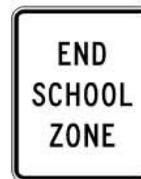


Delaware Department of Transportation
**Manual on Uniform Traffic
Control Devices (MUTCD)**
for Streets and Highways

PART 7

TRAFFIC CONTROLS FOR SCHOOL AREAS



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PART 7. TRAFFIC CONTROLS FOR SCHOOL AREAS

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CHAPTER 7A. GENERAL

Section 7A.01 Need for Standards

Support:

It is important to stress that regardless of the school location, the best way to achieve reasonably safe and effective traffic control is through the uniform application of realistic policies, practices, and standards developed through engineering judgment.

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 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 need to 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).

A school traffic control plan permits the orderly review of school area traffic control needs, and the coordination of school/pedestrian safety education and engineering activities.

Guidance:

A school route plan for each school serving elementary to high school students should be prepared in order to develop uniformity in the use of school area traffic controls and to serve as the basis for a school traffic control plan for each school.

The school route plan, developed in a systematic manner by the school, law enforcement, and traffic officials responsible for school pedestrian safety, should consist of a map (see Figure 7A-1) showing streets, the school, existing traffic controls, established school walk routes, and established school crossings.

The type(s) of school area traffic control devices used, either warning or regulatory, should be related to the volume and speed of vehicular traffic, street width, and the number and age of the students using the crossing.

School area traffic control devices should be included in a school traffic control plan.

Support:

Reduced speed limit signs for school areas and crossings are included in this Manual solely for the purpose of standardizing signing for these zones and not as an endorsement of mandatory reduced speed zones.

In Delaware, as specified in the Delaware Code (Title 21, Chapter 41, Subchapter VIII, §4169), the speed limit within a School Zone shall be 20 mph where 20 mph regulatory signs are in effect during specific periods. While 20 mph is the minimum speed limit within a school zone, there may be mitigating circumstances that warrant a higher limit. The appropriate speed limit should be established in accordance with the results of a traffic engineering study.

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Section 7A.02 School Routes and Established School Crossings

Support:

The planning criterion for school walk routes might make it necessary for children to walk an indirect route to an established school crossing located where there is existing traffic control and to avoid the use of a direct crossing where there is no existing traffic control.

Guidance:

School walk routes should be planned to take advantage of existing traffic controls.

The following factors should be considered when determining the feasibility of requiring children to walk a longer distance to a crossing with existing traffic control:

- A. The availability of adequate sidewalks or off-roadway sidewalk areas to and from the location with existing control;
- B. The number of students using the crossing;
- C. The age levels of the students using the crossing;
- D. The total extra walking distance;
- E. The presence of a school crossing guard; and
- F. The location of the crossing, avoiding locations where the presence of pedestrians crossing the road is unexpected.

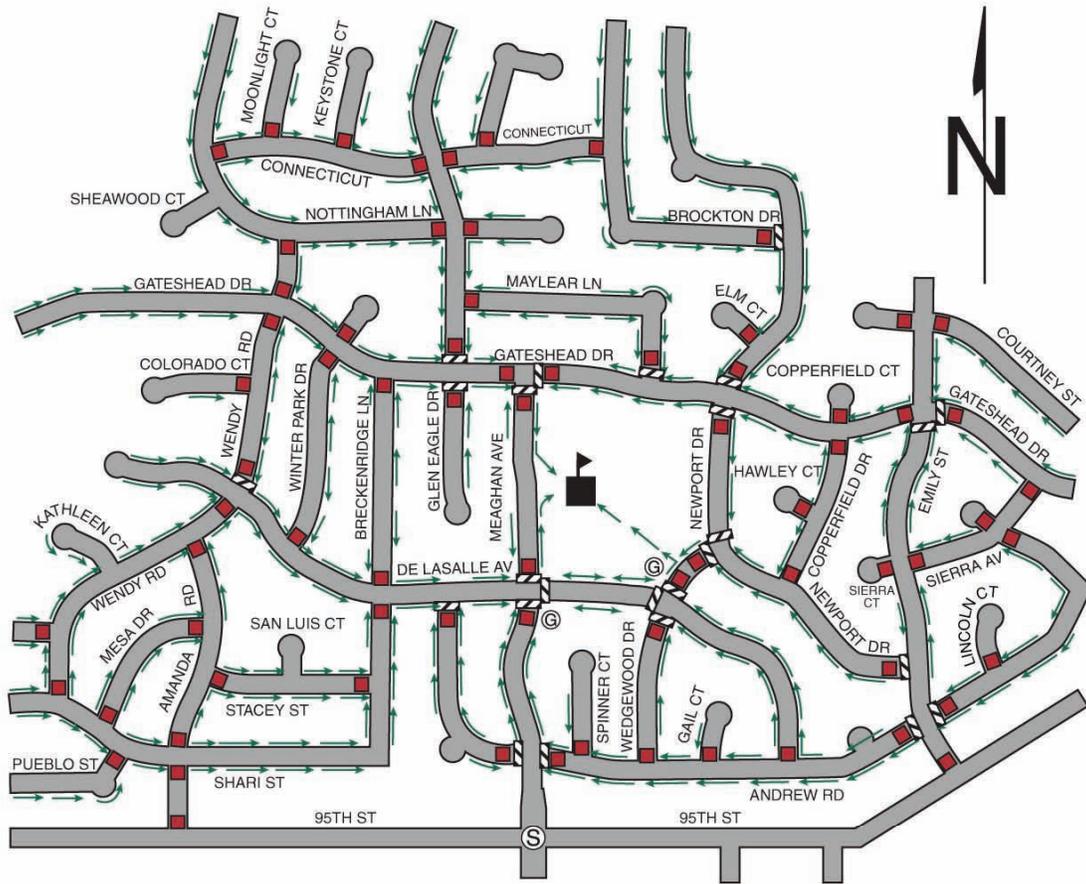
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Section 7A.03 School Crossing Control Criteria**Support:**

Alternate gaps and blockades are inherent in the traffic stream and are different at each crossing location. For safety, students need to wait for a gap in traffic that is of sufficient duration to permit reasonably safe crossing. When the delay between the occurrence of adequate gaps becomes excessive, students might become impatient and endanger themselves by attempting to cross the street during an inadequate gap.

A recommended method for determining the frequency and adequacy of gaps in the traffic stream is given in the Institute of Transportation Engineers' publication, "School Trip Safety Program Guidelines" (see Section 1A.11).

Figure 7A-1. Example of School Route Plan Map



Legend

- | | | | |
|---|------------------|---|-------------------------|
|  | School |  | Signalized Intersection |
|  | Marked Crosswalk |  | STOP Sign Approach |
|  | Crossing Guard |  | Pedestrian Route |

Section 7A.04 Scope**Standard:**

Part 7 sets forth basic principles and prescribes standards that shall be followed in the design, application, installation, and maintenance of all traffic control devices (including signs, signals, and markings) and other controls (including adult crossing guards, student patrols, and grade-separated crossings) required for the special pedestrian conditions in school areas.

Option:

In-roadway signs for school traffic control areas may be used consistent with the requirements of Sections 2B.12, 7B.08, and 7B.09.

Support:

Requirements discussed in Chapter 2A and Section 2B.05 are applicable in school areas.

Section 7A.05 Application of Standards**Support:**

Sections 1A.02 and 1A.07 contain information regarding the application of standards.

Section 7A.06 Engineering Study Required**Support:**

Section 1A.09 contains information regarding engineering studies.

Section 7A.07 Maintenance of Traffic Control Devices**Support:**

Section 1A.05 contains information regarding the maintenance of traffic control devices.

Section 7A.08 Placement Authority**Support:**

Section 1A.08 contains information regarding placement authority for traffic control devices.

Section 7A.09 Unauthorized Devices and Messages**Support:**

Sections 1A.01 and 1A.08 contain information regarding unauthorized devices and messages.

Section 7A.10 Meaning of Standard, Guidance, Option, and Support**Support:**

The introduction to this Manual contains information regarding the meaning of the headings Standard, Guidance, Option, and Support, and the use of the words shall, should, and may.

CHAPTER 7B. SIGNS

Section 7B.01 Size of School Signs

Standard:

The sizes of signs and plaques to be used on conventional roadways in school areas shall be as shown in Table 7B-1.

The Conventional Road sign size shall be used on public roads, streets, and highways unless engineering judgment determines that a Minimum or Oversized sign size would be more appropriate.

The Oversized sign size shall be used on expressways.

Option:

The Oversized sign size may be used for applications that require increased emphasis, improved recognition, or increased legibility.

The Minimum sign size may be used on local residential streets, in urban areas, and where there are low traffic volumes and low vehicle speeds, as determined by engineering judgment.

Section 7B.02 Illumination and Reflectorization

Standard:

The signs used for school area traffic control shall be retroreflectorized or illuminated.

Section 7B.03 Position of Signs

Guidance:

Signs should be placed in positions where they will convey their messages most effectively without restricting lateral clearance or sight distances. Placement therefore should consider highway design, alignment, vehicle speed, and roadside development.

Signs should have a maximum practical clearance from the edge of the traveled way for the safety of vehicles that might leave the roadway and strike the sign supports. Except as noted in the Option, signs should not be closer than 6 ft from the edge of a paved shoulder, or if none, 12 ft from the edge of the traveled way.

Option:

In urban areas, a lesser clearance of not less than 2 ft from the face of the curb may be used. In urban areas, where sidewalk width is limited or existing poles are close to the curb, a clearance of 1 ft from the curb face may be used.

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Section 7B.04 Height of Signs

Support:

Section 2A.18 contains information regarding the mounting height of signs.

Section 7B.05 Installation of Signs

Support:

Section 2A.16 contains information regarding the installation of signs.

Section 7B.06 Lettering

Support:

The Federal Highway Administration's "Standard Highway Signs" book (see Section 1A.11) contains information regarding sign lettering.

Section 7B.07 Sign Color for School Warning Signs**Standard:**

All school warning signs, in addition to the following signs, shall have a fluorescent yellow-green background with a black legend and border:

- A. School Advance Warning sign (S1-1);
- B. SCHOOL BUS STOP AHEAD sign (S3-1);
- C. SCHOOL plaque (S4-3);
- D. The "SCHOOL" portion of the School Speed Limit sign (S5-1);
- E. XXX FEET plaque (W16-2 series);
- F. AHEAD plaque (W16-9p);
- G. Diagonal Arrow plaque (W16-7p); and
- H. Reduced Speed School Zone Ahead sign (S4-5, S4-5a).

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Guidance:

When the fluorescent yellow-green background color is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.

In general, the fluorescent yellow-green background color should be used for all warning signs pertaining to the School Zone within the School Zone and approaching the School Zone. This includes the area starting with the first School Advance Warning Assembly and ending with the END SCHOOL ZONE (S5-2) regulatory sign, which should be white with a black legend.

In situations where non-School Zone warning signs are located within a School Zone, the non-School Zone warning signs should be yellow with a black legend.

If a pedestrian crossing is located within a School Zone, but is not part of an established route to school, the warning signs for that crossing should be yellow with a black legend.

Section 7B.08 School Advance Warning Assembly (S1-1 with Supplemental Plaque)**Guidance:**

The School Advance Warning assembly (see Figure 7B-1) should be installed in advance of locations where school buildings or grounds are adjacent to the highway, except where a physical barrier such as fencing separates school children from the highway.

Standard:

The School Advance Warning assembly shall be used in advance of any installation of the School Crosswalk Warning assembly (see Figure 7B-2), or in advance of the first installation of the School Speed Limit assembly (see Figure 7B-3).

If used, the School Advance Warning assembly shall be installed not less than 150 ft nor more than 700 ft in advance of the school grounds or school crossings.

If used, the School Advance Warning assembly shall consist of a School Advance Warning (S1-1) sign supplemented with a plaque with the legend AHEAD (W16-9p) or XXX FEET (W16-2 or W16-2a) to provide advance notice to road users of crossing activity.

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Option:

A 12 in reduced size in-street School Advance Warning (S1-1) sign (see Figure 7B-4), installed in compliance with the mounting height and breakaway requirements for In-Street Pedestrian Crossing (R1-6 or R1-6a) signs (see Section 2B.12), may be used in advance of a school crossing to supplement the ground-mounted school warning signs. A 12 x 6 in reduced size AHEAD (W16-9p) plaque may be mounted below the reduced size in-street School Advance Warning (S1-1) sign. These reduced size signs may only be used when approved by the Chief Traffic Engineer or a designee.

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If the School Advance Warning Assembly or SCHOOL BUS STOP AHEAD (S3-1) sign have been considered but deemed inappropriate, a SCHOOL CHILDREN WALK ALONG THIS ROAD (S3-1-DE) sign (see Figure 7B-1) may be installed only in special circumstances where the Chief Traffic Engineer or a designee has determined such warning would be necessary.

Table 7B-1. Size of School Area Signs and Plaques

Sign	DeIDOT MUTCD Code	Section	Conventional Road	Minimum	Oversized
School Advance Warning	S1-1	7B.08	900 x 900 mm (36 x 36 in)	750 x 750 mm (30 x 30 in)	1200 x 1200 mm (48 x 48 in)
School Bus Stop Ahead	S3-1	7B.10	750 x 750 mm (30 x 30 in)	---	900 x 900 mm (36 x 36 in)
School Children Walk Along This Road	S3-1-DE	7B.08	750 x 750 mm (30 x 30 in)	---	900 x 900 mm (36 x 36 in)
Reduced Speed School Zone Ahead	S4-5, S4-5a	7B.12	900 x 900 mm (36 x 36 in)	750 x 750 mm (30 x 30 in)	1200 x 1200 mm (48 x 48 in)
School Speed Limit XX When Children Are Present	S5-1-DE	7B.11	600 x 1350 mm (24 x 54 in)	---	900 x 2100 mm (36 x 84 in)
End School Zone	S5-2	7B.13	600 x 750 mm (24 x 30 in)	---	900 x 1200 mm (36 x 48 in)
Delaware Drug Free School Zone	S5-2-DE	7B.13	450 x 450 mm (18 x 18 in)	---	---
School Speed XX Limit When Flashing (Overhead Use Only)	S5-3-DE	7B.11	1525 x 1065 mm (60 in x 42 in)	---	---
Speed Limit (School Use) (English)	R2-1	7B.11	600 x 750 mm (24 x 30 in)	---	900 x 1200 mm (36 x 48 in)
Yield Here to Pedestrians	R1-5L,5R	2B.11	450 x 450 mm (18 x 18 in)	---	---
In-Street Pedestrian Crossing	R1-6, R1-6a	7B.09	300 x 900 mm (12 x 36 in)	---	---

Plaque	DeIDOT MUTCD Code	Section	Conventional Road	Minimum	Oversized
School Bus Stop Ahead	S3-1p-DE	7B.10	600 x 450 mm (24 x 18 in)	---	750 x 600 mm (30 x 24 in)
X:XX to X:XX AM X:XX to X:XX PM	S4-1	7B.11	600 x 250 mm (24 x 10 in)	---	900 x 450 mm (36 x 18 in)
When Children Are Present	S4-2	7B.11	600 x 250 mm (24 x 10 in)	---	900 x 450 mm (36 x 18 in)
School	S4-3	7B.11	600 x 200 mm (24 x 8 in)	---	900 x 300 mm (36 x 12 in)
When Flashing	S4-4	7B.11	600 x 250 mm (24 x 10 in)	---	900 x 450 mm (36 x 18 in)
Mon-Fri	S4-6	7B.11	600 x 250 mm (24 x 10 in)	---	900 x 450 mm (36 x 18 in)
XXX Feet	W16-2	7B.08	600 x 450 mm (24 x 18 in)	---	750 x 600 mm (30 x 24 in)
XXX Ft	W16-2a	7B.08	600 x 300 mm (24 x 12 in)	---	750 x 450 mm (30 x 18 in)
Diagonal Arrow	W16-7p	7B.09	600 x 300 mm (24 x 12 in)	---	750 x 450 mm (30 x 18 in)
Diagonal Arrow (Optional Size)	W16-7p	7B.09	525 x 375 mm (21 x 15 in)	---	---
Ahead	W16-9p	7B.08	600 x 300 mm (24 x 12 in)	---	750 x 450 mm (30 x 18 in)

Section 7B.09 School Crosswalk Warning Assembly (S1-1 with Diagonal Arrow)**Standard:**

If used, the School Crosswalk Warning assembly (see Figure 7B-1) shall be installed at the marked crosswalk, or as close to it as possible, and shall consist of a School Advance Warning (S1-1) sign supplemented with a diagonal downward pointing arrow (W16-7p) plaque to show the location of the crossing.

The School Crosswalk Warning assembly shall not be used at marked crosswalks other than those adjacent to schools and those on established school pedestrian routes.

The School Crosswalk Warning assembly shall not be installed on approaches controlled by a STOP sign.

Guidance:

The School Crosswalk Warning assembly should be installed at marked crosswalk(s), including those at signalized locations, used by students going to and from school (see Figure 7B-2) as determined by an engineering study.

Option:

The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign (see Section 2B.12) may be used at unsignalized school crossings. When used at a school crossing, a 12 x 4 in SCHOOL (S4-3) plaque (see Figure 7B-4) may be mounted above the sign.

A 12 in reduced size School Advance Warning (S1-1) sign (see Figure 7B-4) may be used at an unsignalized school crossing instead of the In-Street Pedestrian Crossing (R1-6 or R1-6a) sign. A 12 x 6 in reduced size Diagonal Arrow (W16-7p) plaque may be mounted below the reduced size in-street School Advance Warning (S1-1) sign.

Standard:

If an In-Street Pedestrian Crossing sign or a reduced size in-street School Advance Warning (S1-1) sign is placed in the roadway, the sign support shall comply with the mounting height and breakaway requirements for In-Street Pedestrian Crossing (R1-6 or R1-6a) signs (see Section 2B.12).

Current Delaware State Law indicates that drivers must yield to pedestrians at unsignalized intersections. The status of this law shall be confirmed with the Chief Traffic Engineer or a designee prior to installing the In-Street Pedestrian Crossing sign.

These signs shall only be used when approved by the Chief Traffic Engineer or a designee.

The STOP FOR legend shall only be used if Delaware State Law specifically requires that a driver must stop for a pedestrian in a crosswalk

The In-Street Pedestrian Crossing sign and the reduced size in-street School Advance Warning (S1-1) sign shall not be used at signalized locations.

Section 7B.10 SCHOOL BUS STOP AHEAD Sign (S3-1) and Plaque (S3-1p-DE)**Guidance:**

The SCHOOL BUS STOP AHEAD (S3-1) sign (see Figure 7B-1) should be installed in advance of locations where a school bus, when stopped to pick up or discharge passengers, is not visible to road users for a distance of 500 ft in advance and where there is no opportunity to relocate the bus stop to provide 500 ft of visibility.

Option:

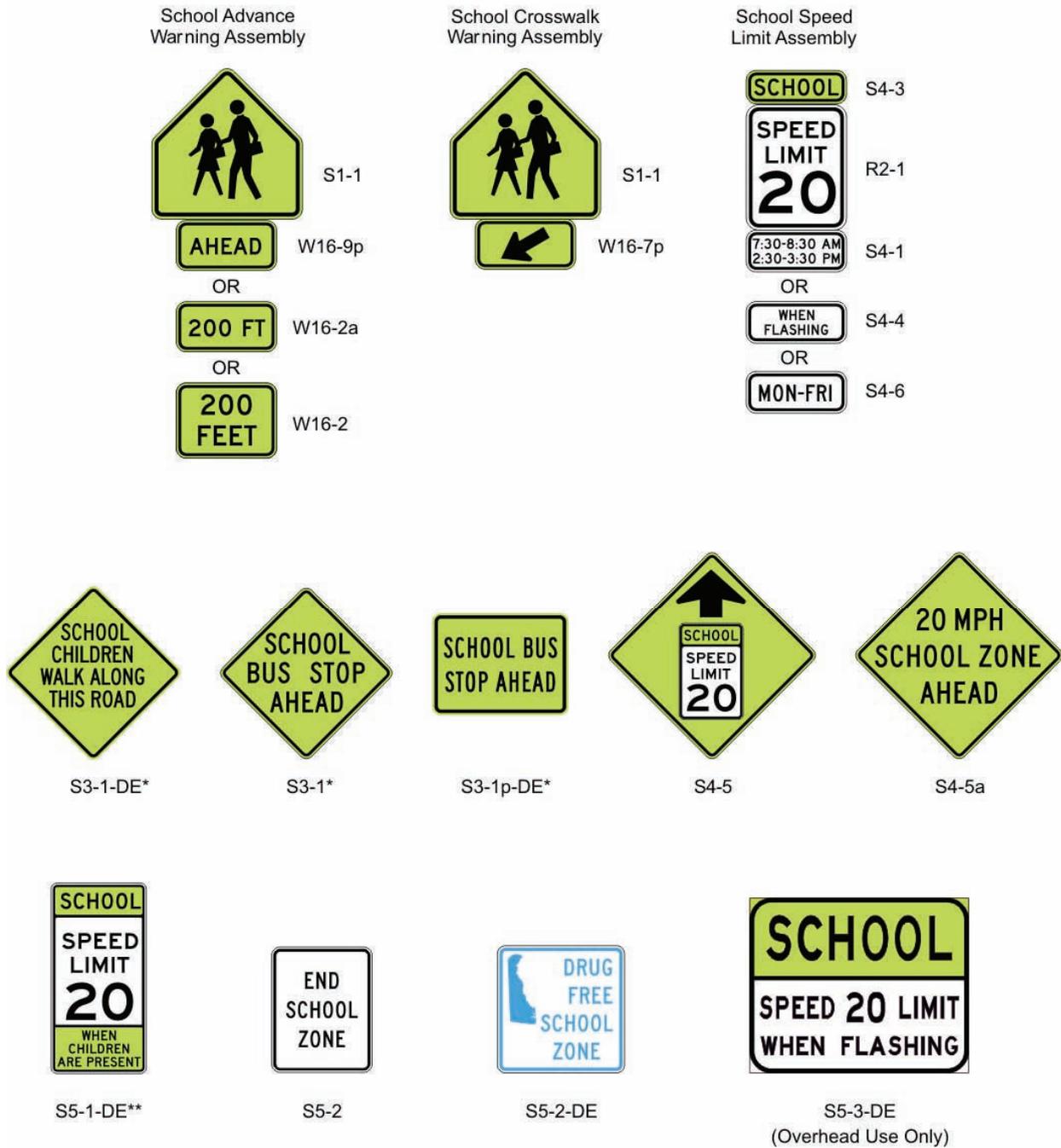
In locations where other warning sign installations are present, the SCHOOL BUS STOP AHEAD (S3-1p-DE) plaque may be used in place of the SCHOOL BUS STOP AHEAD (S3-1) sign to reduce sign clutter.

Guidance:

When used outside of School Zones, the School Bus Stop Ahead (S3-1) sign and the SCHOOL BUS STOP AHEAD (S3-1p-DE) plaque should be yellow with a black legend. When they are used within a School Zone, they should be fluorescent yellow-green with a black legend.

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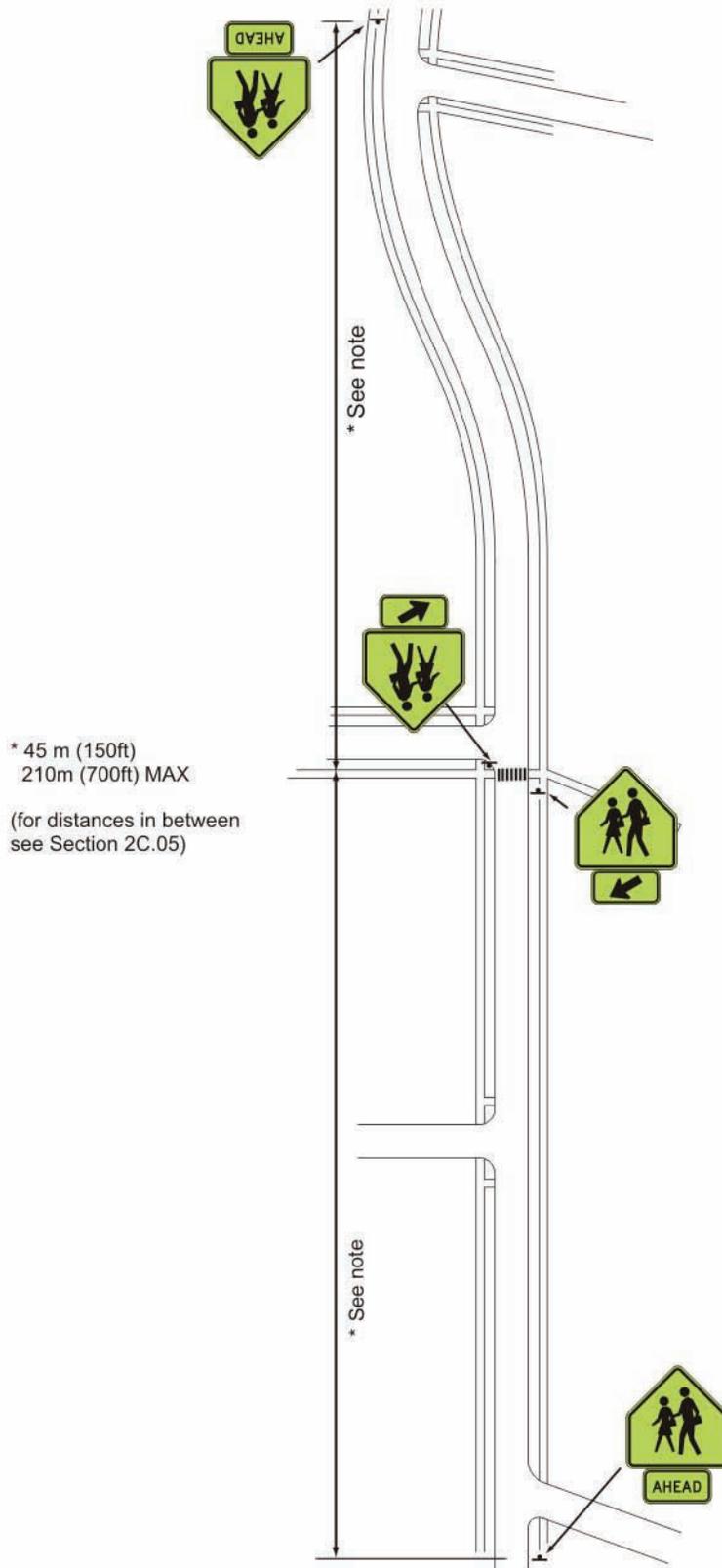
Figure 7B-1. School Area Signs



* FYG only within school zones

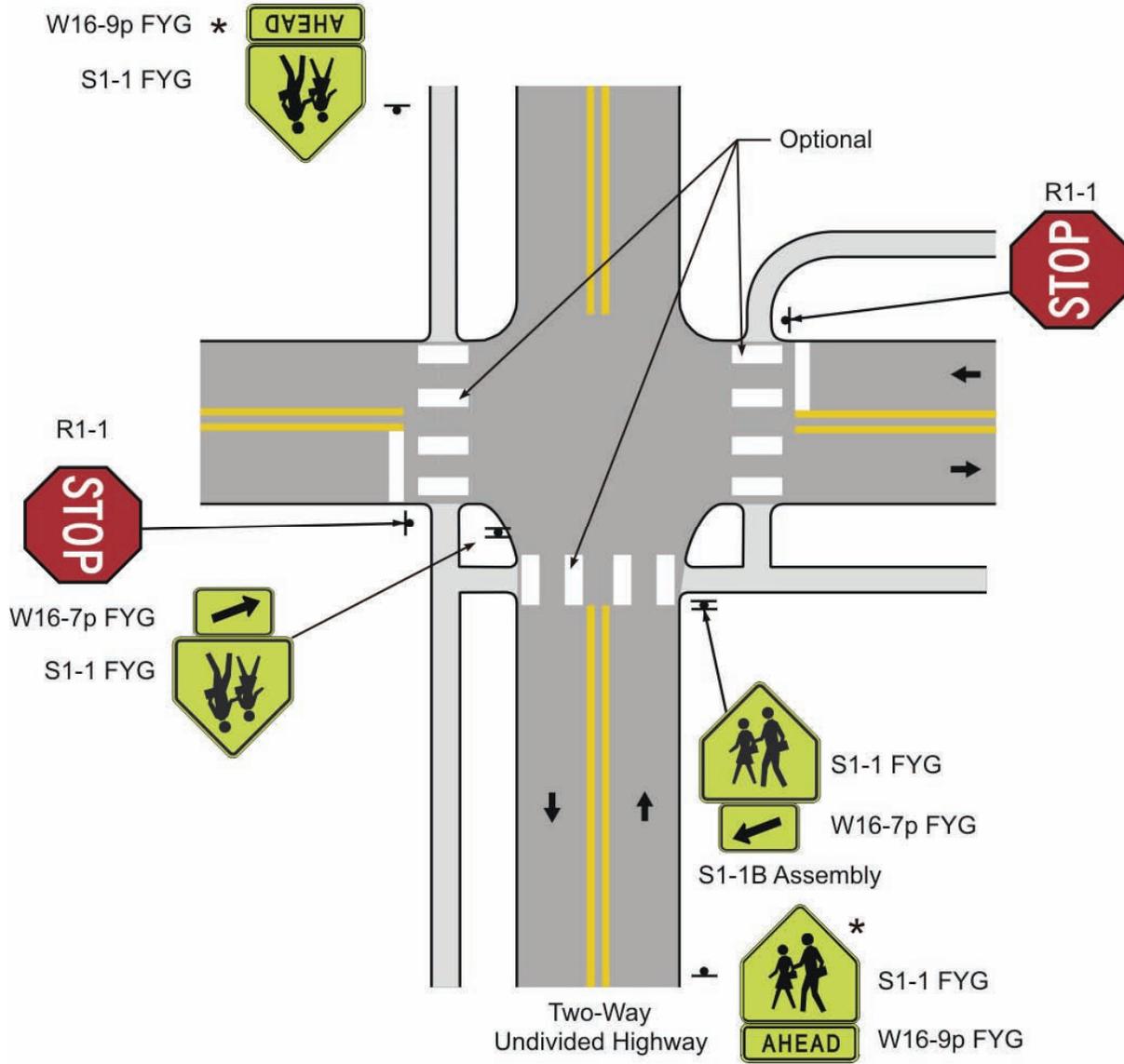
** "When Children Are Present" legend may be replaced with legends from S4-1, S4-4, or S4-6

Figure 7B-2. Examples of Signing for School Crosswalk Warning Assembly



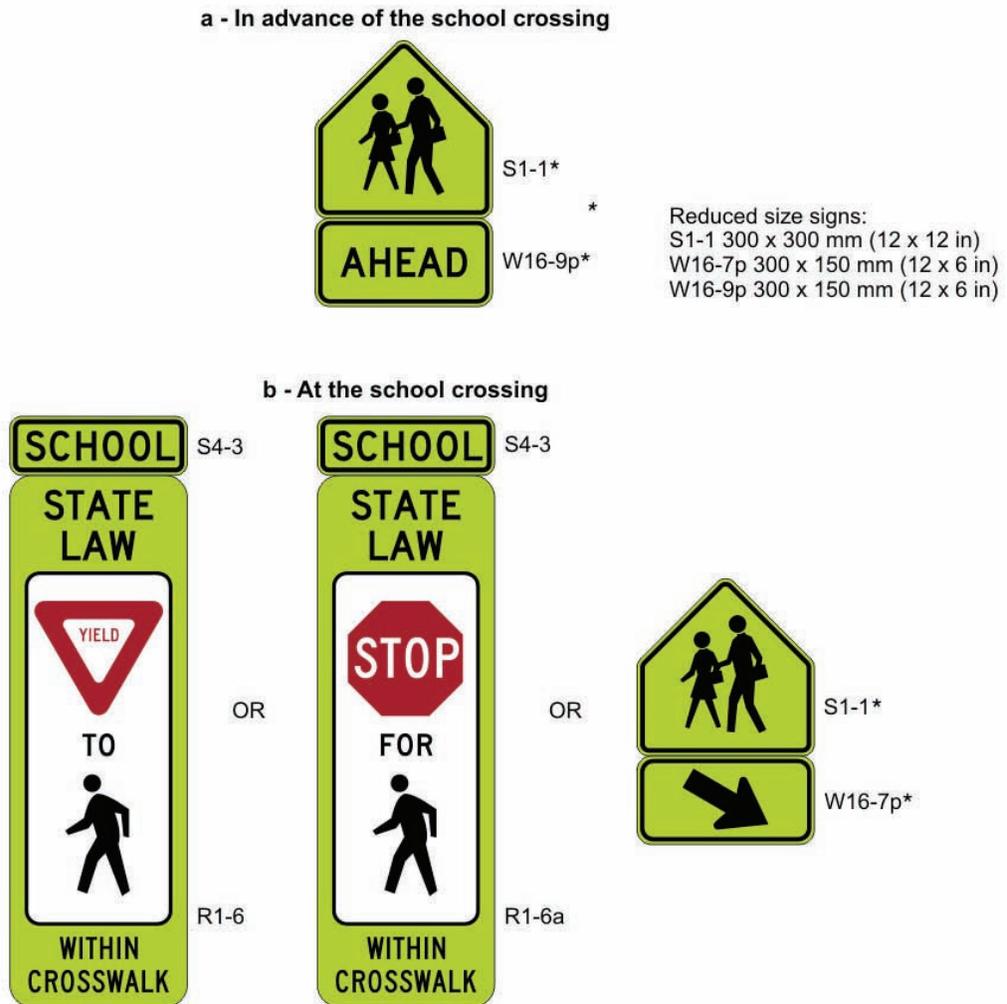
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**Figure 7B-3a. Examples of School Crossing Signing Not Adjacent to School Property
(DelDOT MUTCD Only)**



* Optional Assembly

Figure 7B-4. In-Street Signs in School Areas



Section 7B.11 School Speed Limit Assembly (S4-1, S4-3, S4-4, S4-6, S5-1-DE)

Standard:

A School Speed Limit assembly (see Figure 7B-1) or a School Speed Limit (S5-1-DE) sign (see Figure 7B-3) shall be used to indicate the speed limit where a reduced speed zone for a school area has been established (in accordance with law based upon an engineering study) or where a 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 speed zone begins.

Guidance:

The reduced speed zone should begin either at a point 200 ft from the crosswalk, or at a point 100 ft from the school property line, based on whichever is encountered first as traffic approaches the school.

Standard:

The School Speed Limit assembly shall consist of a top plaque (S4-3) with the legend SCHOOL, a Speed Limit (R2-1) sign, and a bottom plaque (S4-1, S4-4, or S4-6) indicating the specific periods of the day and/or days of the week that the special school speed limit is in effect (see Figure 7B-1).

Option:

An SCHOOL SPEED LIMIT XX WHEN FLASHING sign (S5-3-DE), with Speed Limit Sign Beacons mounted to the left and right of the sign, may be mounted overhead at or as near as practicable to the point where the reduced speed zone begins (see Figure 7B-3), only if approved by the Chief Traffic Engineer or designee.

Changeable message signs that display the speed of approaching drivers (see Section 2B.13) may be used in a school speed limit zone, provided they are approved for use by the Chief Traffic Engineer or designee.

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A Speed Limit Sign Beacon also may be used, with a WHEN FLASHING legend, to identify the periods that the school speed limit is in effect. The lenses of the Speed Limit Sign Beacon may be positioned above or within the face of the School Speed Limit (S5-1) sign (see Figure 7B-1). The lenses of the Speed Limit Sign Beacon may be positioned above the face of the SCHOOL (S4-3) plaque in a School Speed Limit Assembly that also contains a Speed Limit (R2-1) sign and a WHEN FLASHING (S4-4) plaque (see Figure 7B-3).

A FINES HIGHER (R2-6) plaque (see Section 2B.17) may be used to advise road users when increased fines are imposed for traffic violations in school zones. Current Delaware Law does not allow increased fines in School Zones. The status of this law shall be confirmed with the Chief Traffic Engineer or a designee prior to installing the FINES HIGHER sign. The FINES HIGHER plaque shall only be used if Delaware State Law allows increased fines to be administered in School Zones.

Section 7B.12 Reduced Speed School Zone Ahead Sign (S4-5, S4-5a)**Option:**

The Reduced Speed School Zone Ahead (S4-5, S4-5a) sign (see Figure 7B-1) may be used to inform road users of a reduced speed zone when engineering judgment indicates that advance notice would be appropriate.

Standard:

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

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

Guidance:

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In Delaware, as specified in the Delaware Code (Title 21, Chapter 41, Subchapter VIII, §4169), the speed limit within a School Zone shall be 20 mph where 20 mph regulatory signs are in effect during specific periods. While 20 mph is the minimum speed limit within a school zone, there may be mitigating circumstances that warrant a higher limit. The appropriate speed limit should be established in accordance with the results of a traffic engineering study.

Section 7B.13 END SCHOOL ZONE Sign (S5-2)**Standard:**

The end of an authorized and posted school speed zone shall be marked with a standard Speed Limit sign showing the speed limit for the section of highway that follows or with an END SCHOOL ZONE (S5-2) sign (see Figure 7B-1).

Guidance:

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In the State of Delaware, the END SCHOOL ZONE (S5-2) sign should be used to designate the end of the school zone in lieu of the regulatory speed limit sign.

Section 7B.14 Parking and Stopping Signs (R7 and R8 Series)**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 X:XX AM to X:XX PM School Days Only;
- B. No Stopping X:XX AM to X:XX PM School Days Only;
- C. X Min Loading X:XX AM to X:XX PM School Days Only; and
- D. No Standing X:XX AM to X:XX PM School Days Only.

Sections 2B.39, 2B.40, and 2B.41 contain information regarding the signing of parking regulations in school zone areas.

Section 7B.15 DRUG FREE SCHOOL ZONE Sign (S5-2-DE)

Standard:

A Drug-Free School Zone shall be marked with a DRUG FREE SCHOOL ZONE (S5-2-DE) sign as near as practicable to the point at which the roadway crosses into the zone.

Support:

In Delaware, as specified in the Delaware Code (Title 16, Chapter 47, Subchapter IV, §4767), the distribution, delivery, or possession of a controlled substance within 1,000 feet of school property is a felony.

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CHAPTER 7C. MARKINGS

Section 7C.01 Functions and Limitations

Support:

Markings have definite and important functions in a proper scheme of school area traffic control. In some cases, they are used to supplement the regulations or warnings provided by other devices, such as traffic signs or signals. In other instances, they are used alone and produce results that cannot be obtained by the use of any other device. In such cases they serve as an effective means of conveying certain regulations, guidance, and warnings that could not otherwise be made clearly understandable.

Pavement markings have limitations. They might be obliterated by snow, might not be clearly visible when wet, and might not be durable when subjected to heavy traffic. In spite of these limitations, they have the advantage, under favorable conditions, of conveying warnings or information to the road user without diverting attention from the road.

Section 7C.02 Standardization of Application

Standard:

Each standard marking shall be used only to convey the meaning prescribed for it in this Manual.

Section 7C.03 Crosswalk Markings

Support:

Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops.

Crosswalk markings also serve to alert road users of a pedestrian crossing point across roadways not controlled by highway traffic signals or STOP signs.

At non-intersection locations, crosswalk markings legally establish the crosswalk.

Standard:

When crosswalk markings are used, they shall consist of 600 mm (24 in) wide solid white longitudinal lines spaced at 600 mm (24 in) apart and placed parallel to the travel lanes to avoid the wheel paths. They shall not be less than 1.8 m (6 ft) in length (see Figure 3B-16).

Guidance:

Crosswalks should be marked at all intersections on established routes to school where there is substantial conflict between motorists, bicyclists, and pedestrian movements, where students are encouraged to cross between intersections, or where students would not otherwise recognize the proper place to cross (see Figure 7A-1).

Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at locations away from traffic control signals or STOP signs.

Crosswalk markings should extend across the full width of pavement or to the edge of the intersecting crosswalk to discourage diagonal walking between crosswalks (see Figures 3B-15 and 3B-16).

Crosswalks should be marked at all intersections where there is substantial conflict between vehicular and pedestrian movements.

Option:

When patterned pavement or other similar treatments are used to depict crosswalks, 300 mm (12 in) solid white lines may be used to define the crosswalk.

Section 7C.04 Stop and Yield Lines

Standard:

If used, stop lines shall consist of solid white lines extending across approach lanes to indicate the point at which the stop is intended or required to be made.

If used, yield lines (see Figure 3B-14) shall consist of a row of solid white isosceles triangles pointing toward approaching vehicles extending across approach lanes to indicate the point at which the yield is intended or required to be made.

Stop lines shall be placed on all approaches to signalized intersections.

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Guidance:

Stop lines should be 400 mm (16 in) wide.

Stop lines should be used to indicate the point behind which vehicles are required to stop, in compliance with a STOP (R1-1) sign, traffic control signal, or some other traffic control device, except YIELD signs.

Stop lines should be placed on the STOP-controlled approaches of unsignalized intersections of two state-maintained roadways.

The individual triangles comprising a yield line should typically have a base of 600 mm (24 in) wide and a height equal to 1.5 times the base. The space between the triangles should be 300 mm (12 in).

Guidance:

Yield lines should not be used for a right-turn lane that also has a YIELD sign and crosswalk markings.

Option:

Yield lines may be used to indicate the point behind which vehicles are required to yield in compliance with a YIELD (R1-2) sign or a Yield Here to Pedestrians (R1-5) sign.

Guidance:

If used, stop and yield lines should be placed a minimum of 1.2 m (4 ft) in advance of the nearest crosswalk line at controlled intersections, except for yield lines at roundabout intersections as provided for in Section 3B.24 and at midblock crosswalks. In the absence of a marked crosswalk, the stop line or yield line should be placed at the desired stopping or yielding point, but should be placed no more than 9m (30 ft) nor less than 1.2 m (4 ft) from the nearest edge of the intersecting traveled way. Stop lines should be placed to allow sufficient sight distance to all other approaches to an intersection. When necessary to add emphasis to a YIELD sign or to mark the location where a stop might be made in compliance with a motorist's responsibility at a YIELD sign, a YIELD line should be used.

Option:

Yield lines may be used at the approach to the second roadway of a divided highway or entrance to a roundabout (see Figure 3B-16A).

Guidance:

If used at an unsignalized midblock crosswalk, yield lines should be placed adjacent to the Yield Here to Pedestrians sign located 6.1 to 15 m (20 to 50 ft) in advance of the nearest crosswalk line, and parking should be prohibited in the area between the yield line and the crosswalk (see Figure 3B-15).

Stop lines at midblock signalized locations should be placed at least 12 m (40 ft) in advance of the nearest signal indication (see Section 4D.15).

Support:

Drivers who yield too close to crosswalks on multi-lane approaches place pedestrians at risk by blocking other drivers' views of pedestrians.

Section 7C.05 Curb Markings for Parking Regulations**Standard:**

Signs shall be used with curb markings in those areas where curb markings are frequently obliterated by snow and ice accumulation, unless the no parking zone is controlled by statute or local ordinance.

In the State of Delaware, DelDOT does not install or maintain curb markings. If municipalities or private property owners, including schools, opt to install curb markings on facilities within their property limits, the installation and maintenance of such markings shall be at their expense.

Guidance:

When curb markings are used without signs to convey parking regulations, a legible word marking regarding the regulation (such as "No Parking" or "No Standing") should be placed on the curb.

Option:

Local highway agencies may prescribe special colors for curb markings to supplement standard signs for parking regulation.

Support:

Since yellow and white curb markings are frequently used for curb delineation and visibility, it is advisable to establish parking regulations through the installation of standard signs (see Sections 2B.39 through 2B.41).

Section 7C.06 Pavement Word and Symbol Markings**Support:**

Word and symbol markings on the pavement are used for the purpose of guiding, warning, or regulating traffic. Symbol messages are preferable to word messages.

Standard:

Word and symbol markings shall be white. Word and symbol markings shall not be used for mandatory messages except in support of standard signs.

Guidance:

Letters and numerals should be 6 ft or more in height. All letters, numerals, and symbols should be in accordance with the Federal Highway Administration's "Standard Highway Signs" book (see Section 1A.11).

Word and symbol markings should not exceed three lines of information.

If a pavement marking word message consists of more than one line of information, it should read in the direction of travel. The first word of the message should be nearest to the road user.

The longitudinal space between word or symbol message markings, including arrow markings, should be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters under any conditions.

The number of different word and symbol markings used should be minimized to provide effective guidance and avoid misunderstanding.

Except as noted in the Option below, pavement word and symbol markings should be no more than one lane in width.

Option:

The SCHOOL word marking may extend to the width of two approach lanes (see Figure 7C-1).

Standard:

Pavement word and symbol markings shall not extend into the opposing direction travel lane.

Guidance:

If the two-lane SCHOOL word marking is used, the letters should be 10 ft or more in height.

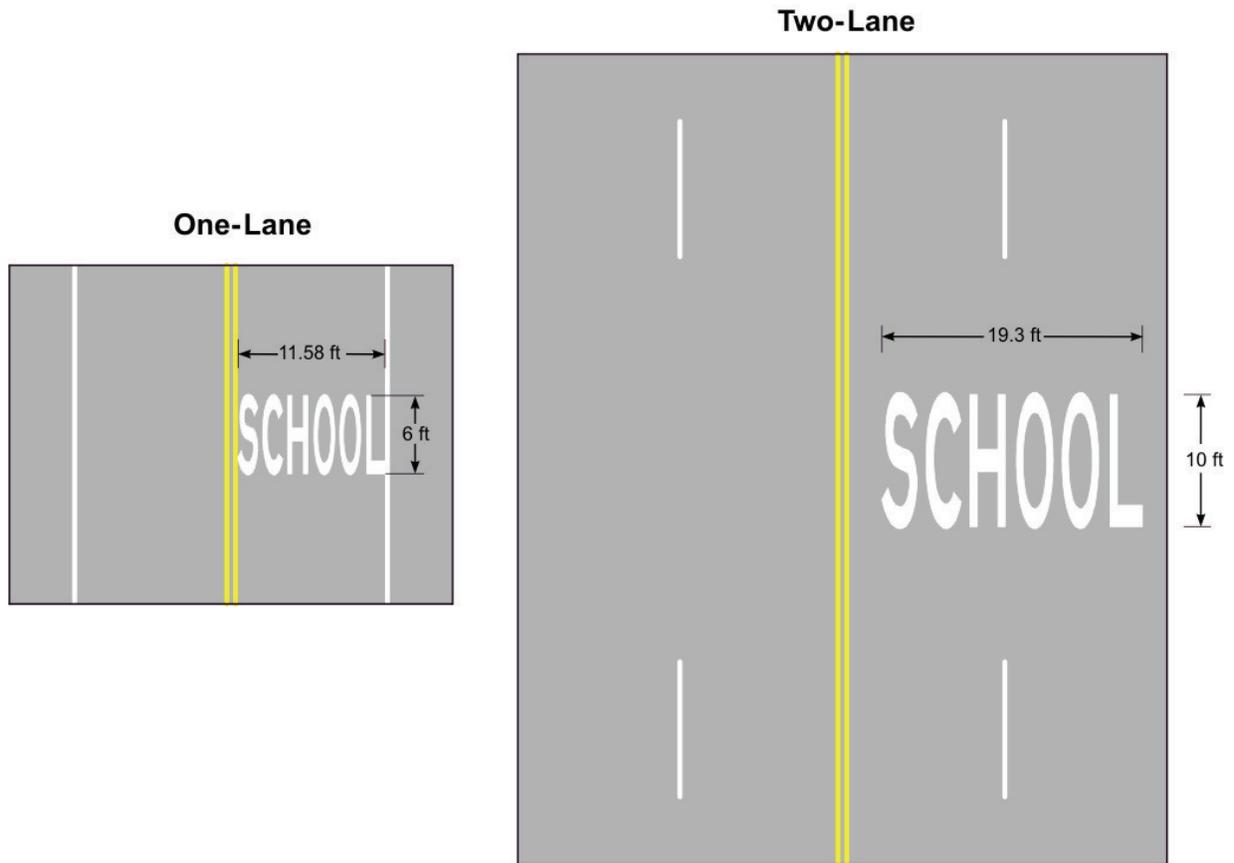
Pavement word and symbol markings should be proportionally scaled to fit within the width of the lane upon which they are applied.

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Figure 7C-1. One & Two-Lane Pavement Marking of "SCHOOL"



CHAPTER 7D. SIGNALS

Section 7D.01 General

Support:

Part 4 contains information regarding highway traffic signals in school areas. The School Crossing signal warrant is described in Section 4C.06.

Section 7D.02 Flashing Beacons at School Crossings

Option:

Flashing yellow beacons may be installed to supplement standard school signing and markings for the purpose of providing advanced warning during specified times of operation when justified.

A flashing yellow beacon may be justified when ALL of the following conditions are fulfilled:

1. At least 40 school pedestrians use the crossing during each of any two hours (not necessarily consecutive) of a normal school day;
2. The crossing is at least 180 m (600 ft) from the nearest alternate crossing controlled by traffic signals, stop signs or crossing guards;
3. The vehicular volume through the crossing exceeds 200 vehicles per hour in urban areas or 140 vehicles per hour in rural areas during the same hour the students are going to and from school during normal school hours; and
4. The critical approach speeds exceeds 55 km/h (35 mph) or the approach visibility is less than the stopping sight distance.

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CHAPTER 7E. CROSSING SUPERVISION

Section 7E.01 Types of Crossing Supervision

Support:

There are two types of school crossing supervision:

- A. Adult control of pedestrians and vehicles by adult crossing guards or uniformed law enforcement officers; and
- B. Student control of only pedestrians with student patrols.

Information for the organization, operation, and administration of an adult crossing guard program are given in “Civilian Guards For School Crossings” (available from the Center for Public Safety of Northwestern University, 405 Church Street, Evanston, IL 60204) and “Adult School Crossing Guards” (available from the American Automobile Association, 1000 AAA Drive, Heathrow, FL 32746).

Information for the organization, administration and operation of a student patrol program are given in “Policies and Practices for School Safety Patrols” (available from the American Automobile Association, 1000 AAA Drive, Heathrow, FL 32746).

Section 7E.02 Adult Crossing Guards

Option:

Adult crossing guards may be used to provide gaps in traffic at school crossings where an engineering study has shown that adequate gaps need to be created (see Section 7A.03), and where authorized by law.

Guidance:

Adult crossing guards should assist school children crossing the streets or assist platoons of vehicles entering or exiting the school.

The Delaware Department of Transportation should not arrange funding for adult crossing guards.

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Section 7E.03 Qualifications of Adult Crossing Guards

Support:

High standards for selection of adult crossing guards are essential.

Guidance:

Adult crossing guards should possess the following qualifications:

- A. Average intelligence;
- B. Good physical condition, including sight, hearing, and mobility;
- C. Mental alertness;
- D. Neat appearance;
- E. Good character;
- F. Dependability; and
- G. Sense of responsibility for safety of students.

Adult crossing guards should be either police officers or other adults who are trained and supervised by local law enforcement agencies. This training should entail instruction on effective verbal and non-verbal communication skills, appropriate uniform, and proper traffic control procedures.

Adult crossing guards should understand how to effectively control traffic, balancing the demands of all conflicting movements.

Adult crossing guards should be aware of the impact their control can have on the flow of traffic on the main road.

Adult crossing guards should pick opportune times to create a safe gap, and should not keep traffic stopped on the main road for an unreasonable length of time.

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Section 7E.04 Uniform of Adult Crossing Guards and Student Patrols

Guidance:

Adult crossing guards should be uniformed so that road users and pedestrians can recognize them and respond to their signals. The uniforms should be distinctively different from those worn by regular law enforcement officers.

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Adult crossing guards shall wear high-visibility retroreflective safety apparel labeled, at minimum, as ANSI 107-2004 standard performance for Class 2 as described in Section 6E.02.

Student patrols shall wear high-visibility retroreflective safety apparel labeled, at minimum, as ANSI 107-2004 standard performance for Class 1 as described in Section 6E.02.

Guidance:

Law enforcement officers should wear high-visibility retroreflective material over their uniforms when directing nighttime operations.

Section 7E.05 Operating Procedures for Adult Crossing Guards

Guidance:

Adult crossing guards should not direct traffic in the usual law enforcement regulatory sense. In the control of traffic, they should pick opportune times to create a reasonably safe gap. At these times, they should stand in the roadway to indicate that pedestrians are about to use or are using the crosswalk, and that all vehicular traffic must stop.

Adult crossing guards should use a STOP paddle. The STOP paddle should be the primary hand-signaling device.

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The STOP paddle shall be an octagonal shape. The background of the STOP face shall be red with at least 6 in series capital white letters and border. The paddle shall be at least 18 in in size and have the word message STOP on both sides. The paddle shall be retroreflectorized or illuminated when used during hours of darkness.

Option:

The STOP paddle may be modified to improve conspicuity by incorporating red or white flashing lights on both sides of the paddle. The red or white flashing lights may be arranged in any of the following patterns:

- A. Two red or white lights centered vertically above and below the STOP legend;
- B. Two red or white lights centered horizontally on each side of the STOP legend;
- C. One red or white light centered below the STOP legend;
- D. A series of eight or more small red or white lights no larger than 0.25 inches in diameter along the outer edge of the paddle, arranged in an octagonal pattern at the eight corners of the STOP paddle. More than eight lights may be used only if the arrangement of the lights is such that it clearly conveys the octagonal shape of the STOP paddle; or
- E. A series of white lights forming the shapes of the letters in the legend.

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If flashing lights are used on the STOP paddle, the flash rate shall be at least 50, but not more than 60, flash periods per minute.

Section 7E.06 Uniformed Law Enforcement Officers

Option:

Uniformed law enforcement officers may be used for school crossing supervision.

Section 7E.07 Student Patrols

Option:

Students patrols may be used to direct and control pedestrians at crossings near schools where adequate gaps in traffic occur frequently enough so that gaps do not need to be created.

Student patrols may be used to direct and control pedestrians at signalized intersections where turning movements are not a significant problem, and may be used to assist adult crossing guards in the control of pedestrians at crossing locations used by large numbers of pedestrians.

Guidance:

Student patrols should not be responsible for directing vehicular traffic. They should not function as uniformed law enforcement officers or adult crossing guards.

Section 7E.08 Choice of Student Patrols

Guidance:

Student patrols should be carefully selected. They should be students from the fifth grade or higher. Leadership and reliability should be determining qualities for patrol membership.

Parental approval should be obtained in writing before a student is used as a member of a student patrol.

Section 7E.09 Operating Procedures for Student Patrols

Guidance:

Student patrols should use a flagging device to stop pedestrians behind the curb or edge of the roadway, and should allow them to cross only when there is an adequate gap in traffic.

Standard:

Flagging devices used during periods of twilight or darkness shall be retroreflective or illuminated. Because they are not authorized to direct vehicular traffic, student patrols shall not use a STOP paddle.

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CHAPTER 7F. GRADE-SEPARATED CROSSINGS

Section 7F.01 Function

Option:

Grade-separated crossings may be used to physically separate the crossing of school pedestrian traffic and vehicular flow.

Section 7F.02 Types of Grade-Separated Crossings

Option:

Grade-separated crossings may be either overpasses over the highway or underpasses under the highway.

Guidance:

The design should follow the guidelines given in the published policies of the American Association of State Highway and Transportation Officials, such as “A Policy on Geometric Design of Highways and Streets” (see Section 1A.11).

Standard:

The design of grade separated crossings shall also follow the requirements specified in the Americans with Disabilities Act (ADA). This requirement often results in significant impacts to adjacent right-of-way, and can add significant expense to a project.

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Support:

Experience has shown that overpasses are more satisfactory than underpasses for pedestrian crossings, as overpasses are easier to maintain and supervise.

Section 7F.03 Criteria for Use of Grade-Separated Crossings

Guidance:

If use of the grade separation will be less convenient to pedestrians than an at-grade crossing, barriers or supervision should be considered to assure a satisfactory level of use.