



# A GUIDE TO SCHOOL AREA SAFETY







## INTRODUCTION TO SCHOOL AREA SAFETY

The guidebook is intended to provide citizens, road authorities, school staff, and other officials throughout the state with a comprehensive reference on school zones and safe travel to and from school. It does not establish policy or standards for the Oregon Department of Transportation or other road authorities in the state.

The guidebook is based on the Federal Highway Administration's 2009 *Manual on Uniform Traffic Control Devices* and the *Oregon Supplements to the MUTCD*. It is updated as needed to maintain current information for the community of people, government, and schools involved in the effort to keep children safe going to, from, and at school. This revision incorporates changes to the *MUTCD*, Oregon laws, and information related to resources available for school area safety.

The guidebook is organized for quick reference. The first section provides a general overview of the various school area designations. The next section presents the statutes and rules for school area safety. The third section gives information on the Safe Routes to School comprehensive approach to planning and implementing improvements for student safety traveling to and around each school and school district. An overview of street design tools that can be used to enhance safety in school zones is presented in the next section. The fifth section gives guidance on the use of specific traffic control devices within school areas. The Resources section lists recognized sources for traffic safety and engineering aspects of safe routes to school plus a number of other programs, resources, and publications for further information.

Your participation in ensuring the usefulness and relevance of this guidebook is invited. The contact information for the guidebook is listed below. The guidebook is available on the ODOT Traffic Roadway Engineering website (<https://www.oregon.gov/ODOT/HWY/TS/Pages/publications.aspx>).

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## SECTION I - SCHOOL ZONES

### What is a school zone?

A school zone is a section of roadway adjacent to a school or a school crosswalk where signs designating school activity are present. School zones are created by posting *School signs* identifying the school site or crossing. Oregon law includes some *criteria* regarding the definition of “school” that applies.



### Why focus on school zones?

School zones represent an opportunity to address safety concerns in areas with potentially high concentrations of especially vulnerable bicyclists and pedestrians. Safer conditions for these users can lead to safer conditions for all travelers in the area and can help agencies meet goals related to improved public health, higher rates of walking and biking, more affordable mobility, and reduced air pollution.

### What is a school speed zone?

A school speed zone is a special 20 mph speed zone for schools allowed by statute and defined by school speed signs. The school speed zone begins at the SCHOOL SPEED LIMIT 20 sign and ends at the END SCHOOL SPEED LIMIT sign or END SCHOOL ZONE sign.

School speed zones should begin a minimum of 200 feet from the school property line or school crosswalk, whichever is determined to be most appropriate. Ideally, school speed zones should be kept short to enhance driver compliance. When school property frontage along the roadway is lengthy and/or fenced, consider focusing the school speed zone on the school crosswalk, potential crossing areas, or unfenced portions.



### What is not a school speed zone?

Not all school zones are posted with a SCHOOL SPEED LIMIT 20 sign. There may be areas adjacent to school grounds where the need for reduced school speeds may be deemed unnecessary. For instance, residential streets on the side or back of a school may not need a reduced speed if travel speeds are already slow. A school along a street that is already safe and comfortable for bicycling and walking or a school with no students who regularly walk or bike may have no need for a reduced speed. A school crosswalk away from the school controlled by a traffic signal may have no need for a reduced speed. Unless a school area or crossing has SCHOOL SPEED LIMIT 20 signs, the area is not considered a school speed zone; it is, however, considered a school zone if a *SCHOOL sign* is posted.

### Who determines that a school zone or school speed zone is appropriate?

Each road authority (state, county, or city) determines where school zones and school speed zones are located along roadways under their jurisdiction. Locations and limits for school zones and school speed zones should be determined on the basis of an *engineering study* that includes relevant

data and needs identified by school or community members. School zones and school speed zones should be established as per the applicable sections of the Manual on Uniform Traffic Control Devices and other adopted policies.

The engineer for the road authority is encouraged to use these guidelines to help determine the need for a school speed zone. A local jurisdiction that does not have the engineering expertise is encouraged to contact their local region ODOT traffic engineering office for assistance or hire a consulting engineer with experience in school zoning. School districts and local traffic safety committees should request a school speed zone study through the local road authority. More information regarding the process for the establishment of a school speed zone may be found in *ODOT's Speed Zone Manual*.

## Why is going 20 mph so important?

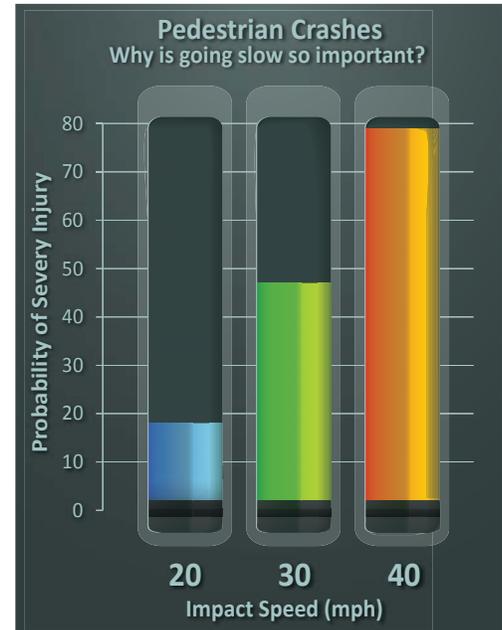
Slower speeds provide more reaction time to unexpected actions of a child. Any collision at a lower speed will generally cause less injury, as well. The severe injury rate for pedestrians or bicyclists struck by a vehicle at higher speeds is much greater than at lower speeds (see chart to right)<sup>1</sup>. A pedestrian struck by a vehicle at 40 mph is almost certain to have severe<sup>2</sup> or life-threatening injuries. If the vehicle is going 30 mph, a pedestrian still has nearly a 50 percent chance of dying or facing life-altering injuries. Crash survivability is significantly better when vehicle speeds are less than 20 mph. Even 5 mph can make a big difference to the pedestrian.

## Where are school speed zones encouraged?

Where all the following conditions exist, a school speed zone is recommended when supported by an engineering study:

- The roadway is adjacent to the school grounds (not limited to front of school buildings).
- There is at least one marked school crosswalk within the proposed school zone which is not protected by a signal or STOP sign.
- The property houses a public or private elementary or middle school (grades K-8).
- The posted speed is 40 mph or below.

An engineering study should establish the need for a school speed zone. If there are children walking to school on a high-speed or high traffic volume road, the road authority should first consider providing improved pedestrian facilities for greater safety for the students. A reduced school speed may also be considered as part of those improvements. A school speed zone provides



<sup>1</sup> Tefft, Brian C. Impact Speed and Pedestrian's Risk of Severe Injury or Death. AAA Foundation for Traffic Safety, 2011. <https://www.aaafoundation.org/sites/default/files/2011PedestrianRiskVsSpeed.pdf>

<sup>2</sup> Severe injury crashes defined as AIS 4 or higher on the 1990 Abbreviated Injury Scale from the Association for the Advancement of Automotive Medicine, 1990.

the greatest margin of safety on high-speed or high volume roads when implemented along with other pedestrian improvements such as sidewalks, crosswalk bulb-outs, and crossing guards.

## Where do school speed zones require further justification?

The benefits of a school speed zone may be limited where any of these conditions exist:

- The school is a public or private high school.
- The school is a publicly funded early childhood education program housed in a building that is or was previously owned by a school district.
- The marked school crosswalk is at a signalized intersection.
- The marked school crosswalk is at a STOP sign.
- The marked school crosswalk is on a roadway segment not adjacent to the school grounds.
- Children walking on the school's Safe Routes to School Plan do not cross the roadway in this area.

The engineering study should address the relevance of these factors in the decision to implement a school speed zone in these areas.

## Where are school speed zones discouraged

School speed zones may not be appropriate where:

- The speed is posted at 45 mph or above and other means or routes are available to school children.
- All children are bused or driven to school, even short distances. The road authority should verify whether or not children currently do or desire to walk or bike to school. Some children, especially middle school students, may prefer walking or biking to school even when buses are available.

At schools adjacent to the roadway where there is no pedestrian or bicycle traffic, a school zone may be established with signs indicating the presence of the school area, but it is generally not appropriate to establish a school speed zone. Rural school areas are often treated in this fashion. A school speed zone is not intended to be used to address motor vehicle safety concerns.

In lieu of establishing a school speed zone, a school sign (establishing a school area without a reduced speed) may serve to warn motorists approaching the school area.



On roadways where the speed is posted 45 mph or more and school speed zones are justified by an engineering study, a range of options to reduce prevailing speeds and improve pedestrian safety should be evaluated in conjunction with the installation of the school speed zone. Consider the following:

- Flashing beacons should be used to notify drivers of when the school speed zone is in effect.
- A REDUCED SCHOOL SPEED LIMIT AHEAD sign should be used in advance of the school speed zone.,
- Improvements such as curbs, sidewalks, narrowed travel lanes, and/or median islands may be used to reduce prevailing speeds.

A speed zone study may be undertaken after the school speed zone and related improvements are in place to see if a reduced posted speed for the roadway is appropriate.

**Guidance for rural school areas** Rural school areas are typically characterized by higher speed roadways, absence of students that walk or bike to school, lack of pedestrian and bicycle facilities, and few nearby residences. Rural roads that are otherwise low volume may have short periods of congestion at the school driveways. These characteristics may warrant a different set of treatments than more conventional urban school areas.

School speed zones are intended to address bicycle and pedestrian-related safety concerns, not motor vehicle safety concerns that typically arise in rural school areas.

Other treatments may more successfully address the safety concerns related to motor vehicle school activity. At the school driveway entrance/exit, consider illumination, warning signs, or turn restrictions as low-cost safety measures. More extensive measures such as an urban roadway design, roundabout, or a transition treatment may help drivers better anticipate school-related activity and conflicts. Some of the treatments listed in *Section IV: Street Design Elements* of this document may be appropriate in rural school areas. For more guidance on transition treatments, see *NCHRP 737: Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways*.



*Example of rural school zone.*

## What is an engineering study?

An engineering study is a documented analysis and evaluation of site specific information, and includes the application of appropriate engineering principles and standards. Considerations in the engineering study may include, but are not limited to:

- Crash history.
- Traffic volumes.
- Gap study of the frequency and duration of crossing opportunities in traffic flow.
- Number of students walking or bicycling to/from school.
- Number of pedestrians utilizing the school crossing.
- Speed study for all directions of travel at the proposed location.
- Examination of conditions adversely affecting pedestrian and bicycle safety (i.e., availability of sidewalks and bike lanes, presence of curb ramps, location of bicycle parking, horizontal and vertical sight distance).
- Examination of the school's drop-off and pick-up operations, including on-street parking controls and off-street parking facilities and their use.
- Examination of the school's Safe Routes to School Plan including a review of planned adult crossing guards.
- Input in the engineering study by the school district, traffic safety committees, and other community representatives (including participation in data collection).

There are places where traffic control devices are in use but may not have been adequately investigated. These controls may not only be unnecessary, expensive to maintain, and ineffective, but more importantly, they may lessen respect for similar traffic control devices that are used in appropriate locations. Traffic controls in school areas should be applied based on sound guidelines and engineering studies.

## SECTION II - LAWS AND RULES ABOUT SCHOOL AREAS

### Traffic control devices

The Oregon Department of Transportation adopts uniform standards for traffic control devices, including signs and pavement markings for all streets open to the public in Oregon as required by statute (ORS 810.200). These standards must be largely in agreement with national standards. ODOT has adopted the federal *Manual on Uniform Traffic Control Devices* to meet this requirement. Part 7, Traffic Controls for School Areas, contains the standards for traffic control in school areas.

The concern for the safety of children on their daily journey to and from school continues to generate community interest in traffic control devices that protect children from the negative impacts of traffic. Communities look to more police and adult guards for school duties, more traffic signals and more signs and pavement markings as the way to provide the desired environment. Such measures, however, are limited by available resources and must be used judiciously within the framework established by the *MUTCD*. Unnecessary measures can be costly and ineffective, and they may lessen the respect for controls that are needed. The *MUTCD* offers this rationale for following a uniform application of traffic control devices: (Section 7A.01):

Regardless of the school location, the best way to achieve effective traffic control is through the uniform application of realistic policies, practices, and standards developed through engineering judgment or studies.

Pedestrian safety depends upon public understanding of accepted methods for efficient traffic control. This principle is especially important in the control of pedestrians, bicycles, and other vehicles in the vicinity of schools. Neither pedestrians on their way to or from school nor other road users can be expected to move safely in school areas unless they understand both the need for traffic controls and how these controls function for their benefit.

Procedures and devices that are not uniform might cause confusion among pedestrians and road users, prompt wrong decisions, and contribute to crashes. To achieve uniformity of traffic control in school areas, comparable traffic situations must be treated in a consistent manner. Each traffic control device and control method described in Part 7 fulfills a specific function related to specific traffic conditions.

A uniform approach to school area traffic controls assures the use of similar controls for similar situations, which promotes uniform behavior on the part of motorists, pedestrians, and bicyclists.

This update to the *Guide to School Area Safety* is based on the standards and guidance contained in the latest version of the *MUTCD* (2009) available at the time of publication. Readers are encouraged to review the latest *MUTCD* at: <http://mutcd.fhwa.dot.gov/>.

An engineer must ultimately take responsibility for engineering decisions involving traffic control devices. Traffic engineers should follow the principles and practices as contained in the *MUTCD*

and other applicable engineering guidance. Engineering decisions should support the safety, health, property, and welfare of the public.

## Oregon Revised Statutes

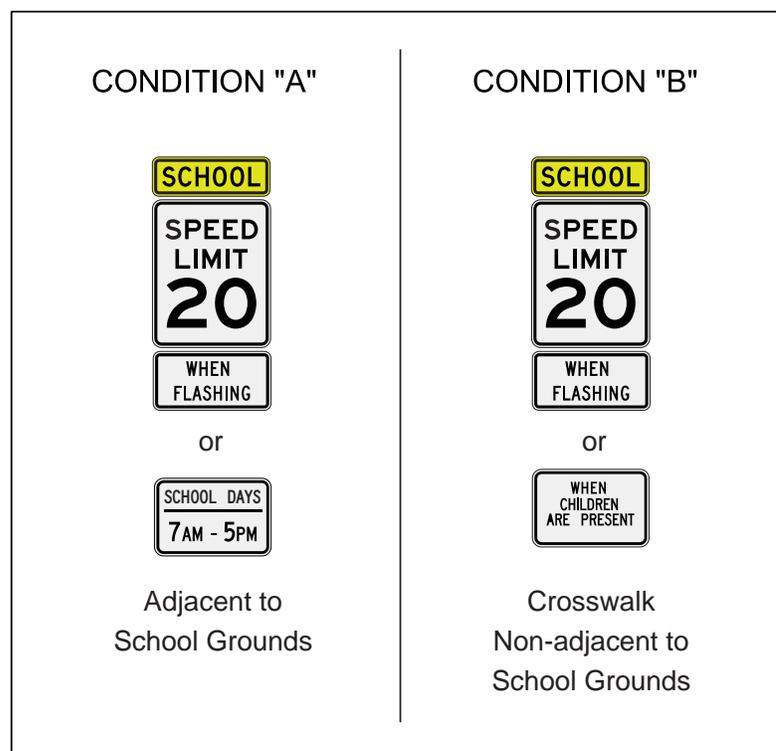
The definitions and authorities for school zones in Oregon are established by Oregon Revised Statutes and Oregon Administrative Rules. Both school zones and school speed zones are statutory. A school zone is defined by *ORS 801.462* as one of two types: a segment of highway that is adjacent to the school grounds or a segment of highway that includes a school crosswalk that is not adjacent to the school grounds. School zones are created by posting school signs identifying the school site or crossing. A school zone does not automatically have a 20 mph school zone speed limit.



Examples of where a school zone would not necessarily have a school speed zone include crossings at signalized intersections, since all traffic is fully controlled, and schools where no children might regularly walk or bike to school.

ORS 801.462 also defines the term “school” for the purposes of regulating school zones. The ORS states that a “school” means a public or private educational institution for one or more levels kindergarten through grade 12 or a publicly funded early childhood education program located in a building currently or previously owned by a school district as defined in ORS 330.005. The Oregon Revised Statutes are available [online](#).

**ORS 811.111 describes school zone speed limits.** School speed zones are defined for the two types of school zone areas: those adjacent to school grounds (Condition A) and crosswalks not adjacent to school grounds (Condition B). If the school speed zone is in Condition A, adjacent to school grounds, the school speed is in effect when a flashing light indicates when children are coming to or leaving the school or, if there is no flashing light, between the hours of 7 a.m. and 5 p.m. on a day when school is in session. For Condition B, at a crosswalk away from school grounds, the school speed limit is in effect with either the flashing light or when children are present as



described in ORS 811.124. Each road authority (state, county, or city) determines where school speed zones are located.

**ORS 811.124 defines “when children are present”** as when children are occupying or waiting to cross in the crosswalk or when there is a traffic patrol member at the crosswalk. Note that “when children are present” applies only at a crosswalk away from the school grounds and applies at any time and on any day.

**ORS 810.243 allows for the operation of flashing lights** as traffic control devices to indicate children are traveling to or from school. When used for this purpose, the lights may be operated only at times when children are scheduled to arrive or leave school. There is an exception that allows flashing lights to operate from 7 a.m. to 5 p.m. if the school has a parking lot located across the street from the school and the street has a posted speed of 45 mph or greater.

**ORS 811.235 establishes the condition of increasing fines in school zones** when signs giving notice of increased fines are posted. The area of increased fines is from the sign indicating increased fines to a sign indicating the end of increased fines or the end of the school zone. The law allows increasing of fines at school zones when lights are flashing or, for a crosswalk away from the school grounds, when the definition of “when children are present” is met. The fines are higher for specified offenses which include:

- All Class A or Class B traffic violations (such as failure to obey a traffic patrol member, not yielding to a pedestrian in a crosswalk or not stopping at a STOP sign or traffic signal).
- Class C or Class D violations relating to exceeding a legal speed.
- Reckless driving as defined by law.
- Driving while under the influence of intoxicants (DUII).
- Failure to perform the duties of a driver involved in an accident or collision as required by law.
- Driving with a suspended or revoked license.
- Fleeing or attempting to elude a police officer.

**ORS 810.245 establishes the ability of road authorities to install signs giving notice of increasing fines in school zones.** These signs must be posted as per ORS 811.235 to enforce higher fines in school zones.

**ORS 811.550 identifies places where stopping, standing, and parking are prohibited,** such as a bike lane, on a crosswalk, or within 20 feet of a crosswalk at an intersection. Some exemptions permitted in ORS 811.560 are applicable for pickup and discharge of passengers.

**ORS 810.180** gives the Oregon Department of Transportation the authority to designate speeds (i.e., speeds different from statutory speeds) on many of the public roadways in Oregon. These designated speeds are established by a written order after an investigation. Decisions on designated speeds are made jointly by ODOT and the city, county, or other agency with road authority.

**ORS 811.020 prohibits drivers from overtaking another vehicle** that is stopped at a crosswalk to permit a pedestrian to cross the roadway.

**ORS 811.025** requires drivers to yield to pedestrians on a sidewalk

**ORS 811.028** requires drivers to stop and remain stopped for a pedestrian in a crosswalk.

**ORS 195.115 requires city and county governing bodies** to work with school district personnel to identify barriers and hazards to children walking or bicycling to and from school. The cities,

counties, and districts may develop a plan for the funding of improvements designed to reduce the barriers and hazards identified.

**ORS 332.176 requires school districts to evaluate potential safety improvements** within 1 mile of an elementary school (and 1.5 miles of a secondary school) in conjunction with large, (over \$1 million) publicly-bonded construction projects.

### **Traffic Patrol Laws**

**ORS 339.650 “Traffic patrol” defined.** As used in ORS 339.650 to 339.665, “traffic patrol” means one or more individuals appointed by a public or private school to protect pupils in their crossing of streets or highways on their way to or from the school by directing the pupils or by cautioning vehicle operators.

**ORS 339.655 Traffic patrols authorized; medical benefits; rules.** (1) A district school board may do all things necessary, including the expenditure of district funds, to organize, supervise, control or operate traffic patrols. A district school board may make rules relating to traffic patrols which are consistent with rules under ORS 339.660 (1).

(2) The establishment, maintenance and operation of a traffic patrol does not constitute negligence on the part of any school district or school authority.

(3) A district school board may provide medical or hospital care for an individual who is injured or disabled while acting as a member of a traffic patrol.

**ORS 339.660 Rules on traffic patrols; eligibility; authority.** (1) To promote safety, the State Board of Education, after consultation with the Department of Transportation and the Department of State Police, shall make rules relating to traffic patrols.

(2) A member of a traffic patrol:

(a) Shall be at least 18 years of age unless the parent or guardian of the member of the traffic patrol has consented in writing to such membership and ceases to be a member if such consent is revoked.

(b) May display a badge marked “traffic patrol” while serving as a member.

(c) May display a directional sign or signal in cautioning drivers where students use a school crosswalk of the driver’s responsibility to obey ORS 811.015.

**ORS 339.665 Intergovernmental cooperation and assistance in connection with traffic patrols.**

(1) The Department of Education and the Department of Transportation shall cooperate with any public, private or parochial school in the organization, supervision, control and operation of its traffic patrol.

(2) The Department of State Police, the sheriff of each county, or the police of each city may assist any public, private or parochial school in the organization, supervision, control or operation of its traffic patrol.

**ORS 811.015 Failure to obey traffic patrol member; penalty.** (1) The driver of a vehicle commits the offense of failure to obey a traffic patrol member if:

(a) A traffic patrol member makes a cautionary sign or signal to indicate that students have entered or are about to enter the crosswalk under the traffic patrol member’s direction; and

(b) The driver does not stop and remain stopped for students who are in or entering the crosswalk from either direction on the street on which the driver is operating.

(2) Traffic patrol members described in this section are those provided under ORS 339.650 to 339.665.

(3) The offense described in this section, failure to obey a traffic patrol member, is a Class A traffic violation.

**ORS 811.017 Failure to yield to traffic patrol member; penalty.** (1) The driver of a vehicle commits the offense of failure to yield to a traffic patrol member if the driver fails to stop and yield the right of way to a traffic patrol member who:

(a) Has entered a crosswalk for the purpose of directing students who have entered or are about to enter the crosswalk; and

(b) Is carrying a flag or wearing something that identifies the person as a traffic patrol member.

(2) For purposes of this section, “traffic patrol” has the meaning given that term in ORS 339.650.

(3) The offense described in this section, failure to yield to a traffic patrol member, is a Class A traffic violation.

## School zone Administrative Rules

**OAR 734-020-0005** adopts the MUTCD as the uniform system of marking and signing highways in Oregon, as required under ORS 810.200, including school area signing and marking.

**OAR 734-020-0015** is related to designating speeds by establishing speed zones other than statutory speeds (but does not apply to school zones). The OAR describes the process for establishment of speed zones on public roads.

**OAR 581-021-0100** establishes the operation and authorities for School Traffic Patrols. The *Oregon Traffic Patrol Manual* published by the Oregon Department of Education is adopted as the operational guide. The Department is also responsible for distribution of equipment, establishing, assisting and training patrols. The school districts are responsible for requesting patrol training and assistance. School districts may also opt to operate school traffic patrols by district guidelines that are approved by the State Superintendent of Public Instruction as meeting or exceeding the standards in the *Oregon Traffic Patrol Manual*.

Oregon Administrative Rules are available online at: <http://arcweb.sos.state.or.us/banners/rules.htm>

## Other guidelines

The Oregon Department of Transportation has adopted other guidelines which relate to school zones. These include the *Speed Zone Manual*, *ODOT Traffic Manual*, and the *Sign Policy and Guidelines*. The *Speed Zone Manual* discusses the speed zone investigation process. The *ODOT Traffic Manual* discusses the use and application of related traffic control devices. The *Sign Policy and Guidelines* identifies the signs authorized for school areas along with guidelines on their location. The above are available online at: <http://www.oregon.gov/ODOT/HWY/TS/Pages/publications.aspx>



## SECTION III - SAFE ROUTES TO SCHOOL PROGRAMS

Safe Routes to School programs are a collection of efforts, typically at the local school or community level, to help assess and make safety changes around schools, educate students on traffic safety for all modes of travel, and encourage students to walk and bicycle to and from school safely. SRTS programs facilitate the planning, development, and implementation of projects and activities that improve health, safety, and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. SRTS brings together city public works, planning, and police staff, school administrators, teachers, support staff, parents, students, neighbors, and health and other community service providers in a School Team and Community Task Force. Programs are typically implemented at elementary and middle schools in an effort to improve travel options and ensure the safety of these especially vulnerable populations.



*Photo credit: Oregon Safe Routes to School Network*

### Developing a School Action Plan – The 6 E’s

In Oregon, completion of the Safe Routes to School Action Plan is the initial step of a SRTS Program at a school. Creation of an Action Plan is recommended as a best practice. The plan requires forming a school SRTS team to collect student travel data, policy information, and other pertinent data to identify solutions that address the barriers and hazards to students walking and biking to/from school. The SRTS team considers the 6 E’s of Safe Routes to School: Engineering, Education, Encouragement, Enforcement, Evaluation, and Equity when developing the Action Plan. With the conclusions drawn from the collected information, the team recommends priority projects and activities that the school, municipality, and community can advance to promote safe walking and bicycling to school. Instructions and a template for completing a SRTS Action Plan are available on the [Oregon Safe Routes to School website](#). Development of a SRTS Action Plan is the responsibility of the local school district.<sup>3</sup>

Successful Safe Routes to School programs see remarkable changes in the way students and parents choose to travel to and from school. Oregon Safe Routes to School practitioners advise including the following activity elements.

#### Engineering Safe Routes

The development of an action plan includes an assessment of the existing routes that are available for children to walk or bike to school. The National Center for Safe Routes to School provides a comprehensive [Walkability Checklist](#) and a [Bikeability Checklist](#) to help guide a route assessment team. The recommended routes are shown on a map of the neighborhood streets within a 10-15 minute walk of the school. The City of Portland has worked with school and neighborhood

<sup>3</sup> While the development of the full SRTS Action Plan with all of the 6 E’s is undertaken at the discretion of the local school district, ORS 195.115 directs city and county governing bodies to work with school district personnel to identify barriers and hazards to children walking or bicycling to and from school. The list of barriers and hazards is a key component of the larger SRTS Action Plan developed by the School Team.

representatives to publish a *Safe Route map* for each of the public elementary schools in the city. A sample is shown on the following page.

The school SRTS team and municipality may also use the walking and biking assessment and the Safe Route maps to plan for needed improvements. Preference is to improve the more direct intuitive routes when possible. Visibility improvements are some of the most effective and least costly means of improving safety in school zones. Local and county governing bodies can meet the requirements of ORS 195.115 (Reducing barriers for pedestrian and bicycle access to schools) by including needed improvements with land use action cases and in transportation system plan updates. See *Section IV – Street Design Elements* and *Section V – Traffic Control Elements* for more detailed guidance regarding physical street improvements.

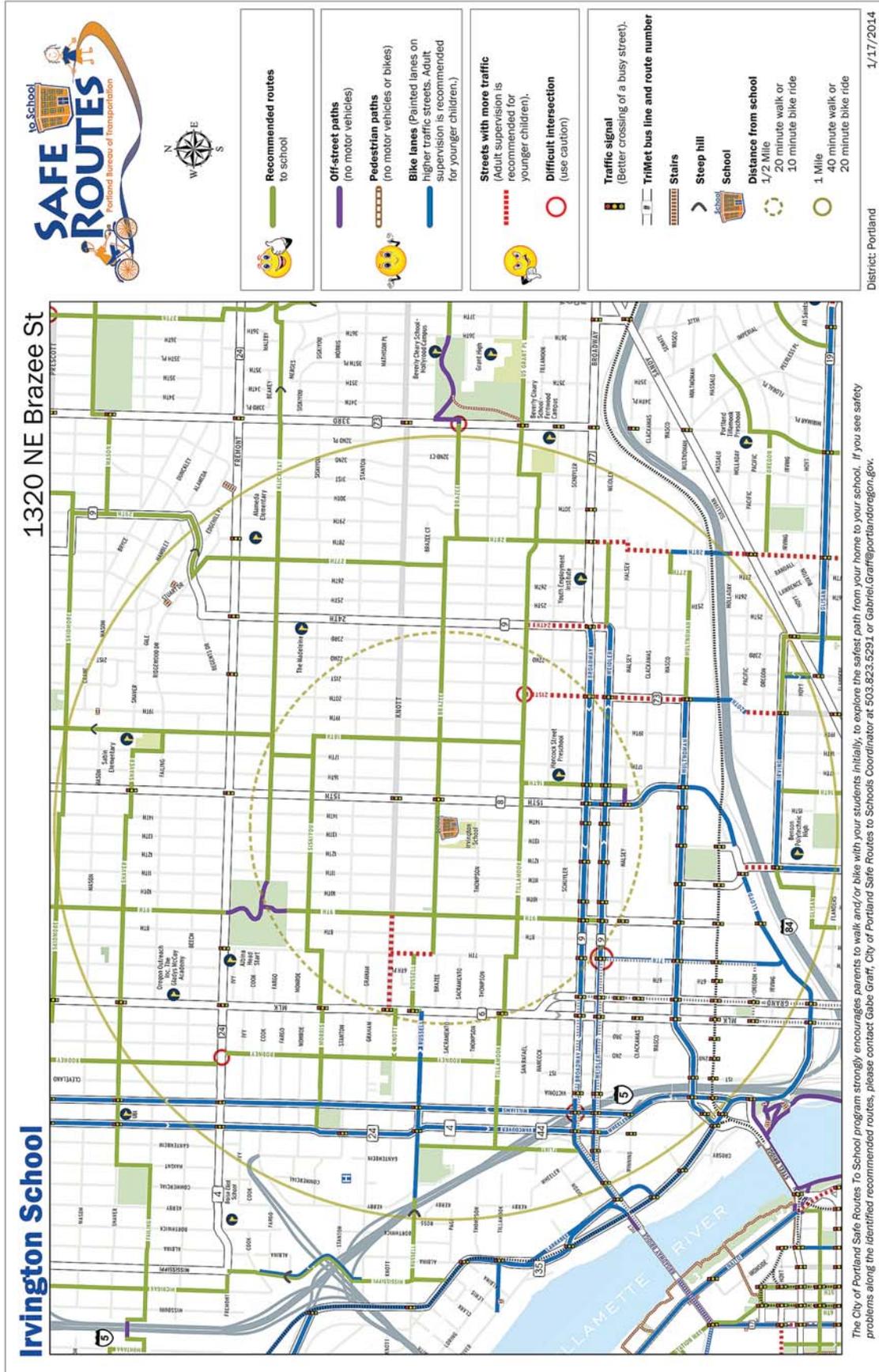
Engineering improvements in school zones should account for unique human factor issues associated with young students who may be walking or biking to school. These factors include:

- Because of their size, children have difficulty seeing and being seen by others.
- Greater difficult in assessing motor vehicle speed and distance, and they generally have a narrower field of vision than adults.
- Young children cannot easily pick out the direction of various sounds.
- They generally develop awareness that vehicles can cause serious injury between the ages of six and eight.
- Young children mix fantasy and reality. They may see cars as living creatures with eyes, nose and mouth. They can easily misinterpret drivers' intentions.
- They may assume that if they see a car, the driver sees them.
- Children don't understand complicated traffic situations well. For example, they may assume that if one car slows down to stop at an intersection, then cars in other lanes will do the same.
- They tend to focus on things of immediate interest and react spontaneously.
- Children have abundant energy. Their eagerness to be in motion can override their awareness of traffic.
- They learn by example and may imitate bad examples of adults or older children in traffic.
- Children may take risks because they overestimate their ability, knowledge, and strength.

## **Educational Programs**

Educational programs are needed to supplement the engineering and enforcement efforts to effectively promote school area safety. In SRTS programs, education links classroom activities and academic achievement to the creation of a safe routes plan to effectively provide a youth-centered perspective, and provides a venue to teach motorists, pedestrians, and bicyclists about their responsibilities and about traffic rules. A number of materials and programs are in existence. These programs include school curriculum, banners, reader boards, internet resources, and work with local media and neighborhoods. These efforts should be continuous throughout the year, but especially strong at the beginning of the year.

SRTS educational programs often include distribution of a map of suggested walking and biking routes to/from the school such as that shown on the previous page. The map can be discussed with students, sent home to parents, and posted online.



An important consideration in developing effective educational programs is recognition that child pedestrians perceive and react to traffic situations in predictable but different ways from adults. A pedestrian safety video that sheds light on these differences is *Children in Traffic*. Educators and traffic safety advocates can use this information to formulate more effective safety messages at school. Refer to the list of human factors in the previous section for topics that may be appropriate to address or consider within the educational component of a SRTS program.

The Oregon SRTS website has curriculum sets for grades K-3, 4-5, and 6-8 that address many of the relevant topics related to school area traffic safety. Known as *Neighborhood Navigators*, the curriculum focuses on travel options, pedestrian and bicycle safety, and urban design. Also, the *Bicycle Transportation Alliance* provides a 10-lesson series specifically related to bicycle safety and a 3-lesson series related to pedestrian safety; those lessons include guidance for a community ride and a community walk.

It's important to identify and utilize public and private service providers best suited to implement an effective school traffic safety education program. Pedestrian and bicycle advocacy groups, transit providers, school bus service providers, local transportation authorities or public works departments, state agencies, neighborhood and business associations, public health advocates, county health departments, and injury prevention professionals often have education and outreach materials and/or personnel available.

While many of the educational activities are typically oriented towards students, there are often opportunities to engage parents as well. Outreach efforts may include material such as ODOT's poster "*When Can My Child Safely Walk or Ride to School?*", instructions on drop-off/pick-up patterns, and reminders to obey speed limits and to turn off engines while waiting.

### Encouragement Programs

The National Center for Safe Routes to School *Online Guide* recommends that encouragement strategies be about planning enjoyable activities and rewarding participation. Encouragement activities can be quick and easy to start, done with little funding, and they can generate enthusiasm for other strategies that require more investment in terms of time and funding. Attention to missing or inadequate bike parking facilities can encourage more bicycling by shielding bikes from inclement weather and guarding against theft. Ideas for encouragement programs include:

- *Walk + Bike to School Day* (First Wednesday in October in Oregon).
- *Walk + Bike to School Challenge Month* (May).
- Park and Stride programs where parents drop kids off at signed locations and school staff walk with students to school. (Helps reduce school-area congestion too.)
- Class participation in community events such as Kidical Mass and *Open Streets/Cycloviva* events.
- With a *walking or biking school bus*, children walk (or bike) to school in a group along a set route with adult supervision. Each 'bus' (group of students) walks (or bikes) along a set route with at least one adult 'driver' in front and an adult 'conductor' bringing up the rear.

### Enforcement programs

Enforcement enlists the help of local law enforcement to focus efforts in problem areas and increase community awareness of school safety issues. Police departments recognize traffic safety as a major concern of the public they serve. They also acknowledge the interrelationship of school safety, crime prevention, crime resolution, traffic safety, and traffic enforcement.

Law enforcement can take a leading role in improving public awareness of existing traffic laws (e.g., stopping for pedestrians in marked crosswalks, not speeding in school areas, obeying parking controls, and stopping for school buses). Some law enforcement agencies have instituted school safety awareness programs and have a strong presence in the school they serve. Others have provided targeted enforcement at strategic locations to catch violators during peak school travel times of morning arrival and afternoon departure. Also, recent advances in automated enforcement such as photo radar (See ORS 810.438) are becoming effective traffic enforcement tools. In combination with engineering improvements and education programs, the enforcement program can be particularly effective. The *crossing guard program* at a school is typically considered to be an element of the Enforcement Program.

Possible traffic safety problems where enforcement is part of the solution include the following:

- Speeding.
- Illegal passing of school bus.
- Not stopping for pedestrians in a crosswalk.
- Parking violations – bus zone, crosswalks, and driveways, time restricted and fire lanes.
- Risks to pedestrians and bicyclists during drop-off and pick-up times.
- Unsafe pedestrian and bicycle practices.
- Other traffic law violations in school zone.
- Crisis management / incident response.

Oregon Safe Routes to School practitioners advise schools to design a communication process that encourages students and parents to notify the school and police of the occurrence of a crash or near-miss during school commute trips involving auto, bus, pedestrian, or bicycle transportation. Include your local transportation authority or public works department in this reporting system to help produce more valuable data and raise awareness.

Enlist the help of law enforcement with the following traffic safety activities:

- Enforcement of traffic laws and parking controls through citations and warnings.
- Enforcement of Oregon's school zone laws.
- Targeted enforcement of problem areas – an intensive, focused effort during the first two weeks of school and a strategy for the rest of the year.
- Participation in School Safety committees and Safe Routes to School task forces to help identify safety problems and solutions.

## Evaluation

The SRTS Action Plan should include an assessment or evaluation component. Periodic student and/or parent surveys can help the school district, road authorities, and funders understand the impacts of recent projects and programs and to plan for future initiatives. Survey results can be a powerful tool for the promotion of the program. Pictures help connect the data to smiling faces. The *Oregon SRTS website* has a student hand tally form and a parent survey form which can be used to establish baseline and annual metrics related to a SRTS program.

## Equity

The Engineering, Education, Enforcement, and Encouragement initiatives of the Action Plan should be viewed through an equity lens to ensure that these efforts benefit all demographic groups attending the school. It is important to recognize that different demographic groups may need different forms of communication or different incentive programs to all benefit from the SRTS programs.

## SRTS funding

Sources of funding for the improvements and programs identified in the SRTS Plan should be identified if possible. Contact information for potential grant programs, local public works department, and local police department should be listed.

Non-infrastructure applications for Oregon SRTS funding for grades K-8 remain under the direction of ODOT's Transportation Safety Division. School or school district projects addressing Education, Encouragement, Enforcement and Evaluation must have either a completed SRTS Action Plan for benefiting schools, or a project that leads to the completion of the SRTS Action Plan. Awards of non-infrastructure projects address regional equity, potential to increase walking and bicycling to and from school, pedestrian and bicycling safety education among K-8 students, project readiness, and benefit to the community.

The best starting point for developing an infrastructure project and for locating the funding for that project is often the local public works department. The municipality or the local school district may have a process for selecting infrastructure projects for funding. *ORS 332.176* requires school districts to evaluate potential safety improvements within 1 mile of an elementary school and 1.5 miles of a secondary school when a large, publicly bonded school construction project (over \$1million) is proposed.

Funding may also be available for infrastructure projects through ODOT's Statewide Transportation Improvement Program. The STIP selection process occurs every two to three years. Infrastructure proposals that primarily address safety concerns on state or local streets may be eligible for funding under ODOT's *All Roads Transportation Safety* Program. If a number of serious crashes have occurred at a specific intersection or short section of street, it may be good candidate for the ARTS Program.

Infrastructure proposals that improve or expand multimodal accommodations on the state highway system may be eligible for ODOT "Enhance" funding. The Oregon Transportation Commission will select Enhance projects based on recommendations developed by governments, public agencies, and citizen representatives through a process conducted by the Metropolitan Planning Organizations where applicable, and the Area Commissions on Transportation. Contact an ODOT regional *STIP coordinator or related staff* for more information about project eligibility, funding levels, and the project selection process for both safety and modernization-type projects. While the applications for infrastructure projects do not require submission of a SRTS Action Plan, the community process and documented conclusions of a SRTS Action Plan effectively tell the story and support the need to improve the safety of students on the route to school.

For more information about funding for SRTS programs and initiatives, see the funding page for the *National Center for SRTS*.

## SECTION IV – STREET DESIGN ELEMENTS

When assessing the safety of the immediate area surrounding the school building, it is important to consider elements of the school site and street design such as the provision of sidewalks, street widths, visibility at key locations, and design of pick-up and drop-off areas.

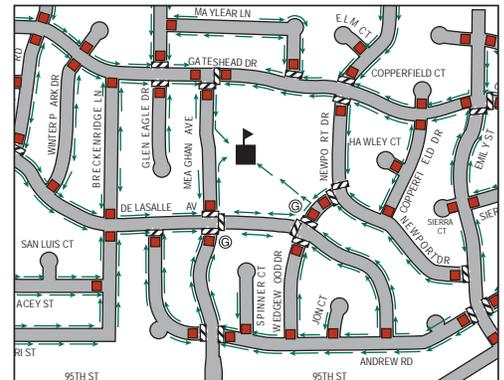
- Are there sight obstructions that should be corrected by restricting or removing parking or by trimming trees and shrubs?
- What accommodations have been made for children riding to school on bikes?
- Are the designated loading and unloading zones free from conflicts with other traffic?
- Are sidewalks needed to improve safety?

A School Route Plan for each school serving elementary through high school students should be prepared to serve as the basis for identifying the desired walking and biking routes. Once problem areas are identified, then changes to the layout of the street, traffic control devices, and education and law enforcement activities can be identified and enacted.

### Pedestrian network enhancements

Physical elements of the pedestrian network should be assessed for safety and comfort. This includes an assessment of features such as sidewalks, curb ramps, and crosswalks. Conflicts with motor vehicles at crosswalks and driveways should be assessed. Enhancements such as sidewalks, driveway relocations or consolidation, traffic calming, and improved sight distance may be identified. Keep in mind that simply marking a crosswalk may not improve safety; often, physical street improvements such as illumination, a pedestrian refuge island, or curb extension may also be needed to create a safe pedestrian crossing.

On state highways, the design of pedestrian facilities should follow the standards established in the *ODOT Highway Design Manual*. Further guidance is available in the *ODOT Bicycle and Pedestrian Design Guide*, *American Association of State Highway and Transportation Officials Guide for the Planning, Design and Operation of Pedestrian Facilities* and *National Association of City Transportation Officials Urban Street Design Guide*.



*Example of School Route Map*



*Example of continental crosswalk marking.*



*Example of pedestrian island.*

## Pedestrian islands and curb extensions

Pedestrian islands allow students to use existing gaps in traffic to split the crossing of the roadway into manageable parts. This is especially important where there are multiple travel lanes in each direction. Without enhancements such as islands, these roadways may not offer good opportunities for crossing and may encourage students to dash across the roadway during less than adequate gaps. Median islands are one of the most effective ways to increase safety and make crossing easier. While median islands generally provide significant safety benefits, their possible impact to vehicle turning movements should be assessed.



*Example of curb extension.*

The use of curb extensions (bulb-outs) can reduce crossing distances. These extensions also have the effect of increasing the visibility of the pedestrian. Where on-street parking is present, curb extensions should be considered.

## Raised crosswalks



*Example of raised crosswalk.*

Pedestrian crosswalks may be combined with a speed table to increase pedestrian visibility and lower traffic speeds. A raised crosswalk typically involves raising the roadway to an elevation near that of the sidewalk. Even though curb ramps are usually eliminated with raised crosswalks, tactile warning stripes must be provided to warn visually impaired pedestrians of the interface with vehicular traffic. Raised crosswalks can be located midblock or at intersections, and they may be used in parking lots and across driveways. However, they may not be appropriate on arterials. If the street is frequently used by emergency response vehicles, it may not be appropriate to install raised crosswalks or it may be necessary to modify the design of the raised crosswalk.

## Textured crosswalks



*Example of colored/textured crosswalk. Photo by pedbikeimages.org / Dan Burden.*

Textured crosswalks are generally discouraged due to their poor record for long-term durability and visibility. 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). Textured crosswalks can be rough, impeding the movement of pedestrians with wheelchairs, walkers, or sight impairments. Textured and colored crosswalks are typically higher maintenance and some materials can become slick creating a slipping hazard.

ODOT's practice is to not install textured or colored crosswalks. It is sometimes, however, the desire of a local road authority to install them. If textured crosswalks are used, they should be made of durable materials, such as stamped concrete, with minimal beveling. Colored crosswalks should avoid the use of standard traffic control colors. All textured and/or colored crosswalks are required to have the standard transverse white lines or continental (longitudinal) white lines to ensure their visibility and recognition to motorists.

## Bicycle network enhancements

Surrounding streets should be equipped with appropriate accommodations for students on bicycles and bicycle access should be available from all directions. Sidewalks, bikeways, and trails should connect to the school property. Consider improving linkages between surrounding neighborhoods to provide access such as between cul-de-sacs and school property. Bicyclists should have secure and separate parking facilities close to school entrances.

Bikeways are divided into three classifications:

- Separated bikeways such as cycle tracks, raised bike lanes, and shared use paths which offer an element of physical separation between motorized vehicles and bicycles.
- On-road bikeways such as shoulders, bike lanes, and buffered bike lanes which are located on the same curb-to-curb portion of the roadway as motor vehicles.
- Shared lanes with slow speeds (25 mph or less) and low traffic volumes where bicyclists ride in the travel lane with motor vehicles and special attention is given to the needs of the bicyclists (sometimes referred to as a bicycle boulevard or neighborhood greenway).

Bicycle facilities need to be developed in a comprehensive manner to provide an uninterrupted network of comfortable routes to school. Separated bikeways are increasingly being recognized for their ability to enhance safety and attract new riders on streets where standard bike lanes may have been used in the past.

On state highways, the design of bicycle facilities should follow the standards established in the *ODOT Highway Design Manual*. Further guidance is available in the *ODOT Bicycle and Pedestrian Design Guide*, AASHTO's *Guide for the Development of Bicycle Facilities* and NACTO's *Urban Bikeway Design Guide* and *Urban Street Design Guide*.

## Traffic calming measures

Traffic calming measures are intended to encourage drivers to drive at appropriate speeds. The selection of traffic calming strategies must consider the operational goals for the roadway, adjacent land use, and emergency vehicle operations. Treatments on local neighborhood and some collector streets may include:

- Speed humps, speed tables, or raised crosswalks.
- Traffic circles or diverters.
- Narrower street and intersection widths.
- Other geometric features or traffic control that may be aimed at reducing the speed and/or volume of traffic.

On arterials and state highways, traffic calming treatments typically need to be more accommodating of larger vehicles, higher speeds, and higher volumes. Changes to the roadway environment can be used to reduce speeding and cue drivers to a mixed use environment of pedestrians, bicycles and transit, such as:



*Example of cycle track. Photo by pedbikeimages.org / Carl Sundstrom.*



*Example of a neighborhood street with gateway treatment.*

- Wider sidewalks.
- Streetscaping.
- Median islands.
- Pedestrian-scaled amenities.
- Roadway lane reconfiguring (such as a 4 lane to 3 lane “road diet” conversion).

Some calming devices, common to all types of streets, also help reduce crossing distance and may include:

- Pedestrian refuges.
- Curb extensions.,
- Roundabouts.

See ODOT’s *Main Street Handbook* or NACTO’s *Urban Street Design Guide* for more information.

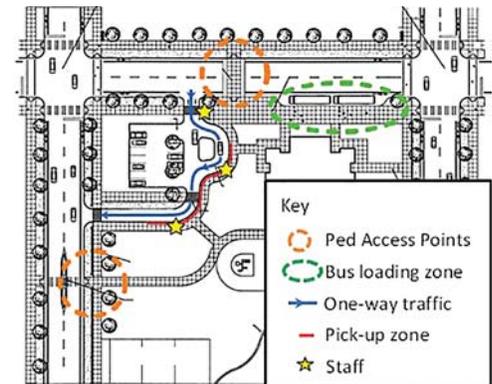


*Example of traffic calming treatments on an arterial street. Notice curb extension, light post, trash barrel, hanging flower baskets, and other vertical elements near street. Image ©2016 Google.*

## Site layout and parking

Site layout and parking should be focused on reducing pedestrian, bicycle, and motor vehicles conflicts. A problem at many schools is the growing activity of parent pick-up and drop-off. When possible, consideration should be given to separating bus and parent drop-off/pick-up points. Redesign of parking areas to improve flow and reduce pedestrian/vehicle conflicts should be considered. School officials should work closely with public works (traffic engineering) representatives to evaluate traffic safety issues with site layout and parking.

Morning traffic operations on a school campus usually operate safely and efficiently due to parent traffic arriving at a broader range of times. Afternoon traffic operations, however, are quite different because most often parents arrive well before the school dismissal and park adjacent to the school. The afternoon queue often results with vehicles stopped in the roadway or along the shoulder of a major through route, which increase the chances of collisions and similar traffic-related safety concerns.



*Example of a school site circulation plan.*

According to California’s Safe Routes to School Program, more children are hit by cars near school than at any other location. To help change this pattern, their program recommends some low-cost and easy-to-implement measures that schools, parents, and local governments can undertake. View their one-page document *Improving School Drop-Off and Pick-Up Zones*. There may be inexpensive options such as staggered release, valet assistance with loading/unloading children, or requiring the parent to park if the child cannot get in and out of the car unassisted. The Massachusetts Department of Public Health and WalkBoston have published an excellent *guidebook on school site design*.

## SECTION V – TRAFFIC CONTROL ELEMENTS

### Signs

The *MUTCD* promotes uniformity in design of signs to include shape, color, dimension, symbols, as well as uniform application of signs. Consistency in application increases compliance as signs are quickly recognized and the messages are easily understood. The following guidance is provided as a service to road authorities in Oregon; it does not create a standard or supersede requirements found in the *MUTCD* or other local policies. Some road jurisdictions may have more stringent standards about the application or size of the signs. Refer to the applicable road jurisdiction's standards for further information. The following guidance is based on the 2009 *MUTCD* and the ODOT *Sign Policy and Guidelines*. *Chapter 7* of the ODOT *Sign Policy and Guidelines* contains several example school zone sign layouts.

#### Sign sheeting

The 2009 *MUTCD* specifies that fluorescent yellow-green (FYG or strong yellow-green) background shall be used on all new school-related warning signs. Existing warning signs will be replaced with FYG-background signs as the current signs reach the end of their life or ODOT will change out the signs if the school district agrees to pay for the replacement. ODOT reserves the use of the fluorescent yellow-green (strong yellow-green or FYG) sheeting exclusively for school-related warning signs. The mixing of standard yellow and FYG background signs within a school area should be avoided. All school area signs should use high intensity sheeting or better.

#### School Zone Sign Assembly

The beginning of a school zone is established by posting a SCHOOL sign (S1-1). The sign may be supplemented with a SCHOOL plaque (S4-3P) and/or, if appropriate, an ALL YEAR plaque (S4-7P).

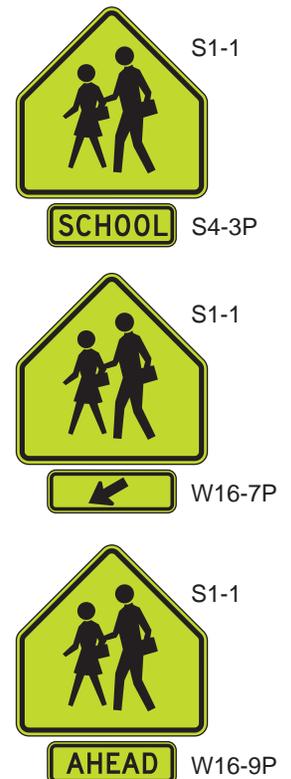
#### School Crossing Assembly

The School Crossing Assembly consists of a SCHOOL sign (S1-1) supplemented with a diagonal downward pointing arrow (W16-7P). The School Crossing Assembly may be used at uncontrolled school crossings that are adjacent to schools and along established school pedestrian routes. This sign assembly shall not be used at crossings controlled by STOP or YIELD signs.

This sign assembly should not be used at a signalized intersection unless justified by an engineering study. If used indiscriminately, drivers may lose respect for the sign and ignore it when it is used at uncontrolled intersections. A better option may be to enhance the visibility of the entry points into the school zone.

#### School Advance Crossing Assembly

The School Advance Crossing Assembly (S1-1 & W16-9P) is used in advance of the School Crossing Assembly. This sign may be omitted when preceded by a School Zone Sign Assembly.



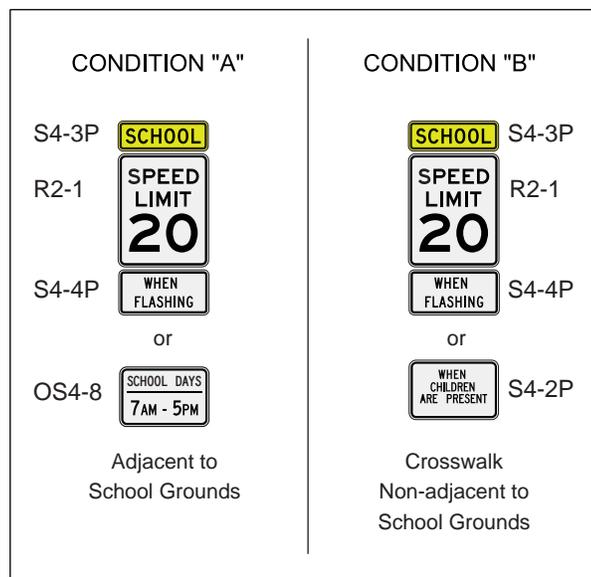
## School speed signs

When a school speed zone is established, the School Speed Limit Assembly shall be used. The beginning of the school speed zone is indicated by the sign assembly which consists of a top plaque with the legend SCHOOL (S4-3), a SPEED LIMIT 20 sign (R2-1), and a bottom plaque indicating when the school zone is in effect. A School/Speed Limit 20 combination sign (OS5-5 in ODOT *Sign Policy and Guidelines*) may be used with a supplemental plaque in lieu of three separate signs.

As per ORS 811.111, possible bottom plaques include one of the following: WHEN FLASHING; SCHOOL DAYS/ 7 a.m. to 5 p.m.; or WHEN CHILDREN ARE PRESENT. If the WHEN FLASHING condition is used, the operation of the flashing units must meet the requirements of *ORS 810.243*. If a timeframe is used on the plaque, it must adhere to the 7 a.m. to 5 p.m. specifically stated in the ORS. The conditions meeting the definition of WHEN CHILDREN ARE PRESENT are defined in ORS 811.124.

School speed zones are categorized into one of two types; those on streets adjacent to school grounds (Condition A), and those for crosswalks that are not adjacent to school grounds (Condition B). If the school speed zone is in Condition A, the bottom plaque must be either WHEN FLASHING or SCHOOL DAYS/ 7 a.m. to 5 p.m. If the school speed zone is in Condition B, the bottom plaque must be either WHEN FLASHING or WHEN CHILDREN ARE PRESENT.

The choice between the bottom plaques should be based on a consideration of the site conditions, local practice, and school needs. Flashing units are generally more effective at reducing any confusion and getting driver attention for the school speed zone for warning drivers of possible school children, however, their added cost may not be justified in some situations or their added visibility may not be needed. Flashing units should especially be considered for higher speed approaches (35 mph or greater). See *Section 1* for guidance on where school speed zones are encouraged, where they require additional justification, and where they are discouraged.



## Flashing Beacons for indicating children arriving or leaving school

The School Speed Limit Assembly, “SCHOOL SPEED LIMIT 20 WHEN FLASHING”, must be accompanied by circular flashing beacon lights to indicate when children are scheduled to arrive at or leave from school.<sup>4</sup> Statute ORS 810.243 requires that the beacons flash only when children are scheduled to arrive or leave school unless a few very specific conditions are met.<sup>5</sup> Typical flashing periods are at the beginning and end of the school day. The general practice is to set the beacons to flash approximately 30 minutes prior to and 15 minutes after a scheduled arrival, and for 15 minutes prior to and 30 minutes after a scheduled departure. Flashing may also occur for half-day releases such as noon for half-day kindergarten release. The road authority may need to conduct field observations to determine the daily flashing schedule. The road authority typically maintains and programs the flashers according to the school-provided schedule for the school year.



School beacons should be placed on or immediately adjacent to the School Speed Limit sign assemblies with the “WHEN FLASHING” plaque. See *Section 4L.04 of the MUTCD*.

School flashers are not inexpensive; the estimated cost is \$10,000 to \$15,000 for a pair of side-mounted units or \$50,000 for a pair of overhead units plus ongoing maintenance, management, and power costs. If a school district requests flashing beacons on state highways, the school district may be required to pay the installation and utility costs.

## End school zone

The end of a school *speed* zone must be marked with either an “END SCHOOL ZONE” or “END SCHOOL SPEED LIMIT” sign. If the school speed zone includes FINES HIGHER signing, the END SCHOOL ZONE sign should be used; otherwise, the “END SCHOOL SPEED LIMIT” sign should be used. A standard Speed Limit sign alone is not an acceptable substitute to end a school speed zone, but may be used in conjunction with either sign above to indicate the underlying speed of the roadway.

## School reduced speed zone ahead sign.

If the posted speed is 35 mph or higher, a School Reduced Speed Ahead sign (S4-5) should be used to inform drivers of a school speed zone ahead. Section 7B.16 of the *2009 MUTCD* details the sign. If used, the advance warning sign should be placed at least the required minimum distance for the posted speed per the MUTCD prior to the School Speed Limit Assembly.



S4-5



<sup>4</sup> See MUTCD Section 4L.04 for additional guidance on the design and operation of flashing beacons.

<sup>5</sup> ORS 810.243 contains an allowance for beacons to operate from 7 a.m. to 5 p.m. if the school has a parking lot located across the street from the school and the street has a posted speed of 45 mph or higher.

## School bus stop ahead sign

SCHOOL BUS STOP AHEAD signs are used in advance of locations where school buses stopping to pick up or discharge passengers are not visible for a minimum distance of 500 feet and there is no opportunity to relocate the bus stop to a location with better visibility. The sign shall have a minimum 30" x 30" size. These signs are not intended to be used everywhere a school bus stops to pick up or discharge passengers but for use only where terrain and roadway features limit the approach sight distance and where there is no opportunity to relocate the stop to another location with adequate visibility. Stops posted with these signs should be reviewed periodically to determine if they are still used.

Bus stop locations may be reviewed through the guidance offered in the National Highway Transportation Safety Administration's publication *Selecting School Bus Stop Locations: A Guide for School Transportation Professionals*.



## Traffic fines higher signs

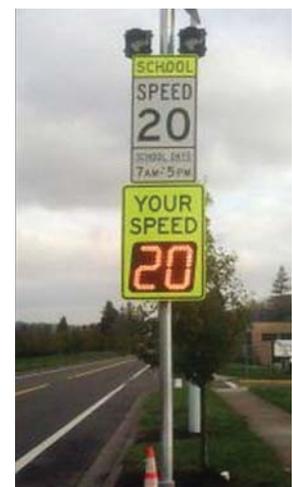
The higher fine provision applies in school zones **only** if posted (as fines higher) **and** lights are flashing **or** the definition of "when children are present" is met (the definition of "when children are present" can only be met at crosswalks not adjacent to school property). Road jurisdictions are allowed under ORS 810.245 to post signs warning of increased traffic fines within school speed zones. A school district may request the road authority to install a BEGIN HIGHER FINES ZONE (R2-10) sign or a FINES HIGHER plaque (R2-6P) as described in Sections 2B.17 and 7B.10 in the 2009 MUTCD. The FINES HIGHER plaque (R2-6P), if used, should be placed on the School Zone Sign (S1-1) Assembly. The "TRAFFIC FINES DOUBLE IN THIS SCHOOL ZONE" (OR4-21) sign and the smaller version "TRAFFIC FINES DOUBLE IN SCHOOL ZONES" sign (used off state highways) may be used until signs reach their end of life.

## Changeable message signs

Changeable message signs may be used in lieu of School Speed Limit assemblies, to inform drivers of the special school speed limit. The changeable messages signs may use blank-out signs in order to display school speeds only during periods it applies. Their basic shape, message, and layout should conform to the same standards as the fixed School Speed Limit assemblies.

A speed feedback sign is a type of changeable message sign that may be used to display the speed of approaching drivers. The sign may be portable or permanently installed in conjunction with the School Speed Limit Assembly. These signs have been shown to be quite effective in slowing the fastest violators in school speed zones.<sup>6</sup> Considerations for installing a permanent speed feedback sign include the following:

- Crash experience within the past three years.
- Prevailing travel speeds when children are arriving or leaving the school.
- Other pertinent factors such as installation and maintenance costs, public support, and the number of children who walk or bike to school at the entrances covered by the signs.



<sup>6</sup> FHWA lists several studies (here) that found significant reductions in the 85th percentile speeds when speed feedback signs were used in school speed zones with high rates of excessive speed. In these locations, the signs were associated with a reduction in the 85th percentile speeds of 4-9 mph.

## Parking restrictions

Parking restrictions and other signs governing the stopping and standing of vehicles can be used to cover a wide variety of applications and can be a very effective tool for increasing school area safety. Visibility and control of traffic are some reasons for considering parking restrictions. Contact the road authority or local jurisdiction for regulations and any special requirements governing parking restrictions. Restrictions can include a variety of options including but not limited to the following: prohibiting parking at any time, limited-time parking, and restrictions based on vehicle type, day, or time of day. Yellow curb markings may be used to supplement the signs. ORS 811.550 (17) prohibits parking within 20 feet of any crosswalk regardless of whether or not a sign is posted.



## In-street pedestrian signs

In-street Pedestrian Crossing signs are intended to be used to remind drivers of the laws regarding right of way of pedestrians at unsignalized pedestrian crossings. Guidance on using these signs is given in section 2B.12 and 7B.12 of the MUTCD. The “STOP FOR” legend must be used in Oregon.

Before installing signs, each location should be reviewed separately in terms of site conditions and pedestrian safety. Signs should be installed on the centerline and as close as practical to the marked crossing without placing it in the crosswalk, typically 1-5 feet in advance of the crosswalk.

These signs have proven to be very effective as traffic calming devices and at increasing motorist stopping compliance at crosswalks. They have been shown to achieve a level of stopping compliance similar to rectangular rapid flashing beacons in lower speed locations. They can be especially effective if placed and removed daily or only when crossing guards are present to indicate when children are arriving or departing from school. They can be an effective complement to school crossing guards.

The In-street Pedestrian Crossing signs shall not be placed at stop or signal controlled intersections. Where there is a high volume of turning movements (especially large vehicles), an in-street sign may need to be placed on a raised island to prevent the need for frequent replacement. Narrow streets may pose a problem as the signs may not allow enough room for larger vehicles or unskilled drivers to pass without hitting the sign.



R1-6c



Photo credit: [bikewalklincolnpark.com](http://bikewalklincolnpark.com)

## Pavement markings

Pavement markings have an important role to play in school area safety. They can be used to supplement the regulations or warnings of other devices such as traffic signs or they may obtain results that cannot be obtained by the use of any other device. However, pavement markings have definite limitations. They may be covered by snow, may not be clearly visible when wet, and may not be very durable when subject to heavy traffic. Pavement markings also require a higher degree of maintenance than other traffic control devices, resulting in recurring costs to the road jurisdiction.

## Marked crosswalks

Marked crosswalks are commonly marked at locations where drivers are accustomed to stopping such as signalized intersections and all-way stop intersections. Where existing traffic controls are not available and it is not feasible to require children to walk out of direction, crosswalks may also

be marked in other uncontrolled locations. Locations for uncontrolled marked crosswalks should consider a School Route Plan, if available, as well as the need and ability to provide adult crossing guards and safety features such as illumination, median refuge islands, and curb extensions. In



*Example of continental crosswalk marking.*

an effort to ensure that marked crosswalks are only placed where they are needed, communication with the school and/or school district and an engineering study are required before establishing marked crosswalks at locations other than signalized or stop controlled approaches to intersections. The number and age of the students using the crossing should be taken into consideration. See *FHWA Publication HRT-04-100* and ODOT's Criteria for Establishing Marked Crosswalks in the ODOT *Traffic Manual* for further guidance on the decision to mark or not mark a crosswalk. Additional treatments beyond pavement markings are often needed; see the ODOT *Traffic Manual* or *NCHRP 562: Improving Pedestrian Safety at Unsignalized Crossings* for guidance on the selection of additional treatments.

Longitudinal crosswalk markings (also called “continental”) have been shown to be visible from significantly greater distances and require less maintenance than the transverse crosswalk markings, so their use is encouraged at uncontrolled marked crosswalks. ODOT has established a practice of marking uncontrolled crosswalks with longitudinal markings and marking signalized and stop-controlled crosswalks with transverse crosswalk markings without regard to whether or not the marked crosswalk is in a school zone. The convention of using continental-style markings at uncontrolled crosswalks and transverse lines at controlled crosswalks is intended to distinguish uncontrolled crosswalks (where drivers have an obligation to scan and stop for pedestrians intending to cross the street) from controlled crosswalks (where the driving task is dominated by a STOP sign or traffic signal) Some communities have adopted an alternative practice of using longitudinal crosswalk markings at all school crosswalks (signalized, stop controlled, or uncontrolled) as a means of distinguishing school crosswalks in the community.

### Stop lines

Stop lines are solid white lines normally 12-24 inches wide extending across all approach lanes and indicate the point at which vehicles are required to stop in compliance with the STOP sign, traffic signal, or other legal requirement. Stop lines are not ordinarily used with signalized crosswalks in Oregon unless it is desirable to stop vehicles in advance of the nearest crosswalk line. When used, stop lines shall be placed as near as practical to the intersecting roadway but should not be closer than 4 feet to the traveled way or crosswalk line.



### Advance stop lines

Advance stop lines are stop lines set in advance of uncontrolled marked crosswalks on multi-lane roadways in order to provide additional time and visibility for pedestrians to avoid vehicles not stopping in adjacent lanes (i.e. multiple threat crashes). Advance stop lines are strongly recommended to reduce multiple threat crashes whenever a crosswalk is marked across a street with more than one through lane in each direction. Advance stop lines (24-inch width) are typically

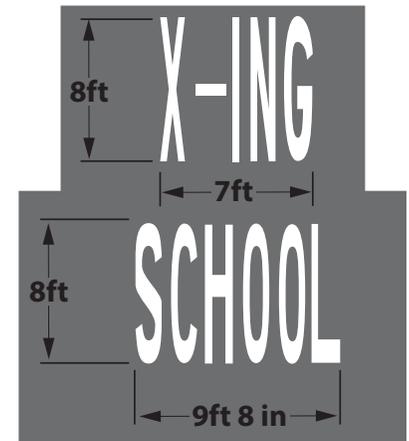
set back 20-50 feet in advance of uncontrolled marked crosswalks (20 feet is the minimum). A common practice is to place them a distance in feet equivalent to the posted speed. The STOP HERE FOR PEDESTRIANS (or pedestrian symbol) sign R1-5b or R1-5c must be used if an advance stop line is used for a pedestrian crosswalk. See “Advance Stop Lines” in the ODOT Traffic Manual for further guidance.

### Parking restrictions

Road authorities may authorize curb markings (usually yellow) to supplement standard signs or to replace signs if permitted by local ordinance. ORS 811.550 (17) prohibits parking within 20 feet of a crosswalk regardless of whether or not the curb is marked.

### Word and symbol markings

Word and symbol markings on the pavement may be used as a supplement, but are not a required marking. Markings in the travel lane require a high degree of maintenance and they should be used only as necessary. Letters and numerals should be white and 8 feet or more in height and if the message consists of more than one word, it should read up, i.e., the first word should be nearest to the driver. Where approach speeds are low, somewhat smaller characters may be used. Pavement messages should preferably be no more than one lane in width except school messages may extend to the width of two lanes. When a two lane width is used, the characters should be 10 feet or more in height. SCHOOL is one of the more commonly used markings. See Section 7C.03 of the MUTCD for further guidance.



### Maintenance of signs and markings

Signs and pavement markings for school speed zones should be inspected routinely by the road authority. Preferably, inspections should occur before the beginning of each school year or towards the end of the school year to schedule maintenance during the summer. Damaged signs should be replaced. If use of the school building or traffic patterns change, the school district should notify the road authority. Zones which no longer meet the criteria for school areas should be removed (such as when the school permanently closes or the building use changes).

### Supplemental Devices (i.e., Yellow Diamonds, RRFB's, PHB's)

Overuse of supplemental devices tends to erode their effectiveness as safety devices. To preserve their usefulness as warning devices, flashing lights and other attention-grabbers should be used in a selective manner only when warranted by an engineering study. ODOT has a policy to only use yellow diamonds to temporarily highlight a change in regulatory conditions such as a revised speed limit or a new traffic signal.

### Reflective strips on sign posts

A supplemental device that seems to catch the attention of drivers is the addition of reflective strips the length of the sign post. This device is effective at grabbing the attention of drivers and is inexpensive to add to the post.



*Example of reflective strip on sign post.*



Photo credit: Carmanah Technologies Corp.

### Rectangular rapid flashing beacons (RRFB)

RRFBs consist of two rapidly and alternately flashed rectangular yellow LED arrays located between the crosswalk warning sign and the supplemental downward arrow plaque. These devices have a significant effect on driver stopping compliance rates. There is evidence that they increase the distance at which motorists begin to slow for a pedestrian in a crosswalk. Because of their relatively high installation costs and ongoing maintenance costs, their installation should be limited to locations where they are justified after a thorough consideration of vehicle volume and speeds, number of pedestrians, length of crossing, and other relevant factors. RRFB's should only be considered after other proven pedestrian safety measures such as median refuge islands have been deemed inappropriate or insufficient. Crossing guards are also a good option.

RRFBs may only be used in conjunction with a Pedestrian or School Crossing Assembly and they may not be used with traffic signals, STOP signs, or YIELD signs. If used in a "WHEN FLASHING" school

speed zone, care should be taken to locate the RRFB at a sufficient distance from the "WHEN FLASHING" beacon to avoid driver confusion. If placed too closely to a "WHEN FLASHING" beacon, some drivers may mistakenly believe the school speed zone is in effect when the RRFB is flashing; conflicts arise if other drivers continue at normal speeds. See the ODOT Traffic Manual section 6.6.7, and see Federal Highway Administration's July 16, 2008, *Interim Approval for the Optional Use of Rectangular Rapid Flashing Beacons* for further guidance on the use of these devices.

### Warning signs

Rural school areas may have no students walking or biking to school but may have short periods of congestion near the school entrances. An optional "Congestion" sign may be used to warn drivers of the related school traffic and may be useful when a slower school speed is not warranted.

### Pedestrian hybrid beacons (PHB)



The PHB is a relatively new traffic control device that may be used at midblock pedestrian crossings on arterial streets. The signal indications are dark until a pedestrian pushes a button that activates the device. Once activated, the PHB cycles through periods of flashing yellow, solid yellow, solid red, and then flashing red for traffic on the arterial street. The standard WALK, flashing DON'T WALK, and DON'T WALK messages are shown to pedestrians at the appropriate times. PHB's tend to be used where vehicle speeds are too high to permit

pedestrians to safely cross the road or where gaps in traffic are not adequate to permit pedestrians to cross. They offer an efficiency advantage for motor vehicles over conventional traffic signals because traffic can proceed (after stopping) during the flashing red phase, and they generally cost less than a conventional traffic signal, especially if the PHB heads can be located along the side/median of the street instead of overhead. Red indications, as used in conventional traffic signals and PHB's, have been found to generally result in the highest rates of stopping compliance at marked crosswalks.

## School area traffic signals

School signals are standard traffic control signals erected at established school crossings on the basis of the need to create adequate gaps in the vehicular traffic stream for pedestrian crossings. When properly designed, located, and operated under conditions that fully warrant their use, school signals may offer the following **ADVANTAGES** over other treatments:

- Traffic signals generally have a higher rate of driver compliance as compared to treatments that do not have a red indication such as flashing beacons or signs.
- Considering initial and operating costs, school signals may offer cost-savings as compared with police supervision or crossing guards over a period of several years.
- Under conditions of favorable spacing, signals can be coordinated with adjacent signals to provide for continuous or nearly continuous movement of vehicular traffic.

The following **DISADVANTAGES** for signals should be considered when choosing a specific means of crossing control:

- School signal control has a much higher initial cost than police supervision or crossing guards. It should only be considered for locations where several years use is expected.
- In some circumstances, the school signal control requires supplemental control by an adult, guard or school safety patrol (i.e., right turns on red).
- Signals can increase the frequency of some types of motor vehicle crashes (i.e., rear-end crashes).



*Example of signalized school crossing. Photo by pedbikeimages.org / Dan Burden*

A school signal may be warranted at an established school crossing when a traffic engineering study indicates that the number of adequate gaps in the traffic stream during the periods the children are using the crossing is less than the number of minutes in the same time period. Signals have the potential to increase some types of crashes; they should be used only after other less restrictive means to have students utilize existing gaps have been considered (i.e., pedestrian refuges, in-street signs). See Section 4C.06 of the *MUTCD* for more information on school signals.

## School crossing guards and safety patrols

The *Oregon Traffic Patrol Manual For Schools* (Oregon Department of Education) recommends practices for the organization, operation, and administration of a crossing guard program in Oregon. The information below is essentially a summary of some of the key points of that document.

There are two types of school crossing supervision: control of pedestrians and vehicles with adult crossing guards or police officers, and control of pedestrians only with student safety patrols. School districts have the authority to use adults as safety patrol members or crossing guards. They can be an important element of the Traffic Patrol Program. Certain criteria should be used to determine at which location adult crossing guards are placed. The Department of Education suggests that generally, an adult crossing guard is needed when:

- The traffic situation at the school crossing is too hazardous to be navigated by children.
- The crosswalk is so far from the school that it cannot be monitored by school officials.
- It is difficult for children to observe traffic at all corners.

- The crossing is close to school and a great number of children make it difficult to control the crossing.
- When there is a high volume of turning traffic to and from an arterial.
- When there is a high volume of pedestrian traffic across an arterial.
- When there is not at least one safe gap in traffic per minute during the crossing time.

When any **ONE** of these conditions exist, adult supervision may be necessary to create gaps in traffic, caution the traffic turning over crosswalks, and safely assist groups of children across the street. Customarily, crossing guards are used in elementary schools. In particularly hazardous situations, middle schools may wish to utilize crossing guards as well.

Crossing guards should not be directing traffic. Instead, they should be selecting opportune times to create a safe gap. Crossing guards may be used to provide gaps in traffic at school crossings where an engineering study has shown that adequate gaps must be created. Crossing guards must wear a fluorescent yellow-green vest labeled as ANSI 107-2004 for class

2 risk exposure. They may also wear a fluorescent yellow-green hat and carry a school crossing flag or flagger paddle as recommended by the Oregon Department of Education. The Oregon Department of Education, Pupil Transportation has a 15 minute video, “Tips and Techniques for the Adult Crossing Guard” available upon request at 503-947-5737 or email at [buslicense@ode.state.or.us](mailto:buslicense@ode.state.or.us).



Student safety patrols should be authorized by the local school board. They do not direct traffic but they do supervise children using a crossing. School authorities should be responsible for organizing, instructing and supervising student safety patrols with the assistance of the local police. They should be students from the fifth grade or higher and parental approval should be obtained in writing before a student is used as a member of the safety patrol. Student safety patrol members must wear a bright colored yellow, orange or strong yellow-green retroreflective ANSI Class 1 high-visibility safety vest. Student safety patrols carry a retroreflective 24” minimum square flag. The flag color may be yellow or strong yellow-green. The Oregon Department of Education, Pupil Transportation Program provides technical assistance for establishing student safety patrol programs. A 30-minute video to help train student safety patrols is available upon request at 503-974-5737 or email at [buslicense@ode.state.or.us](mailto:buslicense@ode.state.or.us).

## SECTION VI - SCHOOL ZONE SAFETY RESOURCES

### National resources

The *National Center for Safe Routes to School* is a centralized resource of information on successful Safe Routes to School programs and strategies. Users of this site will find information on how to start and sustain a Safe Routes to School Program, case studies of successful programs as well as many other resources for training and technical assistance. A comprehensive *Online Guide* is available. This federally-funded program also provides educational resources related to SRTS, a listserv, and toll-free phone number. A *Walkability Checklist*, a *Bikeability Checklist*, and an *example school site assessment form* are also available.

The *Safe Routes to School National Partnership* is a non-profit organization that provides a wide range of materials, reports, webinars, and other information related to SRTS programs.

The **Safety Division of Federal Highway Administration** describes Safe Routes to School plans in *SRTS Program Guidance*.

The **Institute of Transportation Engineers** offers a variety of *Briefing Sheets* on matters related to school area safety, walking and bicycling audits, school site design, and traffic calming.

The national website for *Walk and Bike to School Day* offers resources for attracting wide support and momentum for your Safe Routes to School Program along with some fun. In *Oregon*, Walk and Bike to School Day is celebrated in October.

*America Walks* is a national coalition of local advocacy groups dedicated to promoting walkable communities. The organization works to foster the development of community-based pedestrian advocacy groups to educate the public about the benefits of walking and to act as a collective voice for walking advocates. America Walks offers advice about how to get started and how to work effectively with public officials and engineering and design professionals.

The *Pedestrian and Bicycle Information Center* is a clearinghouse for information about health and safety, engineering, advocacy, education, enforcement, and access and mobility. The PBIC serves anyone interested in pedestrian and bicycle issues, including planners, engineers, private citizens, advocates, educators, police enforcement and the health community. PBIC supports a *repository for digital image files*.

**The Institute for Transportation Research and Education** at North Carolina State University provides information on best practices for managing school campus traffic. Their *website* includes a Carpool (Pick-up and Drop-off Area) Decision Tree, a web-based support tool to be used by school staff to analyze and find recommendations on ways to improve school-related traffic.

### Oregon Resources

**Oregon's Safe Routes to School Program** maintains a *website* with information related to creating School Safety Action plans, school newsletter ideas, examples of implementations of the 6E's, and links to numerous safety brochures, posters, and videos. The program coordinates the Walk+Bike Challenge Month (May) and the Walk+Bike to School Day (early October) offering a package of incentive giveaways, promotional flyers, and media materials for participating schools. The program

hosts a SRTS bi-annual conference and training workshop for school coordinators, a monthly information and resource sharing conference call, a listserv, and a quarterly newsletter related to walking and biking to school. Suggestions for school area site assessment are also provided. Individuals and organizations may join the associated SRTS Network ([website](#)) to collaborate with other city and school district contacts on SRTS programs.

The **Oregon Department of Education, Pupil Transportation Program** ([website](#)) provides technical assistance for establishing student safety patrol programs. The *Oregon Traffic Patrol Manual For Schools* recommends practices for the organization, operation, and administration of a crossing guard program in Oregon. Training videos for safety patrols are available by contacting ODE at [buslicense@ode.state.or.us](mailto:buslicense@ode.state.or.us).

**ODOT's Transportation Safety Section** maintains a *Safe Routes to School website* that includes information related to establishing SRTS Action plans, pedestrian safety school curriculum, and informational videos and brochures. *A number of free brochures, posters, and other materials are available.* Another excellent resource is the *Community Traffic Safety Resource Guide*.

Oregon's **Transportation and Growth Management Program** provides information related to *school siting* and the role this decision has on walking and biking rates.

Also available from **ODOT** is the *Oregon Bicycle and Pedestrian Design Guide* which provides guidance for improving pedestrian and bicycle safety. Contact the ODOT Roadway Engineering Unit at [RoadwayEngineeringSection@odot.state.or.us](mailto:RoadwayEngineeringSection@odot.state.or.us) for questions related to this guide.

**The Street Trust** (formerly the Bicycle Transportation Alliance) runs a statewide bicycle safety education program that teaches youth grades 4-7 bicycle safety in a 10-hour comprehensive curriculum. The program includes training where students learn traffic rules and ride bicycles on the street. The Street Trust ([website](#)) brings resources such as bicycles, helmets, and *curriculum*, and will train teachers. More information is available at the program [website](#).

The **Safe Kids Oregon Program** ([website](#)) is part of the national Safe Kids Campaign. The program is sponsored by the Oregon Child Development Coalition. Publications and videos related to helmet fitting and pedestrian safety are available on the program website. Information is available for low-cost helmets in the Portland area.

The **Trauma Nurses Talk Tough Program** at Legacy Emanuel Medical Center ([website](#)) offers presentations to elementary and junior high school students in the Portland metro area related to bicycle and auto safety. The center also offers below-retail cost helmets.

## Local programs around Oregon

There are numerous local Safe Routes to School programs around Oregon, at the local, county, and regional level. Some of the largest or longest-running programs are listed below. Check Oregon's Safe Routes to School [website](#) for a complete list of ODOT-funded programs, or ask your local school, city, public health, or other community group about other activities that may not be listed here.

**Clackamas County** launched a safe routes program in 2003 to improve routes to local area schools. The County works with local schools to improve the safety of key routes to schools ranging from simple tasks such as roadside vegetation maintenance to school flashers and crosswalks. The Clackamas County Sheriff's Office also is a strong player in helping with enforcement around the school zones. For more information, contact the *Traffic Engineering program*.

**Washington County** ([website](#)) uses a comprehensive approach to school area safety including reader boards, targeted enforcement, crossing guard training, engineering approaches including enhanced signing, flashing lights and traffic calming, mapping safe routes to school, and consulting to schools in solving specific safety problems. In September 2013, Washington County was awarded a \$150,000 non-infrastructure grant from the Oregon Safe Routes to School Program to fund a SRTS coordinator for three years. This coordinator will help boost the number of SRTS programs and activities throughout the county while building valuable SRTS partnerships among city and county agencies, schools, community organizations, and neighborhoods.

The **City of Ashland** has used a variety of strategies to increase bicycle and pedestrian safety. Public awareness and education are ongoing through a **Look Out for Each Other** campaign, banners, brochures and a crosswalk awareness week. They have used **Safety Chicken**, an adult in a giant chicken costume, to promote walking and biking safety to the students. Engineering improvements include pole-mounted active speed zone signs which are circulated through the school districts, providing materials for the KEEP KIDS ALIVE, DRIVE 25 Campaign, and applying different crosswalk treatments where greater visibility is needed.

School districts in **Lane County** support an active *Safe Routes to School Program*. As this is an urban area with multiple school districts, a *regional SRTS plan* was developed in 2012. The Lane Transit District's *School Solutions Program* provides families with fun, safe, and healthy ways to get to school through carpool, walking, biking, or transit. The program has created *walking route maps* for many of the schools in the area.

Information related to Safe Routes to School in the **Bend** area is available through the *Bend Commute Options Program*.

The **City of Milwaukie** ([website](#)) has developed a number of approaches to pedestrian safety. As part of their School Trip Safety Program, they have used speed humps and a neighborhood speed watch program that includes banners, radar feedback trailer, advisory letters to speeders and the media to slow drivers down in neighborhoods.

The **City of Portland** implemented a *safe routes program* in 2003 as part of its Community and School Traffic Safety Partnership. The city worked with the local school district to develop an easy-to-use mobile phone application that allows parents and staff to report safety and access issues through map-based technologies. Information is also available related to "*Walking School Buses*" and "*Bicycle Trains*".

## Other Resources

The Safe Routes to School National Partnership's *Pacific Northwest Regional Network* provides support and information related to efforts to improve conditions for walking and biking to school in the Portland, Vancouver, and Salem areas.

The *Safe Routes to School Program* of the **Washington State Department of Transportation** offers a how-to guide for developing school walk and bike route plans. Additional resources and information related to safety education is available from the *Washington Safe Routes to School Coalition*.

The **New Jersey Department of Transportation** provides extensive guidance on best practices for school zone design in their *New Jersey School Zone Design Guide*.

The **Ohio Department of Transportation** offers *School Travel Plan* development guidelines and templates.

Chicago's Active Transportation Alliance provides a *Safe Routes to School Toolkit* to help new Safe Routes to School initiatives get started.

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