Queensland Road Safety Technical User Volumes (QRSTUV)

Guide to Schools

November 2022

Queensland Government

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About this document

The *Queensland Road Safety Technical User Volumes* (QRSTUV): *Guide to Schools* is the guideline used for schools in Queensland.

How to use this document

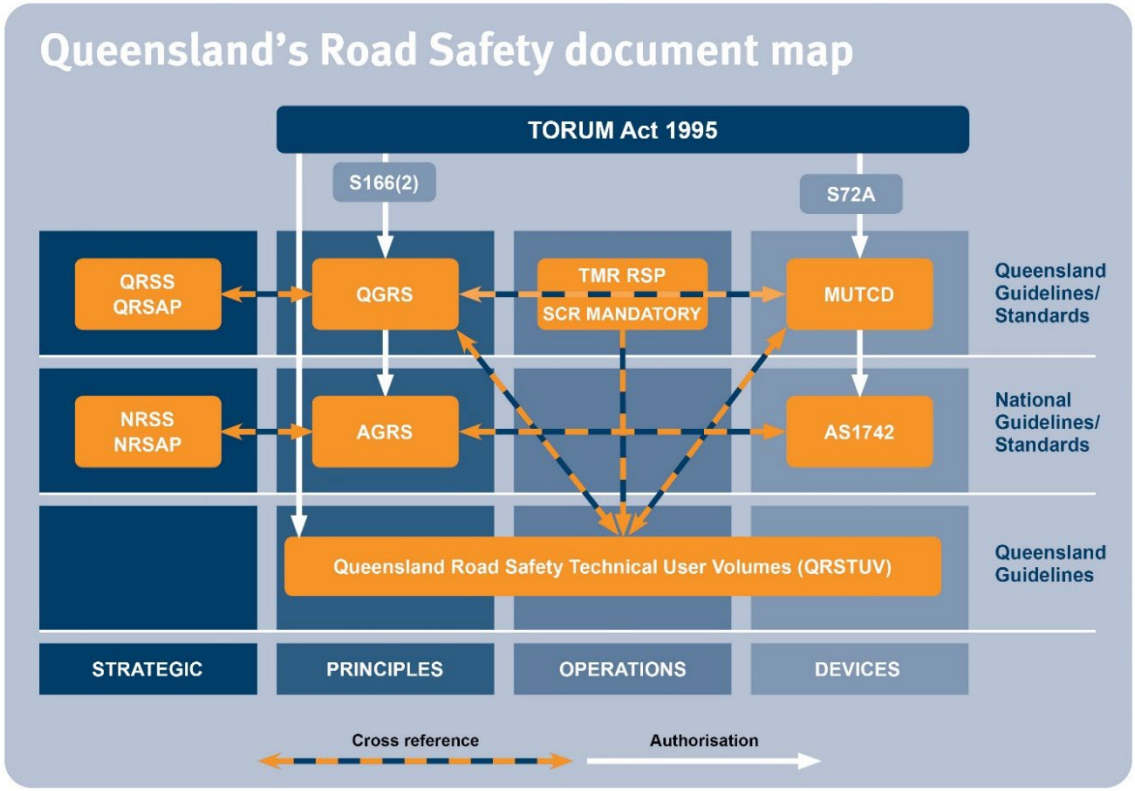
The Department of Transport and Main Roads has agreed to adopt the standards published in Austroads Guides and Australian Standards as part of national harmonisation. The department seeks to avoid duplicating information addressed in national guidance and has developed documents instead that provide Queensland-specific advice while following the structure established in Austroads Guides and Australian Standards.

Queensland-specific advice includes practices which vary from national practice because of local environmental conditions (such as geography, soil types, climate); different funding practices; local research; local legislation requirements; and to expand instruction on particular issues.

As such, the *Queensland Guide to Road Safety* (QGRS) takes precedence over the Austroads *Guide to Road Safety* (AGRS,) except where the Austroads Guide is accepted without changes. In the same manner, the Queensland *Manual of Uniform Traffic Control Devices* (Queensland MUTCD) takes precedence of the Australian Standard AS 1742, except where the Australian Standards are accepted without changes.

The QRSTUV: *Guide to Schools* is designed to be read and applied together with the QGRS and AGRS, and Queensland MUTCD and AS 1742. Readers shall have access to the Austroads Guide and Australian Standards to understand its application in Queensland.

A summary of the documents relevant to road safety practice in Queensland, and their links, is provided below:



Definitions

The following general amended definitions apply when reading the *Queensland Road Safety Technical User Volumes* (QRSTUV): *Guide to Speed Management.*

Term	Definition
AGRS	Austroads *Guide to Road Safety*
AS 1742	Australian Standard AS 1742 *Manual of Uniform Traffic Control Devices*
NRSS	*National Road Safety Strategy*
NRSAP	*National Road Safety Action Plan*
QGRS	*Queensland Guide to Road Safety*
QRSS	*Queensland Road Safety Strategy*
QRSAP	*Queensland Road Safety Action Plan*
QRSTUV	*Queensland Road Safety Technical User Volumes*
RSP	Queensland Department of Transport and Main Roads *Road Safety Policy*
TORUM Act 1995	*Transport Operations (Road Use Management) Act 1995* (Qld)
TRUM	Volume 2 of the *Traffic and Road Use Management* manual preceded the *Queensland Guide to Road Safety* and was withdrawn on publication of the corresponding QGRS Part.

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1 Introduction

This guideline, the *Queensland Road Safety Technical User Volumes* (QRSTUV): *Guide to Schools*, is intended to provide guidance to any organisation or authority involved with, or seeking information about, traffic management and road safety at schools.

Traffic conditions near schools can affect the safety of school children. The traffic environment around schools is a complex road transport environment encountered by motorists and a complex traffic environment frequently encountered by children. The complexity is because traffic density and pedestrian movements are concentrated in short periods in the morning and in the afternoon.

This *Guide to Schools* provides solutions to aid drivers to recognise that children are impulsive, unpredictable and inexperienced, and encourages drivers to use caution in the vicinity of a school.

Pedestrian and vehicle interaction to improve safety around schools can be managed through the provision of infrastructure from one or more of the following categories:

a) school pedestrian facilities

b) school parking facilities

c) school cyclist facilities

d) school warning facilities, and

e) school zones.

The QRSTUV: *Guide to Speed Management* contains the guidelines for the process to undertake a speed limit review, which includes school zone guidance.

2 School pedestrian facilities

2.1 General

The following sections provide guidance on the use of the various mid-block pedestrian crossing facilities at schools.

The *Queensland Guide to Traffic Management, Part 6 Intersections, Interchanges and Crossings Management* provides guidance regarding selection of particular crossing facilities for various road types.

2.2 Children's crossings

2.2.1 Definition

A children's crossing is an area of a road:

a) at a place with stop lines marked on the road, and:

   i. children crossing flags, or

   ii. children's crossing signs and twin yellow lights.

b) indicated by, and:

   i. two red and white posts erected on each side of the road, or

   ii. two parallel continuous or broken lines on the road surface from one side of the road completely or partly across the road.

c) extending across the road between the posts or lines.

2.2.2 Guidelines for installation

Children's crossings are usually installed near schools (within 200 m) where the requirements for such a facility arise only during specific and limited times of the school day. Where children's crossings are installed, pram ramps should also be installed. Where a crossing is required for large numbers of students, an adequate safe waiting area, or areas, should be provided.

Where a children's crossing at a school is supervised, an 'in the hand' 'STOP' Banner (R6-7) should be used during the times when it is operational.

Children's crossings are warranted at schools where:

- numbers of school children cross a roadway, and
- the crossing can usually be located within 200 m of the school, and
- an undertaking can be obtained to:
  - display the 'CHILDREN CROSSING' flags (R3-3) during the period when school children are likely to be crossing the roadway proceeding to or from school (see Section 2.4), and

- operate and maintain a School Crossing Supervisor during normal crossing periods while displaying ‘CHILDREN CROSSING’ flags (R3-3) and 'in the hand' ‘STOP’ banner (R6-7) (see Section 2.4). With the exception that School Crossing Supervisors do not operate on crossings that are used only by high school students or where the Transport and Main Roads' road safety advisors undertake a risk assessment (using the *School Crossing Supervisor Scheme Risk Assessment Report*) and determine that a School Crossing Supervisor is not warranted.

Children's crossings should not be installed on roads:

- where the posted speed limit is greater than 70 km/h (where there is a school zone, the posted speed limit is the school zone speed limit when the crossing is operational), or
- where there is inadequate sight distance to the pavement at the crossing for the motorist from at least one of the approaches, or
- on multilane roads with more than two through traffic lanes in any one direction of travel, or
- at or close to intersections as the ‘STOP’ line installed as part of the children's crossing will likely require drivers to stop through the intersection.

The installation of kerb extensions at children's crossings should be installed wherever possible to:

- improve visibility and, therefore, safety of the children and School Crossing Supervisor, and
- reduce the travel distance between the kerbs and reduce the exposure time on the road for the pedestrians.

Where parked vehicles close to the children's crossing obscure the ‘CHILDREN CROSSING’ flags from approaching traffic, it may be necessary to install ‘CHILDREN CROSSING’ flags on kerb extensions. ‘CHILDREN CROSSING’ flags should be installed adjacent to the ‘STOP’ line marking.

Figure 7.2(a) in Part 10 *Pedestrian control and protection* of Queensland's MUTCD shows the signing, line marking and parking requirements at a children's crossing.

In addition to this, the dashed crosswalk indicated in Figure 7.2(a) shall be provided at all children's crossings. The dashed crosswalk lines provide separation between vehicles approaching the stop line and where pedestrians are crossing the road and may prevent vehicles encroaching into the crossing area. The dashed crosswalk will also assist in better delineating to pedestrians the crossing path, especially where there are large volumes of pedestrians.

The dashed crosswalk lines are an additional measure to the red and white posts, to make the children's crossing more visible to motorists and to provide a designated path for pedestrians to cross the roadway.

The potential reduction in the NO STOPPING distance when kerb extensions are provided at zebra crossings as indicated in Figure 6.2 in Queensland MUTCD Part 10 does not apply to children's crossings.

2.3 School Crossing Supervisor

A School Crossing Supervisor may be required to operate at crossings of this nature during periods when the ‘CHILDREN CROSSING’ flags (R3-3) are displayed. This would necessitate the use of an 'in the hand' ‘STOP’ banner as stated previously.

Transport and Main Roads has developed a tool for assessing the risk at children's crossing using form F1840 (refer to Appendix A4) and, therefore, the need for a School Crossing Supervisor. Based on the risk assessment:

- where the risk is ‘high’, an engineering assessment is required to determine whether the school crossing type requires upgrading, to reduce the risk. A School Crossing Supervisor is not to be deployed at a high risk crossing.
- where the risk is ‘medium’, a School Crossing Supervisor is warranted, and an application for a School Crossing Supervisor should be submitted and considered on a state-wide basis, and prioritised based on funding.
- where the risk is ‘low’, a School Crossing Supervisor is not warranted.

All children's crossing established on multilane roads must have a School Crossing Supervisor provided for each direction of travel, where the risk is 'medium' or 'low’. School zones should be established where a children's crossing is installed on a multilane road to reduce the risk to vulnerable pedestrians crossing the road and School Crossing Supervisors operating the crossing. For locations that have a risk that is 'high' or a warrant that precludes a children's crossing, an engineering assessment is required to determine whether the school crossing type requires upgrading. A crossing facility is required when demand, or future demand exists on a multilane road.

For divided roads, where the risk level is 'medium', a School Crossing Supervisor should be considered for both directions of travel.

2.4 Installation of combined children's crossings with pedestrian crossing (zebra) at schools

A pedestrian crossing may exist within a school zone for use by pedestrians outside school zone times. This facility is normally installed if there is substantial pedestrian use outside school zone times. Refer to the *Guide to Traffic Management* Part 6 Section 9.1.2 for further information.

Children's crossings that are supervised provide a higher level of safety for school children than pedestrian crossings. Where a pedestrian crossing is installed within a school zone, a children's crossing should also be installed and an undertaking obtained to operate and maintain a School Crossing Supervisor during normal school crossing periods while displaying ‘CHILDREN CROSSING’ flags (R3-3) and 'in the hand' ‘STOP’ banner (R6-7).

Pedestrian crossings are to be installed in accordance with Clause 6 of Part 10 of Queensland's MUTCD. Figure 7.2(b) within Part 10 of Queensland's MUTCD provides details for signing and marking a combined children's crossing and pedestrian crossing (zebra) at schools. The potential reduction in the NO STOPPING distance when kerb extensions are provided at zebra crossings as indicated in Figure 6.2 in Part 10 of Queensland's MUTCD does not apply to combined children's and zebra crossings.

The use of raised zebra crossings or wombat crossings should be considered for combined children's crossing and zebra crossings. Raised crossings are more prominent and make pedestrians waiting to cross or crossing the road more visible to motorists. They are effective in reducing vehicle speeds, as the vertical deflection is designed to make it less comfortable for motorists to traverse at speed (generally aiming at reducing speeds to 30 km/h or less). Raised crossings may be suitable at locations where there is poor speed compliance.

The raised profile and the use of different coloured road surfacing differentiates the crossing from the roadway and may discourage vehicles encroaching / queuing into the crossing area. For further guidance on the use of raised crossings, refer to:

- *Queensland Guide to Traffic Management, Part 6 Intersections, Interchanges and Crossings Management*
- *Road Planning and Design Manual, Volume 3 Part 4 Intersections and Crossings –- General*, and
- Austroads *Guide to Road Design, Part 4: Intersections and Crossings – General*.

2.5 Display of 'CHILDREN CROSSING' flags (R3-3)

Refer to Figures 7.2(a) and 7.2(b) in Clause 7.2 of Queensland's MUTCD Part 10.

'CHILDREN CROSSING' flags (R3-3) shall only be displayed during times when children are likely to use the crossing. If the flags are displayed when children are not likely to use the crossing, motorists will disregard them.

Accordingly, 'CHILDREN CROSSING' flags shall be displayed only in accordance with the following requirements:

a) Where there is a school zone, 'CHILDREN CROSSING' flags should be displayed during the hours of operation of the school zone. In special circumstances, 'CHILDREN CROSSING' flags may be displayed outside school zone hours when children are required to cross the road as part of their school activity.

b) Where there is no school zone, 'CHILDREN CROSSING' flags should be displayed on school days only during the school zone operating hours within that local government jurisdiction.

c) 'CHILDREN CROSSING' flags shall be displayed throughout the day at split campus schools during the school zone operating times (refer to Section 7 for further details).

2.6 Signalised pedestrian crossings

Signalised pedestrian crossings give priority to vehicles and pedestrians, split by time, and allow pedestrians to cross when the through traffic is stopped by a red traffic light. Signalised pedestrian crossings can be used at mid-block locations or incorporated into traffic signals at intersections.

Under special circumstances (for example, where a supervised crossing has been upgraded to a signalised pedestrian crossing), a signalised crossing may be supervised during the times it is used by school children. This would generally be a transitional arrangement. The 'in the hand' 'STOP' banner (R6-7) shall not be used at traffic signals.

School Crossing Supervisors do not have authority to control traffic at signalised crossings. The crossing is activated by students or pedestrians waiting to cross the road, not by the School Crossing Supervisor.

2.6.1 Pedestrian actuated traffic signals (mid-block) at schools

The principles for installation of pedestrian actuated traffic signals are outlined in Part 14 *Traffic Signals* of Queensland's MUTCD. Refer to Clause 8 of Part 10 of Queensland's MUTCD for relevant line marking and signing arrangements.

Other measures which may improve safety at a signalised crossing include:

a) increasing the width of the crossing from 2.4 m (accepted minimum of crosswalks near schools) to the preferred 3.5 m, and/or

b) installing kerb extensions or blister islands to reduce the travel distance across the road.

2.6.2 Traffic signals at intersections

Traffic signal facilities for pedestrians may be provided at intersections as follows:

a) installation of new intersection signals on the basis of pedestrian warrants, or

b) installation of crosswalk facilities at an existing signalised intersection.

Refer to Part 14 of Queensland's MUTCD for the guidelines for the installation of traffic signals at intersections.

2.6.3 Slip lanes

Slip lanes at signalised intersections create uncertainty for pedestrians and motorists with regards to priority and they are particularly problematic for vision impaired persons. They are a high risk to pedestrians as drivers' attention is split between the crossing and looking to the right towards oncoming traffic.

Queensland Guide to Traffic Management Part 6 advises that unsignalised left-turn slip lanes should generally be avoided. Guidance indicates the removal of slip lanes being the preferred treatment, with raised wombat crossings and signalised crossings with pedestrian protection being acceptable alternatives for the pedestrian treatment of slip lanes.

2.7 Subways and bridges

Refer to Part 10 of Queensland's MUTCD for the guidelines for the installation of subways and bridges.

2.8 Pedestrian refuges, medians and kerb extensions

Pedestrian refuges, medians and kerb extensions have the effect of narrowing the road, thereby reducing the time that pedestrians are exposed to traffic when crossing the road. Provision of these devices may also have the added benefit of helping to reduce the speed of passing motorists by providing additional visual cues of the need to reduce speed.

Part 10 of Queensland's MUTCD provides guidelines for the installation of pedestrian refuges, medians and kerb extensions. Further information on when to install these facilities is detailed in the *Queensland Guide to Traffic Management* Part 6.

When designing physical pedestrian aids, it is important to ensure that the device will not create a hazard for other road users. The following issues shall be considered:

a) devices shall not encroach on the travel routes of other road users, particularly people riding bikes

b) devices shall be well lit, delineated and appropriately signed to ensure they do not become a hazard at night

c) bollards, fencing or vegetation installed on these devices shall not obscure sight lines to / from child pedestrians

d) appropriate kerbing shall be used, that is, semi mountable where the island is very close to the through lane, and

e) the facilities shall be usable by people with disabilities, as well as be suitable for prams.

2.9 Pedestrian fencing

Pedestrian fencing is used at schools in association with other pedestrian facilities to direct children to crossing points and prevent crossing at uncontrolled locations. Fencing may also be used on pedestrian refuges or medians to encourage pedestrians to wait in the middle of the road before completing the crossing. Fencing on the kerb line also discourages motorists from parking close to a crossing point.

At some locations, it may be possible to avoid installation of pedestrian fencing outside the school grounds by relocating school gates to appropriate locations relative to pedestrian crossings or school transport facilities.

At locations where visibility is not a problem, and where the fencing is intended to direct pedestrians, rather than create an impenetrable barrier, landscaping may be an aesthetic alternative to mesh or chain fencing. Maintenance issues of this option shall be considered. Fence material and construction should also be such as to minimise injuries to road users in the event of a collision (for example, horizontal rails shall not be used). Fencing on medians at staged crossings should be aligned so that pedestrians will face oncoming traffic as they are about to leave the median.

Consider providing reflective markers on the pedestrian fencing to delineate the fencing.

Figure 2.9 – Pedestrian fencing on a median

Particular attention should be given to the height and placement of the fence, and to the material used in its construction to minimise the potential sight obstruction between drivers and children about to cross the road. Fencing should be considered as a last resort because of the restrictions it imposes on pedestrians.

2.10 Yellow pedestrian holding line

Yellow pedestrian holding lines shall be used at school crossing facilities to encourage school children to wait behind the line before being directed to cross the road. This holding line helps to prevent school children encroaching onto the roadway while waiting to cross the road.

Part 10 of Queensland's MUTCD details yellow holding line requirements. This line must be yellow in colour and shall be applied to all children's crossings and combined zebra and children's crossings.

Where there is a yellow NO STOPPING line extending across the crossing facility, a yellow holding line shall also be installed as per Part 10 of Queensland's MUTCD to ensure that children do not attempt to stand at the yellow NO STOPPING line.

2.11 Placement of entry / exit points

The location of entry and exit points to the school is essential to direct pedestrians, people riding bikes and vehicles to desired locations. Gates should be located so that children waiting to be collected by parents / carers can stay inside the school fence. This has benefits in terms of road safety by preventing children playing near or on the road, as well as personal safety.

Suitable placement of gates may remove the need for pedestrian fencing outside the school. Intended routes from inside the school to various transport facilities (that is, bus stops, car parks, and foot and cycle paths) should be clearly established to avoid conflicts and maximise efficiency of the other facilities.

In particular, note that:

a) children should not have to cross the main entry / exit point or walk through the off-street parking in order to access other facilities

b) gates should be placed at locations that direct children to the designated crossing points, and

c) bicycle racks and access gates should be placed at locations where children riding bikes can safely access cycle paths.

Additional guidance on the placement of entry / exit points can be found in *Planning for Safe Transport Infrastructure at Schools*.

2.12 Impact on pedestrian crossing infrastructure due to development

The crossing facility provided at schools is based on traffic and road characteristics prevailing at the time the facility was constructed. Over time, traffic and road characteristics change and the appropriateness of the facility should be reassessed.

Where traffic and road characteristics change due to development within the vicinity of the school, the road authority should consider conditioning the developer to contribute towards the cost of installing appropriate infrastructure at the school.

Additional guidance on the placement of entry and exit points can be found in *Planning for Safe Transport Infrastructure at Schools*.

3 School parking facilities

It is important that adequate parking and pick up and set down facilities are provided to ensure school children travelling to and from school in private motor vehicles and buses are not subject to pedestrian and vehicle conflict.

Where schools are located on roads with high traffic volumes, off-street parking facilities are the preferred option (where the availability of land and funds permit). Bus and car parking facilities should be separated in both on and off-street facilities.

Additional guidance on the provision of school parking facilities can be found in *Planning for Safe Transport Infrastructure at Schools*.

4 School cyclist facilities

Adequate provision should be made for people riding bikes to enter and exit the school grounds safely, as well as store bicycles.

Additional guidance on the provision of school cyclists' facilities can be found in *Planning for Safe Transport Infrastructure at Schools*.

5 School warning treatments

5.1 Warning signs

5.1.1 General

Warning signs that may be used to warn motorists of the likely presence of school children on or crossing the road near schools include:

a) CHILDREN (W6-3)

b) PEDESTRIANS (W6-1)

c) PEDESTRIAN CROSSING AHEAD (W6-2) sign, and/or

d) BICYCLES (W6-7).

These signs may be used with one of the following supplementary plates where appropriate:

a) SCHOOL (W8-14)

b) BLIND (W8-19)

c) PRESCHOOL (W8-24)

d) DISABLED (W8-20), and/or

e) CROSSING AHEAD (W8-22).

5.1.2 Guidelines for installation

Warning signs are installed in accordance with the requirements of Queensland's MUTCD. Tables 5.1.2(a) and 5.1.2(b) are designed to assist in the selection of appropriate warning signs at schools.

Table 5.1.2(a) – Warning signs for use in advance of crossing facilities

Crossing facility	Warning sign
Pedestrian crossing (zebra)	PEDESTRIAN CROSSING AHEAD (W6-2) sign with a SCHOOL (W8-14) supplementary plate
Children’s crossing	CHILDREN (W6-3) sign with a CROSSING AHEAD (W8-22) supplementary plate
Pedestrian actuated signals	SIGNALS AHEAD (W3-3) sign if warranted

Other than in advance of a crossing facility, warning signs should only be used where:

a) a number of pedestrians cross the road but the numbers are insufficient to justify a specific pedestrian facility, or

b) there is significant pedestrian use at nights, or

c) the presence of pedestrians might be unexpected, or

d) the pedestrian demand extends over a length of road.

Table 5.1.2(b) – Warning signs for different site conditions

Site conditions	Warning sign
Significant number of pedestrians throughout the day, not only associated with the school	PEDESTRIAN (W6-1) sign
At schools without pedestrian crossing facilities	CHILDREN (W6-3) sign with a SCHOOL (W8-14) supplementary plate

Signs should only be installed where warranted. Improperly used or unnecessary warning signs lose effectiveness and can lead to disregard of signs by motorists. Sign clutter should also be avoided.

5.2 Pavement markings

5.2.1 General

Pavement markings and threshold treatments may be used to highlight road facilities at schools. All pavement markings associated with pedestrian crossing facilities shall be white and be retroreflective.

5.2.2 Pavement messages

Refer to Queensland MUTCD Part 4 for School Zone pavement markings.

The use of pavement messages in advance of pedestrian facilities at schools should be restricted to sites where driver awareness of the facility may be reduced by the horizontal or vertical alignment of the road or by volume of traffic, particularly during the peak periods when children are likely to be present on the road.

Word messages for use on road pavements are as follows:

a) PED X

b) SCHOOL X, and/or

c) SCHOOL.

Table 5.2.2 provides guidance on use of pavement messages at schools.

Table 5.2.2 – Pavement messages

Sign	Associated pavement message
PEDESTRIAN CROSSING AHEAD (W6-2) sign with or without a SCHOOL (W8-14) supplementary plate	PED X with or without AHEAD
CHILDREN (W6-3) sign with a CROSSING AHEAD (W8-22) supplementary plate	SCHOOL X with or without AHEAD
CHILDREN (W6-3) sign with a SCHOOL (W8-14) supplementary plate	SCHOOL

5.3 Flashing lights (wig wags) on warning signs

5.3.1 General

Queensland's MUTCD provides for the use of two alternately flashing lights (wig wags) installed above warning signs when the message being conveyed on the warning sign is one of extreme severity of hazard or there is a lack of adequate stopping sight distance to the hazard.

Flashing lights / wig wags installed above warning signs should be used at schools only in accordance with the following guidelines.

The use of smaller in-built flashing lights on enhanced school zone signs is addressed in QRSTUV: *Guide to Speed Management*.

5.3.2 Guidelines for installation

Flashing lights / wig wags may be used on warning signs at schools only where:

a) there is a children's or pedestrian crossing, and

b) where driver sight distance to the crossing is less than the stopping distance, and

c) enhanced school zone signs (refer to QRSTUV: *Guide to Speed Management*) have not been installed, and

d) the flashing lights / wig wags) are programmed to flash only during the hours of operation of the School Crossing Supervisor or if the School Crossing Supervisor is not present for the times when children are likely to be using the crossing on school days.

The 85th percentile speed should be used to calculate the stopping distance. Refer to Section 6.9 of this document for further guidance on improving compliance with school zone speed limits.

5.4 Threshold treatments

5.4.1 General

Threshold treatments may be provided at entrances to school zones to create a change in driver perception of the speed environment. In the absence of a school zone, threshold treatments may be used to define the school precinct.

5.4.2 Guidelines for installation

Threshold treatments similar to those used at the perimeter of Local Area Traffic Management (LATM) areas may be used to define the start and end of school precincts.

The purpose of threshold treatments is to inform road users that they are entering a school environment and that they should modify their driving behaviour, and reduce their speed where required.

Threshold treatments around schools will provide the greatest benefits at school zones where it is difficult for drivers to identify the need to reduce speed, for example, on wide, open straight roads or where the school is set back from the edge of the road.

Where used at schools without a school zone, threshold treatments shall be located adjacent to the PEDESTRIAN CROSSING AHEAD (W6-2) or CHILDREN (W6-3) warning signs.

Where used at schools without a school zone, threshold treatments shall include the word SCHOOL.

Refer to the QRSTUV: *Guide to Speed Management* for guidance on School Zone threshold treatments.

5.5 Consistent colour scheme

5.5.1 General

Road safety around a school is improved if motorists' awareness of the presence of the school is increased. To draw motorists' attention to the presence of schools, a unique colour scheme, called ‘consistent colour’, has been developed for use on regulatory and warning signs used at schools.

Consistent colour signs have a fluorescent yellow / green sign face, with a fluorescent orange target board of the same shape as the sign it highlights. The consistent colour scheme is applied to the following signs:

a) CHILDREN (W6-3)

b) PEDESTRIAN CROSSING AHEAD (W6-2), and

c) PEDESTRIAN CROSSING (R3-1).

Supplementary plates used with these signs are fluorescent yellow / green, but without a target board.

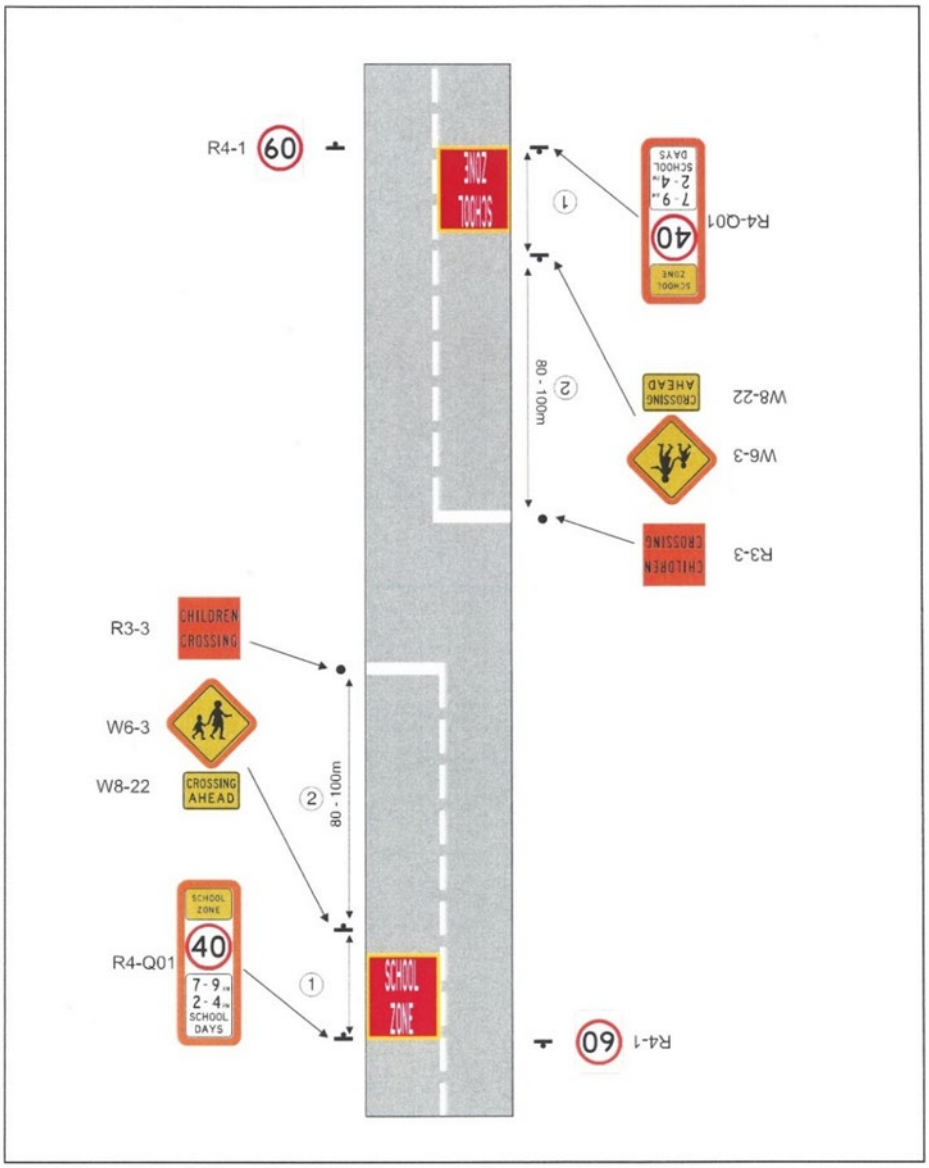
The standard SCHOOL ZONE (R4-Q01) sign has a fluorescent orange target board, a fluorescent yellow / green sign face, with the words SCHOOL ZONE, the speed restriction and the times of operation of the school zone on one sign.

5.5.2 Guidelines for installation

Use of the consistent colour scheme is restricted to school areas. Consistent colour should be applied to all relevant signs in a school area when introducing the consistent colour scheme.

A typical consistent colour scheme application within a school zone is shown in Figure 5.5.2.

Figure 5.5.2 – A typical application of consistent colour treatment within a school zone



Notes:

1. The SCHOOL ZONE (R4-Q01) sign should be located not less than 0.6 V (V = 85th percentile speed in km/h) in advance of any advance crossing signs, for example, W6-3 / W8-22.
2. The CHILDREN (W6-3) / CROSSING AHEAD (W-22) sign assembly should be located 80–100 m in advance of the crossing. This distance may be reduced to 30 m minimum in very low speed environments.

6 School zones

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.1 General

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.2 Alternatives to installing school zones

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.3 Application of school zones

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.4 School zone speed limits

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.5 Times of operation

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.6 Length of a school zone

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.7 Indicating times of operation on school zones signs

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.8 Types of school zone signs

6.8.1 Standard school zone sign (R4-Q01 and R4-Q04)

For signage required for school zones, refer to Queensland MUTCD Part 4.

6.8.2 Enhanced (flashing light) school zone sign at school zones (TC1783)

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.8.3 Technical requirements for enhanced school zone signs

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.8.4 Signage requirements for school zones on multilane roads

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

6.9 Speeding in school zones

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

7 Split-campus schools

7.1 General

A split campus school has facilities including, but not limited to buildings, sports grounds, swimming pools or other facilities that are used as part of the school curriculum that are separated by a road that school children are required to cross throughout the day and throughout the school year.

Provided children are required to cross the road at intervals throughout the school day, two or more schools that share facilities which require school children to cross a road throughout the day may also be treated as split-campus schools.

Where split campuses exist, the road safety risk to the school children is increased. To minimise risk, supplementary engineering treatments, such as the installation of traffic calming and permanent 40 km/h speed limit, should be considered.

7.2 Minimum infrastructure requirements

Motorists must be made aware of the presence of a school and to expect children will be crossing the road. The installation of adequate infrastructure must ensure the safety of these school children. The following minimum infrastructure shall be provided at split campus schools:

a) school zone (unless a permanent speed limit of 40 km/h applies)

b) pedestrian crossing facility, and

c) warning signs.

7.3 School zones at split campus schools

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

7.4 School zone signs at split campus schools

For guidance on school zones, refer to the QRSTUV: *Guide to Speed Management*.

7.5 Pedestrian facilities at split-campus schools

7.5.1 General

A significant risk to children travelling to and from school is the conflict between pedestrian and vehicular traffic. This risk can be minimised by separating pedestrians from vehicles through grade separation.

A grade separated facility may not always be the most suitable option as pedestrians may not use it if it is installed on roads with relatively low perceived risk.

The risk to children crossing the road at a split-campus school can also be minimised by implementing traffic engineering measures, including the installation of appropriate pedestrian crossing facilities and traffic calming.

7.5.2 Selection of pedestrian facilities

A number of factors need to be considered when determining the most appropriate type of pedestrian facility. These include:

a) the function of the road, including traffic characteristics (volumes, type of traffic, number of lanes)

b) pedestrian characteristics (volume, age of pedestrians, crossing frequency)

c) speed limit on the approach to the facility

d) sight distance and stopping distance

e) roadside activity

f) safety of other road users

g) road environment, including the presence of traffic calming devices

h) construction and maintenance costs of the facility, and

i) use of the facility by the intended road users.

The *Queensland Guide to Traffic Management, Part 6 Intersections, Interchanges and Crossings Management* Section 9.1.2 *Pedestrian crossing facility selection* also provides guidance in selecting appropriate crossing facilities.

Where a grade separated facility is installed, supplementary treatments may be necessary to ensure that intended users do not cross the road at grade level.

7.6 Treatments for four-lane or wider roads

7.6.1 General

Four-lane roads usually carry around 10,000 vehicles per day or higher. The level of risk to school children depends on the signage, control and infrastructure measures in place and generally increases with traffic volume.

In the 10,000–20,000 vehicles per day range, there is an increased risk to children crossing the road. Enhanced at grade facilities provide appropriate measures to manage this risk and should be considered.

Where there are concerns regarding performance of crossings, the following treatments can be considered.

7.6.2 Lane ‘throttling’

On arterial roads with four through traffic lanes, where the traffic volumes are 10,000–15,000 vehicles per day, consideration should be given to throttling from four to two lanes. Lane throttling involves reducing the number of through traffic lanes (for example from four to two) where the lanes are not required for traffic capacity reasons. Lane throttling provides a number of benefits, including:

a) reduced crossing distance, with a resultant reduction in risk due to shorter exposure times

b) reduced red time at the pedestrian crossing, and

c) better speed compliance due to the changed road environment.

When throttling lanes, the minimum length requirement for merge lanes and tapers should be provided.

7.6.3 Grade separation

At split campus schools on arterial roads with four through traffic lanes where traffic volumes exceed 15,000 vehicles per day and other lower cost treatments are not adequate, a grade separated pedestrian facility should be considered.

At split campus schools on arterial roads with six or more through lanes, pedestrian crossings shall be grade separated.

Where a grade separated facility has been provided across an arterial road, there should not be any direct access to the school from that road. Access for students to enter the school premises should be provided from other lower order roads.

If this is not practical, direct access to the school should be closed off during school hours, except in the morning and afternoon when children arrive to school and leave school.

7.7 Installation of pedestrian facilities

Part 6 of the *Queensland Guide to Traffic Management* provides guidance for the installation of various types of pedestrian facilities.

7.8 Warning signs

Advance warning signs should be installed to warn motorists of the presence of the school and pedestrian crossing facility.

The following warning signs may be used to warn motorists of the likely presence of school children on or crossing the road:

a) CHILDREN (W6-3)

b) PEDESTRIANS (W6-1, and)

c) BICYCLES (W6-7).

Appropriate supplementary plates may be installed with these warning signs. All warning signs shall be consistent colour signs.

Where the installation of a warning sign does not have the desired effect on driver behaviour, the installation of flashing / wig wag lights above the warning sign may be considered (see Section 5.3).

7.9 Threshold treatments

For guidance on spilt-campus school zone threshold treatments, refer to the QRSTUV: *Guide to Speed Management*.

7.10 Crossing supervision

A split campus that does not meet the risk assessment criteria for a supervised crossing under the School Crossing Supervisor Scheme could consider alternative options to supervise children crossing roads. Options include Traffic Monitors, school-paid School Crossing Supervisors and volunteer School Crossing Supervisors. Options should be discussed with Transport and Main Roads Regional Road Safety Advisors and representatives from the relevant road authority and local government.

7.11 Split-campus schools created after 30 September 2011

Transport and Main Roads does not encourage the construction of school facilities that create a split-campus school as the frequent crossing of the road between campuses increases the risk to the children attending that school.

The road authority assessing any development application that creates a split campus school should condition developers to provide appropriate pedestrian crossing facilities. Further information on planning for schools can be found in the document *Planning for Safe Transport Infrastructure at Schools*.

8 Road safety management of rural school bus routes and bus stops

8.1 Introduction

This guidance is designed to provide engineering practitioners with a better understanding of rural school bus safety needs in Queensland. It should be read in conjunction with other traffic engineering and road design guidelines. It is intended to demonstrate that best practice and specific attention to the safety needs of school bus traffic can lead to an overall safer road system. Discretion and judgement should be exercised in the light of many factors which may influence the choice of treatment in a given situation.

Issues concerning school bus transport safety include:

a) the selection and the standard of school bus routes

b) the provision of school bus stops

c) signing of school bus routes and stops, and

d) in-vehicle safety, e.g., standees, seat belts and padding.

As the guidance deals with road engineering aspects of school transport safety, issue ‘d)’, above, is outside scope.

Owing to the transient nature of school bus stops in rural areas due to the movement of the school children population, the provision of school bus stops is often considered to be difficult to justify when the costs are high. However, in order to improve the safety performance of the more hazardous bus routes, Transport and Main Roads manages the Safe School Travel (SafeST) package – refer to the department’s website for further information.

To enable school bus routes and stops to be assessed and treated in a consistent manner, guidelines for good practice are necessary to address the first three issues identified above.

8.2 Purpose

The guidance in the following sections is provided to engineering practitioners on the ‘good practice’ principles of road safety on rural school bus routes. They also provide safety principles and criteria in the selection or review of rural school bus routes and school bus stops.

As there are no official warrants or standards applicable for much of the traffic and safety requirements on school bus routes and bus stops, much of the assessment is subjective and relies on engineering judgement and other relevant local knowledge and experience. Where necessary, the practitioner should enlist specialist engineering advice.

This guidance covers the traffic safety aspects of school bus routes and school bus stops, and the provision of appropriate signing to warn motorists of the possible presence of school buses and school children. The treatment and provision of school bus routes and bus stops should ensure safe and convenient travel for children going to and from school.

A Road Safety Checklist (refer to Section 12) has been developed in conjunction with the guidance and nominates safety issues to be considered during the assessment of rural school bus routes and bus stops. The checklist is not intended to highlight all of the issues – rather, it is to act as a prompt for practitioners and enables a brief summary of any safety investigation into school bus routes / stops to be made.

9 Road environment safety principles

The following sections provide a brief outline of the general principles of a safe road environment and risk assessment.

9.1 A safe road environment

The function of a road is primarily to provide for the movement of people and goods. Other subsidiary functions, such as parking and use of roads for services, are often also permitted. A safe road environment is one which allows road users to perform the primary function of movement without undue risk of injury or damage.

To move about the road system safely, road users must negotiate the physical road environment and avoid or resolve conflicts with other road users. This requires road users to perceive and process information, make decisions, and react within specific time intervals.

Comfortable and safe driving and riding occurs when motorists are operating well below a stressful processing and decision-making rate and above a minimum level of arousal. This aspect is a critical component in the development and maintenance of a safe road environment.

A safe road environment should:

- warn the road user of any substandard or unusual features
- inform the road user of conditions to be encountered
- guide the road user through unusual sections
- control the road user's passage through conflict points or conflict sections, and
- forgive the road user's errant or inappropriate behaviour.

From this it can be seen that:

- Road users expect similar situations to be treated in similar ways. Otherwise, there will be a reliance on warning, which may or may not counteract other information and expectations.

Things to be avoided are:

- inadequate treatment (not treating a situation to an appropriate level)
- mistreatment (using the wrong treatment for the situation), and
- excessive treatment (using 'more treatment for more safety', thereby masking other similar situations which have already been treated to the appropriate level).

Optimum values for design parameters should be applied as often as possible, compatible with terrain or other prevailing constraints.

- Advance information and warning should be used to strengthen the delineation of a road.
- Driver overload, which may cause vital information to be overlooked or discarded, should be avoided. Overload can result from too many signs, conflicting messages or lack of delineation.

Therefore, a safe road environment is one which:

- provides no surprises in road design or traffic control (expectancy factors)
- provides a controlled release of relevant information (not too much at once), and
- provides repeated information where pertinent to emphasise danger.

As different road user groups (e.g., car drivers, motorcyclists, truck drivers, cyclists, bus drivers, pedestrians, etc.) and the individuals within each group will have different abilities and needs, a safe road environment will be one which is designed, constructed and managed with these different road user abilities and needs in mind.

9.2 Assessing risk

While all roads have inherent risks, and these risks vary in severity for the different road users, a safe road environment is one where the risk to all road users is at a level which Transport and Main Roads considers suitable based on a risk assessment. Risk in relation to road environment safety is defined by three elements:

1. Probability: the chance of the occurrence of an event.
2. Exposure: the number of vehicles or people travelling past a particular hazard or whom the hazard may affect.
3. Severity: the effect of a range of various factors should a crash occur. Such factors may include:
    a. proportion of buses in traffic
    b. proportion of trucks in traffic
    c. relationship to speed zone or speed environment and actual operating speeds
    d. crash severity in terms of fatality, hospitalisation, medical treatment or property damage
    e. the proximity of emergency services (in terms of road trauma management), and/or
    f. crash types.

The following expression can be used to assess risk:

Risk =	crash frequency	x	severity
(Cost)	(probability x exposure)		(crash cost)

Where exposure is expressed in terms of traffic volumes, severity is expressed in terms of crash outcome (cost) and probability is expressed in terms of a value.

Thus, a safer road environment can be achieved by reducing exposure and/or probability and/or severity which, in essence, is a Safe System.

Two major road environment safety initiatives for achieving a safe road environment are Road Safety Audit and the Treatment of Crash Locations.

10 Bus Routes

The following sections provide an outline of the guidelines for good practice for the safety management of rural bus school routes, considering factors such as road and traffic characteristics and signing.

10.1 General

School bus routes should provide safe and convenient travel for children going to and from school. The route should be safe for the operation of school buses and should be such that school children would be picked up and set down at the same locations.

In general, the route used and/or proposed to be used by school buses should satisfy the design criteria contained in relevant Austroads guides, Queensland guides and the Queensland *Manual of Uniform Traffic Control Devices* in relation to issues such as:

- sight and stopping distances
- road geometry
- pavement and drainage
- auxiliary lane and intersection
- traffic control, and/or
- roadside object, etc.

Further considerations for good practice in relation to school bus routes and safety should include issues such as:

- school bus performance/operations along the route, and
- signing specifically for school bus routes.

These issues are further discussed in the following sections.

10.2 School bus performance issues

10.2.1 Traffic delay and queuing

Momentary bunching of the traffic may result because of the performance of the school bus (e.g., up/down roadway grades due to the stopping of the bus fully or partially within a traffic lane, etc.). Bunching causes delays to the vehicles in the bunches. If these delays are continued over a perceived long period of time, they may cause unnecessary risk taking by the motorists. This may have an adverse effect on the safety of school children.

Thus, the following traffic criterion should be considered when assessing school bus routes: *The school bus performance and frequency of stops should not create excessive traffic delays and queues for other vehicles*.

Where excessive delays are experienced by other road users, consideration should be given to the provision of overtaking facilities, such as auxiliary lanes, bus stopping areas fully clear of the traffic lanes, slow vehicle turnouts, etc.

Queue lengths following school buses may create a safety hazard to other road users. For example, the end of a queue may be just over the crest of hill due to school bus performance/stopping. Where this situation is unavoidable and frequently occurs, consideration should be given to warning motorists of the situation through other measures such as signing.

10.2.2 Speed disparities

Speed disparities between vehicle types (e.g., passenger car, school bus, etc.) may occur as a result of the performance of the school bus (e.g., up/down roadway grades due to the stopping of the bus, etc.). This may lead to increased queuing, delay and overtaking manoeuvres. The increased overtaking requirements and reduced service volumes can give rise to operational and safety problems at higher traffic flow.

Moreover, high speed disparities between vehicles may cause unsafe situations and increase the possibility of multiple vehicle crashes (e.g., rear-end, etc.). For example, where the driver of a high-speed vehicle comes unexpectedly onto a slow-moving vehicle (e.g., around curve, over crest, etc.).

Thus, the following roadway criterion should be considered when assessing school bus routes: *The school bus performance and frequency of stops should not create excessive speed disparities between vehicles*.

Where excessive speed disparities are expected, consideration should be given to overtaking provisions, maximising sight and stopping distances, improving warning of the situation, using an alternate route, using a more appropriate vehicle, etc.

Where long, steep grades are likely to cause the school bus to slow down to speeds of 40 km/h or less, auxiliary lanes should be considered in accordance relevant Austroads guides, Queensland guides and the Queensland *Manual of Uniform Traffic Control Devices*.

10.2.3 Traffic lane discipline

Poor traffic lane discipline (e.g., not travelling within the designated traffic lane) may result from the performance of the school bus (e.g., around curves, etc.). Poor traffic lane discipline in conjunction with poor visibility increases the potential for multiple vehicle crashes (e.g., side swipe, head-on, etc.).

Wide traffic lanes and shoulders provide drivers with increased opportunity for safe recovery when their vehicles run off the road and also provide increased lateral separation between overtaking and passing vehicles. Additional safety benefits include reduced interruption from school bus stopping, emergency stopping and road maintenance activities, less wear at the lane's edge, improved sight distance at critical horizontal curves and the possibility of improved pavement structural support/pavement drainage.

Thus, the following carriageway criterion should be considered when assessing school bus routes: *The school bus should be able to remain within its correct traffic lane around horizontal curves*.

Where this is not possible, and depending on the degree of the hazard created, consideration should be given to carriageway widening, improving the sight distance to or warning of the situation, using an alternative route, using a smaller sized vehicle, providing additional warning to road users, etc. The degree of the hazard can be subjectively assessed on the basis of traffic volume and visibility (e.g., probability of conflict and ability to see it, etc.).

Refer to the Austroads *Guide to Road Design* and *Road Planning Design Manual, Volume 3* for information pertaining to desirable lane widths and curve widening in relation to bus routes.

10.2.4 Road surface condition

Irregularities or defects in the roadway surface could adversely affect the controllability of the school bus and, thus, could increase the chance of driver error which, in turn, could increase the likelihood of a crash. It has been reported that surface roughness may be a much larger factor in truck crashes than car crashes.

Pavement/road surface type and condition (e.g., skid resistance, etc.) can influence operating speed, rolling resistance, the vehicle's performance and aquaplaning characteristics. For example, consider the scenario of a fully loaded school bus climbing up a curvilinear steep grade under moist road conditions, e.g., fog.

Thus, the following pavement criterion should be considered when assessing school bus routes: *The road surface material along the school bus route should be suitable for bus performance under all weather conditions*.

In the instance of unsatisfactory roughness and skid resistance, consideration should be given to rectifying the problems.

Figure 10.2.4(a) – Unsealed pavement along school bus routes

Pavement appears to be soft with pavement edges deeply scoured. The poor condition of the pavement may be hazardous to the school bus operator and school children as there is a risk of reduced controllability of the school bus.

Figure 10.2.4(b) – Unsealed pavement along school bus route

10.2.5 Structures

A number of structures, such as bridges, culverts, floodways, causeways and stock grids, may be present along the school bus route. It is extremely important to investigate and confirm the structural integrity of these structures, keeping in mind the mass and dimensions of the school bus using the route. In addition to this, any property access that is traversed by the school bus should be structurally sound.

Thus, the following structural criterion should be considered when assessing school bus routes: *The structural integrity of all bridges, culverts, floodways, causeways, stock grids, property accesses, etc., along the school bus route should be adequate*.

10.3 School bus route signing

Traffic signs are provided to aid in the safe and orderly movement of traffic. It is therefore essential to ensure uniformity in the application of signs. Similar conditions should always be treated with the same type of sign, so that road users can readily anticipate the course of action required. The use of a sign which is at variance with its use elsewhere is confusing and, consequently, creates a potentially hazardous situation.

Furthermore, the Queensland *Manual of Uniform Traffic Control Devices* also stresses the significance of the loss in effectiveness of warning signs if used unnecessarily or too frequently. Their use should be restricted to the minimum and consistent with safety requirements. A warning sign should not be used if, under normal conditions, the motorist can be expected to see and appreciate the potential hazard ahead.

Thus, the following signing criteria should be considered when assessing school bus routes: *A road should only be signed as a school bus route where, for safety reasons, it is necessary to warn motorists of the possible presence of the school bus or school children on the road*.

Should it be necessary to sign a road as a school bus route, the 'SCHOOL BUS ROUTE' sign (TC9945), with supplementary plate 'NEXT ...km' (W8-17), should be used at the beginning of the route, and repeated as necessary, where the school bus route exists for a distance greater than 1 km along a particular road and has one or more of the following deficiencies/conditions:

- narrow carriageway
- unsealed surface
- winding alignment
- poor longitudinal profile
- steep grades
- the route is used by more than two school bus services, in either the same direction or opposing directions, at the same time of the day
- the route is highly used by heavy vehicles, tourist vehicles, etc., and the safety operations of the school bus are of high concern (e.g., proportion of heavy vehicles is greater than 10%, ex.), and/or
- the school children activities adjacent to the roadway pose safety concerns.

Figure 10.3(a) – 'SCHOOL BUS ROUTE' sign with 'NEXT … km' plate (TC9945 and W8-17)

It should be noted that where the safety standard of the road environment is considered to be deficient and compromises the safety of school bus operations, school children's activities, or other general road users, the use of the road/route for school bus operations should be reviewed. This may mean upgrading the road environment to improve safety if no other school bus route choices are available.

It is not intended that school bus warning signs be used to justify unsafe school bus routes and school bus stopping areas. Every attempt should be made to ensure school bus routes and school bus stops are safe and convenient.

To maintain credibility of school bus warning signs, it is important that they be removed as soon as the road ceases to be used as a school bus route or the road is upgraded such that the school bus route may not need signing.

Figure 10.3(b) – Example of a non-standard school bus route sign

A non-standard school bus route sign is shown in Figure 10.3(b). The sign has a white background with red text, which drivers may mistakenly perceive as a regulatory sign.

If the school bus route requires signing, TC9945 with W8-17 would be more suitable.

The school bus turn-around area along a school bus route should be signed where, for safety reasons, it is necessary to warn motorists of the possible presence/operations of the school bus on the road.

The 'SCHOOL BUS TURNING' sign (TC9306) should be used in advance of where the school bus performs a turnaround manoeuvre, which may impede traffic flows and/or compromise the safety of other road users.

Figure 10.3(c) – 'SCHOOL BUS TURNING' sign (TC9306)

The school bus turn-around areas should be located at places where the safety of the bus occupants and other road users is not compromised. The road in the vicinity of the turnaround area should provide sufficient visibility to approaching drivers and should be in good condition (e.g., roughness, skid resistance, etc.).

The 'SCHOOL BUS TURNING' sign should not be used to justify unsafe school bus turnaround areas. Every attempt should be made to ensure school bus turnaround areas is safe and convenient.

The school bus entry from an adjoining land access onto a road system should be signed where, for safety reasons, it is necessary to warn motorists of the possible presence/operations of the school bus on the road.

The ‘SCHOOL BUS ENTERING’ sign (TC9611) should be used in advance of where the school bus enters a road from an adjoining land access and this may impede traffic flows on such a road and/or compromise the safety of other road users.

Figure 10.3(d) – ‘SCHOOL BUS ENTERING’ sign (TC9611)

It should be noted that where the safety of the road environment is considered to be deficient (e.g., lack of visibility, etc.) and compromises the safety of school bus operations, school children's activities, or other road users, the use of the access for school bus entering operations should be reviewed. This may mean upgrading the road environment/access to improve safety if no other school bus entering choices are available. This sign should not be used to justify unsafe school bus entering operations.

11 Bus stops

The following sections outline the guidelines for good practice for the safety management of rural school bus stops, considering factors such as crash history, visibility, roadway characteristics, traffic characteristics, school bus stop locations, signing, passenger waiting facilities and pedestrian facilities.

11.1 General

The location of school bus stops should be carefully evaluated to enhance the safety and convenience for school children using the facilities and/or for other road users.

Generally, school bus stops should be located and designed to:

- maximise the safety of school children and other road users, and
- minimise the interference to traffic flow on the road system.

In general, the location and/or design of school bus stopping places should satisfy the design criteria contained in the traffic engineering and road design guidelines/manuals (e.g., Austroads *Guide to Traffic Management*, Transport and Main Roads' Queensland *Manual of Uniform Traffic Control Devices*, Transport and Main Roads' *Road Planning and Design Manual*, etc.).

Further considerations for good practice in relation to school bus stopping locations, design and safety should include issues such as:

- crash history in the vicinity of the school bus stop
- visibility to/from the school bus stop activities
- provisions for passing zones at the school bus stop
- roadway characteristics in the vicinity of the school bus stop
- traffic characteristics in the vicinity of the school bus stop
- provisions for bus stop facilities at intersections and mid-blocks
- signing specifically for school bus stops and crossing areas
- provisions for passenger waiting facilities, and
- provisions for pedestrian facilities.

These issues are further discussed in the following sections.

11.2 Crash history

Crashes in most instances have multiple causal factors. In general, the three contributing factors in motor vehicle crashes (and their involvement) are:

1. human factors (which are involved in around 95% of crashes)
2. road environment factors (which are involved in some 28% of crashes), and
3. vehicle factors (which are involved in around 8% of crashes).

Analysis of crash data at a particular site or road section may identify the causal factors and subsequently remedial treatments may be recommended. All crash data should be considered when assessing school bus stop locations.

Thus, the following crash criterion should be considered when assessing school bus stops: *School bus stops should not be located in areas with a history of crashes*.

11.3 Visibility issues

11.3.1 Visibility

Drivers need sufficient visibility along a road to avoid collision, especially with respect to events such as stopped school buses, children crossing, etc.

The optimum locations for school bus stops are locations on sections of a road with a straight alignment and uniform gradient. School bus stops should not be located in unexpected situations and/or at locations with limited visibility, such as just around sharp horizontal curves or just over crests, etc.

The visibility of the school bus stop should be adequate so that:

- following vehicles can stop or slow down safely behind the school bus while the bus is entering or leaving the bus stop, and/or
- vehicles can safely pass the school bus while it is engaged in pick up/set down activities.

Thus, the following visibility criteria should be considered when assessing school bus stops: *The school bus stopping location and its activities should be conspicuous to all road users and in accordance with the Queensland Manual of Uniform Traffic Control Devices*.

Where sight distance is restricted, school bus stops should be avoided in the vicinity of sharp curves or severe changes in vertical alignment. Ideally, in relation to visibility issues, school bus stops should be located on sections of relatively straight and flat roadway.

Where school bus stops need to be located in less than ideal locations, other measures (e.g., signing, providing full pull-off areas for the bus, etc.) should be considered for increasing the conspicuity of the hazard and improving safety. Where children are required to cross the roadway at such locations, serious consideration should be given to relocating the bus stop to a safer location and ensuring a safe travel path is provided for the children.

School bus stops and their associated activities should not be obstructed by vegetation, road side objects, bridge abutments, etc. Where necessary, measures such as removing or selective clearing of vegetation, benching of embankments, etc., should be considered for increasing the conspicuity of the site and improving safety.

The school bus stop and its activities should be adequately visible in all relevant lighting and weather conditions.

Where visibility is deficient under one or more of such conditions and safety may be compromised, other measures, such as signing, delineation, lighting, etc., should be considered to warn motorists of the potential hazards associated with the school bus stop activities during adverse weather conditions.

Figure 11.3.1 – Example of advance warning sign on approach to a school bus stop

✗ Visibility to/from the school bus stopping area is restricted by the horizontal curve.

✓ The ‘CHILDREN’ sign installed is suitable, though a ‘BUS STOP’ plate could be added or, alternatively, a ‘SCHOOL BUS TURNING’ sign could replace this sign.

11.3.2 Stopping sight distances

Approach sight distance appropriate to the approach speed should be provided on each approach to the bus stop. This is the minimum distance that is required by the driver of a vehicle to observe the school bus at the bus stop, children crossing at the bus stop, etc., in sufficient time to react and stop, if necessary, before entering the conflict area.

Generally, the same stopping sight distance criterion is applied to all passenger vehicles and buses/trucks where the driver's eye height is 1.15 m and 1.80 m, respectively. This is based on the assumption that even though buses and trucks generally require longer braking distances, the bus/truck drivers are generally able to see the vertical features of obstructions substantially farther ahead due to their higher position. The only exception is where vertical obstructions are on the inside of curves, where the greater eye height of the driver is of no value in compensating for the longer stopping distances. In such situations, longer stopping distances should be provided for buses/trucks. Refer to Austroads *Guide to Road Design* and *Road Planning Design Manual, Volume 3*.

Thus, the following visibility criterion should be considered when assessing school bus stops: *Adequate stopping sight distances to the school bus stop and its activities should be made available to approaching drivers, especially if children are required to cross the roadway*.

Where the minimum stopping sight distance is not attainable, other measures, such as signing, providing a high friction surface, etc., should be considered for increasing the conspicuity of hazards (i.e., stopped bus and children) and reducing crash risk. Refer to the Austroads *Guide to Road Design* and *Road Planning Design Manual, Volume 3* for minimum stopping sight distances.

It should be noted that stopped buses within the traffic lane, on, or near, a crest or curve, may also be in breach of traffic legislation. That is, a driver must not stop on, or near, a crest or curve on a length of road that is not in a built-up area unless the driver's vehicle is visible for 100 m to drivers approaching the vehicle and travelling in the direction of travel of traffic on the same side of the road as the vehicle.

11.3.3 Passing zones (overtaking zones)

Safe and effective passing zones at bus stops on two-lane roads require both adequate sight distance to opposing vehicles and adequate passing zone length. Passing sight distance is needed to ensure that passing drivers have a sufficiently clear view ahead to minimise the possibility of collision with an opposing vehicle. The length of the passing zone needs also to take account of the length of the bus being overtaken. This is also dependent on the speed.

Thus, the following visibility criterion should be considered when assessing school bus stops: *Adequate passing opportunities should be provided at school bus stops for following vehicles*.

To allow for safe passing of vehicles at bus stops, it may be necessary to provide pick-up/set-down areas for buses to stop. It should be noted that, in accordance with traffic legislation, where there is no continuous dividing line or dividing strip, there must be at least three metres of the road alongside the vehicle that is clear for other vehicles to pass and where there is a continuous dividing line or dividing strip, the driver must position the vehicle at least three metres from any such dividing line or dividing strip.

Figure 11.3.3 – School bus stop established on narrow carriageway

A school bus stop is located where the sedan is parked. There is restricted width between the barrier lines and the kerb (i.e., three metres between parked school bus and barrier lines would not available as stipulated by legislation). As a result, motorists are forced to cross the barrier lines to pass the parked vehicle. This is illegal and extremely unsafe.

A bus pick-up / set-down area should be constructed or, alternatively, the bus stop should be relocated.

11.4 Road characteristics

11.4.1 Roadway grades

Grades in the road cause speed disparities between vehicle types, leading to increased queuing and overtaking requirements. The increased overtaking requirements and reduced level of service can give rise to operational and safety problems at higher traffic flows.

The safety aspect of uphill operation also relates to speed disparities. Rear-end crashes can occur where the driver of a vehicle comes unexpectedly onto a slow moving vehicle.

Thus, the following roadway criterion should be considered when assessing school bus stops: *The school bus stop should be appropriately located in relation to the roadway grade and auxiliary lane facilities*.

School bus stops should be located in relation to grades, such that adequate sight distance is achieved (refer Section 11.3.1) and school bus performance is not excessively degraded so as to become a hazard and/or impede general traffic flows. For example, where visibility is not an issue and where grades are very steep school bus stops should be avoided in sag curves or on the grade incline due to the difficulty and hazard of braking and/or accelerating amid general traffic.

School bus stops should not be located within the tapering sections of auxiliary lanes (e.g., overtaking lanes, climbing lanes, descending lanes, turning lanes, passing bays, etc.) or runaway vehicle facilities.

11.4.2 Lanes and shoulders

Wide traffic lanes and shoulders provide drivers with increased opportunity for safe recovery when their vehicles run off the road and also provide increased lateral separation between overtaking and passing vehicles. Additional safety benefits include reduced interruption from school bus stopping, emergency stopping and road maintenance activities, less wear at the bitumen edge, improved sight distance at critical horizontal curves and possibility of improved pavement structural support/pavement drainage.

Thus, the following carriageway criterion should be considered when assessing school bus stops: *Adequate road shoulders should be provided to improve safety at school bus stops*.

Wider road shoulder widths (e.g., 3.0 metres or wider, etc.) allow commercial vehicles to stop clear of the traffic lanes. Where the route carries a high volume of commercial vehicles (e.g., greater than 10%) and/or the incidence of bus stopping is high, wider shoulders are desirable.

Traffic legislation states that the driver of a heavy vehicle, or long vehicle, must not stop on a length of road that is not in a built-up area, except on the shoulder of the road. Therefore, where the stopped school bus either partially or fully obstructs the traffic lanes, widening of road shoulders should be carried out to provide full clearance to traffic lanes.

Figure 11.4.2 – Location of school bus stop

There is inadequate width for the school bus to be positioned completely clear of the travel lane.

The uneven surface is unsuitable for school children to embark / disembark from the bus. This would be considerably worse during wet weather when water would be flowing down the table drain.

11.4.3 Road surface condition

Irregularities or defects in the roadway surface could adversely affect the controllability of the vehicle and, thus, could increase the chance of driver error and the likelihood of a crash. It has been reported that surface roughness may be a much larger factor in truck crashes than car crashes.

Pavement/road surface type and condition can influence operating speed, rolling resistance, the vehicle's performance and aquaplaning characteristics.

Thus, the following criterion should be considered when assessing school bus stops: *The road surface material at the school bus stop should be suitable for bus performance under all weather conditions*.

Where the road surface performance at the bus stop is deficient under wet weather conditions (e.g., low skid resistance, etc.) and safety of the bus and passengers may be compromised, consideration should be given to a more appropriate surface material (e.g., gravel, bitumen, etc.).

If resealing work is being carried out in the vicinity of a bus stop, consideration should be given to sealing the bus stop if the amount of usage of the bus stop is significant.

Figure 11.4.3 – Bus stopping area located at property access

Bus stopping area is unsatisfactory due to poor skid resistance during wet weather conditions.

11.5 Traffic characteristics

11.5.1 Traffic volume, speed and composition

High traffic volumes on a two-lane road may result in a higher level of bunching of vehicles and/or lower operating speeds which may in turn cause unnecessary risk taking by motorists due to such factors as frustration, impatience, etc. This risk taking may affect or compromise the safety of other road users.

Roads with high traffic speed and a large proportion of heavy vehicles present a higher risk situation to road users.

Thus, the following traffic criterion should be considered when assessing school bus stops: *Provision should be made for the school bus to stop clear of the traffic lanes especially where traffic volumes, speed environments and/or the percentage of heavy vehicles, towing vehicles, etc. are high*.

The factors influencing the traffic efficiency and road safety on roads due to school bus operations are typically:

- traffic volumes during school bus operation times
- speed environment
- traffic composition (e.g., high proportion of heavy vehicles, towing vehicles, etc.)
- frequency of school bus stopping
- lengths of time school bus stopped
- probability of passing vehicles (i.e., gaps)
- terrain, and/or
- road conditions.

Where the traffic efficiency and/or road safety are compromised by one or more of these factors, due to the school bus operations, consideration should be given to the provision of pick-up/set-down facilities (or similar) for the school bus.

School bus stops should be avoided (or limited) in high-speed environments (e.g., greater than 80 km/h), particularly on major roads (e.g., arterial roads, etc.) and/or where the proportion of heavy vehicles, towing vehicles, or similar, using the route during school bus operations, are considered to be high (e.g., greater than 10%). Heavy vehicles, towing vehicles, etc., present a higher risk situation, especially to children waiting at the road side or crossing the road (e.g., eye heights, stopping distances, clearances, etc.).

Where school bus stops are located in such environments, other measures, such as appropriate bus stopping facilities, children's waiting facilities / areas and children's travel paths / crossing locations should be provided considering the traffic composition and speed. For example, these initiatives include the provision of a facility for bus re-entry into the traffic stream at bus stopping areas, ensuring that the location of waiting children is conspicuous to all motorists, the provision of a waiting area that is appropriately distanced from the traffic lanes and the provision of a safe crossing of the carriageway for children.

11.6 School bus stop locations

11.6.1 At intersections

As stopped/stopping buses cause conflicts in traffic, locating bus stops at intersections minimises the conflict area. However, the effect of bus stops on intersection sight distance requirements and the visibility and location of pedestrian crossings should always be considered.

From the bus passenger and pedestrian safety viewpoint, a bus stop located on the departure side of the intersection is safer than one located on the approach side as children cross behind the bus where they can be seen. In this position, the bus does not block the view of traffic controls and other intersection traffic.

Other advantages of the departure side bus stop include:

- reduced bus conflicts with left-turning vehicles
- increased intersection capacity by freeing the kerb lane for through movement
- improved sight distances at intersections

- shorter kerb length requirements for bus stop approaches, and
- easier bus re-entry into traffic after passenger loading/unloading.

Buses stopped on the approach side of intersections may severely block the children's view of approaching traffic, and the approaching driver's view of the children. Approaching motorists are often unable to stop when a child steps out into the traffic from behind the front end of a bus. Relocation of a school bus stop to the departure side of an intersection can improve pedestrian safety because it eliminates the sight restriction posed by the bus.

Thus, the following intersection criteria should be considered when assessing school bus stops: *The school bus stop should be located on the departure side of intersections, children's crossing locations, and property accesses, where possible*.

To avoid misinterpretation of a bus driver's intention to stop at the departure side of the intersection as turning left, the bus stop should be located approximately 50 metres beyond the intersection.

School bus stops should not be located opposite the terminating leg of a T-junction for safety and efficiency reasons. Refer to the Austroads *Guide to Road Design* and *Road Planning Design Manual, Volume 3* for typical intersection bus stop layouts and details on set out.

11.6.2 At mid-blocks

As mentioned previously, full pick-up / set-down areas are preferred and should be provided where sufficient width exists as buses can load and unload passengers clear of traffic.

Mid-block school bus stops should be located either across property accesses or downstream of property accesses to minimise conflicts. Refer to the Austroads *Guide to Road Design* and *Road Planning Design Manual, Volume 3* for typical bus stop pick-up / set-down area layouts.

Where there is a possibility of buses from opposite directions arriving concurrently at a school bus stopping location on an undivided road, the school bus stops should be staggered or full pick-up/set-down areas provided to avoid the creation of a bottleneck. In the former situation, the bus stops should be staggered with the rear of the buses opposite each other, so as to encourage children to always cross the road behind the school bus where sight distance between children and other traffic is best.

When buses are not fully clear of the traffic lanes, an appropriate stagger distance (i.e. between the rears of the stopped buses) should be provided to ensure other vehicles can safely pass.

11.7 School bus stop signing

Traffic signs are provided to aid in the safe and orderly movement of traffic. It is therefore essential to ensure uniformity of applications of signs. Similar conditions should always be treated with the same type of sign, so that road users can readily anticipate the course of action required. The use of a sign which is at variance with its use elsewhere is confusing and, consequently, creates a potentially hazardous situation.

Furthermore, the Queensland *Manual of Uniform Traffic Control Devices* also stresses the significance of loss in effectiveness of warning signs if used unnecessarily or too frequently. Their use should be restricted to the minimum and consistent with safety requirements. A warning sign should not be used if, under normal conditions, the motorist can be expected to see and appreciate the potential hazard ahead.

Thus, the following signing criteria should be considered when assessing school bus stops: *A school bus stopping location should only be signed as a school bus stop where sight distance is restricted and cannot be sufficiently improved*.

In accordance with the Queensland *Manual of Uniform Traffic Control Devices*, the 'Children' sign (W6-3) with supplementary plate 'BUS STOP' (W8-Q03) or bus and student sign (TC9944) should only be used in advance of school bus stops in rural areas where visibility for approaching drivers of any children waiting at the stop is less than 200 metres. It is not intended that these signs should be generally used at school bus stops. To improve safety, consideration should be given to relocating the bus stop to a location with adequate visibility.

Where sight distance is adequate to the school bus stopping location (i.e., greater than 200 metres), these signs should generally not be used. In such situations, it is considered that the signing on the school bus and the operation of the bus flashing lights during stops is more effective in alerting other road users of the likely presence of children than the use of permanent warning signs.

Figure 11.7(a) – School bus stop signing

Children's sign with 'BUS STOP' plate (W6-3 and W8-Q03)

OR

Bus and Student sign (TC9944).

Children's crossing areas should only be signed where, for safety reasons, it is necessary to warn motorists of the possible presence of school children on the road.

The children sign (W6-3) alone should only be used where:

- pedestrian volumes are significant, but insufficient to justify a pedestrian crossing (zebra) or traffic signals
- the presence of pedestrians may not be expected, or
- the pedestrian demand extends over a length of road.

To maintain credibility of these signs, it is important that they be removed as soon as the situation ceases to warrant such signing.

Figure 11.7(b) – Example of using children sign (horizontal curve restricts visibility to/from school bus stopping area)

In Figure 11.7(b) Children sign is used to advise motorists of unexpected presence of pedestrians.

11.8 Passenger waiting facilities

11.8.1 Waiting areas

Waiting areas for children are typically adjacent to the school bus stop and provide children with a safe area to wait for the school bus. The areas should be level, well drained and free from tripping hazards, and may be gravelled, sealed, etc. Shade provisions may also need to be a consideration in some locations.

Waiting areas are not provided at set down stops where children would normally just step off a school bus to walk (without waiting) to their destination.

Thus, the following passenger waiting criterion should be considered when assessing school bus stops: *Where needed, waiting areas should be provided at school bus stops for school children to assemble and disperse*.

Children's waiting areas should be located as far as possible from the traffic lanes for their safety. Waiting areas should desirably be located beyond the clear zone with easy access to the bus door.

11.8.2 Passenger infrastructure

Bus shelters provide the children with weather protection. Shelter location is an important consideration because the shelter may restrict sight distances of drivers leaving side roads or property accesses, be within the clear zone for the speed environment, etc. If the shelter is located too close to the traffic lanes, the restricted space between the fixed shelter and the moving school bus can become hazardous to children.

Thus, the following passenger facility criterion should be considered when assessing school bus routes and school bus stops: *Where needed, provisions for passenger bus shelters should be considered*.

Passenger shelters should be provided where there is a demonstrated need. The need should be determined from factors such as passenger demand, stop permanency, passenger waiting duration, passenger convenience (e.g., from heat, rain, etc.).

The shelter should be located such that the bus driver is able to see the waiting children in time to stop the school bus. Speed environment and physical features should be considered in the location of the shelter in relation to the traffic lanes. Desirably, shelters should be located beyond the clear zone so as not to become a hazard to road users. Refer to Transport and Main's *Road Planning and Design Manual* for further details on clear zones.

11.8.3 Parking facilities

Safe parking facilities (i.e., roadside parking, separate parking area, etc.) should be available at school bus stops where parents assemble with vehicles to drop-off/collect children. Parked / stopping vehicles should not create hazardous situations for any road users.

Adequate area should be available to permit parents to park their vehicle, drop-off children and collect them safely with minimal disruption to traffic. Where needed, a separate parking facility should be considered.

Thus, the following parking criterion should be considered when assessing school bus stops: *Provisions for safe parking facilities should be considered at school bus stops where parents assemble with vehicles to drop-off / collect children*.

Parking availability in all appropriate weather conditions (i.e., dry, wet, etc.) and access of parking facilities (where applicable) needs to be considered.

11.9 Pedestrian facilities

Pedestrian facilities, such as crossings and refuges, should only be provided where warranted. The warrants for these facilities are outlined in the Queensland *Manual of Uniform Traffic Control Devices*.

Generally, young children lack the skills and road sense that are typically acquired at a later age, which enable people to behave safely on the road.

Thus, the following pedestrian facility criteria should be considered when assessing school bus stops: *Where necessary, safe pedestrian crossing opportunities should be provided at the school bus stop*.

Safe crossing opportunities should be provided for children considering:

- conspicuity of children at the side of the road
- visibility from both the drivers and children's view points
- crossing distance.

Where applicable, school bus stops should be located as close as practical to existing pedestrian crossing facilities. In such cases, the school bus stop should be located on the departure side of the crossing, at a minimum distance of 10 metres from the crossing. If there is a need to locate the bus stop on the approach side of the crossing, the bus stop should be a minimum of 20 metres from the crossing.

Safe travel paths should be available for children to travel from/to the school bus stop for children.

The need for children to walk along the edge of a vehicle carriageway should be avoided where possible, especially on roads where the traffic speed, volume and proportion of heavy vehicles are high. In such situations, travel paths at the maximum distance from the traffic lanes should be cleared/provided for children to access.

12 Road safety checklist for school bus routes and stops

Factor			N/A	Yes	No	Comments
School bus routes						
School bus performance and bus route issues						
1	Is the performance of the school bus acceptable to other motorists (i.e., no significant delays)?					
2	Is adequate infrastructure provided to prevent excessive speed disparities between school bus and other vehicles?					
3	Does the school bus remain within the designated traffic lane, particularly around horizontal curves?					
4	Is the pavement surface along the school bus route in good condition and is it satisfactory under adverse weather?					
School bus route signing						
1	Are motorists expecting to see a school bus or school children ahead?					
2	Are the correct signs used for advance warning of school bus operations and is each sign necessary?					
3	Have all redundant signs been removed?					
4	Are all school bus turning movements free from impeding traffic flow and/or reducing safety of other road users (e.g., within road, near properties, etc.)?					
School bus stops						
Crash history						
1	Does crash history indicate that a bus stop at the location will not compromise school bus stop activities?					
Visibility issues						
1	Is the location of the school bus stop conspicuous to all road users?					
2	Are school students crossing the road visible to motorists?					
3	Is the school bus stop free from obstructions, such as vegetation, roadside objects, bridge abutments, etc.?					
Stopping sight distances						
1	Is the minimum stopping sight distance provided on each approach to the bus stop?					

Factor			N/A	Yes	No	Comments
2	Are adequate passing opportunities for following vehicles provided at the school bus stop?					
Roadway grades						
1	Is the school bus stop appropriately located in relation to the roadway grade?					
2	Is the school bus stop located away from the tapering section of an auxiliary lane or from a runaway vehicle facility?					
Lanes and shoulders						
1	Are adequate road shoulders provided for safe school bus operators?					
Road surface condition						
1	Is the road surface material at the school bus stop adequate, particularly during wet weather conditions?					
Traffic characteristics						
1	Have investigations into factors such as speed, traffic composition and school peak traffic volumes been carried out in an effort to assess whether bus pull-off areas are needed?					
School bus stop locations						
1	Is the bus stop appropriately located on the departure side of the intersection/crossing location/property access?					
2	Is the mid-block bus stop located opposite the property access (opposite side of road) and downstream of, or across, property access (same side of road)?					
3	Are school bus stops that are located on opposite sides of an undivided road staggered to avoid bottleneck?					
School bus stop signing						
1	Does school bus stop signing comply with Queensland MUTCD?					
Passenger waiting facilities						
1	Are passenger waiting facilities level, well-drained and free from tripping hazards?					
2	Are passenger waiting areas outside the clear zone?					
3	Is the bus shelter located outside the clear zone?					
4	Are safe parking facilities provided near the school bus stop?					

Factor			N/A	Yes	No	Comments
Pedestrian facilities						
1	Do pedestrian crossings and refuges comply with Queensland MUTCD?					
2	Are safe travel paths provided for children travelling to/from the bus stop?					

Glossary

Term	Definition
All-day school zone	A school zone at a split-campus school that operates all day generally between 7am and 4pm. The start and finish times can be changed to suit a school's individual requirement. Enhanced School Zone Speed Limit signs are installed to designate all-day school zones.
Arterial road or primary arterial road	A road whose main function is to carry traffic across metropolitan areas or from one region to another.
Auxiliary lane	The portion of carriageway adjoining the through traffic lanes for speed change or for other purposes supplementary to through traffic movement (e.g., overtaking lanes, turning lanes, passing bays, etc.).
Built-up area	In relation to a length of the road, means an area in which there are buildings on land next to the road, or there is street lighting, at intervals not over 100 m for distance of at least 500 m or if the road is shorter than 500 m for the whole road.
Carriageway	That portion of the road formation set aside for the use of traffic, either moving or stationary. It includes a number of traffic lanes, plus shoulders, regardless of whether any parts are sealed and regardless of the width of the pavement courses.
Children's crossing	A roadway crossing intended for part-time use, mainly by school children, indicated by the use of CHILDREN CROSSING flags, red and white posts, and STOP lines on the road.
Clear zone	The total roadside border area, starting at the edge of the traffic lanes, available for safe use by errant vehicles. This area may consist of the road shoulder, parking bays, recoverable slopes or clear run out areas.
Collector road	A road whose main function is the distribution of traffic between sub-arterial roads and local streets within suburbs, and which can also provide access to adjacent property.
Combined children's and pedestrian crossing at schools	A pedestrian crossing (zebra) where a children's crossing is also installed with red and white posts, and flags are displayed at times when school children cross the roadway.
Department	Queensland Department of Transport and Main Roads
Dividing line	A road marking formed by a line, or two parallel lines, whether broken or continuous, designed to indicate the parts of the road to be used by vehicles travelling in opposite directions.
Dividing strip	An area or a structure that divides a road lengthways, but does not include a nature strip, bicycle path, footpath or shared path.
Enhanced School Zone Speed Limit sign	A school zone sign that incorporates a flashing annulus and twin flashing lights that flash during the operation of the school zone. These signs are intended to draw motorists' attention to the operation of the school zone.
Footpath	Along a roadway, the strip of land between the property boundary and the kerb of the roadway. There may be a concrete, paved or sealed path within the footpath.
Kerb extension	A local widening of the footpath, which reduces the width of roadway to be crossed by pedestrians.
Kerb or kerbing	A raised border of rigid material along the edge of a roadway. Used to separate the roadway from an adjacent footpath or median.

Term	Definition
Local street	The main function of a local street is to provide access to an adjacent property.
May	A permissive condition: where the word 'may' is used, it indicates that provision is conditional or optional – usually, no specific requirement for design or application is intended.
Median or median strip	A strip of road, not normally intended for use by traffic, which separates roadways carrying traffic in opposite directions. A median can be bounded by kerbing.
Multilane road	A one-way road, or a two-way road, with two or more marked lanes (except bicycle lanes) that are: a) on the side of the dividing line or median strip where the driver is driving, and b) for the use of vehicles travelling in the same direction.
must	A mandatory condition: stipulation of a 'must' (or 'shall') condition indicates that the requirement/s stipulated are to be met
MUTCD	Queensland *Manual of Uniform Traffic Control Devices*.
Pavement marking	See *Threshold treatment*.
Pedestrian	Includes any walking, running standing, sitting or being otherwise in or upon a road. Note: Persons in a toy vehicle or in a pram or an invalid in a wheelchair not capable of exceeding 10 km/h are also treated as pedestrians.
Pedestrian actuated traffic signals (mid-block)	A signal installation, other than at an intersection, at which changes of aspect are initiated by a pedestrian, usually by pressing a button.
Pedestrian crossing (zebra) or zebra crossing	A roadway crossing indicated by a series of white stripes parallel to the centre of the roadway and by the display of Pedestrian Crossing (R3-1) signs.
Pedestrian interval	A time interval during which pedestrians are given the opportunity to cross the road at a traffic signal or an intersection signal.
Pedestrian refuge	An island installed in the roadway to allow pedestrians to cross the roadway in two stages.
Pick-up / set-down facilities	Short-term parking areas designed for safely picking up and dropping off children.
Road shoulder	That part of the roadway from the outer edge of the traffic lane to the edge of usable carriageway and excludes any berm, verge, rounding or extra width provided to accommodate guide posts, guard fencing, etc.
Road user	A driver, rider, passenger or pedestrian.
Roadway	That part of a road or street normally used for vehicular traffic, including bicycles.
School bus	Any omnibus while it is being used exclusively for the carriage of school children to or from a school.
School bus stop	Any school bus passenger pick up or set down area.
School Crossing Supervisor	An authorised person, appropriately trained, who controls vehicle and pedestrian movements at children's crossings or at other crossings where children cross roads.

Term	Definition
School zone	A section of roadway, adjacent to, or in the vicinity of, a school, along which a reduced speed limit applies during specified times on school days.
Secondary arterial or sub-arterial road	A road whose main function is to carry traffic between suburbs and between arterial roads.
Shall	See *must.*
Should	Indicates a recommendation. Where the word 'should' is used, it is considered to be recommended usage, but not mandatory – any recommendation that is not applied must be based on sound traffic engineering judgement and documented.
Sight distance	The distance at which a driver / pedestrian / person riding a bike has an unobstructed view of other road users, roadside hazards and traffic control devices.
Slow vehicle turnout	A very short section of paved road shoulder or added lane, which is provided to allow slow vehicles to pull aside and be overtaken.
Speed zone or linear speed zone	A length of roadway on which the speed limit is defined by speed limit signs.
Split-campus school	A split-campus school has facilities that are separated by a road and children are required to cross that road throughout the day to access the facilities.
STOP line	A transverse line marked on a roadway at a traffic control device at which vehicles are required to stop in accordance with relevant regulations.
Stopping distance	The distance travelled by a vehicle between the time when the driver receives a stimulus signifying a need to stop and the time when the vehicle comes to rest.
Subway	With regard to pedestrians and people riding bikes, pedestrians and cyclists, a structure, or tunnel, taking a footpath or cycle path under a road or railway.
Threshold treatment	At a school, a broad coloured band across the traffic lane in the direction of travel on which the words SCHOOL ZONE or SCHOOL are painted.
Traffic control device	Any sign, signal, light, pavement marking or other installation installed for the purpose regulating, warning or guiding road users.
Traffic	Includes vehicles and pedestrians.
Traffic lane	That part of the roadway set aside for the normal movement of a single stream of vehicles.
Visibility	See *Sight distance*.

Appendix A: School Crossing Supervisor Scheme Risk Assessment

The School Crossing Supervisor (SCS) Scheme Risk Assessment process can be applied to a proposed children's crossing or to an existing children's crossing where primary and/or special school students are present.

Section A1 outlines the process for consideration of a SCS at an existing crossing.

Section A2 outlines the process for consideration of a SCS at a location without a crossing that a new crossing is proposed to be investigated at.

Section A3 provides details for the calculation of the SCS Scheme Risk Assessment Score.

Section A4 provides the Form 1840 required when undertaking a SCS Scheme Risk Assessment.

Section A5 provides information regarding the Review Panel.

Consideration for a new crossing, not eligible for a SCS (i.e., no primary or special school students present), follows the guidance for the selection of a pedestrian crossing set out in the Queensland Guide to Traffic Management Part 6.

A1 School Crossing Supervisor Scheme Risk Assessment Process for Existing Crossing

The assessment for an existing crossing is separated into the following processes. The first process determines if the next step towards a suitable solution will be a non-infrastructure. If a non-infrastructure solution is inadequate, the requirement for a SCS at the existing crossing facility is to be investigated.

If it is found that a SCS would be at high risk at the existing crossing, the required process to be undertaken, and engineering assessment, determines the most suitable crossing type and infrastructure required at that location. The process flowchart for existing crossing locations is shown at Figure A1, and supported by Table A1(a), which provides descriptions for each step.

A risk threshold table (see Table A1(b)) is provided which indicates thresholds for where a School Crossing Supervisor may be warranted.

Figure A1 – Process to Determine if School Crossing Supervisor is Warranted at an Existing Crossing

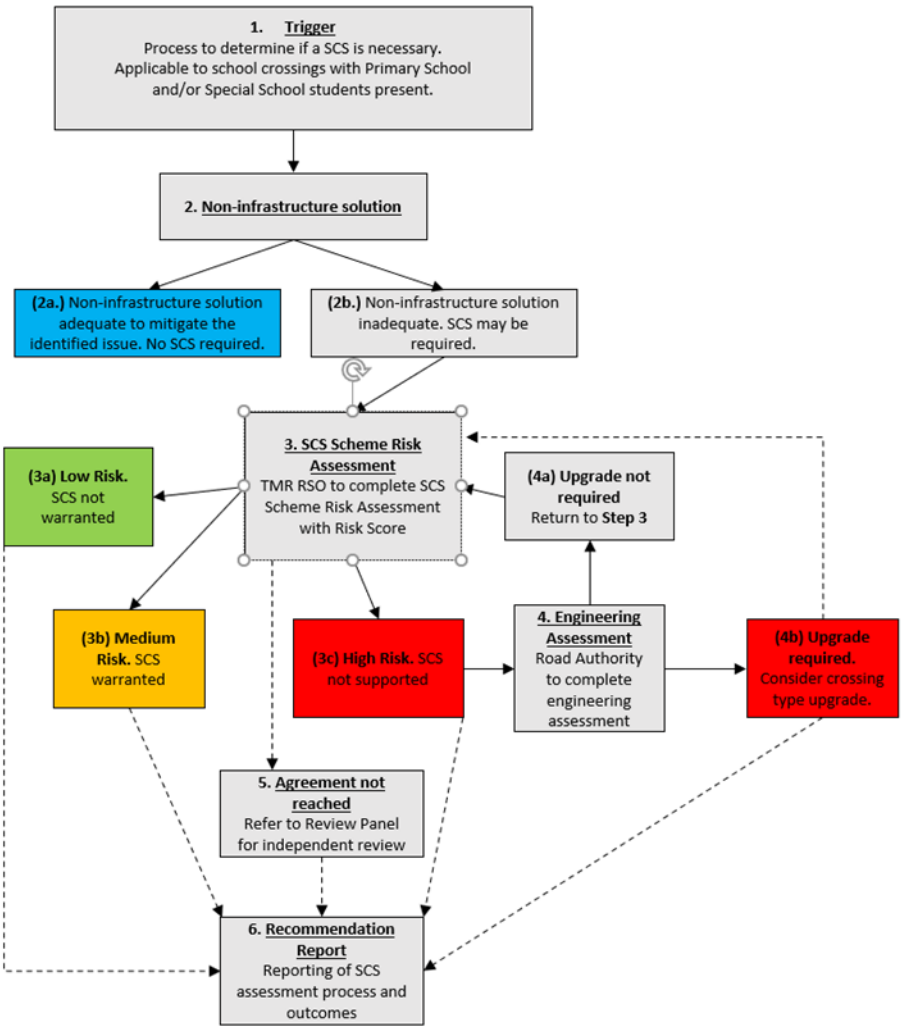


Table A1(a) – Detailed Stages to Determine if a School Crossing Supervisor (SCS) is Warranted for Existing Crossing

Step	What	Responsible	Description
1	Trigger	TMR Road Safety Officer	Meet with the school through the Safe School Travel (SafeST) committee to assess the situation and determine the cause of the issue and possible solution types to address this.
2	Non-infrastructure solutions	TMR Road Safety Officer	Following the identification of an issue, identify and implement appropriate activities such as road safety programs, parent/student education, enforcement of road rules and so on.
(2a)	Non-infrastructure solution adequate	TMR Road Safety Officer	Determine if the proposed non-infrastructure solution identified is adequate in mitigating the identified issue, meaning that a SCS would then not be warranted.
(2b)	Non-infrastructure solution inadequate	TMR Road Safety Officer	Determine if the proposed non-infrastructure solution identified is inadequate in mitigating the identified issue. This would then lead to the possibility that a SCS may be warranted at the location to address the issue.
3	SCS Scheme Risk Assessment	TMR Road Safety Officer	Undertake the SCS Scheme Risk Assessment site inspection and collect on-site data. Compare the results of the SCS Scheme Risk Assessment against the Risk Threshold Table (Table A1(b)).
(3a)	Low Risk	TMR Road Safety Officer	If the Risk Assessment determines that risks at the identified location are **low**, a SCS is not warranted. Advise the school of the result and liaise with the Road Authority to determine if any additional improvements can be made / are required.
(3b)	Medium Risk	TMR Road Safety Officer	If the Risk Assessment determines that risks at the identified location are **medium**, a SCS may be warranted to mitigate the risk. Discuss with the Road Authority the appropriate crossing type and infrastructure for the location. If the proposed crossing type is different to what exists, there is a need to complete Step 3 again to determine if a SCS is still warranted. If a SCS is necessary, advise the school and submit an application for SCS funding/training. If a SCS is approved, liaise with the Road Authority to complete necessary installation of signage and line markings.
(3c)	High Risk	TMR Road Safety Officer	If the Risk Assessment determines that risks at the current location is **high**, a SCS should not be supported to operate in this unsafe environment. The Road Safety Officer is to inform the Road Authority Engineer who is then required to undertake an engineering assessment.
4	Engineering Assessment	Road Authority Engineer	The Road Authority Engineer to complete an engineering assessment to determine if the crossing requires upgrading.

Step	What	Responsible	Description
(4a)	Upgrade not required	Road Authority Engineer	If the engineering assessment determines the crossing does not require upgrading, refer to TMR Road Safety Officer and Step 3 for completion of a SCS Scheme Risk Assessment to determine SCS warrants. The outcomes of the engineering assessment are to be documented and signed off by the Road Authority Engineer and provided to the TMR Road Safety Officer or Manager (Road Safety). Minor infrastructure improvement works may be required to support a SCS at the proposed location.
(4b)	Upgrade required	Road Authority Engineer	If the engineering assessment determines the crossing requires upgrading, the Road Authority should consider the options for upgrading the crossing facility. In some circumstances, the risk may be mitigated through implementation of engineering treatments. All treatment options should be considered by the Road Authority. A site determined to be "High Risk" is not justification for the removal of the crossing unless all other treatments are discounted. The outcomes of the engineering assessment are to be documented and signed off by the Road Authority Engineer and provided to the TMR Road Safety Officer or Manager (Road Safety). If a new crossing facility type is recommended, a SCS Scheme Risk Assessment should be undertaken based on the proposed new crossing facility type, as per Step 3, to determine the new SCS warrants.
5	Agreement not reached	Review Panel	As per the role of the Review Panel in Section A5.
6	Recommendation Report	TMR Manager (Road Safety)	Transport and Main Roads to prepare and provide a report documenting the outcomes from the SCS process and other respective assessments.

Note 1: When the SCS Scheme Risk Assessment is completed, regardless of the calculated risk level, if there are other issues or features present at the site that may impact on the risk level (which are not included in the assessment) the site is flagged for further consideration by the Manager (Road Safety). The Manager (Road Safety) can then refer the site to the responsible road authority for an engineering assessment.

Note 2: When the SCS Scheme Risk Assessment is completed and it is determined that the available sight distance on any approach to the school crossing is less than required, the site is flagged as "Too High" risk and requires immediate attention. A risk score is not calculated. An engineering assessment is required to confirm the available sight distance and, if necessary, recommend treatments to provide the required sight distance.

Table A1(b) provides the risk thresholds for the SCS Scheme Risk Assessment scores calculated for a children's crossing or a combined children's crossing with a pedestrian (zebra) crossing. This includes the use of a wombat crossing.

Table A1(b) – Risk Threshold Table for SCS Scheme Risk Assessment

Facility Type	Risk Level		
	Low	Medium	High
Pedestrian / children's crossing	0-50	51-1000	>1000*

Note: *When the risk score is >1000 consider upgrade of the crossing.

A2 School Crossing Supervisor Scheme Risk Assessment Process for New Crossing

The assessment for a new crossing is triggered by a school related road safety concern. The process detailed in Figure A2 is then followed to determine if the next step towards a suitable solution will be a non-infrastructure, or an engineering solution.

If a non-infrastructure solution is inadequate, then an engineering solution may be appropriate. The responsible road authority should conduct an engineering assessment at the site to determine the need for a crossing, and the appropriate crossing type.

If a crossing is recommended by the engineering assessment, a SCS Scheme Risk Assessment should then be completed by Transport and Main Road's Road Safety Officer for the proposed crossing to determine if a SCS is require as is outlined in Figure A2. Further explanation of each of these steps is provided in Table A2(a).

A risk threshold table (Table A2(b)) is provided to identify thresholds for when a School Crossing Supervisor may be warranted.

Figure A2 – Process to Determine if School Crossing Supervisor is Warranted at New Crossing

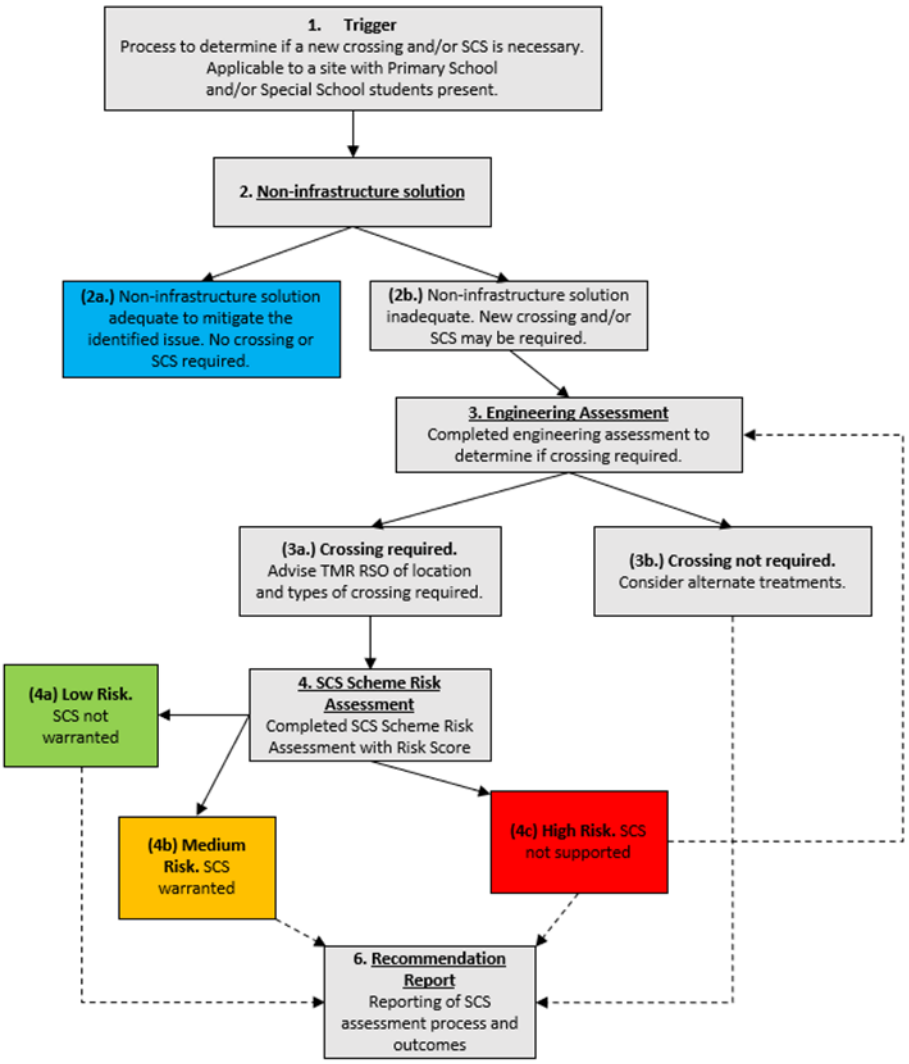


Table A2(a) – Detailed Stages to Determine if a School Crossing Supervisor (SCS) is Warranted for a New Crossing

Step	What	Responsible	Description
1	Trigger	TMR Road Safety Officer	Meet with the school through the Safe School Travel (SafeST) committee to assess the situation and determine the cause of the issue and possible solution types to address this.
2	Non-infrastructure solutions	TMR Road Safety Officer	Following the identification of an issue, identify and implement appropriate activities such as road safety programs, parent/student education, enforcement of road rules and so on.
(2a)	Non-infrastructure solution adequate	TMR Road Safety Officer	Determine if the proposed non-infrastructure solution identified is adequate in mitigating the identified issue, meaning that a SCS would then not be warranted.
(2b)	Non-infrastructure solution inadequate	TMR Road Safety Officer	Determine if the proposed non-infrastructure solution is inadequate in mitigating the identified issue. This would then lead to the possibility that a SCS may be warranted at the location to address the issue.
3	Engineering Assessment	Road Authority Engineer	The Road Authority Engineer to complete an engineering assessment to determine whether a crossing is required.
(3a)	No Crossing Required	Road Authority Engineer	If the engineering assessment determines that a crossing is not required, a SCS is not required. The Road Authority to determine if any minor improvements can be made / are required. Advise the school of the outcome.
(3b)	Crossing Required	Road Authority Engineer	If the engineering assessment determines that a crossing is required, the Road Authority Engineer is to determine the most suitable location for the crossing and the type of crossing to be installed. The outcomes of the engineering assessment are to be documented and signed off by the Road Authority Engineer and provided to the TMR Road Safety Officer or Manager (Road Safety). If a crossing facility type is recommended, a SCS Scheme Risk Assessment should be undertaken based on the proposed new crossing facility type, as per Step 4, to determine the SCS warrants.
4	SCS Scheme Risk Assessment	TMR Road Safety Officer	Undertake the SCS Scheme Risk Assessment site inspection and collect on-site data. Compare the results of the SCS Scheme Risk Assessment against the Risk Threshold Table (Table A2(b)).
(4a)	Low Risk	TMR Road Safety Officer	If the Risk Assessment determines that risks at the identified location are **low**, a SCS is not warranted. Advise the school/Road Authority of the results.

Step	What	Responsible	Description
(4b)	Medium Risk	TMR Road Safety Officer	If the Risk Assessment determines that the risks at the identified location are **medium**, a SCS may be warranted to mitigate the risk. Discuss with Road Authority to consider the required infrastructure for the location. If a SCS is necessary, advise the school and submit an application for SCS funding/training if approval for a SCS is received, liaise with the Road Authority to complete necessary installation of signage and line markings.
4c)	High Risk	TMR Road Safety Officer	If the Risk Assessment determines that the risks at the identified location crossing are **high**, a SCS should not be supported to operate in this unsafe environment. The Road Safety Officer is to refer back to the Road Authority Engineer, as per step 3, to reassess and determine if there is a more suitable location for the crossing, or a more suitable crossing type, is required.
5	Recommendation Report	TMR Manager (Road Safety)	Transport and Main Roads to prepare and provide a report documenting the outcomes from the SCS process and other respective assessments.

Note 1: When the SCS Scheme Risk Assessment is completed, regardless of the calculated risk level, if there are other issues or features present at the site that may impact on the risk level (which are not included in the assessment) the site is flagged for further consideration by the Manager (Road Safety). The Manager (Road Safety) may forward this information to the Road Authority Engineer for consideration.

Note 2: When the SCS Scheme Risk Assessment is completed and it is determined that the available sight distance on any approach to the school crossing is less than required, the site is flagged as "Too High" risk and requires immediate attention. A risk score is not calculated. An engineering assessment is required to confirm the available sight distance and, if necessary, recommend treatments to provide the required sight distance.

Table A2(b) provides the risk thresholds for the SCS Scheme Risk Assessment score calculated for a children's crossing or a combined children's crossing with a pedestrian (zebra) crossing. This includes the use of a wombat crossing.

Table A2(b) – Risk Threshold Table for SCS Scheme Risk Assessment

Facility Type	Risk Level		
	Low	Medium	High
Pedestrian / children's crossing	0-50	51-1000	>1000*

Note: *When the risk score is >1000 consider upgrading of the crossing.

A3 Calculation of the Risk Score

The risk score is calculated using the following formula:

$$Risk\ Score = \frac{\log_{10}(S \times SD \times PIn \times E \times W \times \mathrm{C} \times F) \times P \times V^2}{100{,}000}$$

Where:

- Pedestrian volume (P)
- Vehicle volume (V)
- Speed (S)
- Sight distance (SD)
- Proximity to intersection (PIn)
- Environment (E)
- Crossing distance (W)
- Type of crossing control (C), and
- Type of crossing facility (F).

Risk values for each of the attributes included in the formula are provided in the following sections.

Type of School Pedestrian

The values in the table are used to adjust the pedestrian volumes when calculating P to allow for the different level of risk associated with different types of school children using the crossing. The value of P is factored using the values in Table A3(a) for the different types of a school age pedestrians using the school crossing.

Table A3(a) – School Pedestrian Equivalent Units

Type of School Pedestrian	Equivalent Unit
Primary School Aged Student	2.00
Special School Student	6.00

Pedestrian volume (P)

The value used for the pedestrian volume (P) is determined from pedestrian counts completed as part of the site assessment. The methodology for collection of pedestrian counts is provided in the instructions document which complements the School Crossing Supervisor Scheme Risk Assessment Report Form. Pedestrian counts are conducted during am and pm operation times and are counted over 10 minute intervals. The value of P is adjusted using factors in Table A5. PV^2 is calculated for each 10 minute period. The peak PV^2 is determined over a 30 minute period (using consecutive 10 minute counts) and is used in the calculation of the risk score.

Vehicle volume (V)

The value used for the vehicle volume is determined from vehicle counts completed as part of the site assessment. The methodology for collection of vehicle counts is provided in the instructions document which complements the School Crossing Supervisor Scheme Risk Assessment Report Form. Vehicle counts are conducted during am and pm operation times and are counted over 10 minute intervals. V^2 is calculated for each 10 minute period. The peak PV^2 is determined over a 30 minute period (using consecutive 10 minute counts) and is used in the calculation of the risk score.

Speed (S)

The value used for speed (S) in the risk assessment calculation is the enforceable speed limit at the time the crossing is operational for the SCS Scheme Risk Assessment, which is conducted by the Road Safety Officers. The risk factors for each of the speeds is shown in Table A3(b).

Table A3(b) – Speed Risk Factor

Speed Limit	Risk Factor
≤ 30 km/h	0.22
40 km/h	1.00
50 km/h	4.13
60 km/h	6.82
70 km/h	9.09
80 km/h	9.09
90 km/h	9.09
100 km/h ≥	9.09

Sight distance (SD)

The risk factors for the sight distance (SD) are shown in Table A3(c). For the SCS Risk Assessment, the speed measure to guide the sight distances is the enforced posted speed limit at the time of operation of a children's crossing. The posted speed limit and the gradient of the approaches to the school crossing are used to interpret the sight distance risk factor to be used in the risk assessment calculation.

For the Engineering Assessment, based on the observed operation of traffic, the more appropriate of either the measured speed or posted speed should be used to interpret the sight distance risk factor in the Table A3(c).

Two measurements of sight distance have been selected to identify the risk categories:

- Stopping Sight Distance (SSD) – the distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead (Austroads, 2016).
- Safe Intersection Sight Distance (SISD) – the minimum sight distance which should be provided on the major road at any intersection (Austroads, 2018) to allow a normally alert driver travelling at the design speed on a wet road to perceive, react and brake to a stop before reaching a hazard / vehicle within the intersection.

Difference between the two sight distance measurements is that the SSD includes the reaction and braking time prior to the driver applying the brakes. Whereas the SISD also includes the distance the vehicle travels while the driver decides the evasive action required.

The use of SSD has been selected as the minimum sight distance required for the safe operation of a crossing due to it being the minimum distance a vehicle requires to safety stop before intruding into the crossing space. Should the available sight distance be less than the required SSD, the risk to children and SCS are considered too high for a crossing to be at that location.

Table A3(c) - Sight Distance Risk Factors

Speed	Sight Distance Parameter	Sight Distance Range (flat gradient)	Sight Distance Range (sloping gradient)	Risk Factor
30 km/h	> SISD	> 55 m	> 55 m	1.00
	SSD – SISD	30-55 m	30-55 m	1.42
	< SSD	< 30m	< 30m	*
40 km/h	> SISD	> 75	> 80m	1.00
	SSD – SISD	45 – 75 m	45 – 80 m	1.42
	< SSD	< 45m	< 45m	*
50 km/h	> SISD	> 100m	> 105m	1.00
	SSD – SISD	60 – 100m	65 – 105m	1.42
	< SSD	< 60m	< 65m	*
60 km/h	> SISD	> 130m	> 135m	1.00
	SSD – SISD	80 – 130m	85 – 135m	1.42
	< SSD	< 80 m	< 85 m	*
70 km/h	> SISD	> 160m	> 170m	1.00
	SSD – SISD	100 – 160m	110 – 170m	1.42
	< SSD	< 100 m	< 110 m	*
80 km/h	> SISD	> 190m	> 205m	1.00
	SSD – SISD	125 – 190m	135 – 205m	1.42
	< SSD	< 125 m	< 135 m	*
90 km/h	> SISD	> 225m	> 240m	1.00
	SSD – SISD	150 – 225m	165 – 240m	1.42
	< SSD	< 150 m	< 165 m	*
100 km/h	> SISD	> 265m	> 280m	1.00
	SSD – SISD	180 – 265m	200 – 280m	1.42
	< SSD	< 180 m	< 200 m	*

* Where the sight distance measured is shorter than the required SSD for the posted speed limit, the risk is considered too high for the operation of a SCS or use by children. Sight distance restrictions are required to be addressed immediately.

Proximity to intersection (PIn)

The value used for the proximity to intersections (PIn) in the risk assessment calculations are provided in Table A3(d).

Table A3(d) – Proximity to Intersection Risk Factors

Proximity to Intersection	Risk Factor
Mid-block Crossings (intersection more than 50 m from school crossing)	1.00
Intersection 30-50 m from school crossing	1.50
Intersection less than 30 m from school crossing	2.25

Environment (E)

The value used for environment (E) in the risk assessment calculations are provided in Table A3(e).

Table A3(e) – Environment Risk Factors

Environment	Risk Factor
Rural or Outside Built-Up Area	1.00
Residential or Built-Up Area	3.00
Built-Up Area with Commercial Land Uses	4.00

Crossing distance (W)

The values used for the crossing distance (W) in the risk assessment calculations are provided in Table A3(f).

Table A3(f) – Crossing Width Risk Factors

Carriageway Width	Risk Factor
< 6 metres	1.00
6 - 7 metres	1.26
7 - 9 metres	1.84
9 - 10 metres	2.15
10 - 12 metres	2.83
12 - 14 metres	3.56
14 - 20 metres	6.08
≥20 metres	8.00

Type of crossing control (C)

The values used for the type of crossing control (C) in the risk assessment calculations are provided in Table A3(g). The type of crossing control available for a child is considered to influence the risk of a child crossing the road safely. The availability of a signalised crossing provides time-based separation for vehicles and pedestrians and directs students when it is safe to cross. Whereas at an unsignalised pedestrian crossing, where a SCS is not present, it is up to the child to determine when it is safe to cross.

Table A3(g) – Type of Crossing Control Risk Factors

Crossing Control	Risk Factor
Signalised Crossing	1.00
Unsignalised Crossing	3.84

Type of crossing facility (F)

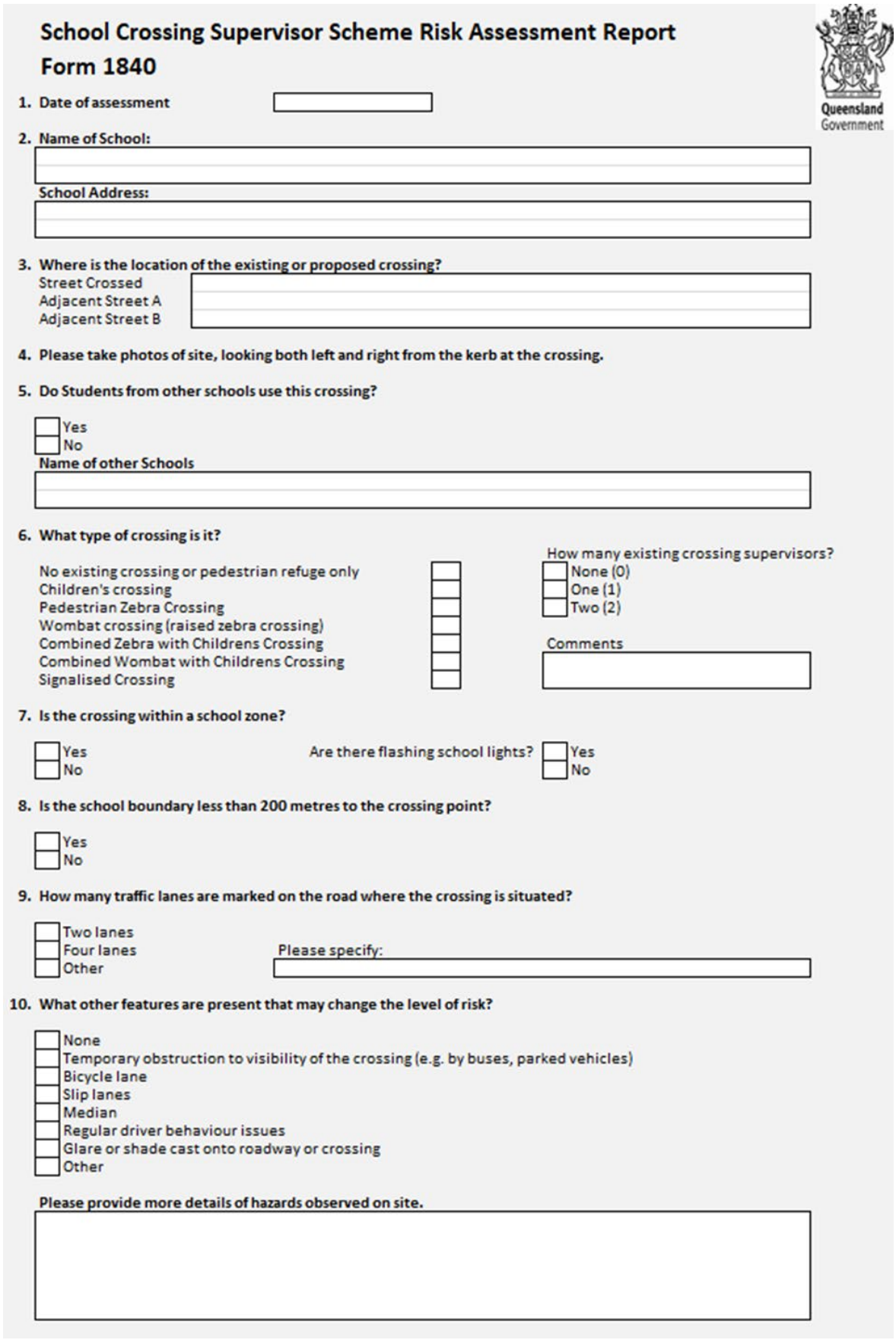
The values used for the type of crossing facility control (F) in the risk assessment calculations are provided in Table A3(h). The type of crossing is considered to influence the risk of a child crossing the road safely.

Table A3(h) – Type of Crossing Facility Risk Factors

Facility Type	Risk Factor
No existing crossing or pedestrian refuge only	4.8
Children's crossing	1.25
Pedestrian Zebra Crossing	1.0
Wombat crossing (raised zebra crossing)	0.5
Combined Zebra and Children's Crossing	0.9
Combined Wombat with Children's Crossing	0.4
Signalised Crossing	0.95
Other	1.0

A4 Form 1840

Form 1840 is provided for the completion of the SCS Scheme Risk Assessment.



School Crossing Supervisor Scheme Risk Assessment Report
Form 1840

Queensland Government

1. **Date of assessment**

2. **Name of School:**

School Address:

3. **Where is the location of the existing or proposed crossing?**
   Street Crossed
   Adjacent Street A
   Adjacent Street B

4. **Please take photos of site, looking both left and right from the kerb at the crossing.**

5. **Do Students from other schools use this crossing?**

☐ Yes
☐ No

Name of other Schools

6. **What type of crossing is it?**

☐ No existing crossing or pedestrian refuge only
☐ Children's crossing
☐ Pedestrian Zebra Crossing
☐ Wombat crossing (raised zebra crossing)
☐ Combined Zebra with Childrens Crossing
☐ Combined Wombat with Childrens Crossing
☐ Signalised Crossing

How many existing crossing supervisors?
☐ None (0)
☐ One (1)
☐ Two (2)

Comments

7. **Is the crossing within a school zone?**

☐ Yes
☐ No

Are there flashing school lights? ☐ Yes ☐ No

8. **Is the school boundary less than 200 metres to the crossing point?**

☐ Yes
☐ No

9. **How many traffic lanes are marked on the road where the crossing is situated?**

☐ Two lanes
☐ Four lanes
☐ Other

Please specify:

10. **What other features are present that may change the level of risk?**

☐ None
☐ Temporary obstruction to visibility of the crossing (e.g. by buses, parked vehicles)
☐ Bicycle lane
☐ Slip lanes
☐ Median
☐ Regular driver behaviour issues
☐ Glare or shade cast onto roadway or crossing
☐ Other

Please provide more details of hazards observed on site.

11. Proximity of crossing to intersection or major driveway closest kerb?

- ☐ Greater than 50 metres
- ☐ 30 - 50 metres
- ☐ Less than 30 metres

12. What is the typical surrounding environment area?

- ☐ Built-Up Area with Commercial Land Uses
- ☐ Residential or Built-Up Area
- ☐ Rural or Outside Built-Up Area

13. What is the width of the road crossed by pedestrians?

☐ metres

14. What are the speed limits at this location?

Speed limit outside of school zone hours ☐ km/h
Speed limit during school zone hours ☐ km/h

15. What is the visibility (site distance) from the crossing location?

LEFT	RIGHT	
		metres, taken from school side looking to the oncoming traffic lane
		metres, taken from non-school side looking to the oncoming traffic lane

16. Is the road flat or sloped?

- ☐ Flat
- ☐ Sloped

17. Pedestrian and Traffic Counts, taken every 10 minutes during crossing use

Morning counts
Date of count ☐ School start time ☐

AM Start	*Primary Students*	*Secondary Students*	*Special Students*	*All Vehicles*

Afternoon counts
Date of count ☐ School finish time ☐

PM Start	*Primary Students*	*Secondary Students*	*Special Students*	*All Vehicles*

18. N/A

19. Risk Assessment Results

Crossing type

Risk Score | Risk Level

20. Risk Assessment Result Considerations

	Action for consideration
☐ A school crossing to be established	
☐ Low risk school crossing	
☐ Medium risk school crossing	
☐ High Risk School crossing site*	
☐ School crossing is Too High risk*	
☐ Other features identified that may impact of risk level in Q10*	
☐ The school crossing is located outside 200 m of the school boundary	
☐ Two school crossing supervisors*	

*For these triggered sites, an engineering assesment may be required.

It is recommeded that school crossing supervision:

	Yes	No	(use drop down box to select)	
be established				
be continued				
be reduced			How much?	
be increased			How much?	
change operating times			Recommeded times	
be withdrawn				

Inspecting Officer Name | Inspecting Officer Signature | Date

Senior Advisor Name | Senior Advisor Signature | Date

21. Recommendation and endorsement approval

Comments

	Yes	No		
Is an Engineering Assessment Required?				
Has an Engineering Assessment Being undertaken?			Short Term Treatment	
			Long Term Treatment	

Manager (Road Safety) Name | Manager (Road Safety) Signature | Date

22. Checklist (use drop down box to select)

☐ Have you attached site photos to FORM 1840?

☐ Has the Inspecting Officer and Senior Advisor signed the output form?

☐ Have you input risk assessment results into RAR Database?

☐ If an Engineering Assessment was required, has a second FORM 1840 being undertaken, and Assessment attached?

A5 Review Panel

The Review Panel will undertake independent assessment of any referred recommendations by the Manager (Road Safety), Road Authority Engineer, or School, and will make an appropriate recommendation back to the respective agency or agencies on the determination. The Review Panel will be chaired by the Transport and Main Roads' Director (Safer Roads).

Membership of Review Panel

The Review Panel is composed of the following Transport and Main Roads officers:

1. Director (Safer Roads) – Chairperson
2. Manager (Safer Roads)
3. Director (Road Design)
4. Director (Traffic Engineering), and
5. Principal Engineer (Safer Roads).

The Chairperson may invite relevant experts or officers from Transport and Main Roads and/or local government and/or other experts to participate in the independent assessment of the SCS Scheme Risk Assessment process.

Meetings of the Review Panel

Meetings of the Review Panel shall be called only when there are referrals to discuss. Each member of the Panel will be provided with the report and other information required for review and decision at least 10 working days in advance of the meeting. At the meeting, the Review Panel will either:

- draft advice on the matter for the Manager (Road Safety), Road Authority Engineer, or School to help in making a final decision, or
- identify additional actions and further information and schedule a second meeting to complete the independent assessment.

Time for Review Panel assessment

Depending on the nature of the issues to be considered (for example, technical complexity, community's involvement, local or regional significance), the Review Panel will endeavour to complete its assessment within one month of referral by the Manager (Road Safety), Road Authority Engineer, or School. Additional information from the Manager (Road Safety), Road Authority Engineer, or School may be requested in the process of the independent assessment. The assessment period may be extended if further information is requested

Obligations of road authorities

Road authorities are obliged to supply additional information to the Review Panel when requested within a reasonable timeframe as deemed appropriate. The Review Panel will not be obliged to provide its independent assessment if the requested information is not provided in a timely manner. Transport and Main Roads Districts and Regions and/or local governments are expected to cooperate fully with requests for any additional information for an independent assessment.

Review Panel assessment report

The Review Panel Chairperson will submit a brief report with the Review Panel's findings and recommended actions to the relevant Manager (Road Safety), Road Authority Engineer, or School.