.

When the Traffic-Roadway Section approves and distributes a permanent or a short-term speed zone order on a state highway, those who have responsibility for sign installation and removal (including private consultants) must notify the Traffic-Roadway Section when the signs are installed and removed.

Special Considerations

Establishing speed zones in Oregon requires an engineering investigation. These investigations are in accordance with nationally accepted traffic engineering standards and procedures, which have been established through years of research and experience.

A major factor in speed zoning is the 85th percentile, the speed at or below which 85 percent of the vehicles are traveling. This is an indication of what most drivers feel is reasonable and safe. The procedure provides Oregon with a consistent and uniform application of techniques to establish safe and proper speed zoning. Other factors taken into consideration are crash history, roadside culture, traffic volumes, and roadway alignment, width and surface.

Cross References

Speed Zones – General 500.0

File Code	Updated	Notes
TRA 07-02	March 2008	Revised based on TRS staff. Reformatted January 2020.

Variable Speed Zones 500.1

Variable Speed Zones dynamically change the advisory or regulatory speed in response to conditions like congestion or adverse weather.

Standards & Guidelines

01 See the Oregon Statewide Variable Speed System Concept of Operations (*1*).

Process & Required Approvals

ODOT has statutory authority to establish Variable Speed Zones on public roads in the state.

Requests for Variable Speed Zones on state highways are under State Traffic-Roadway Engineer Authority and shall be submitted to the State Traffic-Roadway Engineer for review and conceptual approval prior to starting any design work. The submittal to the State Traffic-Roadway Engineer should include all Intelligent Transportation Systems (ITS) devices anticipated for the project such as Variable Message Signs that require concurrent review and approval by both the State Traffic-Roadway Engineer and Intelligent Transportation Systems Unit. In addition, if the variable speed zone is going to be regulatory they either will require either a speed zone order or may require revision to the Oregon Administrative Rules if they are on an Interstate. They will require a speed zone investigation and if on an Interstate, they require addressing the items outlined in OAR 734-020-0018.

Cross References

Key References

1. Oregon Department of Transportation. *Oregon Statewide Variable Speed System Concept of Operations*. Oregon Department of Transportation, Salem, Oregon.

File Code	New	Notes
TRA 07-02	January 2020	Updated introduction statement, added ref. to Con Ops.

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Construction Speed Zones 500.2

Standards & Guidelines

01 See the Traffic Control Plans Design Manual (*1*) for information on Construction Speed Zones, including how to request one from the State Traffic-Roadway Engineer.

Process & Required Approvals

The State Traffic-Roadway Engineer has the approval authority for a reduced speed in a work zone or other temporary situation.

Cross References

References

1. Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.

File Code	Updated	Notes
TRA 07-02	January 2018	Removed conflicts with TCP Design Manual. Reformat 1/20.

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School Speed Zones 500.3

Standards & Guidelines

01 A School Speed Zone should be established according to ORS 811.111 subsection 1(e) and ORS 810.200.

Process & Required Approvals

Each road authority (state, county, or city) determines within their own jurisdiction, by performing an engineering study, whether a School Speed Zone is appropriate and the limits of that zone.

The road authority with jurisdiction establishes all School Speed Zone exceptions in statutory and basic speed zones. On local jurisdiction roadways, the road authority may establish a School Speed Zone, including those roadways covered by a speed zone order. School Speed Zone exceptions on local jurisdiction roadways are no longer included in the speed zone orders.

On State Highways inside city limits, the local jurisdiction or school district must request the School Speed Zone in writing. For state highways outside city limits, the request usually comes through the District Manager. The request for a School Speed Zone should include a copy of the school district's Pedestrian Route Plan, as described in the MUTCD (*1*).

On state highway segments covered by speed zone order, the School Speed Zone must be approved by the State Traffic-Roadway Engineer and included on the speed zone order. On state highway segments not covered by speed zone order (i.e., statutory speed or basic rule sections), a School Speed Zone may be approved by the Region Traffic Engineer.

The complete report submitted to the State Traffic-Roadway Engineer requesting a School Speed Zone on a state highway shall include:

1. The original correspondence requesting the school zone exception.
2. An engineering study, including an evaluation of the pertinent information. (see A Guide to School Area Safety (*2*))
3. The entire rewording necessary for the new speed zone order.
4. A map showing the existing speed zone and the new school zone (if applicable).
5. Photographs showing the area from beginning to end. Including sight distance or other roadway conditions that would affect the decision to approve the exception.

The engineering study does not necessarily have to include speed checks but should establish the school ground or school crossing boundaries according to the standards adopted by the state. (See the Sign Policy and Guidelines for the State Highway System (*3*) and A Guide to School Area Safety (*2*)).

Special Considerations

ODOT has prepared a publication entitled A Guide to School Area Safety (2) to assist in the placement of traffic controls in school areas.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.
3. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.

File Code	Updated	Notes
TRA 16-05-01	December 2006	Added ref. to A Guide to School Area Safety. Reformat 1/20.

Photo Radar Speed Enforcement 500.4

Photo radar speed enforcement is currently limited to certain jurisdictions and agencies; Fixed Photo Radar (FPR) speed enforcement is further limited to high crash corridors in the City of Portland. Speed enforcement using Red Light Running Cameras is a separate type of photo speed enforcement that is secondary to red light running enforcement (see **Section 304.1**).

Standards & Guidelines

01 Refer to ORS 810.438 through 810.442 for requirements concerning photo radar speed enforcement. For FPR enforcement, see the Fixed Photo Radar Camera Guidelines for State Highways (*1*).

02 See the Sign Policy and Guidelines for the State Highway System (*2*) and the MUTCD (*3*) for signs associated with photo radar speed enforcement.

Process & Required Approvals

State Traffic-Roadway Engineer approval is required for Fixed Photo Radar Camera installation and operation on all state highways regardless of operation or maintenance responsibilities. See the Fixed Photo Radar Camera Guidelines for State Highways (*1*) for approval procedures on State Highways.

Cross References

Key References

1. Oregon Department of Transportation and Oregon Traffic Control Devices Committee. *Fixed Photo Radar (FPR) Camera Guidelines for State Highways*. Oregon Department of Transportation, Salem, Oregon, 2016. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed_Fixed-Photo-Radar-Camera-Guidelines.pdf.
2. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
3. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-05-01	January 2020	Added reference to Fixed Photo Radar Guidelines.

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Traffic Calming 500.5

Traffic calming techniques can be used effectively to encourage drivers to operate their vehicles at appropriate speeds.

Special Considerations

The selection of traffic calming strategies must consider the nature of the street or roadway, adjacent land use, driver population, emergency vehicle concerns, ease of implementation and other site specific factors. If used appropriately, the techniques can encourage drivers to drive at desired speeds, improve the appearance of the roadway, and improve the comfort of pedestrians crossing the roadway and facilitate other modes use of the facility.

Traffic calming for neighborhood streets may include speed bumps, speed humps and traffic circles. While these may be effective in reducing speeds, they create additional neighborhood noise, driver discomfort and hardships for emergency response. Street closures may also be used, but this forces traffic onto other streets. Traffic calming should be designed to encourage driving at the legally established speeds. They should not be designed to physically restrict motorists to slower speeds, in effect establishing an illegal speed limit and posing a hazard to the motoring public.

Traffic calming on state highways, primarily arterial streets, involves different types of changes to the roadway environment to cue drivers to the mixed-use environment, of pedestrians, bicycles and transit. These changes include such items as pedestrian islands, curb bulb-outs, wide sidewalks, and streetscaping. Roundabouts, used in the right places, are another strategy for improving driver behavior on arterial streets. Traffic calming techniques will be different for downtown areas versus transition areas (see Main Street Handbook (*1*)).

Using traffic control devices such as signals or STOP signs for traffic calming is discouraged, as these are generally ineffective. Inappropriate use of traffic control devices may cause safety problems and may increase conflicts and speeds due to driver frustration or indifference. Non-uniform application of devices causes confusion among pedestrians and vehicle operators, prompt wrong decisions, and can contribute to crashes. Vehicular, pedestrian and bicycle safety depends in large measure upon public understanding and acceptance of uniform methods for efficient traffic control.

Strategies such as narrowing lanes and adding on-street parking may result in lower speeds, but they often increase safety concerns. On-street parking increases conflicts between the parking vehicles and bicyclists, as well as other vehicles. It also limits the sight distance and visibility of vehicles entering the roadway from side streets and other accesses. While on-street parking can present safety concerns, it can also act as a buffer between the travel lanes and the sidewalk. Bulb-outs can be used to make pedestrians more visible to the motorists at crossing points. On-street parking is appropriate for most downtown business areas, but may not be appropriate in other areas such as transition areas.

Posting a lower speed may be requested by some communities seeking to increase safety. These are viewed as unrealistic by drivers and can lead to enforcement problems and disrespect for speed limits. Simply posting a lower speed does not guarantee the desired change or increase in safety. By applying some of the softening effects of pedestrian amenities and landscaping, the motorists' natural speeds are often slowed due to the perception of a changing road culture. Striving to lower vehicular speeds naturally using the methods described above is desirable. When a lower speed appears reasonable to the motorist it is more readily accepted. This results in lower speeds, reduces enforcement problems, and increases safety.

Cross References

Land Use and Transportation 107.0
Sight Distance 203.0
Marked Crosswalks on State Highways 310.0
Roundabouts 403.0
Speed Zones – General 500.0
Parking 501.0

Key References

1. Oregon Department of Land Conservation and Development. *Main Street.When a Highway Runs Through It: A Handbook for Oregon Communities*. Oregon Department of Land Conservation and Development, Salem, Oregon, 1999. http://www.oregon.gov/LCD/Publications/MainStreet_HighwayThroughIt_1999.pdf.

File Code	New	Notes
Unassigned	March 2001	Reformatted January 2020.

Parking 501.0

Standards & Guidelines

01 See the Highway Design Manual (*1*) for information regarding the appropriateness of on-street parking.

02 Diagonal parking may be allowed in designated Special Transportation Areas (STA's) when approved by the State Traffic-Roadway Engineer through the design exception process.

03 Parking control on highways is covered in ORS 810.160, ORS 810.200, ORS 811.550, OAR 734-020-0020, OAR 734-020-0080, OAR 734-020-0085, and OAR 734-020-0090.

04 The Region Traffic Unit should maintain a database of Parking Prohibitions and Restrictions that have been ordered by the Region Traffic Engineer.

05 Parking spaces reserved for persons with disabilities shall meet the minimum requirements found in Oregon Transportation Commission Standards for Accessible Parking Places (*2*).

Process & Required Approvals

A request for a parking prohibition or restriction on a section of state highway may be made by a city or county through which the highway runs. That jurisdiction should request the appropriate ODOT Region office to conduct an investigation.

The Traffic Engineering Services Unit provides a form for summarizing engineering investigation data. (See Parking Prohibition Request Form 734-2804)

Once the investigation is completed, the Region Traffic Engineer reviews the investigation and makes a decision to approve or deny the parking prohibition or restriction. The decision of the Region Traffic Engineer shall be forwarded to the Traffic-Roadway Section for filing by the State Traffic-Roadway Engineer.

When a Parking Prohibition or Restriction has been approved, the Region Manager will receive a memo with instructions to have the appropriate signs installed, and to notify the State Traffic-Roadway Engineer of the installation date. The Region Traffic Engineer will also send a letter to the Oregon State Police, notifying them of the prohibition or restriction.

Special Considerations

As a minimum, the investigation should involve the following:

- On-site observation of safety and traffic flow conditions, preferably at a time of day when vehicles are parked in the proposed prohibition or restriction zone.
- Photographs of the area from different approaches to show conditions at the site, preferably at a time of day when vehicles are parked in the proposed prohibition or restriction zone.
- Contact, when appropriate, with affected businesses, citizens, police agencies, and local government jurisdictions, to explain the proposed parking prohibition or restriction, and

to solicit their input. This can usually be accomplished by a person-to-person conversation, but in some instances may require attending a meeting of the local government authorities or a public hearing.

The following three items should be included in any documentation forwarded to the Traffic-Roadway Section:

- Completed Parking Prohibition Request Form
- Map or Sketch of the vicinity with the proposed locations clearly marked
- Photographs taken for the investigation

Normally, one or more of the following justifications are necessary for approving a request to eliminate parking:

- Safety – this usually, but not always, has to do with sight distance for vehicles entering from a side street or driveway.
- Congestion – Vehicles parked in the area impede the flow of traffic.
- Damage to the facility – an example might be if parked vehicles are causing the shoulder to slough off.
- Frequent use of the facility for a purpose not intended – this could be any number of things (unauthorized vending, dumping of trash or sewage, etc.).

In addition to these justifications, limited parking restrictions are sometimes granted as a courtesy to municipalities who request them (time limit, height restriction not related to sight distance, loading zone, parking spaces reserved for persons with disabilities, etc.). These requests are evaluated on a case-by-case basis, and with the understanding that the city will be responsible for installation and maintenance of the signs, and for enforcing the restriction.

Cross References

State Traffic-Roadway Engineer 100.0
Region Traffic Engineer 100.1
Sight Distance 203.0
Uniform Traffic Control Devices 300.0
Interim Approvals 300.1
Marked Crosswalks on State Highways 310.0
Accessible Parking Spaces 312.0
Traffic Calming 500.5

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon, 2012.
2. Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.

File Code	Updated	Notes
TRA 07-01, TRA 07-01-05, TRA 16	January 2018	Removed redundant paragraph. Reformatted January 2020.

Access Management 502.0

Access Management is a comprehensive approach for improving safety and efficiency of traffic operations on transportation facilities, while providing statewide accessibility and mobility.

Standards & Guidelines

01 Criteria for the Access Management policies and guidelines are covered in the Oregon Highway Plan (*1*) and Chapter 734, Division 51 of the Oregon Administrative Rules.

Process & Required Approvals

Region Access Management Engineers (RAMEs) play a lead role in individual projects and the development review process. Providing key technical support for access management standards, the RAMEs provide a communication link between central staff and region staff.

They also act as an ODOT advisory group along with central staff on access management issues, reviewing standards, policies and practices and making recommendations.

The Traffic-Roadway Section plays a significant role in the determination of access management standards, with representation on various technical committees as well as oversight of the grants of access process. The Traffic-Roadway Section also ensures that access management standards are met by its involvement in the approval and design of traffic signals and other traffic control devices, lane configurations, U-turns, freeways, interchanges, etc. Review of traffic impact analyses provides the Traffic-Roadway Section an opportunity to determine the effects of new signals on traffic signal progression, check for adequate traffic storage and sight distances, and ensures designs that comply with the access management standards for the class of road facility. Such reviews also ensure the needs of transit, pedestrians, and bicyclists are included in the site and vicinity design.

Support

Access management necessitates that a logical, functional hierarchy of all roads in the state be established; that hierarchy should then be reinforced by applying various levels of access management. The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 established strong national policy support for the consideration of access management in congestion management and corridor preservation. Standards are established for the different classes of roads in design characteristics such as:

- freeway/highway access management
- interchange spacing
- spacing and control of median openings
- signal spacing
- intersection spacing
- driveway spacing and consolidation
- provision of turn lanes, and acceleration and deceleration lanes

These standards usually reflect land-zoning regulations. Implementation of access management has the effect of separating and reducing conflicts, and thereby reducing the likelihood of traffic crashes. The provision of turn lanes removes decelerating vehicles from the traffic stream thus reducing rear-end crashes, and enabling the rest of the traffic stream to flow with less interruption. Consistent interchange spacing (together with full access control) helps ensure driver expectancy and reduces the turbulence caused by merging and diverging freeway traffic. Nationwide, access management has proven to:

- reduce crashes,
- reduce delays,
- reduce travel times and fuel consumption,
- help improve traffic signal progression by helping to maintain travel speeds,
- reduce congestion and environmental pollution, and help meet Congestion Management and Air Quality (CMAQ) goals,
- increase capacities of various types of facilities,
- improve local economies by improving accessibility to businesses and
- expanding their market areas, and
- reduce the urgency and pressure on local governments to build more roads to balance the effects of mismanagement of the existing facilities.

Cross References

Sight Distance 203.0
Marked Crosswalks on State Highways 310.0
Intersection Control Evaluation 400.0
U-Turns at Signalized Intersections 404.2
Right Turn Lanes 405.1
Right Turn Acceleration Lanes 405.3
Turn Prohibitions 405.7
Interchange Modification Requests 406.0
Grants of Access 502.1
Capacity Analysis 508.0
Traffic Impact Studies 508.1
Legislature 600.0

Key References

1. Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.

File Code	Updated	Notes
Unassigned	January 2018	Updated terminology and OAR references. Reformat 1/2020.

Grants of Access 502.1

A Grant of Access is required to create a new approach where no right of access (access control) exists between the highway and a portion or all of a property abutting the highway.

Standards & Guidelines

01 See OAR 734-051-2020.

Process & Required Approvals

The issues surrounding the applications for grants of access can be complex. The State Traffic-Roadway Engineer chairs a centralized review committee, the Statewide Grant Review Committee (SGRC), with representatives from various disciplines within ODOT. The role of the committee is to provide consistent and fair decisions across the state, decisions that protect Oregon's Highway system and are in the best interests of the traveling public.

When an application for an approach to a State Highway is received, ODOT must determine if an approach (either public or private) is legally permissible and if it meets established policies. If it is determined that the approach is in an area where an approach would not violate established policies but has no legal right of access to the highway, an application for a grant of access may be filed. To approve a grant of access ODOT must determine either that access control is no longer necessary or that the approach would benefit the State Highway System.

Special Considerations

For safety and operational reasons, breaking access control for grants of access is generally difficult to justify.

Cross References

State Traffic-Roadway Engineer 100.0
Access Management 502.0

File Code	Updated	Notes
Unassigned	January 2018	Removed ref to extinct Access Mgmt. Manual. Reformat 1/20.

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Climbing & Passing Lanes 503.0

Passing lanes are distinguished from climbing lanes. Climbing lanes are generally used where grades cause unreasonable reductions in operating speeds of some vehicles. Passing lanes are typically used where there may be inadequate passing opportunities either because of sight distance limitation or as traffic volumes begin to approach capacity.

Standards & Guidelines

01 See the Highway Design Manual (*1*) for more information on climbing or passing lanes.

Process & Required Approvals

The need for a passing or climbing lane may be identified at the District or Region level. Transportation Planning Analysis Unit should be contacted to help analyze when and where climbing or passing lanes may be needed. Region Traffic can assist by requesting or conducting spot speed checks, requesting crash data summaries, and documenting on-site observations.

Climbing and passing lanes are not a delegated authority of the State Traffic-Roadway Engineer and do not require the State Traffic-Roadway Engineer's approval.

Current ODOT policy does not allow construction of new slow vehicle turnouts unless allowed by a Roadway Design Exception.

Special Considerations

Passing lanes tend to reduce unsafe passing maneuvers and may aid in reduction of head-on and sideswipe crashes. The addition of a climbing or passing lane can break up the formation of queues for a limited distance. Typically, queues begin to re-form downstream from a climbing/passing lane within a distance of ½ to 1 mile (800 to 1600m). Note that passing and climbing lanes do not actually add capacity to a facility.

Special consideration should be given for when No Passing Zones should be established in the single lane direction of 3-lane Climbing and Passing Lanes. Refer to the Traffic Line Manual (*2*) for specific guidance on when No Passing Zones should be established on 3-lane sections of highway.

Slow vehicle turnouts are not considered adequate opportunities for passing, since they are ineffective without the cooperation of slower vehicles and are generally too short to completely break up an established queue. These should only be considered when a passing lane is not feasible and not as an alternative to a passing lane.

Cross References

Key References

1. Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.
2. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

File Code	Updated	Notes
Unassigned	January 2018	Added ref to TLM for 3-lane sections. Reformatted Jan. 2020.

Lane Reduction Transition 504.0

Standards & Guidelines

01 When reducing the number of lanes of traffic, the right lane is normally dropped. This practice should be followed whenever possible to match driver expectation and to avoid high-speed traffic making a merge maneuver.

02 In situations where terrain, roadway geometry, or other factors suggest otherwise, the left lane may be dropped.

03 Sign and stripe lane reduction transitions following guidance provided in the Sign Policy and Guidelines for the State Highway System (*1*), Sign Design Manual (*2*), Traffic Line Manual (*3*), and Parts 2 and 3 of the MUTCD (*4*).

Support

Uniform signing and striping reduces driver confusion.

Cross References

Key References

1. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.
2. Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.
3. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
4. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

File Code	Updated	Notes
TRA 16-02	January 2018	Resolved conflicts w/MUTCD, TLM, & SDM. Reformat 1/20.

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Road Closures 505.0

Standards & Guidelines

01 The temporary or conditional closure of highways is covered by OAR 734-020-0150.

Process & Required Approvals

According to OAR 734-020-0150:

1. When weather conditions or road conditions constitute a danger of highway damage or a danger to the safety of the driving public, the Chief Engineer (Technical Services Manager), Region Manager, District Manager, or Assistant District Manager may prohibit the operation upon such highway or section of a highway of any or all vehicles, or any class or kind of vehicles.
2. The prohibition of vehicles may result in total closure or conditional closure of highways or highway sections. Conditional closures may, at the discretion of the Chief Engineer (Technical Services Manager), Region Manager, or District Manager, or Assistant District Manager, include but not be limited to prohibition of several identified classes or kinds of vehicles.
3. Closures or conditional closures should be accomplished by physically barricading or blocking the highway, with placement of appropriate warning signs or devices, and, where possible, signing indicating conditional closure with types of vehicles allowed or prohibited.
4. Road closures and conditional closures are to exist only on a temporary basis and should be removed as soon as road conditions or weather conditions permit, the hazard has been removed, and the danger to the highway or driving public no longer exists.

Special Considerations

The Traffic-Roadway Section does not initiate closures, but may offer technical assistance.

Cross References

Uniform Traffic Control Devices 300.0
Temporary Traffic Control 306.0
Special Events 603.0

File Code	Updated	Notes
Unassigned	December 2006	Updated section name to Traffic-Roadway. Reformat 1/2020.

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Truck Routes 506.0

Prior to 2002, designation of local truck routes was allowed per ORS 810.040 Designation of Truck Routes. In general, the statute says that a road authority can designate any of its highways as a truck route and prohibit the operation of trucks upon any other of its highways that serves the same route or area served by the truck route designated.

As the result of a 2002 Supreme Court decision, ORS 810.040 has been preempted to the extent that in an addition to receiving a delegation of state authority to proceed, the local jurisdiction now has to also establish a bona fide safety reason to create the truck route and that burden was not created by ORS 810.040. For decision-making purposes, it is necessary to characterize "bona fide safety reasons" and determine how local jurisdictions can show that designation of a local truck route is warranted.

Process & Required Approvals

The authority to designate truck routes or prohibit truck operation is given to the road authority under the provisions of ORS 810.040. On state highways, the Oregon Transportation Commission (OTC) designates truck routes. The State Traffic-Roadway Engineer has been given the authority to prohibit truck (large or heavy vehicles) operation under the provisions of ORS 810.030. Based on the outcome of a Supreme Court case, ODOT has established a procedure (*1*) to guide staff and local jurisdictions in establishing truck routes.

To establish a truck prohibition, a request from the Region Manager must be forwarded to the State Traffic-Roadway Engineer following the procedure outlined by the Transportation Development Division (TDD). The procedure may be obtained by contacting the Planning and Implementation Unit of the ODOT Planning Section.

The Approval Procedure for Local Truck Routes (*1*) is a lengthy process that involves the engagement of several stakeholders including local government, motor carrier interests, local residents, businesses, the State Traffic-Roadway Engineer, and ultimately the Oregon Transportation Commission (OTC), which denies or approves all local truck route requests associated with redirecting traffic off the State Highway System. Questions concerning the process should be directed to the Planning and Implementation Unit of the ODOT Planning Section.

Cross References

Key References

1. Oregon Department of Transportation. ODOT Approval Procedure for Local Truck Routes. https://www.oregon.gov/ODOT/Planning/Documents/LocalTruckRoute_ApprovalProcedure.pdf. Accessed July 8, 2019.

File Code	Updated	Notes
TRA 18	October 2010	Revised for TDD proced. for Local Trk Rtes. Reformat 1/20.

One-Way Operation for Trucks & Buses 507.0

Standards & Guidelines

01 See OAR 734-020-0125 and 734-020-0130 for further information and the required field data for the report.

Process & Required Approvals

The State Traffic-Roadway Engineer, in consultation with the Region Manager and Motor Carrier Services Manager, has been delegated the authority to designate sections of highways that allow one-way operation by class or type of vehicle.

A field investigation shall be made and a written report prepared for each section of highway on which one-way truck and/or bus operation may be required.

Cross References

File Code	New	Notes
Unassigned	March 2001	Reformatted January 2020.

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Capacity Analysis 508.0

A capacity analysis is required to determine the existing or future quality of operations (level of service) on a part of a transportation system – freeways, rural highways, intersections, etc.

Standards & Guidelines

01 Follow the established Analysis Procedures Manual (*1*) methods to complete a capacity analysis.

Process & Required Approvals

Requests from the regions to the Traffic-Roadway Section to carry out a capacity analysis should also be addressed to the State Traffic-Roadway Engineer, with all necessary information. Analysis results that influence decisions made at a local level will be returned to the requester. The Traffic-Roadway Section will support the regions on the analysis, but will normally not take the lead in public meetings that involve these investigations.

Special Considerations

Capacity analysis results usually require a decision to be made involving access management issues, construction of a traffic signal, provision of extra lanes, etc. Some of these can only be approved by the State Traffic-Roadway Engineer under a letter of authority from the Technical Services Manager or through Administrative Rule. Requests for approval should include all necessary documentation of a thorough investigation, and a recommendation from the investigator.

Cross References

State Traffic-Roadway Engineer 100.0
Intersection Control Evaluation 400.0
Traffic Signal Operations 404.0
Right Turn Acceleration Lanes 405.3
Multiple Turn Lanes 405.6
Access Management 502.0
Climbing & Passing Lanes 503.0

Key References

1. Oregon Department of Transportation. *Analysis Procedures Manual*, 2nd ed. Oregon Department of Transportation, Salem, Oregon, 2016. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.

File Code	Updated	Notes
TRA 16-07-21 TRA 03-00-01	January 2018	Revised to be consistent with APM methods. Reformat 1/20.

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Traffic Impact Studies 508.1

A Traffic Impact Study (TIS) typically describes, in detail, how a specific development will affect local, or perhaps, regional, transportation systems.

Standards & Guidelines

01 ODOT has established rules covering access management issues. Specific detail on when a TIS is required and the necessary documentation can be found in OAR 734 Division 51, and in the Development Review Guidelines (*1*).

Process & Required Approvals

The Traffic-Roadway Section may be asked to review Traffic Impact Studies (TIS) as part of the developmental review process.

Special Considerations

Many communities as well as ODOT require a TIS before highway approach permits are granted. A TIS may also precede zoning changes, approvals of site plans or subdivision maps, or the preparation of environmental documents.

The Institute of Transportation Engineers (*2*) recommends that a TIS be prepared for any project that generates more than 100 peak hour trips, or when a development is likely to cause other significant traffic flow impacts.

Cross References

Intersection Control Evaluation 400.0
Right Turn Lanes 405.1
Access Management 502.0

References

1. Oregon Department of Transportation. *Development Review Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Documents/Development-Review-Guidelines.pdf.
2. Institute of Transportation Engineers. *Transportation Impact Analyses for Site Development*, 2010 ed. Institute of Transportation Engineers, 2010.

File Code	Updated	Notes
TRA 15	May 2001	Referred to Division 51 for TIA requirements. Format 1/20.

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Freeway Median Crossovers 510.0

Freeway median crossovers help facilitate maintenance activities such as snow removal and provide access for law enforcement or emergency responders to reach roadway incidents. OAR 734-020-0100 defines Freeway, Median, and Crossover as used in this section.

Standards & Guidelines

01 Freeway median crossovers may be constructed on freeways and fully access-controlled expressways so that maintenance crews, emergency service providers, and law enforcement officials can avoid traveling long distances to respond to incidents, perform enforcement activities, and maintain highway operations.

02 OAR 734-020-0100 through 734-020-0115 covers criteria for approval of freeway median crossovers, conditions under which crossovers may be utilized, and persons authorized to use crossovers.

03 The AUTHORIZED VEHICLES ONLY (R5-11) sign should be used at freeway median crossovers to direct motorists not to use the crossovers.

04 See the Traffic Line Manual (*1*) for crossover identification layouts.

Process & Required Approvals

The State Traffic-Roadway Engineer can approve freeway crossovers if the location meets all criteria and conditions listed in OAR 734-020-0105. The Region Traffic Engineer sends requests to State Traffic-Roadway Engineer for review.

If one or more of those criteria are not met, the Chief Engineer (also called the Technical Services Manager), considering need and safety, may approve installation of a freeway median crossover based on an engineering investigation. The State Traffic-Roadway Engineer must review the Region's recommendation and submit it to the Chief Engineer (Technical Services Manager) for consideration.

Special Considerations

Although freeway median crossovers can be beneficial to maintenance crews and emergency responders, the Region Traffic Engineer must account for several considerations before submitting a request to the State Traffic-Roadway Engineer:

- Is there sufficient width on the inside shoulder and in the median to accommodate a crossover (e.g. allowing authorized vehicles to exit or enter the traffic stream in a safe manner)?
- Is there adequate sight distance for authorized vehicles to enter the freeway from a stopped condition at the proposed location of the crossover? In most cases, this will be intersection sight distance determined according to AASHTO Green Book (*2*) Section 9.5.3 Case B1 – Left Turn from the Minor Road using a single-unit truck design vehicle.

- Are other crossover opportunities located more than three miles in either direction from the proposed crossover location?
- Is the proposed crossover located outside the influence area of a nearby entrance or exit ramp to mitigate concerns with merging and weaving maneuvers near the crossover?
- Is the proposed crossover located more than ½ mile away from undercrossing or overcrossing structures that might obscure the sight distance approaching the crossover?
- Has there been communication and coordination between ODOT, local law enforcement, Oregon State Police, and emergency responders on the proposed location of the crossover and the needs of authorized users of the crossover?
- How do maintenance crews and emergency responders currently access the opposite direction and how would having the crossover improve safety and operations?

OAR 734-020-0105 covers many of the considerations listed above. Coordination with Oregon State Police is a key consideration as there are limited crossover opportunities for OSP troopers to engage in enforcement activities or respond to freeway incidents in the opposite direction.

Cross References

References

1. Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.
2. American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Streets and Highways*, 7th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2018.

File Code	Updated	Notes
TRA 16-08-05	January 2020	Modified sight distance considerations.

Legislature 600.0

The Traffic-Roadway Section serves as advisor on legislative bills relating to traffic engineering, roadway engineering, contracting, access management, and issues associated with the Oregon Vehicle Code.

Process & Required Approvals

During each session of the Oregon Legislative Assembly, staff from the Traffic-Roadway Section are actively involved in reviewing and completing the analysis of such bills. This includes reviewing and tracking bills, identifying potential ODOT impact, preparing for the hearings and providing the fiscal impact and written testimony for each bill and/or amendments.

Participants work through the Highway Division Coordinators and the ODOT Legislative Coordinators in presenting ODOT's position on numerous bills. Some of this work extends beyond the annual legislative sessions to include legislative reports and Oregon Administrative Rules that must be developed in response to bills passed during the previous legislative sessions.

The Traffic-Roadway Section also initiates legislation to help introduce or clarify traffic issues covered in the Oregon Vehicle Code through legislative concepts developed by the Oregon Traffic Control Devices Committee (OTCDC).

Cross References

File Code	Updated	Notes
LEG 05	January 2012	Revised to reflect changes to leg. work in TRS. Reformat 1/20

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Naming Highway Facilities 601.0

The following guidelines are taken directly from the Oregon Transportation Commission's Policy for Naming Highway Facilities (*1*) and are to be case-by-case basis.

Standards & Guidelines

01 The Oregon Transportation Commission generally will not name highway facilities after individuals.

02 The Oregon Transportation Commission may elect to suspend guideline 1 if a requester can show compliance with the following criteria:

a. Demonstrated statewide support for naming a facility.

b. The honored individual shall have made a lasting contribution, with a significant and historic impact on Oregon.

c. The honored individual shall have been deceased for at least one year.

d. The facility is long enough to merit a title, such as a bridge or tunnel more than one half mile long, or a highway section with defined end points, which was completed as a whole.

03 The comments of the Oregon Geographic Names Board will be solicited prior to naming any highway facility. (Any federal recognition will be contingent upon their approval.)

Key References

1. Oregon Transportation Commission. Naming Highway Facilities. *Oregon Transportation Commission - Get Involved*, October 15, 1991. https://www.oregon.gov/ODOT/Get-Involved/OTC/OTCpolicy_naming.pdf. Accessed July 8, 2019.

File Code	Updated	Notes
PUB 17-01	March 2001	Updated to match Commission Policy 05. Reformatted 1/20.

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Historical Markers 602.0

Historical markers are installed in state highway right-of-way to provide road user service signing of historical points of interest.

Process & Required Approvals

The Historical Marker Program has been transferred to the Travel Information Council through an interagency agreement, along with other sign programs of motorist service nature. The Oregon Historical Marker Committee oversees the program and meets on a quarterly basis. A staff member of the Traffic-Roadway Section serves on the committee.

Cross References

Signs 302.0

File Code	Updated	Notes
PAR 07-03	March 2001	Reformatted January 2020.

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Special Events 603.0

Standards & Guidelines

01 The applicant shall, at their expense, provide a traffic control plan that complies with current standards of the MUTCD (*1*) and with the Oregon Supplement to the MUTCD (*2*). Signs used in conjunction with special events must also comply with the Sign Policy and Guidelines for the State Highway System (*3*).

Process & Required Approvals

Special events held on state highway right-of-way require a permit, issued by the ODOT District office with jurisdiction and in accordance with criteria established by OAR 734-056-0030. The Traffic-Roadway Section may be asked to review or provide assistance.

Cross References

Key References

1. Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.
2. Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.
3. Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.

File Code	New	Notes
TRA 23-37	September 1997	Reformatted January 2020.

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Placeholder Appendix A

This section reserved for future content.

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ODOT Traffic Engineering Structure Appendix B

Traffic-Roadway Section

The Traffic-Roadway Section is in the Highway Division's Technical Services Branch. The Traffic-Roadway Section's traffic engineering programs affect all ODOT divisions, the State Police, the Public Utilities Commission, cities and counties, Oregon Travel Experience, motorist services providers, the Speed Zone Review Panel, the Oregon Transportation Safety Committee, and all road users on all public roads in Oregon. The traffic engineering programs

- provide statewide policies and guidelines for all traffic control devices;
- develops and maintains standards for traffic signals, illumination, signing, striping, and work zone traffic control;
- provides technical analysis for traffic operation improvements on all state highways;
- administers the federal Highway Safety Improvement Program (HSIP);
- manages programs; manages speed zoning for all public roads;
- monitors traffic speeds; and,
- optimizes operation of statewide traffic signal systems.

The Traffic-Roadway Section includes six central units: Access Management Unit, Roadway Engineering Services Unit, ADA Program, Traffic Standards and Asset Management Unit, and the Traffic Engineering Services Unit. Within the two Traffic Units, there are several subgroups specializing in different areas of Traffic Engineering.

Safety

Provides highway safety analyses; maintain the Safety Priority Index System (SPIS); administers the Highway Safety Improvement Program (HSIP) and Project Safety Management System as well as safety tools used within ODOT; and provides coordination and liaison for safety efforts with other parts of ODOT and outside agencies, including the Highway Safety Engineering Committee and the Oregon Transportation Safety Committee.

Lead Engineer: State Highway Safety Engineer

Investigations

Provides traffic engineering expertise for research studies, legislative issues, crash analyses, safety reviews, access management issues, review and approval of traffic engineering delegated authorities, speed monitoring, speed zoning, new products, highway litigation and tort liability as well as supporting the Speed Zone Review Panel.

Also provides expertise for the development and update of traffic engineering policies, procedures and ODOT manuals. The group also gathers and provides input and recommendations for any proposed changes to the MUTCD, maintains and updates the Oregon Supplement to the MUTCD and works with the Oregon Traffic Control Devices Committee (OTCDC) to establish statewide traffic control standards.

Lead Engineer: State Traffic Investigations Engineer

Signs and Pavement Markings

Provides engineering expertise and maintains standards for all highway signs and pavement markings. The team also develops specifications, maintains Oregon Standard Drawings, reviews new products, and develops manuals. The team may provide some designs for ODOT regions.

Lead Engineers: State Sign Engineer (Signs), Traffic Pavement Markings Engineer

Traffic Structures

Provides engineering expertise and designs for sign bridges, cantilever sign supports, traffic signal poles, illumination poles, VMS supports and other miscellaneous traffic structures.

Lead Engineer: State Traffic Structures Engineer

Work Zone Traffic Control

Develops standards and provides engineering expertise for temporary traffic control. Provides guidance for traffic control plan development for construction projects by communicating standards and best practices for lane reductions, detours, staging, temporary pedestrian accessible routes, and work zone safety.

Lead Engineer: State Traffic Work Zone Engineer

Illumination

Provides engineering expertise, designs, and standards for roadway illumination.

Lead Engineer: State Traffic Illumination Engineer

Signal Standards

Provides engineering expertise for temporary traffic signals, permanent traffic signals, flashing beacons, ramp meters and some portions of weigh stations. The team also develops specifications, maintains Oregon Standard Drawings, and maintains qualified products lists. The team also reviews local agency and developer agreements and plans for traffic control devices, reviews new products, maintains asset management databases, and provides annual training and certification for inspectors of traffic signal construction.

Lead Engineer: State Traffic Signal Engineer

Signal Operations

The Signal Operations group prepares traffic signal and signal system timing, and provides engineering expertise in traffic signal operation, installation of traffic signals, traffic signal

approvals, vehicle detection systems, traffic signal software and communication development, ramp meter operations and railroad preemption systems. The Signal Operations team also provides engineering support for transportation operations research and analysis, HOV lane applications, and signal mounted preemption system design (for emergency and transit vehicles). The group also provides expertise for the development of traffic engineering policies, procedures and proposed legislation.

Lead Engineer: State Signal Operations Engineer

Region Traffic Units

Region Traffic Units are part of each Region's Technical Center and report directly to each Technical Center manager.

Region Traffic Unit staff provide expertise to region and district staff on current traffic policies and procedures. Staff are responsible for overseeing most traffic engineering design including most signal and sign design for Region projects. Staff actively participate as members of project development teams to make sure traffic related issues are considered early in the process and provide traffic information to the team. They also act as the traffic liaison to local agencies on behalf of ODOT.

Members of the unit conduct field investigations at the request of the public, local government, or ODOT personnel. When requested, they conduct engineering investigations, determine appropriate solutions, make written recommendations, and when necessary, request approval of the State Traffic-Roadway Engineer for installation of traffic control devices or modifications to traffic control.

Engineering investigations for changes to traffic control devices often result from safety concerns and can include requests for signs, signals, striping, parking restrictions and speed reductions. They also conduct field safety investigations of the sites and make recommendations for corrective action. Staff also conduct speed zone investigations and/or oversee consultants performing the work and make recommendations for changes to the State Traffic-Roadway Engineer based on the results.

Region Traffic Design and Operations

Region Traffic Unit staff oversee design for all Region projects containing traffic engineering elements including signing, striping, temporary traffic control, and signals. The units provide expertise in signal timing, operations, and vehicle detection systems. They may also provide expertise for the operation of ramp metering systems. Region Traffic Unit staff does signal system coordination in Regions 1 and 2. Traffic-Roadway Section staff does signal coordination in Regions 3, 4, and 5. Some units oversee signing, striping and electrical crews for their region.

Region Traffic Analysis & Investigations

Staff reviews traffic studies for developments and land use actions for their impacts to the state highway system and make recommendations regarding access, traffic mitigation requirements, pedestrian crossings and crosswalk closures, safety (SPIS, Safety Implementation Plan recommendations and overlapping ARTS projects) and operation of the State Highway system. They also review corridor plans and Transportation System Plans (TSPs) for traffic-related issues.

Region Transportation Safety Coordinator

Each Region Traffic Unit has a traffic safety advocate (Region Transportation Safety Coordinator) who is a technical resource for local safety education and law enforcement efforts, and provides access to safety grant funds, materials and training. They handle programs regarding education on child occupant protection, DUII, pedestrian, teen driving, bicycle, and work zone enforcement. They also work with local safety committees on traffic issues.

Region Intelligent Transportation System (ITS) Activities

Region Traffic Units often oversee Intelligent Transportation System (ITS) related activities in their areas. The Traffic Management and Operations Centers monitor and control traffic operations through Intelligent Transportation Systems (ITS) technologies to provide transportation system control, communications, monitoring and information.

Region Access Management

Region Traffic Unit staff are often involved in the access management programs for each Region (some Regions incorporate Access Management into the Region Traffic Unit while others incorporate it into Planning). Each Region has a Region Access Management Engineer (RAME) who provides key technical support for access management practices in the region. The RAMEs also provide a valuable communication link between central staff and region staff and act as an ODOT advisory group on access management issues, policies and practices.

Intelligent Transportation Systems Unit

Within the Maintenance and Operations Branch, the Intelligent Transportation Systems Unit provides identification, planning, design, specification and deployment of ITS systems including incident management systems, some communication systems and travelers' information systems. Some of the device types include cameras, weather stations, variable

message signs, ramp meters, highway advisory radio (including HAR signs), automatic vehicle location, weather hazard monitoring, and warning systems.

The Intelligent Transportation Systems Unit is also responsible for maintenance and operations of all ITS devices statewide, development of ITS device standards, strategic planning for ITS deployment within the state, and helping the ODOT regions in the identification of local partnerships and the use of ITS technologies. Other activities include researching of emerging technology, promoting technology partnerships with other public and private sectors, and supporting ITS deployment by other modes.

Another key role of the ITS Unit is coordinating all ITS activities with ODOT's Information Systems Branch (ISB). Many ITS devices utilize centralized software such as adaptive signal systems and variable speed zone systems. These software systems are installed on ITS servers supported by ODOT ISB staff. Even basic traffic signal functions such as establishing a network connection between a roadside traffic signal controller and the ODOT network requires support by ODOT ISB technicians that support the ITS program.

Traffic Systems Services Unit

Also within the Maintenance and Operations Branch, the Traffic Systems Services Unit provides support for traffic signal testing, turn-on, inspection, and maintenance. The unit also supports the ODOT Intelligent Transportation Systems (ITS) program with expert technical support for ITS systems such as Road Weather Information Systems (RWIS), Highway Advisory Radio (HAR), Bridge Cathodics, Closed-Circuit Television (CCTV) surveillance systems, Fixed and Portable Variable Message Signs (VMS), and data communication networks.

The Traffic Systems Services Unit operates the only approved materials testing laboratory for traffic control products in Oregon. The laboratory operates to ensure compliance with OAR 734-020-0005 that establishes the manual and specifications for traffic control devices within the state and Section 00990.70 of Oregon's Standard Specifications that describes the testing and turn-on procedures for all new traffic systems installations.

Field Applications

Employees of the unit have the responsibility for setting minimum maintenance standards for traffic signal equipment on the state highway system. Employees working with region/district electricians repair and modify all traffic signals maintained by ODOT. TSSU or Region 1 Signal Maintenance Crews are responsible for periodic inspection and maintenance of signal control equipment at signalized intersections while Region/District electricians are responsible for performing maintenance on other elements of the traffic signal system. Inspections will assist the project manager in assuring compliance with the project plans and specifications.

Shop Applications

Employees of the unit have the responsibility for maintaining the following records:

- Inventory of all traffic signal control devices;
- Records of inspections of existing traffic signal control devices;
- Maintenance records of all trouble calls;
- Environmental testing chamber and turn on records of control equipment;
- Shop repair records of control equipment; and
- Documentation of systematic upgrading of equipment.

Shop applications also include environmental testing of all traffic signal equipment used within Oregon. TSSU also provides repair and testing of state maintained control equipment modules.

Crash Analysis and Reporting Unit

Within the Transportation Data Section of the Transportation Development Division, the Crash Analysis and Reporting Unit provides motor vehicle crash data through database creation, maintenance and quality assurance, information and reports, and limited database access. Fatality Analysis Reporting System is a comprehensive file on fatal crashes in Oregon. The motor carrier file contains detailed information on truck related crashes.

Transportation Systems Monitoring Unit

Also within the Transportation Data Section, the Transportation Systems Monitoring Unit is responsible for the Traffic Monitoring Program, which provides vehicle class, occupancy, and traffic volumes for federal, state, local and private decision makers; they support the Integrated Transportation Information System (ITIS) with traffic, speed limit, parking and terrain information.

Transportation Planning Analysis Unit

Within the Planning Section of the Transportation Development Division, the Transportation Planning Analysis Unit of ODOT is working to determine the present and future needs of the statewide transportation system, and evaluate alternative solutions to growing transportation demands. The Transportation Planning Analysis Unit provides an essential link between long-range planning and project development. The Transportation Planning Analysis Unit also reviews system and corridor plans and provides traffic analysis of existing and future traffic demands for projects. The Transportation Planning Analysis Unit participates in technical advisory committees, citizen advisory committees, and project development teams.

The Analysis Procedures Manual is a key document produced by the Transportation Planning Analysis Unit and provides the current methodologies, practices and procedures for conducting

long-term analysis of ODOT plans and projects. Of particular interest are detailed chapters on how to perform intersection analysis, alternatives analysis, and prepare traffic analysis reports.

File Code	Updated	Notes
Unassigned	January 2020	Updated Traffic-Roadway Section content.

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ODOT Traffic Engineering Teams Appendix C

The Traffic-Roadway Section provides expert staff and administrative support to several teams in specific traffic engineering disciplines on the local, regional, state, and national levels.

AASHTO Standing Highway Committee, Subcommittee on Traffic Engineering

- Leader: AASHTO
- Membership: State Traffic-Roadway Engineer

AASHTO Subcommittee on System Operations and Management

- Leader: AASHTO
- Membership: ITS Unit Manager

Forest Highway Tri-Agency Committee

- Leader: Federal Highway Administration, Federal Lands Division
- Membership: ODOT & AOC, US Forest Service, Federal Lands Division of FHWA.
- Focus: State Traffic-Roadway Engineer represents ODOT and AOC. Representatives from Forest Highway Program, AOC, FHWA, and USFS also attend.

Highway Safety Engineering Committee

- Leader: State Traffic-Roadway Engineer
- Membership: Traffic-Roadway Section Staff, Roadway Manager, Region Traffic Managers, FHWA, ODOT Safety Division
- Focus: Establish policies and guidance for ODOT safety programs.

MaxTime Software Users Group

- Leader: State Traffic Signal Operations Engineer
- Membership: City, County, ODOT representatives
- Focus: Cooperative, interagency team working with Intelight's MaxTime software for traffic signal operations.

Oregon Historical Marker Committee

- Leader: As voted by membership
- Membership: TIC, ODOT, Tourism, Oregon Parks, OCTA, DOGAMI, others

- Focus: In July 1991, the Travel Information Council (TIC) adopted the Historical Marker Program from ODOT through an interagency agreement, along with other sign programs of a motorist service nature.

Oregon Traffic Control Devices Committee (OTCDC)

- Leader: As voted by membership
- Membership: State Traffic-Roadway Engineer, 3 cities, 3 counties, ODOT Region Traffic, Oregon ITE, OSP.
- Focus: Advisory group to the State Traffic-Roadway Engineer on uniform standards for traffic control devices in Oregon.

Oregon Travel Experience

- Leader: Selected by OTE Council
- Membership: State Traffic-Roadway Engineer, Representatives of the restaurant, lodging, gasoline, outdoor advertising, and citizens t large appointed by the Governor
- Focus: Administers Oregon's Tourist Oriented Directional Signing (TODS) program, the Specific Motorist Services Signing (LOGO) Program, and the Off-interstate Historical and Cultural Sign Program.

Statewide Pavement Marking Committee

- Leader: MLT Representative
- Membership: Traffic Devices Engineer, Maintenance staff, Striping Crew Staff, Construction Section staff
- Focus: Share best practices, materials, equipment, and policies for pavement marking design, construction, and maintenance.

Pavement Marking Design Working Group

- Leader: Traffic Devices Engineer
- Membership: Traffic-Roadway Section Staff, Region Traffic Staff, Region Roadway Staff
- Focus: Share best practices, materials, equipment, and policies for pavement marking design.

Safety Investigations Group

- Leader: State Traffic Investigations Engineer
- Membership: Traffic-Roadway Section staff, Region Traffic Investigators, Region Transportation Safety Coordinators
- Focus: Advise staff on setting criteria and guidance for performing highway safety investigations statewide

Signal Timers Group

- Leader: State Traffic Signal Operations Engineer
- Membership: Traffic-Roadway Section Staff, region signal timing staff
- Focus: Traffic signal operations

Speed Zone Review Panel

- Leader: Designated by State Traffic-Roadway Engineer
- Membership: County, City, State Policy, Safety Division, ODOT Region, State Traffic-Roadway Engineer
- Focus: Reviews contested speed zone cases.

Statewide Grant Review Committee

- Leader: State Traffic-Roadway Engineer
- Membership: State Traffic-Roadway Engineer, District Manager or Permit Specialist, ROW, Region Access Management Engineer, Roadway, Traffic Investigations Engineer, others as needed
- Focus: reviews applications for grants of access to State Highways

Statewide Work Zone Action Group

- Leader: State Traffic Work Zone Engineer
- Membership: Region TCP designers, Traffic-Roadway Section staff
- Focus: Solidify the design practices being used by the TCP Designers in the Regions

Traffic-Roadway Section/Transportation Safety Division Meeting

- Leader: State Traffic-Roadway Engineer, Transportation Safety Manager
- Membership: Traffic-Roadway Section staff, TSD Roadway Safety Coordinator, FHWA Safety Engineer
- Focus: Coordinate safety programs and projects of mutual interest.

Traffic Operations Group (TOG)

- Leader: State Traffic-Roadway Engineer
- Membership: Region Traffic Engineers/Managers, Traffic-Roadway Section managers and staff
- Focus: Discuss and advise on traffic issues, concerns, and operations.

TOG Walking-Biking Subcommittee

- Leader: Traffic Standards Engineer
- Membership: Traffic-Roadway Section staff, Region Traffic staff
- Focus: Advise TOG on issues affecting walking and biking

Traffic Sign Design Working Group

- Leader: State Sign Engineer
- Membership: Traffic-Roadway Section staff, region traffic sign design staff
- Focus: Share best practices, policies, design for traffic signs

Traffic Signal Design Working Group

- Leader: State Traffic Signal Engineer
- Membership: Traffic-Roadway Section staff, region traffic signal design staff, region traffic signal operations staff
- Focus: Share best practices, policies, designs for traffic signal systems.

TransPort Committee

- Leader: Co-Chaired by ODOT Region 1 and Metro
- Membership: ODOT, Clackamas County, Multnomah County, Washington County, City of Portland, Tri-Met, Metro (non-voting)
- Key Stakeholder Agencies: City of Gresham, City of Beaverton, Port of Portland, City of Vancouver, Portland State University, FHWA, City of Hillsboro, City of Lake Oswego, City of Tigard, City of Willsonville, City of Vancouver, Clark County WA, C-Tran, RTC, and WSDOT.
- Focus: Provides a forum for ITS planning and deployment across the agencies in the Portland metropolitan area.

All-Terrain Vehicle Highway Access Routes Advisory Committee

- Leader: As voted by membership
- Membership: 2 ATV user representatives, 1 city/county representative, 1 law enforcement representative, 1 member at large, 1 non-voting Oregon Parks & Rec. Department (OPRD) representative, 1 non-voting ODOT representative (appointed by ODOT Director, currently State Traffic Investigations Engineer)
- Focus: Reviews potential use of ATVs on State Highways and reports findings and recommendations to Oregon Transportation Committee (OTC).

Traffic Structures Design Working Group

- Leader: State Traffic Structures Engineer
- Membership: Traffic-Roadway Section staff, region traffic staff, region bridge designers
- Focus: Share best practices, policies, designs for Traffic Structures.

File Code	Updated	Notes
Unassigned	January 2020	Removed extinct teams.

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Traffic Engineering Programs Appendix D

The Traffic-Roadway Section administers several traffic engineering related programs that are described below.

Blue Star Memorial Program

At the request of the Oregon State Federation of Garden Clubs, the 1947 Oregon Legislature adopted a resolution designating certain state highways as Blue Star Memorial Drives. The legislature further resolved that ODOT shall erect along said highways suitable tablets and ornamentations to perpetuate the resolution.

This is a program put in place to honor and memorialize men and women of Oregon who served in the armed forces of the United States. This program began in the 1940's and was inspired by the blue stars that mothers put in their windows to signify that they had a son or daughter serving in WWII. The program is part of a national program that is sponsored by the National Council of State Garden Clubs, Inc. The original designation consisted of one transcontinental east and west route and seven north and south routes and was normally assigned one to a state. They were designated throughout their length, or for a considerable distance, generally involving more than one state. These were through routes rather than short sections in one state only.

List of Blue Star Memorial Highways

The following is a list of highways that have been adopted by the Oregon Transportation Commission and are referred to as Blue Star Memorial Highways. Included are the highway routes and their adoption dates by the commission.

Highway Name	Route	Adoption Year
Pacific Highway	OR 99	1948
Pacific Highway East	OR 99E	1948
Pacific Highway West	OR 99W	1948
The Dalles-California Highway	US 97	1959
Pacific Highway	I-5	1967
Columbia River/Old Oregon Trail	I-84	1977
Oregon Coast Highway	US 101	1980
East Portland Freeway	I-205	2000

Establishment of Blue Star Memorial Highways

The Blue Star Memorial Highways are commemorated with a bronze marker mounted on a support post. The local garden club that sponsors the marker usually enhances the

landscape with a small garden at the foot of the marker. The program currently has about 30 markers in place.

ODOT has historically been responsible for installing the marker and the Oregon State Federation of Garden Clubs has been responsible for the furnishing and maintaining the marker/ landscaping.

The site for new markers along these routes is to be worked out with the maintenance district. Common practice has been to place markers in areas of high visibility, such as a highway rest area, which promotes higher visibility and reduced vandalism. The landscaped areas provide rest and relaxation for the weary traveler.

Impaired Driving Victim Memorial Signing

Upon the request of the family of a victim of an impaired driving crash and when certain requirements are met, a sign can be installed on the State Highway System at the site of a fatality caused by an impaired driver.

ODOT established its own Impaired Driving Victim Memorial Signing Program in 1995. The first sign was installed in October 1995 in Tillamook County. As of December 2013, 48 signs have been installed.

Guidelines

The current guidelines were revised and approved by a program review committee on June 8, 2006:

1. A sign can be installed at the site of a fatal crash that was caused by a driver who has been convicted of Negligent Homicide or Manslaughter in the first or second degree and was driving under the influence of intoxicants (either a blood alcohol content of 0.08 or greater and/or a DUII conviction is required). A sign can also be installed at the site of a fatal crash that was caused by a deceased driver who had a blood alcohol content of .08 percent or greater.
2. Signs installed will be black on white, 36" X 48" with a legend, which reads "DON'T DRINK AND DRIVE", below which will be a 36" X 12" plaque with the message "IN MEMORY OF (Victim's Name)." For cases involving controlled substances or inhalants, the legend will read "DON'T USE DRUGS AND DRIVE". Normally up to three names can be listed, but more than one name will require a larger plaque.
3. Each successful applicant will be entitled to one sign assembly as described above, mounted on one side of the post only (no back-to-back signs), facing oncoming traffic, and only on the side of the road nearest the lane of that oncoming traffic. In special situations where a sufficiently large turnout or wayside is available (as determined by Region Traffic Operations staff), and if acceptable to the applicant, a sign may be mounted parallel to the roadway rather than facing oncoming traffic.

4. Signs will be installed on state highways only if the sign location will meet ODOT standards shown in the Sign Policy and Guidelines for the State Highway System.
5. Signs will not be installed on the interstate system, freeways, or their ramps.
6. ODOT has no jurisdiction on county roads or city streets and thus cannot provide signs along these roadways.
7. The sign must be requested by the family of the victim or other sponsor and be paid for by the victim's family or the sponsor. The sponsor need not be a family member, but any proposed installation must include agreement with an appropriate member of the victim's family. If a given crash resulted in more than one fatality, and those fatalities were from different families, the applicant must contact the families of those other victims before application is made, in order to gain written concurrence on whether the sign should even be applied for, which names should appear on the sign, and how much each family will contribute toward the cost of the sign. Only one sign will be installed for any given crash.
8. Signs will cost $600. This amount is intended to cover expenses incurred, such as time spent on review of the application by the program coordinator, investigation of the proposed site by Region personnel, manufacture of the sign by the ODOT Sign Shop, and installation by the Maintenance District sign crew. Only one $600 check or money order will be accepted as payment for any successful application.
9. Region Traffic Operations staff will investigate all proposed installation sites and make a recommendation to the State Traffic-Roadway Engineer regarding sign placement. If the investigation determines that a location other than the one requested in the application is more appropriate, a distance of as much as one half mile away will be acceptable, with variations as approved by the State Traffic-Roadway Engineer. In no case, however, will the alternate location be on a highway other than the one on which the crash occurred.
10. The State Traffic-Roadway Engineer will approve or deny requests received and sign an agreement with sponsors and family members on those that are approved.
11. Signs will remain in place until they are weathered (usually seven to ten years). At that time, they will be removed. If a sign in serviceable condition is stolen, vandalized, or otherwise badly damaged, it will be replaced one time at ODOT expense. After a sign has been removed due to weathering, the original applicant may renew installation of the original sign by paying another $600.

Application Procedure

Persons wishing to sponsor a memorial sign should submit a written request to:

State Traffic-Roadway Engineer
Oregon Department of Transportation

4040 Fairview Industrial Drive SE
Salem, OR 97302-1142

The request should include the following information:

1. Name, address, and telephone number of applicant and relationship to victim
2. A brief description of the crash
3. Date and location of the crash — This should include the highway name or route number, as well as direction and distance in feet from the nearest green milepost paddle, and distance and direction from any other nearby landmarks (such as an intersecting road, or a bridge over a named stream).
4. Names of all parties involved in the crash
5. Proof of conviction (unless driver is deceased) and blood alcohol or drug level of driver (from court, police, or Medical Examiner's records)
6. Name or names, as they should appear on the sign
7. Commitment to provide $600 for installation of sign — Payment will be requested once a sign is approved.

For more information, contact the program coordinator at 503-986-3609.

File Code	Updated	Notes
TRA 24-01-14	March 2001	Updated impaired sign count. Reformatted January 2020.

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs) Appendix E

The descriptions provided in this appendix are a summary. See the full text of statutes on the Oregon Legislature's website and rules on the Secretary of State's website.

Topic	Reference	Description
Crosswalks	ORS 801.220	Defines Crosswalks
Crosswalks	ORS 811.010, 814.040	Apply to Crosswalks and pedestrians.
Delegation of Authority	ORS 184.635 ORS 366.205 OAR 734-020-0410	OTC delegation to Chief and STRE
Emergency Vehicle Preemption	ORS 815.440	Proper use of emergency vehicle preemption (traffic control signal operating)
Emergency Vehicle Preemption	OAR 734-020-0300 thru 0330	Standards for installation, operation
Freeway Median Crossovers	OAR 734-020-0100 thru 0115	Process and criteria for establishing freeway median crossovers
Incident Management	OAR 734-020-0145 OAR 734-020-0147 OAR 734-020-0150	Direction for the management of incidents or related activities.
Jurisdiction	ORS 810.010	Designates the bodies responsible for exercising jurisdiction over highways when the vehicle code requires the exercise of jurisdiction by the road authority. Does not define maintenance responsibility.
Multiple Turns at Highway Intersections	OAR 734-020-0135 thru 0140	Criteria for establishing multiple right and left turns at highway intersections
One-way Operation, Transit Exceptions	ORS 810.130	Allows road authorities to designate specific lanes or highways for one-way operation and allows road authorities to designate where public transit vehicles can proceed in a direction prohibited by other traffic.
Parking Prohibitions	ORS 810.160	Authority to regulate, control, and prohibit parking.
Parking Prohibitions	OAR 734-020-0020, OAR 734-020-0080 thru 0090	Process for establishing parking prohibitions or restrictions
Restrictions by vehicle type or weight	ORS 810.030	Allows the road authority to impose restrictions on highway use, by any or all vehicle types or weight classes, to protect the highway from damage or to protect the interest and safety of the public.

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs) Appendix E

Topic	Reference	Description
Restrictions by vehicle type or weight	OAR 734-020-0045	Prohibit non-motorized vehicles on certain highways,
Restrictions by vehicle type or weight	OAR 734-020-0080	establish restrictions on non-overnight parking (non-emergency) on state highways
Restrictions by vehicle type or weight	OAR 734-020-0100 thru 0115	Provide for use of freeway median crossovers
School Zones	ORS 810.180 ORS 811.111	Establishment of school zones
School Zones	ORS 811.124 ORS 811.106 ORS 811.235	School speed zones
Speed Zones	ORS 810.180 ORS 811.100 thru 811.111 OAR 734-020-0014 thru 0018	Establishment of speed zones in Oregon.
Appropriate driver response to traffic control device	ORS 811.260	Appropriate driver response to traffic signal indications, lane direction signs, stop signs, and yield signs.
Appropriate driver response to traffic control device	ORS 811.360	Turns made against a red indication
Appropriate driver response to traffic control device	ORS 811.455	Appropriate response to railroad crossing signals
Traffic Signal Approval Process	OAR 734-020-0400 thru 0500	Process for installation or removal of traffic signals on state highways
Transit and HOV Lanes	ORS 810.140	Allows road authority to designate bus or HOV lanes.
Transit and HOV Lanes	OAR 734-020-0035 thru 0043	Contains the orders establishing transit and HOV lanes.
Turn Prohibitions	ORS 810.210	Authorizes turn prohibitions
Turn Prohibitions	OAR 734-020-0020	Describes the warrants and criteria for establishing U-turns at signalized intersections and turn prohibitions

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs) Appendix E

Topic	Reference	Description
Uniform Standards and Placement	ORS 810.200 ORS 810.210 ORS 366.205	Establishes uniform standards and placement of traffic control devices.
Uniform Standards and Placement	OAR 734-020-0005	Adopts the MUTCD, Oregon Supplement to the MUTCD, and OTTCH.
U-Turn Designations	ORS 810.130	Authorizes designation of U-Turns
U-Turn Designations	OAR 734-020-0025	Description of warrants and criteria for establishing U-turns at signalized intersections.

File Code	Updated	Notes
Unassigned	January 2020	Reformatted January 2020.

Related Oregon Revised Statutes (ORSs) & Oregon Administrative Rules (OARs) Appendix E

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File Codes Appendix F

The Administrative Management Section maintains files for use by the Traffic-Roadway Section. These files include Subject Files with appropriate coding to differentiate between files. The two main codes used for Traffic-Roadway Section documents in the Subject Files are TRA (Traffic Engineering and Safety) and TSO (Transportation Systems Operations). The table below lists the major codes in these files. Individual files often contain extensive additional levels of code beyond those listed.

Code	Topic
TRA 01	Traffic Engineering Policies and Procedures
TRA 02	Highway Information Tracking Systems
TRA 03	Crash Analysis
TRA 04	Traffic Crashes – Monthly Crash Data-State Police
TRA 05	Traffic Congestion Management System (CMS)
TRA 06	Load Limitations
TRA 07	Highway Operations – Traffic (arranged by highway number and section)
TRA 07-01	Parking
TRA 07-02	Speed Limits and Zones (Alphabetical by city name)
TRA 07-03	Traffic Control Signs
TRA 07-04	Traffic Routing (Alphabetical)
TRA 07-06	Traffic Control Signal Lights (Case file by location)
TRA 07-07	Cattle Passes
TRA 07-08	Channelization (General)
TRA 07-09	Guard Fences
TRA 07-10	Highway Lighting, Luminaries
TRA 07-11	Crosswalks (includes Safety Islands)
TRA 07-12	Railroad Crossings (General)
TRA 07-13	School Crossings
TRA 07-14	Sidewalks and Footpaths
TRA 07-15	Vertical Clearances
TRA 07-16	Traffic Operations Improvement Program
TRA 08	(File Code Discontinued)
TRA 09	Photo-log System (Road Log)
TRA 10	Traffic Safety
TRA 10-01	Traffic Hazards
TRA 10-02	National Safety Council

Code	Topic
TRA 10-03	Hitchhiking
TRA 10-04	Bicycle Safety
TRA 10-05	Traffic Safety Improvement Studies
TRA 10-06	Signing and Flagging (Temporary)
TRA 10-07	Periodic Motor Vehicle Inspection Program
TRA 10-08	Driving Under the Influence of Intoxicants
TRA 10-09	Occupant Protection
TRA 10-10	Motorcycle Safety
TRA 10-11	Operations Traffic Safety Team
TRA 10-12	Network of Employees for Traffic Safety
TRA 10-13	Transportation Safety Action Plan (TSAP)
TRA 10-14	Youth Safety Issues
TRA 10-15	Pedestrian Safety
TRA 10-16	Work Zone Safety
TRA 10-17	Community Traffic Safety Program
TRA 10-18	Corridor Safety Improvement Program
TRA 10-19	Transportation Safety Data
TRA 10-20	Emergency Management System
TRA 11	National Trails
TRA 12	Special Equipment
TRA 13	Traffic Operations Program
TRA 14	Vehicle Miles and Ton Miles
TRA 15	Traffic Studies
TRA 15-01	Traffic Counts
TRA 15-02	Traffic Trend Data
TRA 15-03	Origin-Destination Studies
TRA 15-04	Traffic Density Studies
TRA 15-05	Traffic Counters
TRA 15-06	Traffic Counters on Bicycle Trails
TRA 15-07	Traffic Speed and Time Studies
TRA 15-08	Truck Volume Studies
TRA 15-09	Special Traffic Studies
TRA 16	Traffic Control Data (General) (Includes study, test, design)
TRA 16-01	Illumination

Code	Topic
TRA 16-02	Pavement Markings
TRA 16-03	Curb Markers
TRA 16-04	Traffic Control Signs
TRA 16-05	Speed Zoning
TRA 16-06	Signals
TRA 16-07	Testing and Research of Traffic Control Devices
TRA 16-08	Median/Shoulder Barriers
TRA 16-09	Manual on Uniform Traffic Control Devices
TRA 16-10	
TRA 16-11	Barricades
TRA 17	Highway Map Revisions
TRA 18	Road Inventory
TRA 19	Road Life Studies
TRA 20	Vehicle Safety and Equipment
TRA 21	Vehicle Inspections
TRA 22	Vehicle and Traffic Safety
TRA 23	Directional and Informational Signing
TRA 24	Logo Signing
TRA 25	TODS
TRA 26	Interstate Cultural and Historical Signs
TRA 27	Brown Sign Program
TRA 28	Southern Oregon Regional Signing Study
TRA 29	Travel Publications
TRA 30	Grants of Access
TSO 01	Intelligent Transportation Systems (ITS) – General
TSO 02	ITS Reference Material – General
TSO 03	ITS Organizations
TSO 04	ITS Standards and Specifications
TSO 05	ITS Vendor Information
TSO 06	ITS Planning
TSO 08	ITS
TSO 09	ITS
TSO 10	ITS Projects

File Codes Appendix F

File Code	Updated	Notes
Unassigned	January 2020	

References Appendix G

American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 6th ed. Washington, D.C., 2011.

American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Streets and Highways*, 7th ed. American Association of State Highway and Transportation Officials, Washington, D.C., 2018.

American Association of State Highway and Transportation Officials. *Guide for the Development of Bicycle Facilities*. American Association of State Highway and Transportation Officials, Washington, D.C.

American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st ed. AASHTO, Washington, D.C., 2010.

Brian, R., W. Kittleson, J. Knudsen, B. Nevers, P. Ryus, K. Sylvester, I. Potts, D. Harwood, D. Gilmore, D. Torbic, F. Hanscom, J. McGill, and D. Stewart. *NCHRP Report 613: Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections*. Transportation Research Board of the National Academies, Washington, D.C., 2008. http://www.trb.org/Publications/Blurbs/160046.aspx.

Campbell, J. L., M. G. Lichty, J. L. Brown, C. M. Richard, J. S. Graving, J. Grahm, M. O'Laughlin, D. Torbic, and D. Harwood. *NCHRP Report 600: Human Factors Guidelines for Road Systems*. Transportation Research Board of the National Academies, Washington D.C., 2012. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_600second.pdf.

Dixon, K. K., and C. M. Monsere. *Highway Safety Investigation Manual for the Oregon Department of Transportation*. Oregon Department of Transportation, Salem, Oregon, 2011. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety-Investigation-Manual.pdf.

Fayyaz, K., P. Galvez de Leon, and G. G. Schultz. Driver Compliance at Enhanced Pedestrian Crossings in Utah. Resource System Group, Salt Lake City, Utah, UT-19.03, 2019. https://www.udot.utah.gov/main/uconowner.gf?n=6209985557249300.

Federal Highway Administration Office of Infrastructure. *Interstate System Access Information Guide*. Federal Highway Administration, Washington, D.C., 2010. https://www.fhwa.dot.gov/design/interstate/pubs/access/access.pdf.

Federal Highway Administration. *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 ed. Federal Highway Administration, Washington, D.C., 2012. https://mutcd.fhwa.dot.gov/.

Federal Highway Administration. Pedestrian Safety Guide and Countermeasure Selection System. http://www.pedbikesafe.org/pedsafe/. Accessed January 14, 2019.

Federal Highway Administration. *Roundabouts: A Safer Choice*. https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/fhwasa08006/fhwasa08006.pdf.

Federal Highway Administration. *Safety Benefits of Raised Medians and Pedestrian Refuge Islands*. Federal Highway Administration, Washington, D.C., 2010. https://safety.fhwa.dot.gov/ped_bike/tools_solve/medians_brochure/.

Federal Highway Administration. *Safety Effectiveness of Highway Design Features*. Washington, D.C., 1992.

Federal Highway Administration. *Standard Highway Signs and Markings*. Federal Highway Administration, Washington, D.C. https://mutcd.fhwa.dot.gov/ser-shs_millennium.htm.

Federal Highway Administration. *Synthesis of Safety Research Related to Traffic Control and Roadway Elements*. Federal Highway Administration, Washington, D.C., 1982. https://trid.trb.org/view/192558.

Fitzpatrick, K., M. A. Brewer, R. Avelar, and T. Lindheimer. Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon. Center for Transportation Safety, Texas A&M Transportation Institute, College Station, TX, TTI-CTS-0010, 2016. https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-CTS-0010.pdf.

Fitzpatrick, K., R. Avelar, I. Potts, M. Brewer, J. Robertson, C. Fees, J. Hutton, L. Lucas, and K. Bauer. Investigating Improvements to Pedestrian Crossings With an Emphasis on the Rectangular Rapid-Flashing Beacon. Texas Transportation Institute, Texas A&M University, McLean, Virginia, FHWA-HRT-15-043, 2015. http://www.fhwa.dot.gov/publications/research/safety/15043/15043.pdf.

Fitzpatrick, K., R. Avelar, M. Pratt, M. Brewer, J. Robertson, T. Lindheimer, and J. Miles. Evaluation of Pedestrian Hybrid Beacons and Rapid Flashing Beacons. Texas Transportation Institute, Texas A&M University, McLean, Virginia, FHWA-HRT-16-040, 2016. https://rosap.ntl.bts.gov/view/dot/35859.

Fitzpatrick, K., S. Turner, M. Brewer, P. Carlson, B. Ullman, N. Trout, E.S. Park, J. Whitacre, N. Lalani, and D. Lord. *TCRP Report 112/NCHRP Report 562: Improving Pedestrian Safety at Unsignalized Crossings*. Transportation Research Board of the National Academies, Washington, D.C., 2006. http://www.trb.org/Publications/Blurbs/157723.aspx.

Foster, N., C. M. Monsere, and K. Carlos. Evaluating Driver and Pedestrian Behaviors at Enhanced, Multilane, Midblock Pedestrian Crossings: Case Study in Portland, Oregon. *Transportation Research Record: Journal of the Transportation Research Board of the National Academies*, Vol. 2464, January 2014, pp. 59-66. DOI: https://doi.org/10.3141/2464-08

Hunter-Zaworski, K., and J. Mueller. Evaluation of Alternative Pedestrian Traffic Control Devices. School of Civil and Construction Engineering, Oregon State University, Salem, Oregon, FHWA-OR-RD-12-09, 2012. http://www.oregon.gov/ODOT/Programs/ResearchDocuments/SPR721pedreport.pdf?ga=t.

Institute of Transportation Engineers. *Transportation Impact Analyses for Site Development*, 2010 ed. Institute of Transportation Engineers, 2010.

Insurance Institute for Highway Safety. Red Light Cameras in Philadelphia All But Eliminate Violations. *Status Report*, Vol. 42, no. 1, January 2007. http://www.iihs.org/iihs/sr/statusreport/article/42/1/1.

Isebrands, H., S. Hallmark, and N. Hawkins. Effects of Approach Speed at Rural High-Speed Intersections: Roundabouts Versus Two-Way-Stop Control. *Transportation Research Record: Journal of the Transportation Research Board Online*, Vol. 2402, 2014, pp. 67-77. http://trrjournalonline.trb.org/doi/abs/10.3141/2402-08. DOI: https://doi.org/10.3141/2402-08

Knopp, M. C. MUTCD - Interim Approval for Optioanl Use of Rectangular Rapid Flashing Beacons (IA-11) - TERMINATION. December 21, 2017. https://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/terminationmemo/ia11_termination_memo.pdf. Accessed August 16, 2019.

Knopp, M. C. *MUTCD - Interim Approval for Optional Use of Pedestrian-Actuated Rectangular Rapid-Flashing Beacons at Uncontrolled Marked Crosswalks (IA-21)*. Federal Highway Administration, Washington, D.C., 2018. https://mutcd.fhwa.dot.gov/resources/interim_approval/ia21/index.htm.

Lindley, J. A. (2013, August) MUTCD - Official Ruling 3(09)-24(I) - Application of Colored Pavement. [Online]. https://mutcd.fhwa.dot.gov/resources/interpretations/3_09_24.htm.

Oregon Department of Land Conservation and Development. *Main Street.When a Highway Runs Through It: A Handbook for Oregon Communities*. Oregon Department of Land Conservation and Development, Salem, Oregon, 1999. http://www.oregon.gov/LCD/Publications/MainStreet_HighwayThroughIt_1999.pdf.

Oregon Department of Transportation & Oregon Traffic Control Devices Committee. *Fixed Photo Radar (FPR) Camera Guidelines for State Highways*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed_Fixed-Photo-Radar-Camera-Guidelines.pdf.

Oregon Department of Transportation & Oregon Traffic Control Devices Committee. *Red Light Running (RLR) Camera Guidelines for State Highways*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Red-Light-Camera-Guidelines.pdf.

Oregon Department of Transportation. *A Guide to School Area Safety*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Guide_to_School_Area_Safety.pdf.

Oregon Department of Transportation. *Analysis Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Planning/Pages/APM.aspx.

Oregon Department of Transportation. Blue Sheets: Prequalified Products and Submittals for Qualification of Electrical Equipment and Materials. *Signal Design Guidance Materials*, https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/BlueSheets.pdf. Accessed June 21, 2019.

Oregon Department of Transportation. *Descriptions of US and OR Routes*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/HWY-Route-Descriptions.pdf.

Oregon Department of Transportation. *Development Review Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Planning/Documents/Development-Review-Guidelines.pdf.

Oregon Department of Transportation. Green Sheets: Conditionally Prequalified Products and Submittals for Conditional Qualification of Controller Equipment. *Signal Design Guidance Materials*, https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/GreenSheets.pdf. Accessed June 21, 2019.

Oregon Department of Transportation. *Guidelines for the Operation of Highway Advisory Radio and Other Travelers Information Stations on State Highways*. Oregon Department of Transportation, Salem, Oregon.

Oregon Department of Transportation. *Guidelines for the Operation of Permanent Variable Message Signs*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/VMS-Guidelines.pdf.

Oregon Department of Transportation. *Highway Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Hwy-Design-Manual.aspx.

Oregon Department of Transportation. *Highway Directive DES 02: Roundabouts on State Highway System*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/DES_02.pdf.

Oregon Department of Transportation. *Highway Directive TRA 07-15: Vertical Clearance*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TRA07-15d.pdf.

Oregon Department of Transportation. *Highway Directive TRA 10-16: Guiding Principle for Work Zone Safety*. Oregon Department of Transportation, Salem, Oregon, 2016. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TRA10-16d.pdf.

Oregon Department of Transportation. *Highway Safety Improvement Program Guide*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Safety_HSIP-Guide.pdf.

Oregon Department of Transportation. *Inspector's Manual for Signal Construction*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Construction/Doc_TrafficSignal/00_master_signal_inspector.pdf.

Oregon Department of Transportation. *Lighting Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Policy-Guidelines.pdf.

Oregon Department of Transportation. *Mobility Procedures Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/MCT/Documents/MobilityProcedureManual.pdf.

Oregon Department of Transportation. ODOT Approval Procedure for Local Truck Routes. https://www.oregon.gov/ODOT/Planning/Documents/LocalTruckRoute_ApprovalProcedure.pdf. Accessed July 8, 2019.

Oregon Department of Transportation. *ODOT Pavement Marking Design Guidelines*. Oregon Department of Transportation, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Pavement-Marking-Design-Guide.pdf.

Oregon Department of Transportation. *Oregon Highway Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/odot/planning/pages/plans.aspx.

Oregon Department of Transportation. Oregon Intersection Safety Implementation Plan. Salem, Oregon, 2012. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Intersection_Safety_Implementation_Plan.pdf.

Oregon Department of Transportation. *Oregon Portable Changeable Message Sign Handbook*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/PCMS-Handbook.pdf.

Oregon Department of Transportation. *Oregon Safety Corridor Program Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Documents/SafetyCorridorGuidelines.pdf.

Oregon Department of Transportation. *Oregon Standard Specifications for Construction*. Oregon Department of Transportation, Salem, Oregon.

Oregon Department of Transportation. *Oregon Statewide Variable Speed System Concept of Operations*. Oregon Department of Transportation, Salem, Oregon.

Oregon Department of Transportation. *Oregon Supplement to the Manual on Uniform Traffic Control Devices*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/MUTCD-OR-Supplement.pdf.

Oregon Department of Transportation. Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less. http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf. Accessed February 1, 2013.

Oregon Department of Transportation. *Oregon Transportation Safety Action Plan*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Safety/Pages/TSAP.aspx.

Oregon Department of Transportation. *Policy Statement for Cooperative Traffic Control Projects*. Salem, Oregon, 2002. http://transnet.odot.state.or.us/hwy/trs/Shared%20Documents/2002_policy_statement_for_cooperative_traffic_control_projects.pdf.

Oregon Department of Transportation. *Safety Priority Index System and Oregon Adjustale Safety Index System User Guide*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/SPIS-User-Guide.pdf.

Oregon Department of Transportation. Sign Policy and Guidelines. https://www.oregon.gov/ODOT/Engineering/Pages/Sign-Policy.aspx. Accessed July 10, 2018.

Oregon Department of Transportation. *Speed Zone Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/TRSDocs/Speed-Zone-Manual.pdf.

Oregon Department of Transportation. *Standard Specification for Microcomputer Signal Controller*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signals.aspx.

Oregon Department of Transportation. *Technical Bulletin RD17-02(B): Overhead Structures and Update to Vertical Clearance Standards and Guidance*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/RD17-02(B).pdf.

Oregon Department of Transportation. *Technical Bulletin TR15-01(B): State-wide Policy for Installing Chevrons, Arrows and Advisory Speed Plaques*. Oregon Department of Transportation, Salem, Oregon, 2015. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TR15-01b.pdf.

Oregon Department of Transportation. *Technical Bulletin TR17-02(B): Policy for Intersection Bicycle Boxes*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TR17-02B.pdf.

Oregon Department of Transportation. *Technical Services Directive TSB17-01(D): Traffic Control Plan Design*. Oregon Department of Transportation, Salem, Oregon, 2017. https://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TSB17-01D.pdf.

Oregon Department of Transportation. Technician Certification Program. https://www.oregon.gov/ODOT/Construction/Pages/Technician-Certification-Program.aspx. Accessed July 8, 2019.

Oregon Department of Transportation. *Traffic Control Plan Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/TCP-Manual.aspx.

Oregon Department of Transportation. *Traffic Lighting Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Lighting-Design-Manual.pdf.

Oregon Department of Transportation. *Traffic Line Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Line-Manual.pdf.

Oregon Department of Transportation. *Traffic Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Traffic-Manual.pdf.

Oregon Department of Transportation. *Traffic Sign Design Manual*. Oregon Department of Transportation, Traffic-Roadway Section, Salem, Oregon. http://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Sign-Design-Manual.pdf.

Oregon Department of Transportation. *Traffic Signal Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Design-Manual.aspx.

Oregon Department of Transportation. *Traffic Signal Drafting Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Pages/Signal-Drafting-Manual.aspx.

Oregon Department of Transportation. Traffic Signal Inspector Certification. https://www.oregon.gov/ODOT/Construction/Pages/Signal-Inspector-Cert.aspx. Accessed July 8, 2019.

Oregon Department of Transportation. *Traffic Signal Policy and Guidelines*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf.

Oregon Department of Transportation. *Traffic Structures Design Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Documents_TrafficStandards/Traffic-Structures-Design-Manual.pdf.

Oregon Department of Transportation. *Transportation Management Plan (TMP) Project Level Guidance Manual*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/TMP-Manual.pdf.

Oregon Department of Transportation. *Web-Based Work Zone Traffic Analysis Tool Users' Guide*. Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone-Analysis-Manual.pdf.

Oregon Department of Transportation; Oregon Trucking Associations, Inc.; Associated General Contractors Oregon Columbia Chapter; Oregon State University; AAA; Oregon State Police. Oregon Work Zone Safety Executive Steering Committee Guiding Principle. December 7, 2015. https://www.oregon.gov/ODOT/Engineering/Docs_TrafficEng/Work-Zone_Guiding-Principle.pdf. Accessed May 31, 2019.

Oregon Transportation Commission. Naming Highway Facilities. *Oregon Transportation Commission - Get Involved*, October 15, 1991. https://www.oregon.gov/ODOT/Get-Involved/OTC/OTCpolicy_naming.pdf. Accessed July 8, 2019.

Oregon Transportation Commission. *Standards for Accessible Parking Places*. Oregon Department of Transportation, Salem, Oregon. https://www.oregon.gov/ODOT/Engineering/DOCS_ADA/ADA_Standards-Accessible-Parking.pdf.

Porter, B. E., T. D. Berry, J. Harlow, and T. Vandecar. A Nationwide Survey of Red Light Running: Measuring Driver Behaviors for the "Stop Red Light Running" Program. Old Dominion University, Norfolk, Virginia, 1999. https://trid.trb.org/view/636152.

Ranck, F. Walk Alert: The New National Pedestrian Safety Program. *ITE Journal*, August 1989, pp. 37-40.

Rodegerdts, L., J. Bansen, C. Tiesler, J. Knudsen, E. Myers, M. Johnson, M. Moule, B. Persaud, C. Lyon, S. Hallmark, H. Isebrands, R. B. Crown, B. Guichet, and A. O'Brien. *NCHRP Report 672: Roundabouts: An Informational Guide*, 2nd ed. Transportation Research Board of the National Academies, Washington, D.C., 2010. http://www.trb.org/Main/Blurbs/164470.aspx.

Ross, J., D. Serpico, and R. Lewis. Assessment of Driver Yielding Rates Pre- and Post-RRFB Installation, Bend, Oregon. Research Section, Oregon Department of Transportation, Salem, Oregon, FHWA-OR-RD 12-05, 2011. https://rosap.ntl.bts.gov/view/dot/23683.

Royal, D. Volume II: Findings: National Survey of Speeding and Unsafe Driving Attitudes and Behavior. The Gallup Organization, Washington, D.C., DOT HS 809 688, 2003. https://www.nhtsa.gov/people/injury/drowsy_driving1/speed_volII_finding/SpeedVolumeIIFindingsFinal.pdf.

Shurbutt, J., and R. Van Houten. Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks. Psychology Department, Western Michigan University, McLean, Virginia, FHWA-HRT-10-043, 2010. https://www.fhwa.dot.gov/publications/research/safety/pedbike/10043/10043.pdf.

Srinivasan, R., J. Baek, and F. Council. Safety Evaluation of Transverse Rumble Strips on Approaches to Stop-Controlled Intersections in Rural Areas. in *2010 Annual Meeting of the Transportation Research Board*, Washington, D.C., September 2010.

Thomas, D. H., and M. M. Graham. Safe Transportation for Every Pedestrian: Rectangular Rapid Flashing Beacons. October 30, 2018.

Thompson, T. D., M. W. Burris, and P. J. Carlson. Speed Changes Due to Transverse Rumble Strips on Approaches to High-Speed Stop-Controlled Intersections. *Transportation Research Record: Journal of the Transportation Research Board Online*, Vol. 1973, 2006, pp. 1-9. http://trrjournalonline.trb.org/doi/abs/10.3141/1973-03. DOI: 10.3141/1973-03

Torbic, D. J., D. K. Gilmore, K. M. Bauer, C. D. Bokenkroger, D. W. Harwood, L. M. Lucas, R. J. Frazier, C. S. Kinzel, D. L. Petree, and M. D. Forsberg. *NCHRP Report 737: Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways*. Transportation Research Board of the National Academies, Washington, D.C., 2012. http://www.trb.org/Publications/Blurbs/168309.aspx.

Torbic, D. J., J. M. Hutton, C. D. Bokenkroger, K. M. Bauer, D. W. Harwood, D. K. Gilmore, J. M. Dunn, J. J. Ronchetto, E. T. Donnell, H. J. Sommer III, P. Garvey, B. Persaud, and C. Lyon. *NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips*. Transportation Research Board of the National Academies, Washington, D.C., 2009.

Whitlock & Weinberger Transportation, Inc. An Evaluation of a Crosswalk Warning System Utilizing In-Pavement Flashing Lights. State of California Office of Traffic Safety, 1998. https://www.lightguardsystems.com/wp-content/uploads/2014/11/Whitlock-Weinberger-Report-1998.pdf.

Yang, L., H. Zhou, L. Zhu, and H. Qu. Operation Effects of Transverse Rumble Strips on Approaches to High-Speed Intersections. *Transportation Research Record: Journal of the Transportation Research Record Online*, Vol. 2602, 2016, pp. 78-87. http://trrjournalonline.trb.org/doi/abs/10.3141/2602-10. DOI: 10.3141/2602-10

Zegeer, C. V., J. R. Stewart, H. H. Huang, P. A. Lagerwey, J. Feaganes, and B. J. Campbell. Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled. Federal Highway Administration Office of Safety Research & Development, Washington, D.C., Final Report FHWA-HRT-04-100, 2005. https://www.fhwa.dot.gov/publications/research/safety/04100/04100.pdf.

Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N. J. Thirsk, C. Lyon, B. Persaud, J. Zegeer, E. Ferguson, and R. Van Houten. *NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments*. Transportation Research Board of the National Academies, Washington, D.C., 2017. http://www.trb.org/Main/Blurbs/175381.aspx.

File Code	Updated	Notes
Unassigned	January 2020	Changed to list of references cited by Traffic Manual.

Acronym Glossary Appendix H

Acronym	Meaning
AAA	American Automobile Association
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AATMS	Advanced Areawide Traffic Management System (see ATMS)
ACVOS	Advanced Commercial Vehicle Operations Systems (see CVO)
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AGT	Automatic Guideway Transit
AHC	Automatic Headway Control
AHS	Automated Highway System
AIDS	Automated Information Directory System
AMTICS	Advanced Mobile Traffic Information and Communication System
AOC	Association of Oregon Counties
API	Automatic Personal Identification (see PIN)
API	Applications Programmer Interface
APTS	Advanced Public Transit Systems
APTS	Advanced Passenger Transport Systems
AQMP	Air Quality Maintenance Plan
ASAP	As soon as possible
ASC	Automatic Steering Control
ASC	Actuated Signal Controller
ASCII	American Standard Code for Information Interchange
ASK	Amplitude Shift Keying (digital AM)
ASN	Abstract Syntax Notation
ATCS	Automated Traffic Control System (NEMA)
ATIS	Advanced Traveler Information Systems (formerly ADIS, for Driver)
ATMS	Advanced Traffic (Transportation) Management Systems
ATR	Automatic Traffic Recorder
ATS	Advanced Transportation Systems (Subcommittee of AASHTO)
AVC	Automatic Vehicle Classification
AVCS	Automatic Vehicle Control Systems
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location

Acronym	Meaning
AVLC	Automatic Vehicle Location and Control
AVM	Automatic Vehicle Monitoring
AWDT	Average Weekday (Traffic) - also AWD
BER	Bit Error Rate
BER	Byte Encoding Rate
BER	Basic Encoding Rules
BESI	Bus Electronic Scanning Indicator
Bit	Binary digit
BIU	Bus Interface Unit (NEMA)
BMS	Bridge Management System (ISTEA)
BPR	Bureau of Public Roads (see FHWA)
BPS	Bits Per Second
BRT	Bus Rapid Transit
CA	Controller Assembly (NEMA)
CAA(A)	Clean Air Act (Amendment)
CAD	Call / Active Display (Model 170 Microprocessor Traffic Controllers)
CAD	Computer Aided Design (Drafting)
CAD	Computer Aided Dispatching
CADD	Computer Aided Drafting and Design
CalTrans	California Department of Transportation
CAO	Chief Administrative Officer
CAR	Crash Analysis and Reporting
CAT	Countermeasure Analysis Tool
CBD	Central Business District
CCTV	Closed Circuit Television Camera(s)
CDL	Commercial Driver's License
CD-ROM	Compact Disk - Read Only Memory
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
CMAQ	Congestion Management Air Quality
CMS	Changeable Message Sign(s) (see VMS - preferred)
CMS	Congestion Management System (ISTEA)
COATS	California Oregon Advanced Transportation Systems
COP	City of Portland (Prineville)

Acronym	Meaning
COTS	Commercial Off-the-Shelf computer software and/or hardware
CPFF	Cost Plus Fixed Fee
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSR	Crash Summary Report
CTWLTL	Continuous Two Way Left Turn Lane
CU	Controller Unit (NEMA)
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DBMS	Data Base Management System
DBS	Direct Broadcast Satellite
DCE	Data Circuit Terminating Equipment (typically a modem)
DLSAP	Data Link Service Access Point
DLSDU	Data Link Service Data Unit
DMS	Dynamic Message Sign (See VMS)
DMV	Driver and Motor Vehicle Services
DR	Dead Reckoning
DRIVE	Dedicated Road Infrastructure for Vehicle Safety in Europe
DSRC	Dedicated Short Range Communication
DTE	Data Terminal Equipment
DTR	Data Terminal Ready signal
DUII	Driving Under the Influence of Intoxicants
DW	"DONT WALK" pedestrian signal indication
EIA	Electronic Industries Association
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
EPROM	Erasable Programmable Read Only Memory
ETTM	Electronic Toll and Traffic Management
FAA	Federal Aviation Administration
FAQ	Frequently Asked Questions
FARS	Fatality Analysis Reporting System
FAST Act	Fixing America's Surface Transportation Act
Fax	Facsimile

Acronym	Meaning
FCC	Federal Communications Commission
FCS	Frame Check Sequence
FDW	Flashing "DONT WALK" pedestrian signal indication
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FMCS	Fleet Management and Control Systems
FMOC	Freeway Management Operations Center (see TMOC)
FO	Fiber Optic
FONSI	Finding of Non Significant Impacts
FSK	Frequency Shift Keying
FTA	Federal Transit Administration (formerly UMTA)
FTMS	Freeway Traffic Management System
FTP	File Transfer Protocol
GIS	Geographic Information System
GIS-T	Geographic Information Systems for Transportation
GPO	Government Printing Office
GPS	Global Positioning System
GVW	Gross Vehicle Weight
HAR	Highway Advisory Radio
HCM	Highway Capacity Manual
HDLC	High-level Data Link Control
HDV	Heavy Duty Vehicles
HELP	Heavy vehicle Electronic License Plate
HOV	High Occupancy Vehicle
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
HUD	Head-Up Display
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illumination Engineering Society of North America
IIHS	Insurance Institute for Highway Safety
IM	Incident Management
IMS	Intermodal Management System (ISTEA)
IP	Internet Protocol
ISDN	Integrated Services Digital Network

Acronym	Meaning
ISMS	Information Safety Management System
ISO	International Standards Organization
ISTEA	Intermodal Surface Transportation and Efficiency Act
ITE	Institute of Transportation Engineers (pre-1971 formerly Institute of Traffic Engineers)
ITIS	Integrated Transportation Information System
ITS	Intelligent Transportation Systems (see IVHS)
ITS – America	Intelligent Transportation Society of America (see IVHS - America)
ITS – Oregon	Intelligent Transportation Systems for Oregon
ITWG	ITS Technical Working Group
IVHS	Intelligent Vehicle Highway System (see ITS)
IVHS-America	Intelligent Vehicle Highway Society of America (see ITS-America)
JPACT	Joint Policy Advisory Committee on Transportation
KSA	Knowledge, Skills and Abilities
LAN	Local Area Network
LCD	Liquid Crystal Display
LDT	Light Duty Trucks
LED	Light Emitting Diode
LLC	Logical Link Control
LOC	League of Oregon Cities
LOI	Level Of Importance
LOS	Level of Service
LRM	Local Ramp Meter (Controller software)
LRT	Light Rail Transit
LRV	Light Rail Vehicle
LVA	Linked Vehicle Actuated
MACS	Metropolitan Area Corridor Study
MAP-21	Moving Ahead for Progress in the 21st Century
MDI	Model Deployment Initiative
MIB	Management Information Base
MIS	Management Information System
MMU	Malfunction Management Unit (NEMA)
MODEM	Modulate - Demodulate
MOVA	Modernized Optimized Vehicle Actuation

Acronym	Meaning
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
NCAP	New Car Assessment Program
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research Program
ND	Negative Declaration
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NHTSA	National Highway Traffic Safety Administration
NIST	National Institute of Standards and Technology (Formerly the National Bureau of Standards of the U.S. Department of Commerce.)
NMS	Network Management System
NTCIP	National Transportation Communications for ITS Protocol
NTP	National Transportation Policy
NTSPS	National Transportation Strategic Planning Study
NVT	Network Virtual Terminal (also NVT-ASCII)
OAR	Oregon Administrative Rules
OASIS	Oregon Adjustable Safety Index System
OBC	Onboard Computer
ODOT	Oregon Department of Transportation
OEDD	Oregon Economic Development Department
OERS	Oregon Emergency Response System
OHP	Oregon Highway Plan
OID	Object Identifier
ORS	Oregon Revised Statutes
OSI	Open System Interconnect
OSI-RM	Open System Interconnect – Reference Model (also RM-OS)
OSM	On Street Master (Controller software)
OSP	Oregon State Police
OSRM	On Street Ramp Master (Controller software)
OTC	Oregon Transportation Commission
OTCDC	Oregon Traffic Control Devices Committee
OTE	Oregon Travel Experience (formerly Oregon Travel Information Council)
OTIA	Oregon Transportation Investment Act

Acronym	Meaning
OTIC	Oregon Travel Information Council (also TIC)
OTMS	Oregon Transportation Management System
OTP	Oregon Transportation Plan
PAM	Police Allocation Manual
PASSER	Progression Analysis and Signal System Evaluation Routine (Computer Software)
PCM	Pulse Code Modulation
PCMS	Portable Changeable Message Sign
PCOI	Pedestrian Clear-out Interval
PCU	Passenger Car Unit
PDT	Project Development (or Design) Team (also PT – Project Team)
PDU	Protocol Data Unit
PER	Packed Encoding Rules (a variation of BER for use with low bandwidth.)
PIN	Personal Identification Number
PMPP	Point to Multi-Point Protocol
PMS	Pavement Management System (ISTEA)
PPP	Public/Private Partnership
PROMETHEUS	Program for European Traffic with Highest Efficiency and Unprecedented Safety
PSA	Public Service Announcement
PS&E	Plans, Specifications and Estimates
PSMS	Project Safety Management System
PT	Project Team (also PDT - Project Development Team)
PTMS	Public Transportation Management System (ISTEA)
PTR	Part Time Restriction
RACS	Road - Automobile Communications System
RADAR	Radio Detecting and Ranging
RAM	Random Access Memory
RAME	Region Access Management Engineer
RDC	Rural Development Center
RDSS	Radio Determination Satellite Services
RF	Radio Frequency
RFP	Request for Proposal
RFQ	Request for Qualifications
RFRS	Road Features Rating System
RLR	Red Light Running

Acronym	Meaning
RM-OS	See OSI-RM
ROM	Read Only Memory
ROR	Run-off-road
RPG	Roadway Peer Group (Formerly Roadway Leadership Team, RLT)
RSA	Road Safety Audit
RSPA	Research and Special Projects Administration (USDOT)
RTE/M	Region Traffic Engineer/Manager
RTP	Regional Transportation Plan
RTPWS	Right Turn Permitted Without Stopping
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SAP	Service Access Point
SCC	Surveillance Communication and Control
SCOOT	Split Cycle and Offset Optimization Technique
SDLC	Synchronous Data Link Control
SDO	Standards Development Organization
SDU	Service Data Unit
SGRC	Statewide Grant Review Committee
SHRP	Strategic Highway Research Program
SIP	Safety Improvement Program or State Implementation Plan (Air Quality)
SLG	Synchronous Longitudinal Guidance
SMS	Safety Management System (ISTEA)
SNMP	Simple Network Management Protocol (Version 2 – SNMPv2)
SOV	Single Occupant Vehicle
SP	Standards Publication
SPIS	Safety Priority Index System
SSVS	Super Smart Vehicle System
STA	Special Transportation Area
STE	State Traffic-Roadway Engineer
STIP	Statewide Transportation Improvement Program
STIP	State Transportation Improvement Program
STMF	Simple Transportation Management Framework
STMP	Simple Transportation Management Protocol

Acronym	Meaning
STRE	State Traffic-Roadway Engineer
SZRP	Speed Zone Review Panel
TAC	Technical Advisory Committee
TBC	Time Based Coordination
TBC	Time Base Control (NEMA)
TCM	Transportation Control Measure (Air Quality)
TCP	Traffic Control Plans
TCP	Transmission Control Protocol
TDM	Time Division Multiplexing
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TESU	Traffic Engineering Services Unit
TF	Terminals and Facilities (NEMA)
TFP	Technology For People
TIA	Telecommunications Industries Association
TIP	Transportation Improvement Program
TIR	Traffic Impact Report
TIS	Transit Information System
TIS	Traffic Impact Study
TLV	Type, Length, Value encoding
TMA	Transportation Management Area
TMC	Traffic Management Center (see also TMOC and FMOC)
TMDD	Traffic Management Data Dictionary
TM-H	Traffic Monitoring for Highways
TMOC	Transportation Management Operations Center (see FMOC)
TOC	Traffic Operations Center
TOD	Transit Oriented Development
TODS	Tourist Oriented Direction Signs
TOG	Traffic Operations Group (formerly Traffic Ops Leadership Team, TOLT)
TPAC	Transportation Policy Advisory Committee
TPAU	Transportation Planning and Analysis Unit
TPR	Transportation Planning Rule
TPST	Traffic Project Services Team
TRANSYT	Traffic Network Study Tool (Computer Software)

Acronym	Meaning
TRB	Transportation Research Board
TRL	Time Reference Line
TRRL	Transportation and Road Research Laboratory
TRS	Traffic-Roadway Section
TSAMU	Traffic Standards and Asset Management Unit
TSM	Technical Services Manager
TSM	Transitway Simulation Model
TSM	Transportation System Management
TSO	Telephone Service Order
TSO	Transportation System Operations
TSP	Transportation System Plan
TSSU	Traffic Systems Services Unit
TTI	Texas Transportation Institute
TWLTL	Two Way Left Turn Lane (CTWLTL for Continuous Two Way Left Turn Lane)
UBA	Urban Business Area
UDP	User Datagram Protocol
UHF	Ultra High Frequency (300MHz to 3GHz)
UMTA	Urban Mass Transit Administration (see FTA)
USDOT	United States Department of Transportation (also DOT)
UTC	Urban Traffic Control
VCOI	Vehicle Clearout Interval
VHF	Very High Frequency (30 to 300MHz)
VICS	Vehicle Information Communication System
VIPS	Vehicle Identification and Priority System
VMS	Variable Message Sign (preferred – see also CMS, DMS)
VMT	Vehicle Miles of Travel (Vehicle Miles Traveled)
WAN	Wide Area Network
WIM	Weigh In Motion

File Code	Updated	Notes
Unassigned	January 2020	Added STRE, RTE/M, TOG, RPG

Definitions Appendix I

MUTCD Section 1A.13, as modified by Section 1A.13 in the *Oregon Supplement to the MUTCD*, defines terms used in the *Traffic Manual* that this appendix does not define.

1. **Bicycle lane** See ORS 801.155.
2. **Bicycle path** See ORS 801.160.
3. **Bottleneck** – A link (or section) in a transportation system having a maximum carrying capacity significantly less than the adjoining links. A link represents a continuous section between major nodes. Major nodes may include interchanges (or specific entrance or exit ramps) on controlled access highways and transitways, public road intersections on non-controlled access highways, and guideway junctions on fixed guideway systems. Major nodes on any system may also be defined as a point of geometric change, such as in vertical or horizontal alignment, lane width, etc., which results in significantly reduced operating characteristics. The capacity of the link downstream from the bottleneck must be equal to, or greater than that of the upstream link.
4. **Capacity** – The maximum number of vehicles (vehicle capacity) or passengers (person capacity) that can pass over a given section of roadway or transit line in one or both directions during a given period of time under prevailing roadway and traffic conditions.
5. **Commercial vehicle** See ORS 801.210.
6. **Crossover** – See OAR 734-020-0100.
7. **Crosswalk** – See ORS 801.220
8. **DUII** – Driving Under the Influence of Intoxicants. (See Impaired Driving Victim Memorial Signing.)
9. **Emergency vehicle** – See ORS 801.260
10. **Freeway Median** – See OAR 734-020-0100.
11. **Highway** – See ORS 801.305.
12. **Intersection** – See ORS 801.320
13. **Median** – A continuous divisional island that separates opposing traffic and may be used to separate left turn traffic from through traffic in the same direction as well. Medians may be designated by pavement markings, curbs, guideposts, pavement edge or other devices. (See also Non-Traversable Medians and Traversable Medians)
14. **Non-Traversable Medians** – Medians that are designed to impede traffic from crossing the median. Examples include curbed medians or concrete barrier medians, also included are depressed grass or landscaped medians.
15. **Occupancy** – (1) The amount of time motor vehicles are present in a detection zone expressed as a percent of total time. This parameter is used to describe vehicle density, a measure of highway congestion.

(2) The number of passengers in a vehicle, which when used in conjunction with vehicular volume, provides information on the total number of persons accommodated on a transportation link or within a transportation corridor.

16. **OR Route** – A Route system established and regulated by the Oregon Transportation Commission to facilitate travel on main highways throughout the state. Not all OR Routes are on state highways and not all state highways have an OR route number.
17. **Principal Arterial (Urban, Controlled Access)** – A street or highway in an urban area which has been identified as unusually significant to the area in which it lies in terms of the nature and composition of travel it serves. The principal arterial system is divided into three groups: Interstate freeways; other freeways and expressways; and other principal arterials (with no control of access).

    Principal arterials should form a system serving major centers of activity, the highest traffic volume corridors, and the longest trip desires; and should carry a high proportion of the total urban area travel on a minimum of mileage.
18. **Region Traffic Engineer** – Registered Professional Engineer(s) responsible to approve the installation of specific traffic control devices on state highways within their respective region. The State Traffic-Roadway Engineer assigns this responsibility to Region Traffic Managers who are Registered Professional Engineers. Region Traffic Managers may assign this responsibility to senior-level engineers within their respective region traffic unit. Engineers assigned the responsibility of Region Traffic Engineer shall be members of the Traffic Operations Group. Actual position titles may vary from region to region.
19. **Region Electrical Supervisor** – Person responsible for electrical maintenance in the Region or District.
20. **Road authority** – See ORS 801.445.
21. **Roadway** – See ORS 801.450.
22. **Signal mounted preemption systems** – Preemption systems that require the installation of a traffic signal-structure-mounted preemption detector, which reacts to a remote triggering device. The default state of a signal-mounted system is normal signal operation.
23. **Shoulder** – See ORS 801.480.
24. **Special Event** – Any planned activity that brings together a community or group of people for an expressed purpose, including, but not limited to, parades, bicycle races, road runs and filming activity that may result in total or partial closure of state highways or state highway sections.
25. **State Highway** – The State Highway System as designated by the Oregon Transportation Commission, including the Interstate system.

26. **State Highway Index Number** – An Oregon Transportation Commission approved identifier assigned to a highway. Every state highway has a state highway index number, commonly referred to as a State Highway Number.
27. **State Highway Name** – An Oregon Transportation Commission approved name used in conjunction with a State Highway Index Number to identify a state highway.
28. **Throughway** – See ORS 801.524.
29. **Traffic control device** – See ORS 801.540.
30. **Traffic Management Program** – A systematic process that collects and analyzes traffic operation information on a real time basis and provides for implementation of one or more of the following, reasonably available operational management strategies:
    - Traffic surveillance and control systems
    - Motorists information systems
    - Transit information systems
    - Freeway ramp metering
    - Traffic control centers
    - Computerized traffic signal systems
    - High Occupancy Vehicle (HOV) ramp meter bypass lanes
    - Bus bypass (queue jump) lanes
    - Park and ride facilities
    - Access management techniques
    - Incident management systems and equipment
31. **Traversable Medians** – Medians that are typically built to provide a separation between opposing traffic but do not impede traffic from crossing the median. Examples include painted islands such as two-way left-turn lanes. Note a median marked with two double yellow lines and "crosshatching" transverse median bars is considered a "highway divider" in ORS 811.430. See the Traffic Line Manual for more information.
32. **US Route** – A Route system established by the US Congress to facilitate travel on main highways throughout the nation. An AASHTO committee regulates this route system.

File Code	Updated	Notes
Unassigned	January 2020	Removed definitions not used in the Traffic Manual.

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Forms Appendix J

Previous editions of the Traffic Manual included various forms in the Appendix of the manual. Forms are now on ODOT's Highway Forms website.

File Code	Updated	Notes
Unassigned	January 2020	Referred readers to ODOT's Highway Forms website.

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Traffic Manual Revision History Appendix K

This appendix summarizes the revisions made to the last three editions of the Traffic Manual, beginning with the January 2018 Edition.

Date	Section	Notes	Update Proposal
03/2020	100.0 – STRE Authority	Added S05-06 – Red colored pavement when applied according to IA-22	2020-01
03/2020	300.1 – Interim Approvals	Added IA-22 to Table 300.1-A	2020-01
03/2020	310.6 – Ped Activated Warning Lights	Corrected grammar.	N/A
01/2020	All Sections	Defined new structure and format for the TM.	2018-03
01/2020	Introduction	Clarified purpose, scope, effective date, and how new content applies to existing infrastructure.	2018-24
01/2020	100.0 – STRE Authority	Updated STRE approval requirements for gates.	2018-05
01/2020	100.0 & 100.1 – STRE/RTE Authority	Added a complete list of devices and features that require STRE and/or RTE/M approval.	2018-04
01/2020	101.0 – Publications	Updated publications list, added Traffic-Roadway Section contacts.	2018-16
01/2020	103.0 – Traffic Manual Updates	New section to define update process for the Traffic Manual.	2018-02
01/2020	200.0 – Highway Safety Engineering	Replaced detailed SPIS & OASIS info with reference to the SPIS & OASIS User Guide.	2018-07
01/2020	202.0 – Safety Corridors	Added reference to Safety Corridor Program Guidelines.	2018-25
01/2020	300.1 – Interim Approvals	New section to address MUTCD Interim Approvals.	2018-08
01/2020	302.0 – Signs	Replaced detailed sign policy/process info with a reference to the Sign Policy & Guidelines.	2018-10
01/2020	302.1 – Variable Message Signs	Clarified differences between permanent & portable VMS.	2018-25
01/2020	302.2 – Vehicle Speed Feedback Signs	Replaced sign design details with a reference to the Sign Design Manual and Sign Policy & Guidelines.	2018-11
01/2020	302.4 – Horizontal Alignment Signs	Updated section title and file code.	2018-25
01/2020	303.0 – Pavement Markings	Replaced detailed pavement marking info with a reference to Traffic Line Manual.	2018-09
01/2020	303.1 – Rumble Strips	Incorporated Tech Bulletin TR17-03(B).	2018-06

Traffic Manual Revision History Appendix K

Date	Section	Notes	Update Proposal
01/2020	304.0 – Traffic Signals	Updated consistent to OAR 734-020-0430.	2018-25
01/2020	304.1 – Traffic Signal Enforcement	Updated ORS reference to include ORS 810.437.	2018-25
01/2020	304.2 – Flashing Beacons	Added reference to Signal Design Manual.	2018-25
01/2020	306.0 – Temporary Traffic Control	Added references to ODOT TTC publications & replaced WZTA info with reference to WZTA handbook.	2018-14
01/2020	308.0 – Railroad Crossings	Added reference to Traffic Line Manual and Oregon Supplement to the MUTCD.	2018-25
01/2020	309.1 – Active Warning at Bridges/Tunnels	Added location consideration for maintenance and included other detection systems.	2018-25
01/2020	310.1 – Marked Crosswalks at Signalized Intersections	Updated push button accessibility and channelized right-turn lane language for consistency with current ODOT policies.	2018-22
01/2020	310.6 – Ped Activated Warning Lights	Added beacon placement table, updated investigation considerations, updated descriptions of warning lights, and added supporting information.	2018-19
01/2020	310.7 – Textured & Colored Crosswalks	Clarified PCC and AC with no pigment added are not colored pavement.	2018-21
01/2020	310.8 – Crosswalk Closures & Removals	Clarified process for opening crosswalks, updated closure process per ODOT's ADA process publications.	2018-20
01/2020	312.0 – Accessible Parking Spaces	Updated reference to OTC Standards.	2018-25
01/2020	402.0 – STOP Sign Applications	Updated approvals consistent with current OARs and Delegation Orders.	2018-25
01/2020	404.0 – Traffic Signal Operations	Updated to resolve conflicts with the Traffic Signal Policy & Guidelines.	2018-23
01/2020	405.2 – Channelized Right Turn Lanes	Clarified preferred control type recommendations, added conditions from MUTCD.	2018-17
01/2020	405.3 – Right Turn Accel Lanes	Consolidated supporting history content.	2018-25
01/2020	405.6 – Multiple Turn Lanes	Removed redundant engineering study consideration list.	2018-13
01/2020	405.7 – Turn Prohibitions	Removed content covered by the Traffic Line Manual.	2018-25

Traffic Manual Revision History Appendix K

Date	Section	Notes	Update Proposal
01/2020	405.8 – TWLTL	Added reference to HDM and Traffic Line Manual, removed redundant content.	2018-25
01/2020	500.1 – Variable Speed Zones	Added reference to Statewide Variable Speed System Concept of Operations	2018-25
01/2020	500.4 – Photo Radar Speed Enforcement	Added reference to Fixed Photo Radar Camera Guidelines for State Highways.	2018-12
01/2020	510.0 – Freeway Median Crossovers	Defined sight distance to use when evaluating a location for a freeway median crossover.	2018-01
01/2020	Appendix B – ODOT Traffic Engineering Structure	Updated Traffic-Roadway Section content.	2018-25
01/2020	Appendix C – ODOT Traffic Engineering Teams	Removed extinct teams.	2018-25
01/2020	Appendix F – File Codes	Updated File Code list based on ODOT Standard Filing System Manual	2018-25
01/2020	Appendix G – References	Replaced generic reference list with references cited in the Traffic Manual.	2018-25
01/2020	Appendix H – Glossary	Added STRE, RTE/M, TOG, and RPG to list.	2018-25
01/2020	Appendix I – Definitions	Removed definitions for terms not used in the Traffic Manual, replaced ORS definitions with reference to ORS themselves.	2018-15
01/2020	Appendix J – Forms	Referred readers to forms website.	2018-18

File Code	Updated	Notes
Unassigned	March 2020	Added updates for March 2020 edition.

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