DEPARTMENT OF TRANSPORTATION

GUIDE FOR ESTABLISHING SCHOOL ZONE SPEED LIMITS

JUNE 2023

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CHAPTER 1 - BACKGROUND

This document is an update to the 2012 "A Guide to Establishing Speed Limits in School Zones." Since the 2012 version, changes in research and best practices have occurred in relation to the safety of people walking and biking as well as school zone safety. Safe Routes to School (SRTS) resources and Safe Systems initiatives now offer more holistic evaluation of school area safety, stressing the importance of a layered and redundant safety approach.

This document provides guidance on setting appropriate School Zone Speed Limits (SZSLs). It is based on current best practices and provides a step-by-step process for identifying and implementing an appropriate SZSL as well as other important characteristics for designing a school zone. This document also provides links to valuable resources that are meant to compliment a SZSL. While research shows that appropriate SZSLs on their own have the ability to lower motorist speeds within school zones, the multifaceted approach covered in a SRTS plan is considered best practice for improving school area safety.

SZSLs should be considered just one of many steps for improving the safety of students, parents and staff walking, biking and rolling to school.

BACKGROUND

PURPOSE

This document:

- **Defines procedures that will satisfy the engineering and traffic investigation requirements of Minnesota Statute 169.14 subd 5a.**
  - The statute states that "local authorities may establish a school speed limit within a school zone of a public or nonpublic school upon the basis of an engineering and traffic investigation as prescribed by the commissioner of transportation."
  - The school zone investigation set forth in this document constitutes the prescribed engineering and traffic investigation. This is a coordinated effort requiring several disciplines to accurately perform and process the duties described within this document.
- Is a resource for links to research and guidance on school zone safety and speed management countermeasures.
- Is intended for use by engineers and community leaders as a decision-making tool to assist in the setting of appropriate SZSLs.
- Provides a five-step process for establishing a SZSL.

This document does NOT replace the need for a Safe Routes to School (SRTS) Plan and comprehensive school transportation safety planning.

Five-Step Process for Establishing a SZSL

STEP 1

Establish or review a School Route Plan and crash history

STEP 2

Select an appropriate SZSL

STEP 3

Engineering and traffic (E&T) investigation (if needed)

STEP 4

Design the school zone

STEP 5

Implementation

EXISTING RESOURCES, STATUTES AND GUIDANCE

As noted previously, a variety of resources, guidance and statutes exist that pertain to SZSLs. This section summarizes:

- Minnesota Safe Routes to School Program (MnSRTS)
- State statutes and definitions
- Changes to the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)

Minnesota Safe Routes to School

Minnesota Safe Routes to School is the primary resource recommended to assist with improving safety around schools. The MnSRTS vision is for youth in Minnesota to be able to safely, confidently, and conveniently walk, bike, and roll to school and in daily life. The program provides resources to improve safety, reduce traffic and improve air quality near schools through a multidisciplinary approach that is structured around the 6 E's:

6E's

- **EVALUATION**
- **EDUCATION**
- **ENCOURAGEMENT**
- **EQUITY**
- **ENGAGEMENT**
- **ENGINEERING**

School Zone Speed Limits covered in this guide are just one aspect of the Engineering portion of a SRTS program. Other engineering improvements can include geometric changes to the roadway, signing, crosswalk markings, etc. For best results, a multidisciplinary approach to school zones and school walksheds[1] should be considered to address all 6 E's to provide lasting safety benefits around schools. The Safe Routes to School Resource Index provides a wealth of information on designing, funding and evaluating safe streets and active transportation facilities around schools.

1 A walkshed is the total walkable area from the school. It can be measured as a radius from the school or along a road or sidewalk network. Typical walkshed distances range from 0.5 miles to 1.5 miles for school age students dependent on age and ability.

BACKGROUND

State statutes and definition

The State of Minnesota has a variety of state statutes and definitions related to school zones. As of the date of this document, the following statutes and definitions are in effect which allow local roadway authorities to establish school zone speed limits.

SCHOOL SPEED LIMIT STATUTE

Statute 169.14.5a.(a)

"Local authorities may establish a school speed limit within a school zone of a public or nonpublic school upon the basis of an engineering and traffic investigation as prescribed by the commissioner of transportation[2].

The establishment of a school speed limit on any trunk highway shall be with the consent of the commissioner of transportation. Such school speed limits shall be in effect when children are present, going to or leaving school during opening or closing hours or during school recess periods.

The school speed limit shall not be lower than 15 miles per hour and shall not be more than 30 miles per hour below the established speed limit on an affected street or highway."

Statute 169.14.5a.(b)

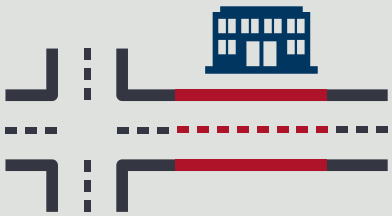
"The school speed limit shall be effective upon the erection of appropriate signs designating the speed and indicating the beginning and end of the reduced speed zone. Any speed in excess of such posted school speed limit is unlawful. All such signs shall be erected by the local authorities on those streets and highways under their respective jurisdictions and by the commissioner of transportation on trunk highways."

2 This document and completion of the five-step process outlined in Chapter 2 satisfies the Engineering and Traffic Investigation requirements of Statute 169.14 subd 5a

SCHOOL ZONE DEFINITION

Section 169.14.5a.(c)

"(c) For the purpose of this subdivision, "school zone" means that section of a street or highway which abuts the grounds of a school where children have access to the street or highway from the school property or where an established school crossing is located provided the school advance sign prescribed by the Manual on Uniform Traffic Control Devices adopted by the commissioner of transportation pursuant to section 169.06 is in place. All signs erected by local authorities to designate speed limits in school zones shall conform to the Manual on Uniform Traffic Control Devices."



DEFINITION OF A SCHOOL

Minnesota Statute 120A.05 provides various definitions of schools such as elementary, middle and secondary schools, as well as school districts. The guidance in this document specifically applies to schools as defined by Statute 120A.05.

BACKGROUND

Because the current statute on SZSLs leaves a large range of possible speeds, the Minnesota Department of Transportation (MnDOT) has developed this guide to assist in selecting an appropriate SZSL based on school zone characteristics and best practices. This document also provides guidance on the recommended elements of an engineering and traffic (E&T) investigation and when an E&T investigation is required. Regardless of the content put forth in this guide, all SZSLs must continue to comply with current state statutes at the time of installation. The user of this guide is responsible for reviewing and complying with current statutes at the time of use.

Changes to the MN MUTCD

The previous guide completed in 2012 was embedded within the MN MUTCD. In revision 10 of the MN MUTCD, the text was changed from a Standard statement to a Support statement. “A Guide to Establishing Speed Limits in School Zones-2011” was removed from Chapter 7E, Speed Limits in School Zones, but the guide is still referenced in the Section 7E.1. This guide replaces the 2012 guide as the “engineering and traffic investigation as prescribed by the Commissioner of Transportation” in Minnesota Statute 169.14 subd 5a.

RESEARCH

To ensure that the contents within this guide align with current best practices for SZSLs, a variety of research was conducted. The primary research for this guide has been published by MnDOT as Transportation Research Synthesis (TRS) number 2301[3] and the key findings are summarized below. Additional resources reviewed and summarized include the 2022 update to the National Roadway Safety Strategy. In addition to the research, a Project Advisory Committee (PAC) provided expert guidance and feedback throughout the completion of this guide. Information on the PAC can be found in Appendix F.

School Zone Speed Limits (SZSLs) Transportation Research Synthesis (TRS2301)

The following summarizes the objectives and findings of the School Zone Speed Limits TRS published by MnDOT in January of 2023.

Research Objectives:

- To provide a summary of current research on the effectiveness of SZSLs in reducing vehicle speeds and the severity and frequency of crashes, particularly for vulnerable roadway users.
- A summary of current state statutes and guidance on SZSLs and additional resources on countermeasures for traffic calming and safety.

Key Findings:

Policy Findings:

- The majority of states (36) use a statute to define a SZSL, with over half of those states having a statutory SZSL set at 15, 20 or 25 mph.
- Many states allow jurisdictions to lower SZSLs below the statutory SZSL based on an engineering and traffic study.
- Minnesota statute allows for a larger range in SZSLs than most states.

Speed and Crash Reductions Findings:

- SZSLs are overall effective at reducing speeds and improving safety, but the extent of their impact is often limited and dependent on additional countermeasures such as the use of flashing beacons, differences in roadway geometry, etc.
- Speed differentials (the difference between the existing speed limit and the SZSL) should be limited to 5-10 mph, with no more than 15 mph without the use of speed limit buffers zones[4].
- Additional countermeasures such as geometric changes to the roadway and flashing beacons, combined with SZSLs, have shown to result in a greater level of speed reduction.
- Properly set SZSLs appear to have limited to no unintended consequences[5]. Further information can be found in MnDOT TRS 2301.

Note: The findings are primarily applicable to lower speed limit settings. The available research on SZSLs on higher speed limit roadways is limited.

3. MnDOT TRS2301 – School Zone Speed Limits (SZSLs): Effectiveness of SZSLs in reducing vehicle speeds, crash severity and crash frequency

4. Fitzpatrick, K., Brewer, M., Obeng-Boampong, K., Eun Sug, P., & Trout, N. (2009). Speeds in school zones (No. FHWA/TX-09/0-5470-1). Texas Transportation Institute.

5 Unintended consequences would be findings such as increased vehicle speed, increase crash rates or lengthening of speed distribution curves.

Trends and Policies

The relationship between vehicle speed and the safety of vulnerable roadway users has been well documented both nationally and internationally. Vehicle speeds impact the amount of time needed to come to a complete stop[6] as well as the likelihood of a pedestrian being killed if hit by a motorist[7]. Reduction of vehicle speeds on local roads are a top priority at the national, state and local levels to reduce severe injury and fatal crashes for vulnerable users.

6. "Reduced speeds allow motorists more time to avoid collisions. A motor vehicle traveling at 50 mph requires 424 feet to come to a complete stop, while a vehicle traveling at 25 mph requires only 152 feet." Slowing Down Traffic, Nat'l Ctr. For Safe Routes to School, http://guide.saferoutesinfo.org/engineering/slowing_down_traffic.cfm.

7. "A pedestrian hit by a vehicle traveling at 40 mph has an 85% likelihood of being killed, whereas the likelihood of death for a pedestrian hit by a vehicle traveling at 20 mph is only 5%." Safe Routes to Schools Guide, Nat'l Ctr. For Safe Routes to School (2011), 3-63, available at http://guide.saferoutesinfo.org/pdf/SRTS-Guide_full.pdf.

National Roadway Safety Strategy

In 2022, the United States Department of Transportation (US DOT) officially adopted the Safe System approach as it's National Roadway Safety Strategy. At the core of this strategy is a department-wide adoption of a comprehensive Safe System approach, which focuses on five key objectives: safer people, safer roads, safer vehicles, safer speeds, and post-crash care. A Safe System approach to safer speeds leverages road design and other infrastructure interventions, speed limit setting, education, and enforcement. Based on the guidance from the US DOT, speed limits should be set to provide a safe, consistent, and reasonable speed to protect drivers, other people in motor vehicles, and people walking, biking, and rolling along the roadway[8].

8. USDOT National Roadway Safety Strategy

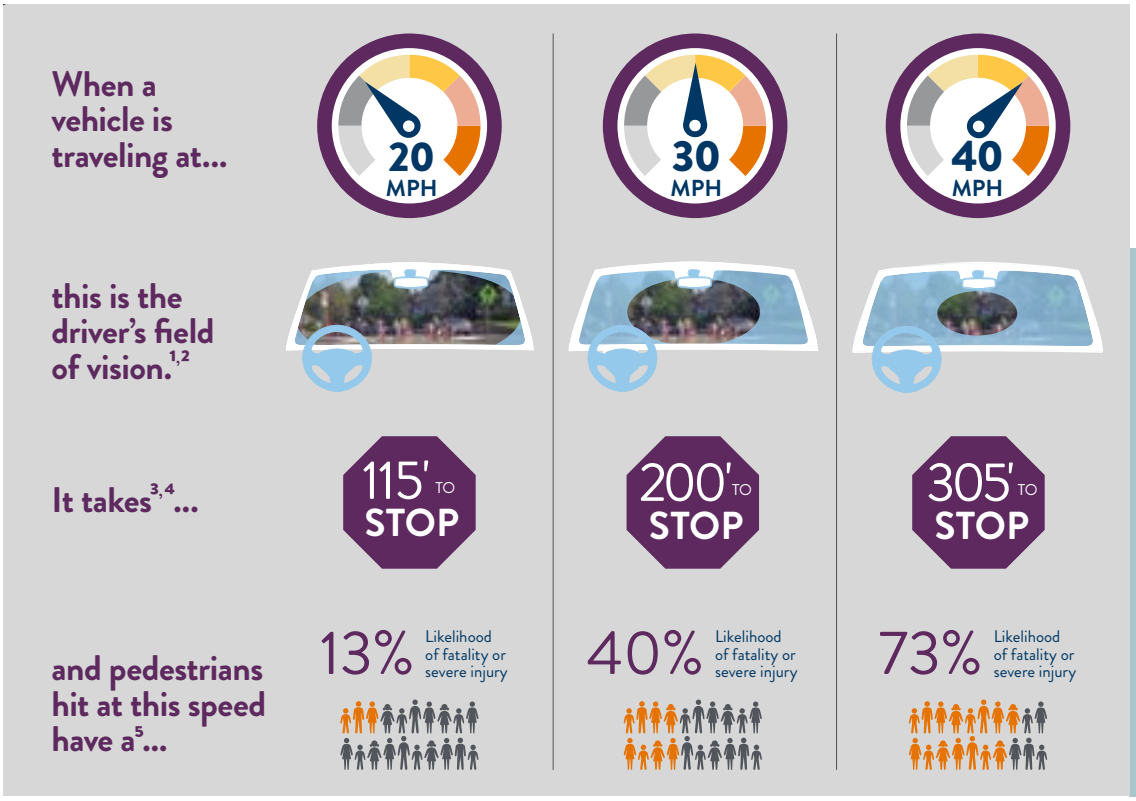


Figure 1 – Impact of vehicle speeds on pedestrian injury risk

Each 1 mph decrease in speed reduces the risk of severe injury or death by 3 percentage points

Other organizations or plans that emphasize the importance of managing speeds to improve safety include, but are not limited to: Vision Zero Network, US DOTs Safe Routes to School Programs, MinnesotaGO, Minnesota Statewide Speed Limit Vision and Toward Zero Deaths.

Cities across the country have begun to adopt 20 mph city-wide speed limits on local roads to set speed limits that prioritize the safety of the most vulnerable users and align with Safe System guidance.

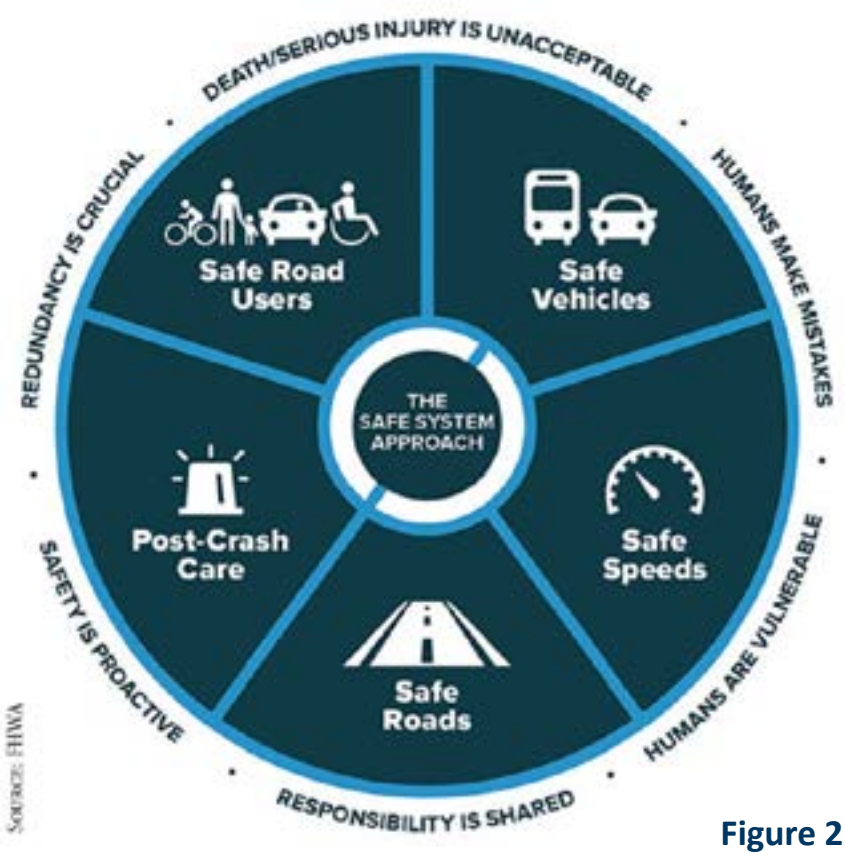


Figure 2 - Safe System approach (Source: US DOT's National Roadway Safety Strategy)

Minnesota Statewide Speed Limit Vision

In December of 2020, MnDOT adopted the following Minnesota Statewide Speed Limit Vision which states that: "Speed limits are set with an emphasis on all users with key influences of safety, engineering and surrounding land use. The vision is guided by three core values."

"Speed limits are:

- Affected by community context, land use, and road design
- Governed by voluntary compliance through education and accepted social norms
- Established through consistent technical evaluation and applied equitably across all communities."

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CHAPTER 2 - PROCESS FOR ESTABLISHING A SCHOOL ZONE SPEED LIMIT (SZSL)

Based on the research finding from the previous section, SZSLs are safe and appropriate countermeasures to be considered by road authorities for reducing speeds and improving safety near schools.

As also previously stated, **SZSLs are just one aspect of school zone safety and a full SRTS plan is always recommended as a best practice for transportation safety planning around a school.**

If a SZSL is desired, this chapter provides the five-step process for selecting and implementing a new SZSL. This section may also be used to evaluate and update an existing SZSL to meet best practices.

STEP 1: Establish or review a School Route Plan and crash history

STEP 2: Select an appropriate SZSL using the guidance chart (Figure A)

STEP 3: Identify if an engineering and traffic (E&T) investigation is needed and if additional safety and speed management countermeasures should be considered

STEP 4: Design the school zone

STEP 5: Implementation

STEP 1: ESTABLISH/REVIEW SCHOOL ROUTE PLAN AND CRASH HISTORY

The first step in the process is identifying the location of the school zone and reviewing a three to five-year crash history for the location in question. Steps two through five will help identify an appropriate SZSL, determine whether a full engineering and traffic (E&T) investigation is required, and aid in the design and implementation process.

1.1 School Route Plan

A School Route Plan, not to be confused with a SRTS Plan, is a simple map that shows the locations where students typically cross to get to school when walking, biking or rolling. Coordination with school administration and road authority is recommended to ensure that school zones are placed in the best locations. School routes and the school route plan are described in more detail in Section 7A.2 of the Minnesota Manual on Uniform Traffic Control Devices. Additional School Route Plan examples from the Dakota County School Safety Assessment and Minnesota SRTS information can be found in Appendix C of this guide.

1.2 Crash History

A crash history should be obtained for all potential SZSL locations to understand any existing safety issues that are present. This information will be used in Step 2 to identify if a full E&T investigation is required and if additional countermeasures should be considered. Under certain situations, (outlined in Step 2) a full E&T investigation may not be necessary before implementing a SZSL.

STEP 1 CHECK-LIST

1.1 Establishing a School Route Plan:

If a School Route Plan or full SRTS plan **already exists**:

- ☐ Review route plan to identify all crossings or access locations that students use to walk, bike or roll to school.
- ☐ Identify preliminary location for school zone.
  - School Name: _____
  - Grades: _____
  - Existing speed limit = _____ mph
  - Existing speed management countermeasures: _____

If a School Route Plan **does not exist** or is outdated:

- ☐ Identify all crossings or access locations that students use to walk, bike or roll to school (see Appendix C for a sample map).
- ☐ Identify preliminary location for school zone.
  - School Name: _____
  - Grades: _____
  - Existing speed limit = _____ mph
  - Existing speed management countermeasures: _____

1.2 Crash History

Does the obtained crash history show existing safety issues in the proposed school zone (particularly pedestrian or bicyclist involved crashes)?

☐ **Yes** ☐ **No**

(Note: A review of the most recent three to five years of crash data is recommended for the entire area under consideration for a school zone speed limit)

STEP 2: SELECT AN APPROPRIATE SCHOOL ZONE SPEED LIMIT

This section guides the selection of an appropriate SZSL, whether or not an E&T investigation is required, and if additional speed management countermeasures are recommended to improve driver speed compliance. The SZSL guidance is based on four elements that were identified during the research process (described in Chapter 1) as well as guidance from the Project Advisory Committee[1]. The elements that impact the effectiveness of SZSLs for reducing speeds and improving safety include:

- Selecting a SZSL that reduces severe injury and fatal crashes for vulnerable users.
- Minimizing the speed differential (5-10 mph preferred, not to exceed 15 mph).
- Using a SZSL buffer zone (a zone with an intermediate SZSL between higher and lower speed zones) or advance warning signage on high-speed roadways when the speed differential exceeds 15 mph.
- Redundancy with countermeasures to improve compliance and safety (such as changes in roadway geometry and enhanced signing).

Figure A is designed to provide recommendations for a range of appropriate SZSLs based on existing speed limits, state statutes and the four items listed above. Based on the desired SZSL, one of three conditions apply.

1 A Project Advisory Committee (PAC) provided feedback throughout the development of this guide. Information on the PAC can be found in Appendix F.

Condition 1

SZSLs that fall within Condition 1 satisfy best practices for both lowering the SZSL and reducing the speed differential. This group has an existing speed limit of 30 mph or less and a speed differential of 10 mph or less. This group does not require an E&T investigation and may skip Step 3.

Condition 2

SZSLs that fall within Condition 2 have existing speed limits of 30 to 50 mph and keep the speed differential to 10 mph or less. SZSLs that fall within this group require an E&T investigation because they are not able to reduce the SZSL to 20 mph and keep a 10 mph or less differential.

Condition 3

SZSLs that fall within Condition 3 have a speed differential greater than 15 mph and are typically on higher speed roadways. This group of SZSLs require an E&T investigation in addition to the recommended use of SZSL buffer zone or advance warning signage. Further definition and guidance on SZSL buffer zones is provided in Step 4.

STEP 2 CHECK-LIST

2.1 Selected School Zone Speed Limit

The selected SZSL is ____ mph

Complying with current state statutes

All SZSLs must continue to adhere to state statute regardless of the content posted within this document. The information below summarizes the existing Minnesota state statute [Statute 169.14.5a.(a)] for SZSLs at the time this document was published. The user of this document is responsible for reviewing and complying with current statutes at the time of use.

- ☐ The selected SZSL is not lower than 15 mph (additionally, MnDOT prohibits lower than 20 mph SZSLs on trunk highways)

  AND

- ☐ The selected SZSL is not more than 30 mph below the existing speed limit

2.2 Identify if any additional requirements apply to your location:

Using Figure A, which Condition box applies to the selected SZSL?

- ☐ Condition 1
- ☐ Condition 2
- ☐ Condition 3

Is a SZSL buffer zone or advance warning signing recommended?

- ☐ Yes (Step 4 provides further guidance)
- ☐ No

Is a full Engineering and Traffic investigation required?

- ☐ Yes
- ☐ No (Skip Step 3, the Engineering and Traffic investigation, and proceed to Step 4)

Should additional countermeasures be considered?

- ☐ Yes (Chapter 3 provides resources on speed management countermeasures)
- ☐ No

Figure A – Appropriate SZSL ranges and requirements based on MN State Statute 169.14.5a and MnDOT identified best practices

EXIST. ROAD SPEED LIMIT	20	25	30	35	40	45	50	55	60	65
Range of School Zone Speed Limits										
15-mph SZSL	C1	C1	C3							
20-mph SZSL		C1	C1	C3	C3					
25-mph SZSL			C2	C2	C3	C3				
30-mph SZSL				C2	C2	C3	C3	C3	C3	
35-mph SZSL					C2	C2	C3	C3	C3	C3

Condition 1 (C1)

Satisfies SZSL best practices

- No E&T investigation required unless there is a history of non-motorist crashes
- No SZSL buffer zone or advance warning signing required
- Additional countermeasures should be considered if pedestrian safety is the justification of the SZSL

Condition 2 (C2)

Satisfies one, but not all best practices

- E&T investigation required
- No SZSL buffer zone or advance warning signing required
- Additional countermeasures should be considered regardless of crash history, if pedestrian safety is the justification for the SZSL

Condition 3 (C3)

Does not satisfy any best practices without additional countermeasures and/or warnings

- E&T investigation required
- SZSL buffer zone or advance warning signing required
- Additional countermeasures should be considered regardless of crash history

Summary of SZSL Best Practices:

- Selecting a SZSL that reduces the risk of severe injury and fatal crashes for vulnerable users
- Minimize differential between existing speed limit and SZSL (5-10 mph is best, no more that 15 mph)
- Use of a SZSL buffer zone or advance warning signage when there is a 15 mph or more differential
- Redundancy with additional countermeasures

STEP 3: ENGINEERING AND TRAFFIC INVESTIGATION

Based on findings of how other states approach and implement SZSLs and research findings of no measurable unintended consequences from implementing SZSLs, an E&T investigation may sometimes be necessary to implement a SZSL.

Conditions 2 and 3 of Figure A require an E&T investigation because they do not meet all best practices. The information collected and reviewed during an E&T investigation is meant to help identify additional safety and speed management countermeasures outlined in Chapter 3.

The following elements are recommended as part of an E&T investigation. Further definitions and guidance can be found in Appendix A.

Sample Engineering and Traffic Investigation Elements

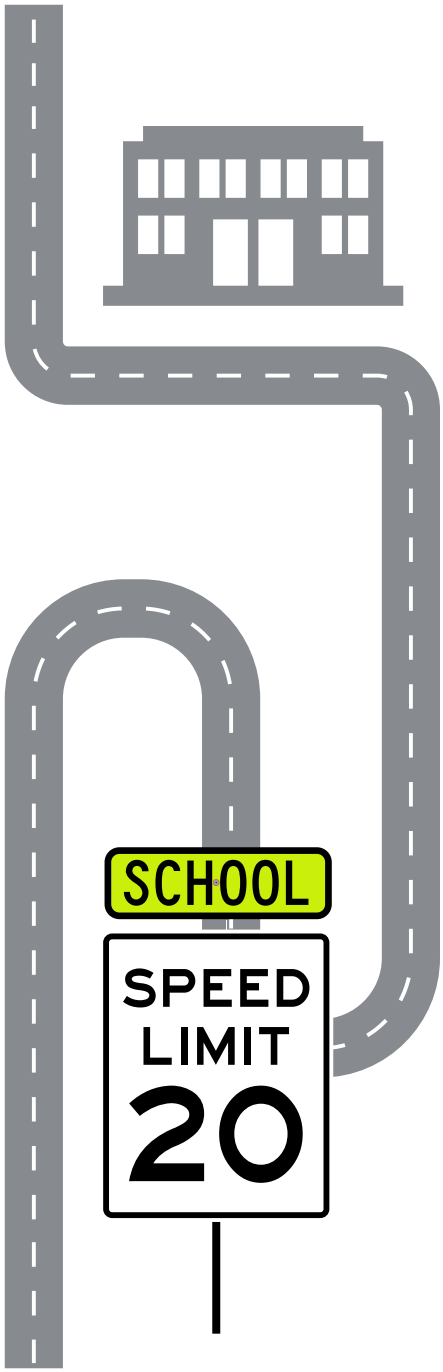
- Roadway geometry
- Traffic volume
- Pedestrian volume
- Parking
- Traffic control devices
- Sidewalks
- Fencing
- Crash history
- Speed study
- Land use and pedestrian generators
- Obstructions and vegetation

Other considerations

- Roadway classification
  - Intersection spacing
  - Driveway density
- Roadway owner
- Student enrollment/mode of transportation used

STEP 4: DESIGN THE SCHOOL ZONE

In addition to the SZSL, where and how the speed limit signs are placed can impact driver compliance. The following section outlines recommendations for location and length of school zones, indicating hours of operation, whether or not a SZSL buffer zone or advance warning signage are recommended on high-speed roadways, and signing allowed under the MN MUTCD.



Location and length of School Zone

The placement and length of the school zone impacts driver compliance. The following summarizes best practices for SZSL signing placement.

- **Length of School Zone: Research has shown that speeds are approximately 1 mph higher for every 500 ft. driven within a school zone**; therefore, longer school zones are associated with greater speed variability and lower speed compliance[2].
- Beginning of School Zone: The *Minnesota Manual on Uniform Traffic Control Devices* (MN MUTCD) states that "The beginning point of a reduced school speed limit zone should be at least 200 feet in advance of a school crossing, or other school related activities; however, this 200-foot distance should be increased if the reduced school speed limit is 30 mph or higher." The federal MUTCD provides further guidance stating "300 ft with a 30 mph SZSL and 400 ft with a 35 mph SZSL".

Safe Routes to School Guidance[3] from the National Center for Safe Routes to School identifies the following recommendations for SZSL sign placement.

- The location of the beginning and end of a school speed limit zone should be based on engineering judgment rather than the exact location of the school property line or fence.
- The school speed limit zone should be centered at the location(s) where students cross the roadway.
- The beginning and ending points should be selected with appropriate consideration for the location of other traffic control devices and/or features [such as visual clutter and vegetation] that could affect the implementation [or effectiveness] of the school zone speed limit.

2 Fitzpatrick, K., M.A. Brewer, K.O. Obeng-Boampong, E. Park., and N.D. Trout. Speeds in School Zones. Report No. 0-5470-1. College Station, TX, USA: Texas A&M Transportation Institute, 2009.

3 Reduced School Area Speed Limits, Safe Routes to School Brief Sheet, ITE

Hours of operation

Minnesota Statutes, Section 169.14.5a.(a), states that "such school speed limits shall be in effect when children are present, going to or leaving school during opening or closing hours or during school recess periods." It is up to the roadway authority to determine what signing type will be used to communicate hours of enforcement.

When a SZSL should be enforced is often cited by law enforcement as a challenge in the field, particularly when SZSLs are paired with "when children are present" signing. The use of flashing beacons (whether activated by school administration, by push button, or by timer) when paired with signing such as "when flashing" can help to clarify when the SZSL should be enforced. Additionally, coordination with local law enforcement may help the roadway authority better understand what works best in their community.

Signing and equipment

MN MUTCD

Part 7 of the MN MUTCD outlines the traffic control devices for school areas. All traffic control devices must conform to the requirements of the current Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD). Attached as Appendix B is signing guidance related to SZSLs.

Mounting heights and visibility should be adjusted based on engineering judgement to ensure visibility by motorists. Signs hidden by vegetation or poles should be made visible. The sign placement and panel sizes need to be MN MUTCD compliant. Pavement markings and signs should be replaced if they no longer meet Mn MUTCD standards. Once the route plan has been developed, locations needing new or additional controls can be identified.

Small text such as the hours of enforcement in the photo above may be too small and could easily be missed by motorists.

Additional Controls

In addition to the SZSL signs outlined in the MN MUTCD, other traffic control devices and markings may be used in school zones to communicate with motorists that a reduced speed is required. Some of these common traffic control strategies include:

- Overhead school flasher speed limit sign
- Changeable message sign
- Speed feedback sign or flashing speed signs
- School advance warning and crosswalk signs
- Pavement markings
- Left/right turn restrictions

Many of the sources listed in Table 3.1 of Chapter 3 provide additional information on the traffic control devices and markings listed above.

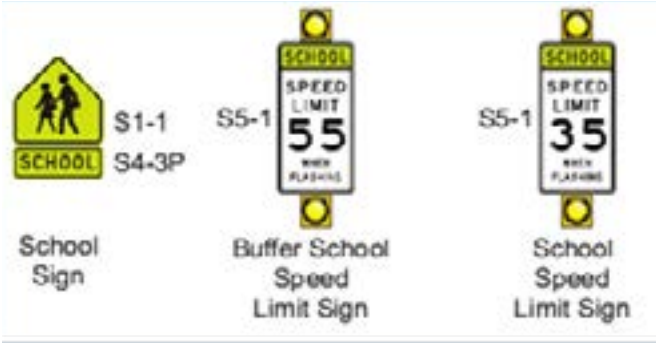
SZSL buffer zone and advance warning signs

With the importance of maintaining smaller speed differentials (15 mph or less) and minimizing the SZSL (<= 35 mph), high-speed roadways may require additional measures to reduce speed limits and driver speeds. Section 7B.16 of the MN MUTCD states that "a Reduced School Speed Limit Ahead (S4-5 or S4-5a) sign should be used to inform road users of a reduced speed zone when the speed limit is being reduced by more than 10 mph or when engineering judgement indicates".

The Texas Department of Transportation (TxDOT) uses a buffered SZSL approach to step down to the desired SZSL closest to the school. This approach has not been widely applied or studied in Minnesota but may provide an opportunity to slow speeds on high-speed roadways when grade-separated crossings are not an option. Appendix E provides a sample application on a 60 mph roadway based on the Texas approach[4]. Roadway authorities interested in this approach are encouraged to reach out to the District Traffic Engineer at MnDOT for further guidance on implementation and evaluation.

Figure 3 – Reduced School Speed Limit Ahead Sign (S4-5, S4-5a), Source MN MUTCD

Figure 4 - SZSL buffer zone signs used on a 70 mph roadway by the TxDOT.



4 FHWA/TX-09/TTI 0-5470-1 Report

Excerpt from the Texas Guidelines for Traffic Control for School Areas:

"Any roadway with an 85th percentile speed greater than 55 mph is to have a buffer zone to transition to a 35-mph school speed limit. Buffer zones permit motorists to travel at the higher posted speeds through both zones when slower speeds are not necessary. An example of a buffer zone is where the regulatory posted speed limit is 70 mph and the school speed limit is 35 mph. In this case a buffer zone of 55 mph can be used on the approach and departure sides of the 35-mph school speed limit zone." (see Figure 4)

"The basic design for a Buffer School Zone (S5-1) sign is the same as for a regular School Speed Limit (S5-1) sign. The SCHOOL SPEED LIMIT XX WHEN FLASHING sign should be used where TxDOT is responsible for signing school speed limit zones and school buffer zones. The buffer zone beacons can be activated up to 5 minutes earlier than the school speed limit zone to eliminate drivers who pass through the buffer zone while it is inactive seeing active beacons only in the lower speed zone."

STEP 5: IMPLEMENTATION

Recording and Reporting

As stated previously, the SZSL process set forth in this document constitutes the "engineering and traffic investigation as prescribed by the commissioner of transportation" under Minnesota Statute 169.14 subd 5a.(a). While it's not a requirement to record and report the process completed in this document to MnDOT, it's recommended that record of this process be completed and retained by the roadway authority. Reporting of this information to MnDOT is voluntary and will be used to help track and evaluate how school zone speed limits are being applied throughout the state.

Appendix D has been provided as a user-friendly reporting worksheet to keep for internal recording and/or to be sent to MnDOT for data collection. It is recommended that the reporting worksheet be signed by a duly certified professional engineer licensed in the State of Minnesota since SZSLs impact the health, safety, and welfare of the general public.

Additional recording and reporting steps are recommended, but not required to satisfy the E&T investigation as prescribed by state statute. These may include updating GIS files and tracking documents such as speed limit and signing databases to reflect changes.

Education and Enforcement

Education and enforcement can help enhance driver awareness and compliance and requires minimal budget. A public education campaign using school newspapers, parent bulletins and local news outlets can help build awareness and understanding for the importance of traffic calming near schools. Coordination with law enforcement to enforce the new SZSL is also important to the overall effectiveness of the posted SZSL.

Evaluation

While evaluation is not a required step to satisfy the engineering and traffic investigation as prescribed by the commissioner of transportation, it is recommended to understand the effectiveness of the SZSL. Suggested evaluation includes:

- Completion of a before-and-after speed study to evaluate the effectiveness of the SZSL (with voluntary reporting to MnDOT)
- A three or five-year review of crash history post implementation to evaluate the effectiveness of the SZSL (with voluntary reporting to MnDOT)

EDUCATION AND ENFORCEMENT ARE COST EFFECTIVE WAYS TO IMPROVE COMPLIANCE

Implementation

Once issues have been identified and additional countermeasures selected, an implementation and funding plan is recommended to assist with follow through. When possible, this process should involve multiple stakeholder agencies such as the roadway authority, city, county or state officials, public safety, and school administrators to encourage follow through and funding acquisition. The reporting worksheet in Appendix D provides a location to document selected complementary countermeasures to improve compliance for SZSLs and lobby for funding. When necessary, temporary installations such as SRTS demonstration projects can provide short term solutions while additional countermeasures are being funded and constructed.

CHAPTER 3 - COMPLEMENTARY COUNTERMEASURES

Chapter 2 outlined the process for setting and implementing a SZSL, but as noted previously, a comprehensive Safe System approach is multifaceted and redundant. Additional safety and speed management countermeasures to complement a SZSL can improve compliance of a SZSL and further improve safety in and around a school zone. These countermeasures typically fall within the "Engineering" section of a SRTS plan or the "Safer Roads" section of a Safe Systems approach. Example countermeasures include elements such as geometric changes to the roadway (bump outs, speed tables, center pedestrian refuge islands, etc) and enhanced signing such as flashing beacons and speed feedback signs.

Table 3.1 provides resources specific to Speed Management Countermeasures and Safe Routes to School best practices.

Table 3.1 – Resources for speed management countermeasures and SRTS best practices

DOCUMENT	YEAR	SUMMARY OF RESOURCE
FHWA Proven Safety Countermeasures website	—	https://highways.dot.gov/safety/proven-safety-countermeasures
Engineering Speed Management Countermeasures (FHWA-SA-14-101)	2014	Summarizes various speed reduction countermeasure, research findings and anticipated reduction in mean and 85th percentile speeds.
Mn Safe Routes to School Resource Index	—	Resource for facility design and other state guidance
Noteworthy Speed Management Practices (FHWA-SA-20-047)	2020	Information for practitioners covering eight case studies highlighting speed management practices.
NCHRP Synthesis 535: Pedestrian Safety Relative to Traffic-Speed Management	2019	Documents known strategies and countermeasures in confined, urban cities for pedestrian safety.
Minnesota's Best Practices for Pedestrian and Bicycle Safety	2021	Provides a mix of treatments that are considered proven strategies, along with emerging treatments that are considered experimental.
MnDOT Speed Safety Cameras TRS	2022	Literature review of before-and-after evaluations of Speed Safety Cameras.
Dakota County School Travel Safety Assessment	2021	Recommends improvements based on safety benefits relative to cost of the treatment.
FHWA Safe Transportation for Every Pedestrian (STEP)	—	A guide to help agencies select pedestrian crash countermeasures at uncontrolled intersections.
FHWA Traffic Calming ePrimer Toolbox	—	Descriptions, applicability, key effects and issues, and design considerations for traffic calming.
Methods and Practices for Setting Speed Limits (FHWA-SA-12-004)	2004	Best practices for location and signing for school zone speed limit, and advance warning assembly recommendations.

Speed Safety Cameras

A Speed Safety Cameras (SSCs) TRS[1] was completed in 2022 to provide a summary of current research on the effectiveness of SSCs, also referred to as Automated Speed Enforcement (ASE). Three US programs were identified that evaluated the use of SSCs within school zones.

All three studies evaluated the impact of SSCs on driver speeds within school zones. Findings indicate that SSCs within school zones are effective at reducing mean vehicle speeds and threshold speeding[2]. The combination of SSCs and flashing beacons within a school zone provided added speed reduction benefits.

One study out of New York City evaluated the effect of SSCs on injury and fatal crashes within school zones[3]. Results from the study showed that SSCs within school zones resulted in a reduction in crashes, particularly those resulting in fatality.

Based on these findings and the 2021 addition of SSCs as a proven safety countermeasure by the Federal Highway Administration[4] (FHWA), it was determined that SSCs were an appropriate countermeasure to pair with SZSLs to improve speed compliance within school zones.

As of the publication date of this document, SSCs are not allowed under Minnesota law. Enabling legislation outlined in the TRS report would be needed before SSCs could be lawfully used within the state.

1 MnDOT TRS2303 – Speed Safety Cameras

2 Threshold speeding refers to motorists driving above the posted speed limit by a certain amount at which point the SSCs would issue a citation. Typically, the threshold speed for issuing a citation is speeds of greater than 10 mph, however, thresholds of greater than 5 mph have also been used on lower speed limit roadways.

3 All school zones included in the NYC SSC study had speed limits of 35 mph or less. New York City DOT. (2014-2017). Automated speed enforcement program report. New York City: NYC DOT.

4 FHWA-SA-21-070. (2021). Proven safety countermeasures, Speed Safety Cameras. US Department of Transportation, Washington DC.

APPENDIX A

ENGINEERING AND TRAFFIC INVESTIGATION

The engineering and traffic investigation (E&T investigation) elements, formerly named the "School Zone Hazard Evaluation", includes an updated checklist of roadway information helpful for assessing and selecting appropriate safety and speed management countermeasures within a school zone. As outlined in Chapter 2 of the *Guide for Establishing School Zone Speed Limits* (SZSLs), some lower speed roadways may meet all best practices for a SZSL and a full engineering and traffic investigation is not recommended nor required prior to implementation. Other roadways such as higher speed roadways, roadways with a history of pedestrian or bicyclist crashes, and/or county and state highways are different environments that require a higher level of evaluation to determine appropriate speeds and additional safety countermeasures.

The following outlines the elements suggested for review when an E&T investigation is recommended under Step 2 of the *Guide for Establishing School Zone Speed Limits*. Once the E&T investigation is complete, refer to Chapter 3 of the guide to identify additional countermeasures that may provide beneficial redundancy and added safety benefits by addressing roadway issues. The reporting of the E&T investigation to MnDOT is not required as part of the implementation process. Appendix D provides an optional reporting worksheet that is recommended to be completed and kept on file for internal record.

ENGINEERING AND TRAFFIC INVESTIGATION ELEMENTS CHECKLIST

☐ Roadway geometry

The width of the road, the width of the shoulders, design speed of turning radii and the number of traffic lanes form the basis of the roadway geometry review. Other roadway features which should be considered are the presence of median refuge islands, curb extensions/bump outs and obstructions such as buildings and foliage or vertical or horizontal curves restricting sight lines.

What to do: Depending on the issues identified, countermeasures such as shoulder widening, median refuge islands, sidewalk/trail construction, and curb extensions/bump outs which shorten crossing distances or the rerouting of children away from a particular area may provide corrective solutions (see Fencing and other barriers).

Motor vehicle traffic volume

Motor vehicle traffic volume should be determined by counting vehicles during peak hours (tabulated by 5- or 15-minute periods) on an average school day, during school student arrival and departure periods. MnDOT's traffic mapping application provides quick access to traffic volumes on many state aid roadways and can supplement and verify manual counts obtained for a location. Frequently, requests for school zones are based on motorist concerns for a lack of safe turning opportunities during peak periods. If gaps in motor vehicle traffic are a concern within the school zone, a gap study should be conducted.

What to do: Roadways with limited gaps in motor vehicle traffic during peak hours may benefit from countermeasures such as turning restrictions or police traffic control during these peak volume periods which often include increased pedestrian activity to improve traffic flow and reduce motorist distractions.

Rerouting may be used to effectively increase management of vehicular traffic by directing students to intersections where control devices are already in place. Rerouting works well and is typically a cost-effective option. School routes should direct students to cross at the lowest vehicle volume streets wherever possible. Higher traffic volume roadways often require additional controls to facilitate safe pedestrian crossings. See Chapter 3 for links to resources for pedestrian crossing facilitation.

Non-motorist volumes

Non-motorist volume counts capture the number of people walking, rolling (using a wheelchair or scooter) and biking. This data may be obtained by counting people walking, rolling and biking on an average school day, or by contacting school authorities who may have volume information. Volumes should be collected at critical intersections or access locations. Ultimately, the ability of a pedestrian or bicyclist to cross the street is dependent on gaps in traffic. Consider using a pedestrian crossing study to evaluate gaps in traffic and pedestrian delay.

What to do: A large pedestrian volume concentrated at a specific location with an appropriate crossing treatment is safer than a spread out crossing over a larger area. The primary method of concentrating pedestrians is the school route plan. Studies have shown that drivers respond favorably with increased care in driving when child pedestrians are visibly present; and if the school route plan is properly devised, students will be increasingly concentrated as they approach the school. Chapter 8 of the Facility Design Guide[1] provides information on evaluating non-motorized facilities.

1 Facility Design Guide https://roaddesign.dot.state.mn.us/facilitydesign.aspx

Traffic control devices and lighting

Traffic control devices include but are not limited to: school crossing signs, pavement markings, signals, crossing guards, school zone warning signs, speed limit signs, stop signs, traffic signals, Rectangular Rapid Flashing Beacons (RRFBs) and HAWK (High-intensity Activated crossWalK) beacons. These items should be precisely noted on the school route plan and a walk through and drive through of the site should be completed in both directions to note visibility and condition of devices. In addition, a review during periods of darkness is recommended to determine the retroreflectivity of signs and condition of pavement markings. If any pedestrian crashes have occurred outside of daylight hours, evaluate if existing street lighting is adequate or needs additional intensity or the placement of additional fixtures.

What to do: All traffic control devices must conform to the requirements of the current Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD). Signs hidden by vegetation or poles should be made visible. Sign placement locations and minimum sign panel heights should be in accordance with the specifications listed in the MN MUTCD. Pavement markings and signs should be replaced if they no longer meet minimum agency standards. Once a school route plan has been developed, locations needing new or additional controls will be apparent. Locations that have crossing guards should have signs and crosswalk pavement markings. Intersections may also have supplemental stop bars if stop signs or signals are present. Pedestrian walk signals should be checked for adequate crossing time based upon the pedestrian counts above and the crossing length. Any traffic control device that is not compliant with the MN MUTCD should be removed or updated to meet requirements.

Parking and loading zones

Parking and school bus and motorist loading zones should be identified on the street receiving the SZSL.

What to do: Ensure that parking and loading areas do not interfere with visibility at crossing locations and remove parking/loading when necessary to improve sight lines. This includes observation of vehicle queues that typically form in these areas.

Sidewalks

Sidewalks should be marked on the school route plan. Width and condition of the sidewalk and curb ramps should also be noted as well as compliance with current Americans with Disabilities ACT (ADA) standards.

What to do: The installation of sidewalks along streets creates a safe area to walk or roll and reduce exposure for vulnerable roadway users. Intermittent gaps or broken sections in the sidewalk pathway system cause pedestrians or bicyclists to enter the road at unexpected locations or limit accessibility. Sidewalks on both sides of the street can benefit both motorists and pedestrians/bicyclists by discouraging crossings when the sidewalk ends or is unusable. Proper maintenance of sidewalks in the winter is also important. Sidewalks play an important role in devising a school route plan. Identified missing sections of sidewalk, poor conditions, or new path locations should be noted.

Crash history

A three to five year analysis of all crashes is recommended. If the area studied includes high-crash locations, they should be identified with an indication of types of crashes, crash rates and comparison to the Critical Crash Rate (CCR) and Critical Fatal and Severity Rate (FAR). The CCR and FAR are statistical rates that are unique to each intersection and based on vehicular exposure and the Statewide average crash and severity rates for similar intersections. The CCR and FAR provide a statistical threshold for screening intersections and segment safety concerns, indicating a location requiring further review.

What to do: High crash locations demand intensive study and positive action. The nature and time of the crashes should be considered to determine whether they are school related and whether these crashes are impacting pedestrian safety. Crashes should be analyzed considering the previously mentioned items in this investigation such that possible solutions such as sidewalks, crosswalks, speed limit reductions, traffic control device installations, etc. may be identified to prevent reoccurring type crashes. If hazards cannot be eliminated by proper use of standard control devices, reroute students away from the area. If a pattern of crashes is discovered, a recommended course of action should be identified.

While vehicle-to-vehicle type crashes may not directly impact pedestrian safety, if they are occurring at the school entrance they can be disrupting to traffic and pedestrians.

Crash analysis should always be completed with the broader context in mind. While specific crash types and frequencies may not be present in a specific instance, the analysis should keep larger trends in mind while identifying recommendations. The road authority should be involved in the review and identification of appropriate solutions.

Fencing and other barriers

Identify existing fencing locations and/or locations which may benefit from fencing.

What to do: Like sidewalks, relatively little fencing can drastically alter walking patterns. Used along school grounds it can effectively prevent students from crossing mid-block and lead pedestrians to safe crossing locations. It also prevents bouncing balls from entering the street. Adding fencing along selected school routes and school playgrounds can be an important part of pedestrian protection and control. Community engagement is critical to ensure the fence provides safety but does not introduce new barriers to walking.

APPENDIX A

Motor vehicle speed

A speed study should be performed to understand the current operating speeds of motorists and the present compliance rates for the posted or normal speed limit and verify if the normal speed limit is appropriate.

What to do: When low speed limit compliance is found, the resources in Chapter 3 should be reviewed for additional speed management countermeasure guidance from FHWA. Changes to roadway geometry, vehicle speed dynamic feedback signs and traffic controls can improve motorist compliance and also be a complementary countermeasure for a SZSL. Adjusting the road character through design countermeasures is the preferred approach to improved speed compliance versus adjusting the speed limit or SZSLs upward to match existing driver speeds.

Stopping sight distance (SSD) calculations should be made by a qualified engineering professional based on field data collection and guidance from the MnDOT Road Design Manual/Facility Design Guide. The standard design parameters apply: an assumed 3.5-foot height of motorist eye and a 2.0-foot object height for SSD.

Land use and pedestrian generators

Pedestrian generators near schools should be reviewed, including nearby recreational trails and facilities, transit stops and commercial destinations. The MnDOT SPACE tool shows priority areas around the state for walking based on equity, safety, health, infrastructure, and land use factors.

Such generators and land uses near schools can impact how students and motorists travel within the school area, the routes taken and how and where they interact. Nearby freight routes and activity may also impact school travel characteristics.

Before or after school destinations may not be limited to residential or school facilities, particularly for middle and high school age students. Understanding the desired destinations beyond the home can help identify crossing locations where students may need additional support to cross safely or redirection when a safe crossing is not available.

Obstructions and vegetation

The physical environment beyond the roadway such as buildings, infrastructure and vegetation can impede visibility. Occasionally a sight distance restriction can be corrected by cutting back brush, but obstructions from buildings and other permanent objects are more difficult to correct and may need additional signing or countermeasure to increase awareness of limited visibility. SSD calculations should also be completed as directed under the Motor vehicle speed section.

Other considerations

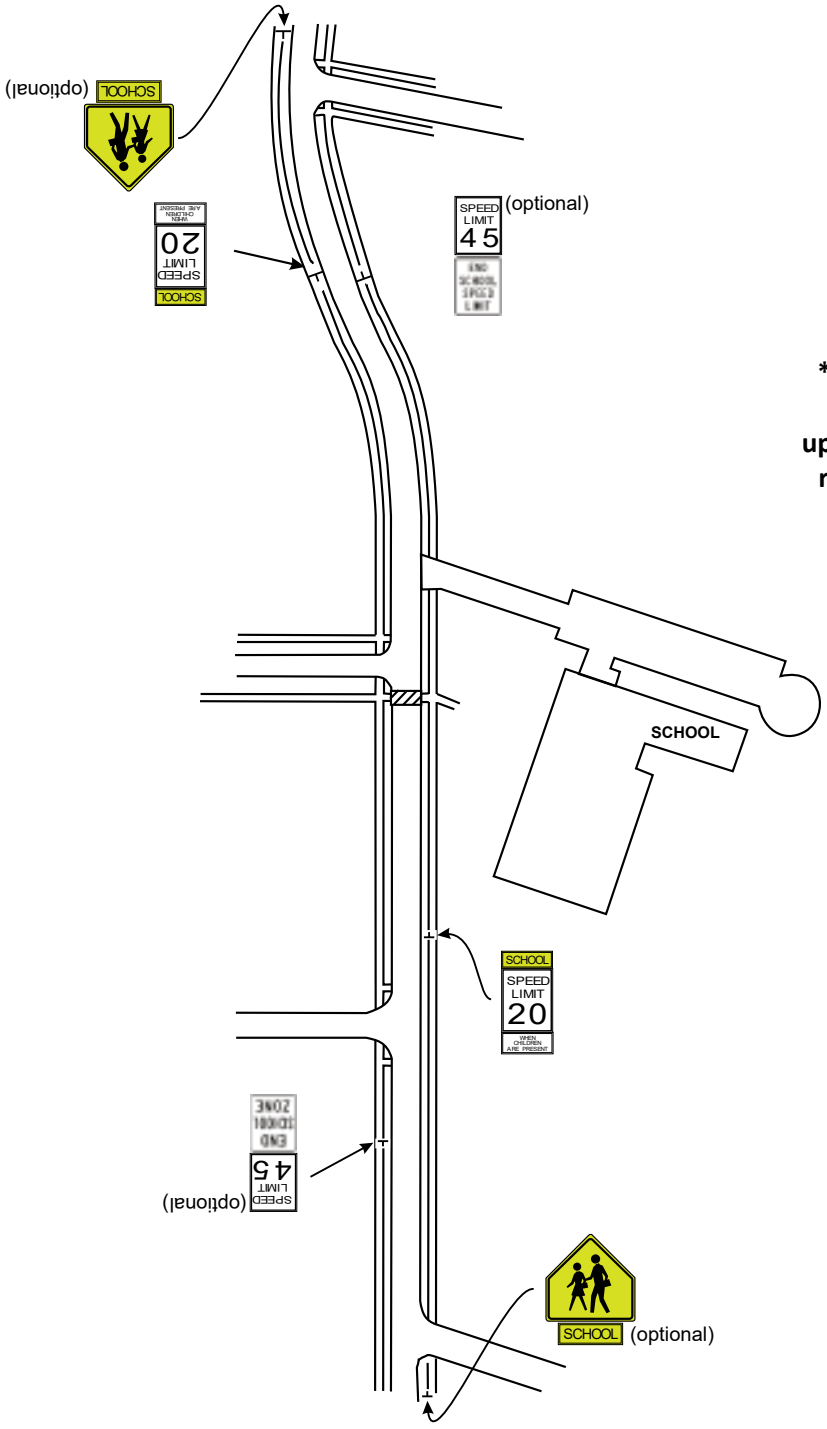
Additional information helpful to select appropriate safety and speed management countermeasures includes but is not limited to:

- Roadway classification
  - Intersection spacing
  - Driveway density
- Roadway owner
- Student enrollment/modal mix

The MnDOT Traffic Engineering Manual[2] (Chapter 14) provides additional guidance on traffic and engineering investigation requirements to establish or change regulatory speed limits.

2 MnDOT Traffic Engineering Manual: https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=17667711

MN MUTCD – SCHOOL SPEED LIMIT SIGNS AND ADVANCE SCHOOL SPEED LIMIT SIGNS



***This information is current as of the date of this document. It is up to the user of this document to review the current version of the MN MUTCD for updates.**

Figure 7B-3. Example of Signing for a Higher Fines School Zone with a School Speed Limit

December, 2011 7B-4

MN MUTCD – SCHOOL SPEED LIMIT SIGNS AND ADVANCE SCHOOL SPEED LIMIT SIGNS

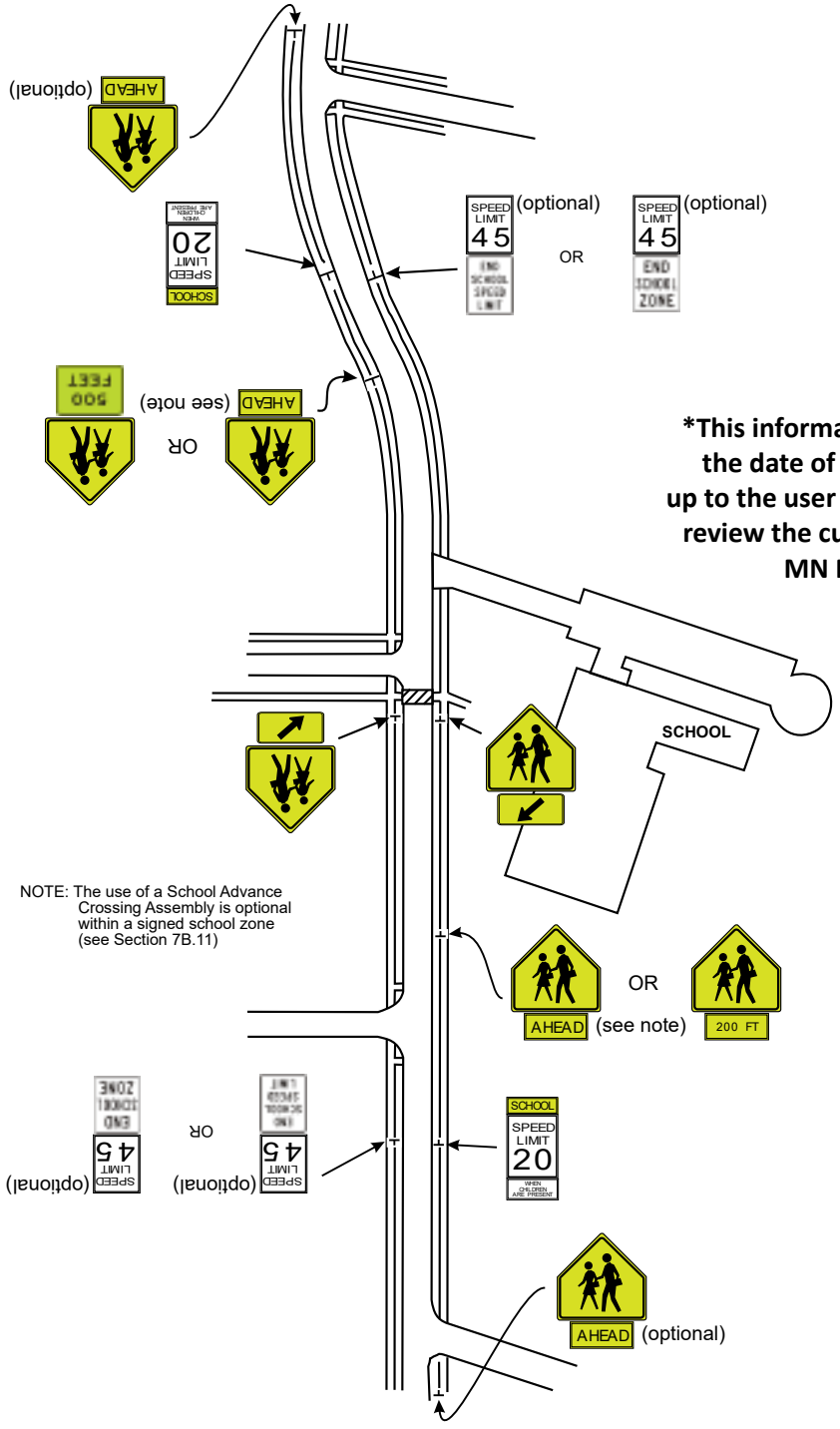
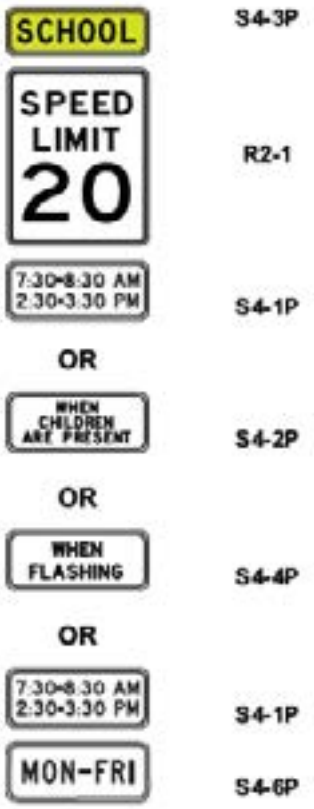


Figure 7B-5. Example of Signing for a School Zone with a School Speed Limit and a School Crossing

Mn Rev. 2

7B.15 School Speed Limit Assembly (S4-1, S4-2, S4-3P, S4-4, S4-6, S5-1) and END SCHOOL SPEED LIMIT Sign (S5-3)



Standard

A School Speed Limit assembly or a School Speed Limit (S5-1) sign shall be used to indicate the speed limit where a reduced school speed limit zone has been established based upon an engineering study or where a reduced school speed limit is specified for such areas by statute. The School Speed Limit assembly or School Speed Limit sign shall be placed at or as near as practical to the point where the reduced school speed limit zone begins (see Figures 7B-3 and 7B-5). It shall be used in conjunction with the School Advance Warning sign (see Section 7B.8).

If a reduced school speed limit zone has been established, a School (S1-1) sign shall be installed in advance (see Table 2C-4 for advance placement guidelines) of the first School Speed Limit sign assembly or S5-1 sign that is encountered in each direction as traffic approaches the reduced school speed limit zone (see Figures 7B-3 and 7B-5).

Guidance

Where increased fines are imposed for traffic violations within a reduced school speed limit zone, a FINES HIGHER (R2-6P), FINES DOUBLE (R2-6aP), or $XX FINE (R2- 6bP) plaque (see Figure 2B-3) should be installed as a supplement to the reduced school speed limit sign to notify road users.

Standard

Except as provided in paragraph one of the following Option, the downstream end of an authorized and posted reduced school speed limit zone shall be identified with an END SCHOOL SPEED LIMIT (S5-3) sign (see Figure 7B-5).

Option

If a reduced school speed limit zone ends at the same point as a higher fines zone, an END SCHOOL ZONE (S5- 2) sign may be used instead of a combination of an END HIGHER FINES ZONE (R2-11) sign and an END SCHOOL SPEED LIMIT (S5-3) sign.

A standard Speed Limit sign showing the speed limit for the section of highway that is downstream from the authorized and posted reduced school speed limit zone may be mounted on the same post above the END SCHOOL SPEED LIMIT (S5-3) sign or the END SCHOOL ZONE (S5-2) sign.

Guidance

The beginning point of a reduced school speed limit zone should be at least 200 feet in advance of a school crossing, or other school related activities; however, this 200-foot distance should be increased if the reduced school speed limit is 30 mph or higher.

Standard

The School Speed Limit Assembly shall be either a fixed-message sign assembly or a changeable message sign.

The fixed-message School Speed Limit assembly shall consist of a top plaque (S4-3P) with the legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1P, S4-2P, S4-4P, or S4-6P) indicating the specific periods of the day and/or days of the week that the special school speed limit is in effect.

Option

Changeable message signs (see Chapter 2L and Section 6F.60) may be used to inform drivers of the school speed limit. If the sign is internally illuminated, it may have a white legend on a black background. Changeable message signs with flashing beacons may be used for situations, where greater emphasis of the special school speed limit is needed.

Guidance

Even though it might not always be practical because of special features to make changeable message signs conform in all respects to the standards in this Manual for fixed message signs, during the periods that the school speed limit is in effect, their basic shape, message, legend layout, and colors should comply with the standards for fixed-message signs.

A confirmation light or device to indicate that the speed limit message is in operation should be considered for inclusion on the back of the changeable message sign.

If supplemental plaques S4-1P or S4-2P are used to indicate the periods during which the school speed limit is in effect, considerations should be given to increasing the sign sizes to provide improved legibility. Section 2A.13, Table 7B-1 provides guidance regarding larger signs.

Mn Rev. 9

Standard

Fluorescent yellow-green pixels shall be used when the "SCHOOL" message is displayed on a changeable message sign for a school speed limit.

Option

Changeable message signs may use blank-out messages or other methods in order to display the school speed limit only during the periods it applies.

A Speed Limit Sign Beacon (see Section 4L.4) also may be used, with a WHEN FLASHING legend, to identify the periods that the school speed limit is in effect.

Support

Under the provisions of Minnesota Statutes, Section 169.14, Subd. 5a, the Minnesota Department of Transportation has developed the publication "A Guide to Establishing Speed Limits in School Zones" describing the procedures for establishing school speed limits in Minnesota (see Chapter 7E).

Mn Rev. 1

7B.16 Reduced School Speed Limit Ahead Sign (S4-5, S4-5a)

S4-5

S4-5a

Guidance

A Reduced School Speed Limit Ahead (S4-5, S4-5a) sign should be used to inform road users of a reduced speed zone where the speed limit is being reduced by more than 10 mph, or where engineering judgment indicates.

Standard

If used, the Reduced School Speed Limit Ahead sign shall be followed by a School Speed Limit sign or a School Speed Limit assembly.

The speed limit displayed on the Reduced School Speed Limit Ahead sign shall be identical to the speed limit displayed on the subsequent School Speed Limit sign or School Speed Limit assembly.

7B.17 Parking and Stopping Signs (R7 and R8 Series)

Mn Rev. 1

Option

Parking and stopping regulatory signs may be used to prevent parked or waiting vehicles from blocking pedestrians' views, and drivers' views of pedestrians, and to control vehicles as a part of the school traffic plan.

Support

Parking signs and other signs governing the stopping and standing of vehicles in school areas cover a wide variety of regulations. Typical examples of regulations are as follows:

A. No Parking 8:00 AM to 5:00 PM School Days Only;
B. No Stopping 8:00 AM to 5:00 PM School Days Only;
C. 5 Min Loading 8:00 AM to 5:00 PM School Days Only; and
D. No Standing 8:00 AM to 5:00 PM School Days Only.

Sections 2B.46, 2B.47, and 2B.48 contain information regarding the signing of parking regulations in school zone areas.

APPENDIX C

SAMPLE SCHOOL ROUTE PLANS

Dakota County School Route Plan Example

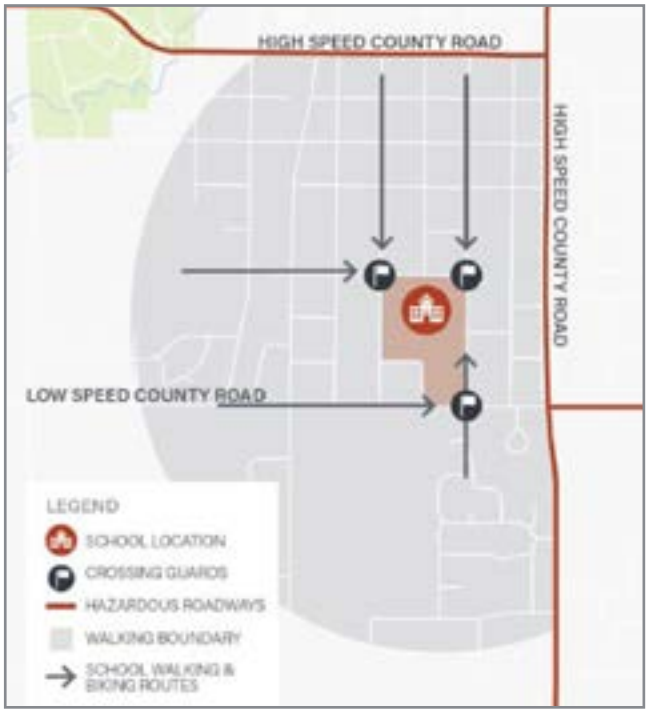
A school route plan is a requirement before consideration of other treatments such as school crossing enhancements and evaluation of SZSL. A school route plan should be developed before any new infrastructure treatments are considered. An example of a school route plan from the Dakota County School Travel Safety Assessment is shown in Figure C-1 and the plan includes:

- School location
- Walk zone (also referred to as walkshed) of the school
- Primary walking and biking routes from each area of the walk zone
- Locations of school crossings and crossing guards

School routes and the school route plan are described in more detail in Section 7A.2 of the Minnesota Manual on Uniform Traffic Control Devices.

Figure C-1 – Dakota County Example School Route Plan

(Source: Dakota County School Travel Safety Assessment)



APPENDIX C

Minnesota Safe Routes to School Program School Route Plan Example

The following information is provided by the MN SRTS program for School Route Plan identification.

MN SRTS - School Route Plan identification:

Walk and Bike Route Maps show: stop signs, signals, crosswalks, sidewalks, paths/trails, crossing guard locations, and hazardous locations around a school. These can be used by families to identify the best way to walk or bike to school. District liability concerns are sometimes cited as reasons not to publish walking route maps. While no walking route will ever be completely free of pedestrian safety concerns, a well-defined route should provide the greatest physical separation between walking students and traffic, expose students to the lowest traffic speeds and use the fewest and safest roadway crossings.

Target Audience: Elementary, middle school, high school, caregivers

Format: Information for caregivers and students

Outcomes: Improved walking/bicycling safety behavior, increased walking, increased bicycling

Discussion Questions: Are you aware of suggested walking and biking routes in your neighborhood? Would this resource be most valuable in print or online format?

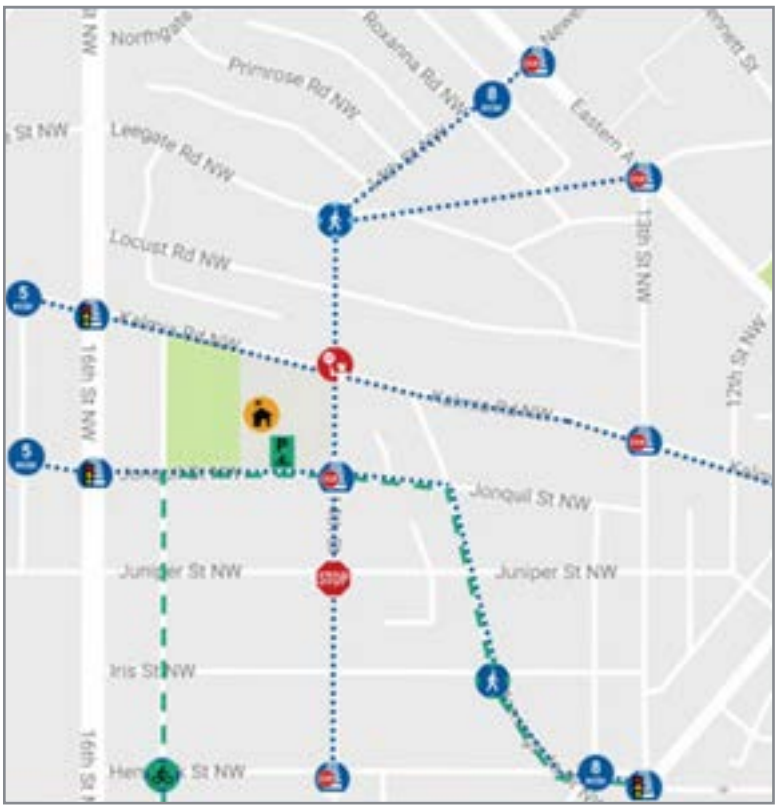


Figure C-2 – Walk and bike route map from the SRTS Guide to Pedestrian & Bicyclist Maps

APPENDIX D

REPORTING WORKSHEET

School Zone Speed Limits (SZSLs)

This worksheet helps document the five-step process for setting a school zone speed limit (SZSL) as outlined in the 2023 *Guide for Establishing a School Zone Speed Limit*. The completion of this document is recommended for recording and reporting purposes. This information is *not* required to be completed or submitted to MnDOT for approval. Reporting of this information to MnDOT is voluntary and will be used to help the State track and evaluate how SZSLs are being applied throughout the state.

School Zone Information

School Name:

_____

Grades: _____ Existing speed limit = ____ mph

☐ School Route Plan Attached

Existing speed management countermeasures:

_____

3-5 Year Crash History

☐ No

☐ Yes, Explain:

_____

_____

_____

_____

Conditions Identified in Figure A of the *Guide for Establishing a SZSL*

The selected SZSL is _____ mph

☐ The selected SZSL is not lower than 15 mph* (or 20 mph on a trunk highway), AND

☐ The selected SZSL is not more than 30 mph* below the existing speed limit

* This information summarizes the existing Minnesota state statute (Statute 169.14.5a) for SZSLs at the time this document was published. It is the responsibility of the reader to review current state statutes when using this document to ensure that no changes have occurred after publication.

☐ ***Condition 1 –***

Satisfies best practices

- No Engineering & Traffic Investigation required unless there is a history of non-motorist crashes
- Additional countermeasures are recommended if there is a history of non-motorist crashes or pedestrian safety is the justification for the SZSL
- No "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs recommended

☐ ***Condition 2 –***

Satisfies some, but not all best practices

- Engineering & Traffic Investigation required
- No "Reduced Speed Limit Ahead" or buffer SZSL recommended
- Additional countermeasures should be considered regardless of crash history, if pedestrian safety is the justification for the SZSL

☐ ***Condition 3 –***

Does not satisfy best practices without additional countermeasures

- Engineering & Traffic Investigation required
- "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs required
- Additional countermeasures should be considered regardless of crash history

Buffer Recommended

☐ No

☐ Yes. If so, identify buffer sign type and placement. _____

If an Engineering & Traffic Investigation was conducted, identify included elements

- ☐ Roadway geometry
- ☐ Motor vehicle volumes
- ☐ Non-motorist volumes
- ☐ Traffic control devices and lighting
- ☐ Parking and loading zones
- ☐ Sidewalks
- ☐ Crash history
- ☐ Fencing and other barriers
- ☐ Motor vehicle speed
- ☐ Obstructions and vegetation
- ☐ Land use and pedestrian generators

Other considerations

- ☐ **Roadway classification**
  - ☐ **Intersection spacing**
  - ☐ **Driveway density**
- ☐ **Roadway owner**
- ☐ **Student enrollment/modal mix**
- ☐ **Other:** _____

Complementary Countermeasures Selected:

☐ No

☐ Yes. If so, describe additional countermeasures selected and date of anticipated implementation:

_____

_____

_____

Contact Information

Name of Roadway Authority: _____

Name of Roadway Authority Representative: _____

Signature: _____ Date: _____

Note: It's recommended that this document be signed by a duly certified professional engineer since SZSLs impact the health, safety, and welfare of the general public.

If you would like to participate in voluntary reporting to MnDOT, send the completed form to the MnDOT Office of Traffic Engineering at traffic.dot@state.mn.us.

REPORTING WORKSHEET: SCHOOL ZONE SPEED LIMITS (SZSLs)

EXAMPLE Urban Residential 30 mph Roadway

This worksheet helps document the five-step process for setting a school zone speed limit (SZSL) as outlined in the 2023 *Guide for Establishing a School Zone Speed Limit*. The completion of this document is recommended for recording and reporting purposes. This information is *not* required to be completed or submitted to MnDOT for approval. Reporting of this information to MnDOT is voluntary and will be used to help the State track and evaluate how SZSLs are being applied throughout the state.

School Zone Information

School Name:

Urban Residential Example

Grades: **K-6** Existing speed limit = **30** mph

☑ School Route Plan Attached

Existing speed management countermeasures:

High visibility crosswalks and marked SZ crossings

3-5 Year Crash History

☑ No

☐ Yes, Explain:

Conditions Identified in Figure A of the *Guide for Establishing a SZSL*

The selected SZSL is **20** mph

☑ The selected SZSL is not lower than 15 mph* (or 20 mph on a trunk highway), AND

☑ The selected SZSL is not more than 30 mph* below the existing speed limit

* This information summarizes the existing Minnesota state statute (Statute 169.14.5a) for SZSLs at the time this document was published. It is the responsibility of the reader to review current state statutes when using this document to ensure that no changes have occurred after publication.

☑ ***Condition 1 –***

Satisfies best practices

- No Engineering & Traffic Investigation required unless there is a history of non-motorist crashes
- Additional countermeasures are recommended if there is a history of non-motorist crashes or pedestrian safety is the justification for the SZSL
- No "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs recommended

☐ ***Condition 2 –***

Satisfies some, but not all best practices

- Engineering & Traffic Investigation required
- No "Reduced Speed Limit Ahead" or buffer SZSL recommended
- Additional countermeasures should be considered regardless of crash history, if pedestrian safety is the justification for the SZSL

☐ ***Condition 3 –***

Does not satisfy best practices without additional countermeasures

- Engineering & Traffic Investigation required
- "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs required
- Additional countermeasures should be considered regardless of crash history

EXAMPLE Urban Residential 30 mph Roadway

Buffer Recommended

☑ No

☐ Yes. If so, identify buffer sign type and placement. _____

If an Engineering & Traffic Investigation was conducted, identify included elements

- ☐ Roadway geometry
- ☐ Motor vehicle volumes
- ☐ Non-motorist volumes
- ☐ Traffic control devices and lighting
- ☐ Parking and loading zones
- ☐ Sidewalks
- ☐ Crash history
- ☐ Fencing and other barriers
- ☐ Motor vehicle speed
- ☐ Obstructions and vegetation
- ☐ Land use and pedestrian generators

Other considerations

- ☐ **Roadway classification**
  - ☐ **Intersection spacing**
  - ☐ **Driveway density**
- ☐ **Roadway owner**
- ☐ **Student enrollment/modal mix**
- ☐ **Other:** _____

Complementary Countermeasures Selected:

☐ No

☑ Yes. If so, describe additional countermeasures selected and date of anticipated implementation:

When flashing sign selected to improve compliance and clarify to law enforcement when SZSL is in effect. Add parking restrictions to all legs of the intersection of Road A and Road B. Expected to be implemented summer of 2024.

Contact Information

Name of Roadway Authority: _____

Name of Roadway Authority Representative: _____

Signature: _____ Date: _____

Note: It's recommended that this document be signed by a duly certified professional engineer since SZSLs impact the health, safety, and welfare of the general public.

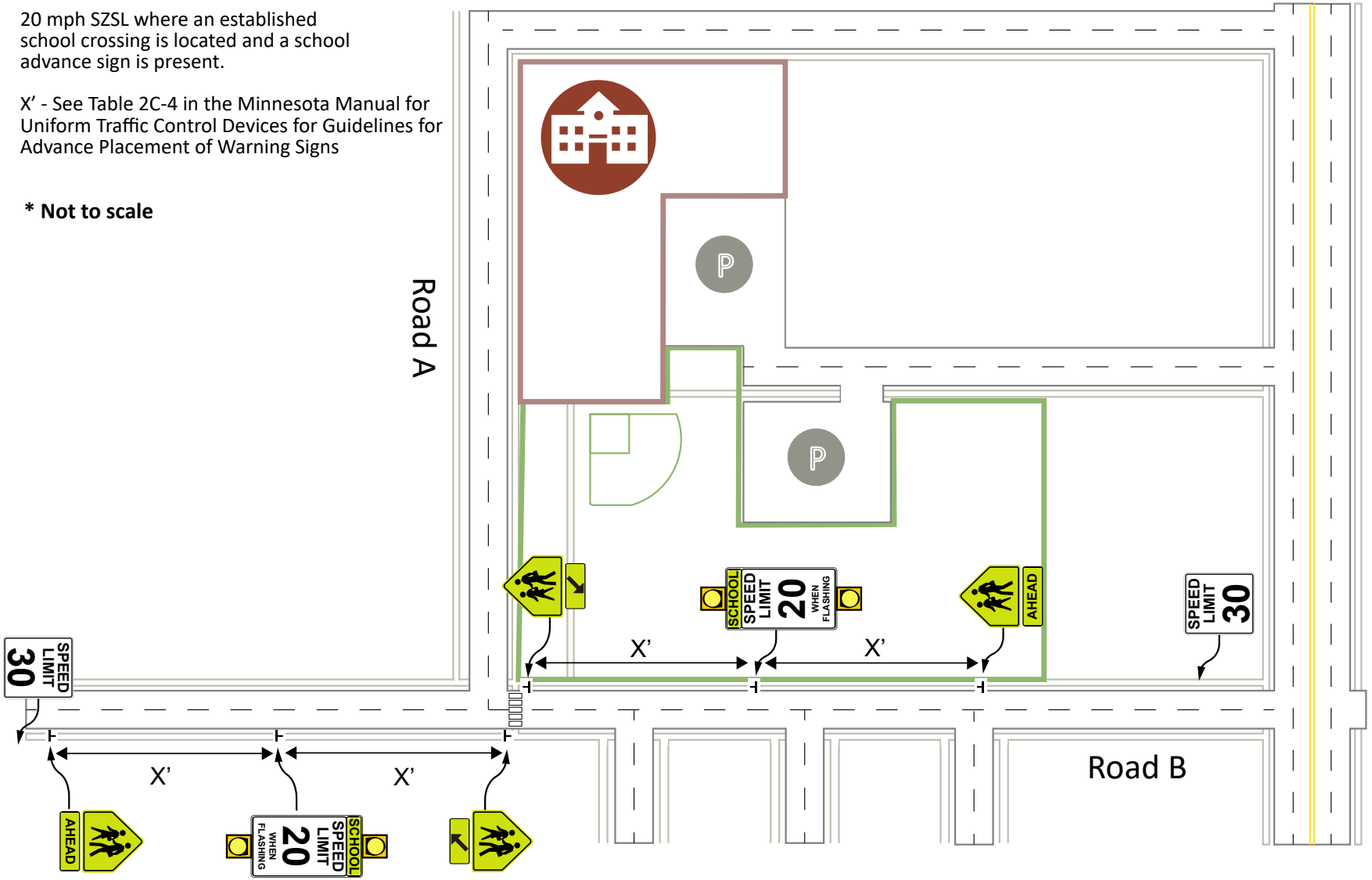
If you would like to participate in voluntary reporting to MnDOT, send the completed form to the MnDOT Office of Traffic Engineering at traffic.dot@state.mn.us.

Urban Residential - 30 MPH Roadway

20 mph SZSL where an established school crossing is located and a school advance sign is present.

X' - See Table 2C-4 in the Minnesota Manual for Uniform Traffic Control Devices for Guidelines for Advance Placement of Warning Signs

*** Not to scale**



REPORTING WORKSHEET: SCHOOL ZONE SPEED LIMITS (SZSLs)

EXAMPLE Suburban Residential 40 mph Roadway

This worksheet helps document the five-step process for setting a school zone speed limit (SZSL) as outlined in the 2023 *Guide for Establishing a School Zone Speed Limit*. The completion of this document is recommended for recording and reporting purposes. This information is *not* required to be completed or submitted to MnDOT for approval. Reporting of this information to MnDOT is voluntary and will be used to help the State track and evaluate how SZSLs are being applied throughout the state.

School Zone Information

School Name:

Suburban Residential Example

Grades: **6-8** Existing speed limit = **40** mph

☑ School Route Plan Attached

Existing speed management countermeasures:

None

3-5 Year Crash History

☑ No

☐ Yes, Explain:

_____

_____

_____

_____

Conditions Identified in Figure A of the *Guide for Establishing a SZSL*

The selected SZSL is **25** mph

☑ The selected SZSL is not lower than 15 mph* (or 20 mph on a trunk highway), AND

☑ The selected SZSL is not more than 30 mph* below the existing speed limit

* This information summarizes the existing Minnesota state statute (Statute 169.14.5a) for SZSLs at the time this document was published. It is the responsibility of the reader to review current state statutes when using this document to ensure that no changes have occurred after publication.

☐ ***Condition 1 –***

Satisfies best practices

- No Engineering & Traffic Investigation required unless there is a history of non-motorist crashes
- Additional countermeasures are recommended if there is a history of non-motorist crashes or pedestrian safety is the justification for the SZSL
- No "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs recommended

☐ ***Condition 2 –***

Satisfies some, but not all best practices

- Engineering & Traffic Investigation required
- No "Reduced Speed Limit Ahead" or buffer SZSL recommended
- Additional countermeasures should be considered regardless of crash history, if pedestrian safety is the justification for the SZSL

☑ ***Condition 3 –***

Does not satisfy best practices without additional countermeasures

- Engineering & Traffic Investigation required
- "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs required
- Additional countermeasures should be considered regardless of crash history

EXAMPLE Suburban Residential 40 mph Roadway

Buffer Recommended

☐ No

☑ Yes. If so, identify buffer sign type and placement. **S4-5a placed in advance of SZSL in each direction**

If an Engineering & Traffic Investigation was conducted, identify included elements

- ☑ Roadway geometry
- ☑ Motor vehicle volumes
- ☑ Non-motorist volumes
- ☐ Traffic control devices and lighting
- ☑ Parking and loading zones
- ☑ Sidewalks
- ☑ Crash history
- ☐ Fencing and other barriers
- ☑ Motor vehicle speed
- ☑ Obstructions and vegetation
- ☑ Land use and pedestrian generators

Other considerations

- ☑ **Roadway classification**
  - ☑ **Intersection spacing**
  - ☑ **Driveway density**
- ☑ **Roadway owner**
- ☐ **Student enrollment/modal mix**
- ☐ **Other:** _____

Complementary Countermeasures Selected:

☐ No

☑ Yes. If so, describe additional countermeasures selected and date of anticipated implementation:

When flashing sign selected to improve compliance and clarify to law enforcement when SZSL is in effect. Add parking restrictions to all legs of the intersection of Road A and Road B. Expected to be implemented summer of 2024.

Contact Information

Name of Roadway Authority: _____

Name of Roadway Authority Representative: _____

Signature: _____ Date: _____

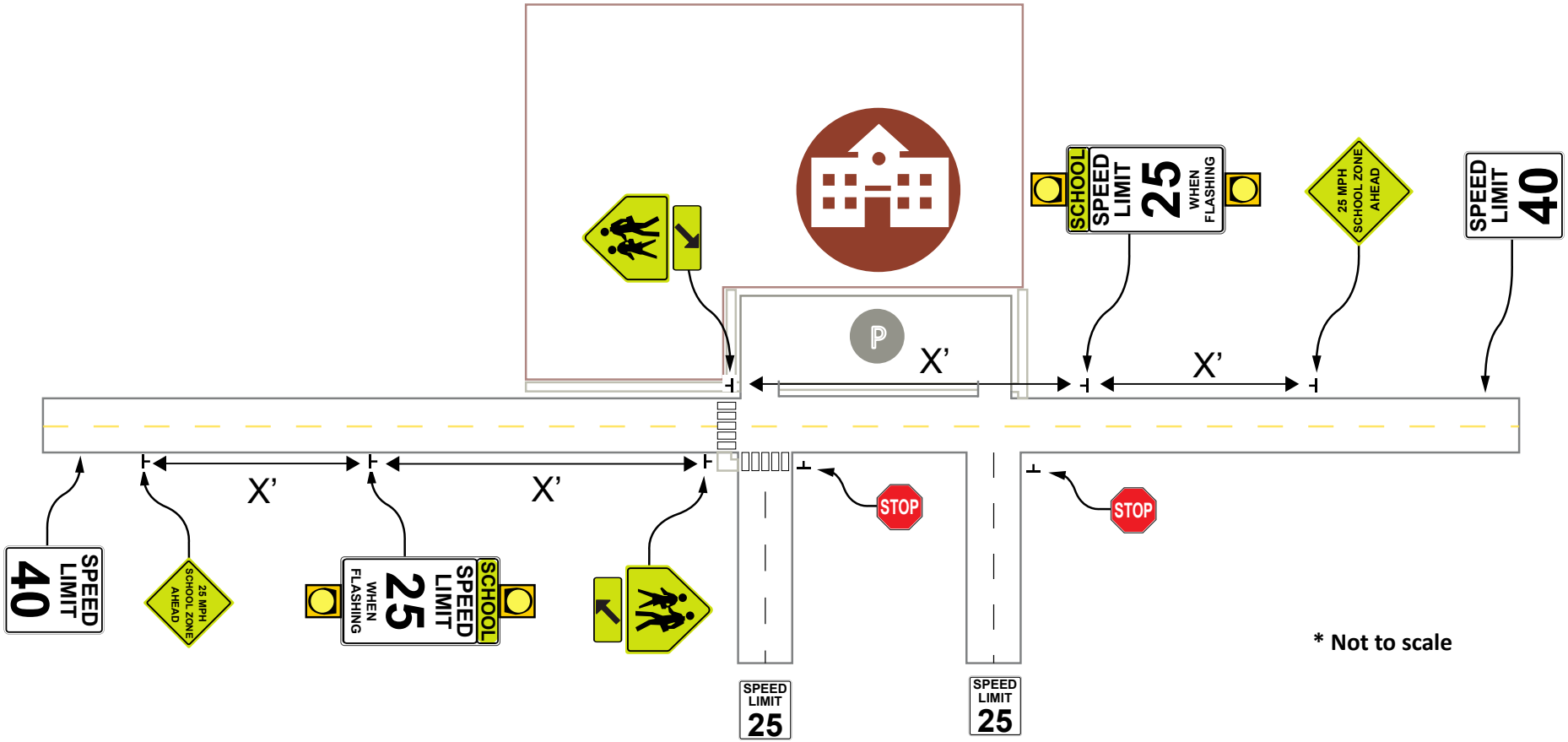
Note: It's recommended that this document be signed by a duly certified professional engineer since SZSLs impact the health, safety, and welfare of the general public.

If you would like to participate in voluntary reporting to MnDOT, send the completed form to the MnDOT Office of Traffic Engineering at traffic.dot@state.mn.us.

Suburban Residential - 40 MPH Roadway

25 mph SZSL with Reduced School Speed Limit Ahead Sign (S4-5a)

X' - See Table 2C-4 in the Minnesota Manual for Uniform Traffic Control Devices for Guidelines for Advance Placement of Warning Signs



APPENDIX E

REPORTING WORKSHEET: SCHOOL ZONE SPEED LIMITS (SZSLs)

EXAMPLE Rural High-Speed 60 mph Roadway

This worksheet helps document the five-step process for setting a school zone speed limit (SZSL) as outlined in the 2023 *Guide for Establishing a School Zone Speed Limit*. The completion of this document is recommended for recording and reporting purposes. This information is *not* required to be completed or submitted to MnDOT for approval. Reporting of this information to MnDOT is voluntary and will be used to help the State track and evaluate how SZSLs are being applied throughout the state.

School Zone Information

School Name:

Rural High-Speed Example

Grades: **K-12** Existing speed limit = **60** mph

☑ School Route Plan Attached

Existing speed management countermeasures:

None

3-5 Year Crash History

☐ No

☑ Yes, Explain:

Severe injury pedestrian crash in the past five years.

Conditions Identified in Figure A of the *Guide for Establishing a SZSL*

The selected SZSL is **25** mph

☑ The selected SZSL is not lower than 15 mph* (or 20 mph on a trunk highway), AND

☑ The selected SZSL is not more than 30 mph* below the existing speed limit

* This information summarizes the existing Minnesota state statute (Statute 169.14.5a) for SZSLs at the time this document was published. It is the responsibility of the reader to review current state statutes when using this document to ensure that no changes have occurred after publication.

☐ ***Condition 1 –***

Satisfies best practices

- No Engineering & Traffic Investigation required unless there is a history of non-motorist crashes
- Additional countermeasures are recommended if there is a history of non-motorist crashes or pedestrian safety is the justification for the SZSL
- No "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs recommended

☐ ***Condition 2 –***

Satisfies some, but not all best practices

- Engineering & Traffic Investigation required
- No "Reduced Speed Limit Ahead" or buffer SZSL recommended
- Additional countermeasures should be considered regardless of crash history, if pedestrian safety is the justification for the SZSL

☑ ***Condition 3 –***

Does not satisfy best practices without additional countermeasures

- Engineering & Traffic Investigation required
- "Reduced Speed Limit Ahead" signs (S4-5 or S4-5a) or buffer SZSLs required
- Additional countermeasures should be considered regardless of crash history

EXAMPLE Rural High-Speed 60 mph Roadway

Buffer Recommended

☐ No

☑ Yes. If so, identify buffer sign type and placement. **SZSL buffer zone with a 45mph to 35 mph step down**

If an Engineering & Traffic Investigation was conducted, identify included elements

- ☑ Roadway geometry
- ☑ Motor vehicle volumes
- ☑ Non-motorist volumes
- ☑ Traffic control devices and lighting
- ☑ Parking and loading zones
- ☑ Sidewalks
- ☑ Crash history
- ☑ Fencing and other barriers
- ☑ Motor vehicle speed
- ☑ Obstructions and vegetation
- ☑ Land use and pedestrian generators

Other considerations

- ☑ **Roadway classification**
- ☑ **Intersection spacing**
- ☑ **Driveway density**
- ☑ **Roadway owner**
- ☑ **Student enrollment/modal mix**
- ☐ **Other:** _____

Complementary Countermeasures Selected:

☐ No

☑ Yes. If so, describe additional countermeasures selected and date of anticipated implementation:

Buffered speed limit reduction to 45-mph SZSL, then a 35-mph SZSL. Based on meeting warrants, include a HAWK (High-Intensity Activated Crosswalk) beacon with high visibility crosswalk markings.

Contact Information

Name of Roadway Authority: _____

Name of Roadway Authority Representative: _____

Signature: _____ Date: _____

Note: It's recommended that this document be signed by a duly certified professional engineer since SZSLs impact the health, safety, and welfare of the general public.

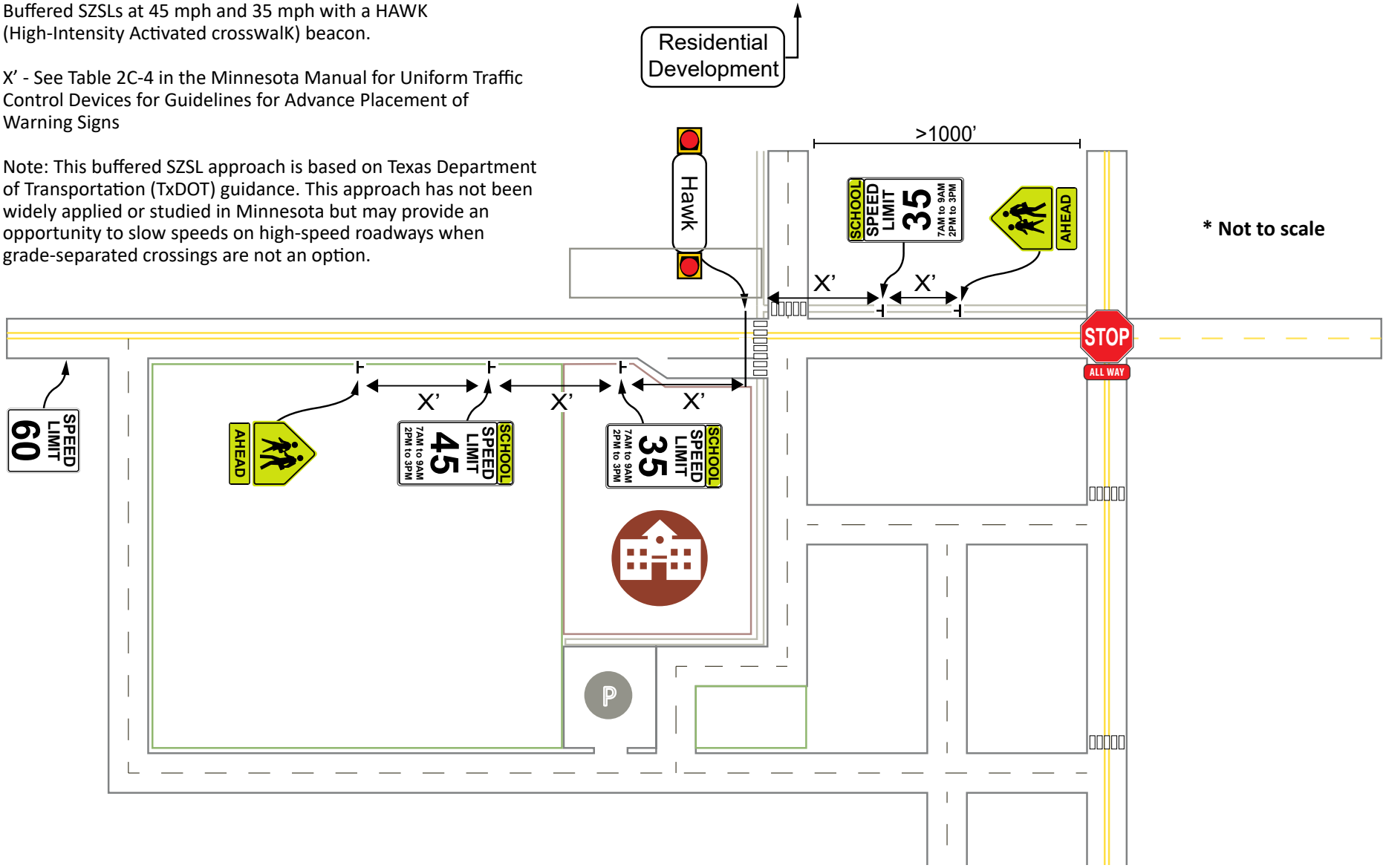
If you would like to participate in voluntary reporting to MnDOT, send the completed form to the MnDOT Office of Traffic Engineering at traffic.dot@state.mn.us.

Rural - 60 MPH Roadway

Buffered SZSLs at 45 mph and 35 mph with a HAWK (High-Intensity Activated crosswalK) beacon.

X' - See Table 2C-4 in the Minnesota Manual for Uniform Traffic Control Devices for Guidelines for Advance Placement of Warning Signs

Note: This buffered SZSL approach is based on Texas Department of Transportation (TxDOT) guidance. This approach has not been widely applied or studied in Minnesota but may provide an opportunity to slow speeds on high-speed roadways when grade-separated crossings are not an option.



APPENDIX F

PROJECT ADVISORY COMMITTEE

NAME	ROLE	EMAIL
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Erin Jordan	Traffic Engineer (SEH)	ejordan@sehinc.com
Heather Kienitz	Consultant Project Manager, Sr. Traffic Engineer (SEH)	hkienitz@sehinc.com
Hun Wen Westman	Member of the MN MUTCD Committee (Saint Paul)	hunwen.westman@ci.stpaul.mn.us
Jason Radde	Representative from MnDOT OTAT	
Kristi Sebastian	Dakota County Engineer/ FHWA	kristi.sebastian@dot.gov
Mark Sehr	County Engineer: Rural County (Rock County)	mark.sehr@co.rock.mn.us
Mark Vizecky	Representative from MnDOT State Aid (MnDOT)	mark.vizecky@state.mn.us
Mark Wagner	OTE Project Manager (MnDOT)	mark.wagner@state.mn.us
Nathan Drews	OTE Safety Section (MnDOT)	nathan.drews@state.mn.us
Sam Budzyna	City Traffic Engineer (Rochester)	sbudzyna@rochestermn.gov
Sonja Piper	State Active Transportation Safety Engineer (MnDOT)	sonja.piper@state.mn.us
Tiffany Kautz	Traffic Standards Engineer (MnDOT) (in place of State Signing Engineer)	tiffany.kautz@state.mn.us
Zach Whitley	Assistant District 3 Traffic Engineer (MnDOT)	zachary.whitley@state.mn.us

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