Traffic Signs Manual

CHAPTER 1

Introduction

2018

Traffic Signs Manual

Chapter 1

Introduction

Department for Transport

Department for Infrastructure (Northern Ireland)

Scottish Government

Welsh Government

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Traffic Signs Manual

Contents of Chapters 1–8

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1 INTRODUCTION

1.1 Overview

1.1.1. The Traffic Signs Manual (the Manual) offers advice to traffic authorities and their contractors, designers and managing agents in the United Kingdom, on the use of traffic signs and road markings on the highway network. Mandatory requirements are set out in the Traffic Signs Regulations and General Directions 2016 (as amended) (TSRGD). In Northern Ireland the relevant legislation is the Traffic Signs Regulations (Northern Ireland) 1997 (as amended). Whilst the Manual can assist with complying with the mandatory requirements, it cannot provide a definitive legal interpretation, nor can it override them. This remains the prerogative of the courts or parking adjudicators in relation to the appearance and use of specific traffic signs, road markings etc. at specific locations.

1.1.2. The advice is given to assist authorities in the discharge of their duties under section 122 of the Road Traffic Regulation Act 1984 and Part 2 of the Traffic Management Act 2004 in England and under Part 1 of the Roads (Scotland) Act 1984. Subject to compliance with the Directions, which are mandatory (see **1.4.2** and **1.4.3**), it is for traffic authorities to determine what signing is necessary to meet those duties.

1.1.3. It includes advice on the use, siting, and illumination of traffic signs and road markings on all purpose roads and motorways, as well as temporary signs for use in connection with road works and in emergency situations by the police. Reducing sign clutter was a key aim of the revision of TSRGD. The guidance on decluttering in the Manual has been strengthened to reflect the changes in TSRGD, acknowledging the work of the Road Signs Task Force led by Sir Alan Duncan. Following the advice in the Manual can help traffic authorities reduce the amount of sign clutter on their roads.

1.1.4. The Manual applies to the United Kingdom. References to “the national authority” should therefore be interpreted as referring to the Secretary of State for Transport, the Department for Infrastructure (Northern Ireland), the Scottish Government or the Welsh Government as appropriate. Any reference to the “Department” is a reference to the Department for Transport or the appropriate national authority for Northern Ireland, Scotland or Wales as described above.

1.2 Definitions

1.2.1. In the Manual, the word “must” is used to indicate a legal requirement of the Traffic Signs Regulations and General Directions (or other legislation) that must be complied with. The word “should” indicates a course of action that is recommended and represents good practice. The word “may” generally indicates a permissible action, or an option that requires consideration depending on the circumstances.

1.2.2. Section 64 of the Road Traffic Regulation Act 1984 defines a traffic sign as “any object or device (whether fixed or portable) for conveying to traffic on roads or any specified class of traffic, warnings, information, requirements, restrictions or prohibitions of any description … and any line or mark on the road for so conveying such warnings, information, requirements, restrictions or prohibitions” and stipulates that these signs be “specified by regulations made by the national authority, or authorised by the national authority”. The types of signs and carriageway markings and their appropriate use are prescribed in TSRGD.

1.2.3. “Signing” includes not only traffic signs mounted on supports (and other structures such as gantries, bridges, railings, etc) but also carriageway markings, beacons, studs, bollards, traffic signals, matrix signals and other devices prescribed in TSRGD.

1.3 Responsibility

1.3.1. Traffic signs are placed by the traffic authority, through the powers provided by the Road Traffic Regulation Act 1984, to provide warnings, information and details of restrictions to road users. The police and certain other public bodies and statutory authorities also have the right to place traffic signs, but only in the limited circumstances provided for by the relevant legislation.

1.3.2. In order to achieve safe and efficient operation of a highway network, it is essential that all signing provided is necessary, clear and unambiguous, and gives its message to road users at the appropriate time. The message must be quickly and easily understood at the point it is needed; neither too soon that the information might be forgotten, nor too late for the safe performance of any necessary manoeuvre.

1.3.3. Engineers who design and maintain the road network must be able to offer consistent standards that can satisfy the road user’s need for information and guidance. Traffic authorities depend on signing for the efficient control and movement of traffic, for enforcement of traffic regulations and, most importantly, as an aid to road safety. It is therefore recommended that all major traffic signing work should have been designed or checked by someone with an appropriate qualification.

1.3.4. An example qualification would be the Institute of Highway Engineers’ Professional Certificate in Traffic Sign Design that allows applicants to demonstrate their experience and produce work to the required standard. A designer holding a Practitioner or Expert level Certificate would be likely to demonstrate the skills needed to adequately check traffic signing work. For more information please see:

www.theihe.org/professional-certificates

1.3.5. In describing the design and use of signs, mention is made of the definitions listed in **Table 1-1**. These are all elements that must be considered during the design stage of the signing process to ensure signs are seen accurately by drivers, within the appropriate time frame and to maintain road safety.

Table 1-1 Definitions

Sign legibility	The attributes of a sign face that allows recognition of its text characters, numerals and symbols. It is affected by the choice and size of type face, the contrast between colours and the amount of light reaching the observer from the sign. It directly relates to an observer's visual acuity.
Legibility distance	The furthest distance at which a sign is legible determines the time available for a driver to read its message, taking account of the speed at which they are travelling.
Readability	The character of a sign that leads to comprehension of its intended message. This depends on legibility, its layout and spacing, the clarity and ease of recognition of any symbology, the amount of information it contains, and the time available to read it. It is considered a subjective outcome.
Conspicuity	The capacity of a sign to stand out or be distinguishable from its surroundings and thus be readily discovered by the eye. It is improved if there is a noticeable contrast between a sign and its background. It is particularly likely to be an issue for smaller signs.
Visibility	The physical attributes of a sign and its location that allow it to be seen at a given distance, even if not yet legible.

1.4 References

1.4.1. Any reference to the "Regulations" or the "Directions" is a reference to the Traffic Signs Regulations and General Directions 2016, applicable to England, Scotland and Wales. Reference to a diagram number or to a Schedule is a reference to a diagram or Schedule in those Regulations.

1.4.2. In Northern Ireland, the relevant legislation is the Traffic Signs Regulations (Northern Ireland) 1997 as amended. Diagram numbering occasionally differs in these Regulations and references to Schedules do not apply to Northern Ireland. The design of road markings, meanings and permitted variants are generally similar but can vary; where the Northern Ireland Regulations apply, the designer is advised to read them in conjunction with the Manual.

1.4.3. Not all road markings referred to in the text are included in the Northern Ireland Regulations. References to directions are not applicable in Northern Ireland; where these are referred to, advice should be sought from the Department for Infrastructure's Headquarters.

1.5 Format

1.5.1. Any reference to a "Chapter" is a reference to a Chapter of the Traffic Signs Manual, and any reference to a "section", unless otherwise stated, is a reference to a section within a chapter of the Manual.

1.5.2. References to Schedules, Parts, items and paragraphs within TSRGD are shown in an abbreviated format. In this system, "Schedule" is shortened to "S" and "Part" is indicated by the second number without a prefix. The final element, variously "item" or "paragraph" is also denoted by a number without a prefix. This is illustrated in the following examples:

"Schedule 9, Part 6, item 25" becomes "S9-6-25"

"Schedule 11, Part 6, paragraph 3" becomes "S11-6-3"

"Schedule 12, Part 2" becomes "S12-2"

1.5.3. The numbering system contained in the Manual utilises three levels comprising sections, sub-headings and numbered paragraphs. Internal references are in **bold blue**.

1.5.4. Dimensions on the figures are in millimetres unless stated otherwise. Many markings are fully dimensioned in TSRGD. Detailed working drawings of traffic signs and road markings are available at:

www.gov.uk/government/collections/traffic-signs-signals-and-road-markings

Working drawings for Welsh and English bilingual signs are available at:

www.traffic-wales.com/traffic_signs.aspx

1.5.5. In addition to indicating overall dimensions, TSRGD prescribes maximum heights for road markings and road studs (regulation 10).

1.5.6. The size of text on traffic signs is specified in terms of its x-height. This is the height of the lower case letter “x”. The unit of measurement when designing a sign is the stroke width which is one quarter of the x-height. The design of traffic signs is dealt with in Chapter 7.

1.6 Further information

1.6.1. The Manual is published as a series of individual chapters. Until Chapter 2 ‘Informatory Signs’ is published, advice is provided in Local Transport Note (LTN) 1/94 ‘The Design and Use of Directional Informatory Signs’, which is available at:

www.gov.uk/government/publications/design-and-use-of-directional-informatory-signs-ltn-194

1.6.2. Revised chapters of the Manual are published infrequently and the current version should always be used. Reference should always be made to the latest relevant legislation, as amended, to ensure that decisions are taken in conformity with the current statutory requirements. As stated above, the requirements of legislation always take precedence.

1.6.3. Where more detailed background information might be helpful, reference is made to Standards and Advice Notes in the Design Manual for Roads and Bridges (DMRB), available from TSO or at:

www.standardsforhighways.co.uk/dmrb

Technical enquiries regarding the content of the Manual should be made directly to the Department for Transport. All other enquiries should be made to TSO.

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Department for Infrastructure (Northern Ireland)
Scottish Government
Welsh Government

2 THE GOLDEN RULES

2.1 General

2.1.1. Only where there is a Traffic Regulation Order (TRO) in place (or a similar regulatory requirement, such as the start of a 30 mph speed limit in a street-lit area) is there a statutory requirement to provide signs. 'Less is more' is therefore a good adage when designing a scheme. Where there is a need to warn and inform road users, signs or markings will also be needed. Signs should only be provided where a clear need has been identified, and should be minimal and sympathetic to their environment (see section **5**). These principles apply in both urban and rural settings.

2.1.2. It is recommended that traffic authorities audit their traffic signs, traffic signals and road markings on a regular basis and maintain a comprehensive sign inventory. This will enable them to manage their assets better and to determine whether their existing signs are necessary and enable rationalisation of information provided to road users.

2.1.3. A review of existing signing undertaken before new signs are introduced, and where new traffic schemes are being planned, will help identify those signs that are obsolete or unnecessary, which can then be removed from the road network, as well as signs that need replacing (see **2.3**). It will also help to avoid new signs being placed that are inconsistent with existing signs or which obscure visibility of them.

2.2 Standardisation of traffic signs

2.2.1. Consistency of sign appearance and use are essential for road safety, as is the selection of sizes appropriate for the prevailing traffic speed. Warning signs sited at different distances from the associated hazards in different localities, for instance, could mislead road users who venture outside their local area. Overuse of warning signs may be distracting to the road user as illustrated in **Figure 2-1**. To obtain the fullest benefits of uniformity, therefore, there should not only be uniformity of signs but also uniformity in their use, in their siting and their illumination (see **5.2** and section **11**).

2.2.2. Standardisation of signing applies equally to road markings and signals, which are also considered to be traffic signs. Rapid assimilation of easily recognisable messages ensures that road users can react in time to changes in road and traffic conditions.

2.2.3. Designers need to recognise and take full benefit from the flexibility in TSRGD, rather than preparing overly-cautious designs. Good scheme design must satisfy regulatory requirements, meet functional objectives and provide clarity and safe movement for all road users. The design should, however, consider and provide for the visual quality of the streetscape as well. In certain circumstances, it may be appropriate for designers to visit the site rather than rely on drawings, maps or web-based applications. A successful scheme achieves functional demands and high visual quality, while being delivered within constraints that include physical space, budget and programme.

2.2.4. The recommended location and mounting height of signs is set out in the Manual. There can be contradictory requirements at junctions such as the differing visibility needs of car drivers, lorry drivers and pedestrians. Successful design must resolve these contradictions enabling a safe, environmentally friendly and effective design (see section **5**).

2.2.5. Authorisation for a non-standard sign can only be given in situations where there is no sign already prescribed. Further Statutory Instruments are made from time-to-time that amend the Regulations and/or Directions in TSRGD, so awareness of these is essential. Designers should use the DfT website or www.legislation.gov.uk to check that they are using the latest TSRGD (as amended).

2.2.6. The legal aspects of signing are sometimes misunderstood by practitioners, particularly the prohibition on an authority unilaterally inventing its own non-standard signs. These aspects are covered in the following sections, as is the need for authorisation or a special direction when non-prescribed signs are required, or a prescribed sign is to be used in a way not permitted by the Directions.

Figure 2-1 Overuse of warning signs – this roundabout on a single carriageway road is adequately indicated by the map-type advance direction sign

2.3 Reducing sign clutter

2.3.1. Parliament sets the legislation governing traffic signs' appearance and meaning, but decisions about which signs to place and in which scenario is a matter for traffic authorities. Research carried out in 2013 by the Department for Transport to inform the Traffic Signs Policy Review showed that the number of traffic signs had doubled in the previous 20 years.

2.3.2. The overuse of traffic signs blights the landscape, wastes taxpayers' money and dilutes important safety-critical messages. Clutter also increases risks to road workers and creates additional maintenance burdens.

2.3.3. The principles of good traffic management are in line with good streetscape design – neither is helped by over-provision and clutter. Therefore, this increase in traffic signs is unsustainable and rather than being erected to address a perceived single issue, they should be erected where sound engineering principles justify them.

2.3.4. Enabling local authorities to reduce sign clutter on their roads has substantial benefits such as improving the streetscape, minimising the environmental impact of signing and reducing the cost of providing signs and any lighting units. It also reduces the need for maintenance (e.g. sign cleaning, lamp changing, foliage cutting) and helps rationalise signs to ensure they are provided only when required.

2.3.5. Reducing sign clutter was a key aim of the Traffic Signs Policy Review, and TSRGD therefore includes a number of changes to facilitate this. It provides a modern framework that means fewer signs need to be placed, and gives traffic authorities the right to remove many of their existing signs. This enables the message to have clarity without distracting road users and spoiling the environment. Overuse of any one type of sign dilutes the message being conveyed and The Department for Transport expects authorities to be proactive in removing unnecessary signs, and design signing schemes to minimise clutter from the outset (see section **9**).

2.4 Duplication of regulatory signs

2.4.1. Terminal signs indicating the start of a restriction, requirement, prohibition or speed limit should not necessarily be duplicated on each side of the carriageway. Provisions that previously required signs to be paired have been removed from TSRGD. Designers should actively consider this flexibility in order to reduce environmental impact, but care should be taken to ensure that, where a single sign is used, it is clearly visible to all relevant road users, and does not give rise to issues relating to road safety or enforcement. There remains a duty on traffic authorities to place such signs as they consider will give adequate guidance of a regulatory measure. Where it is necessary to place two signs they should match in terms of design, illumination, height and, wherever possible, be aligned with one another on either side of the road.

2.4.2. At traffic signals and signal controlled pedestrian crossings, TSRGD requires two signal heads per approach, one of which must be a primary signal head. At most sites, this should suffice. Some complex junction layouts may require extra signal heads (for example on multilane approaches) but designers should always start from a position of providing the minimum number of heads necessary. The routine use of ‘tall poles’ to provide an extra signal head mounted at height should be avoided.

3 LEGAL ASPECTS AND RESPONSIBILITIES

3.1 Responsibility

3.1.1. Use of the road creates risk and potential conflict for all traffic, including pedestrians. The legal aspects and responsibilities for signs alone would require a full and comprehensive guide. This is outside the scope of this Manual and the subject is dealt with only briefly in this section.

3.1.2. Traffic authorities are responsible for ensuring correct standards of signing on their roads; only they can erect permanent traffic signs or permit their erection.

3.1.3. Section 122 of the Road Traffic Regulation Act 1984 places a duty on authorities to exercise their functions under the Act (which include the provision of traffic signs) "to secure the expeditious, convenient and safe movement of traffic". Authorities may only use signs of a size, colour and type prescribed in legislation or specially authorised by or on behalf of the national authority. The Regulations, which include all of the sign diagrams and the other Schedules, cannot be changed except by the making of amendment regulations. However, regulation 4 permits the authorisation of signs that are not prescribed by TSRGD. The national authority may modify the Directions (direction 11) by issuing a special direction to a traffic authority to permit a prescribed sign to be used in a different manner, but not to change its appearance.

3.2 Legal framework

3.2.1. If a traffic authority wishes to use a sign not prescribed by TSRGD, application for special authorisation should be made to the national authority. The design of such signs should conform to established principles, and special signs will generally only be authorised in exceptional circumstances. This is essential in order to minimise the number of sign types required for the safe and efficient functioning of the road system. Sign types having only local usage and significance could cause difficulties for road users unfamiliar with the area. However, from time to time there is a need for a new sign design that has general application. In this case, the Department for Transport will produce a non-prescribed working drawing for the sign, thus removing the need for site-specific engineering drawings.

3.2.2. TSRGD limits the use of certain signs and certain classes of sign. The Manual not only explains in non-legal language the requirements of TSRGD, but also advises on all aspects of signs and their use, including matters not covered in the Statutory Instrument. If traffic authorities follow this advice, a reliable and uniform system of traffic signing will result, benefitting road users throughout the country.

3.2.3. Traffic authorities are not free to use all the signs shown in TSRGD without further authority. They may do so generally with informatory signs and warning signs, but there are a large number of signs conveying statutory requirements that first require a Traffic Regulation Order to be made to give effect to the requirement. Subsequent Chapters give further details on the use of prescribed signs and road markings, as well as stating where a Traffic Regulation Order or other authority is required before a sign or marking may be used.

3.3 Location

3.3.1. The use of non-prescribed signs on public highways without authorisation by the national authority might be deemed unlawful, with authorities using them acting beyond their powers. The erection of an unauthorised sign in the highway is an obstruction and the possible consequences of erecting or permitting the erection of obstructions can be severe. Those

responsible could lay themselves open to a claim for damages, for example if an obstruction is the cause of an accident or an injury in a collision, or if it adversely affects a property adjacent to the road by blocking light or impairing visual amenity. Furthermore, the use of unlawful traffic signs might compromise enforcement of statutory provisions and be detrimental to road safety.

3.3.2. Traffic authorities will normally erect traffic signs within the highway boundary but, if this is not possible, under section 71 of the Road Traffic Regulation Act 1984, they can enter land to erect signs on or over land adjacent to the highway, with the owner's permission. They can also, if necessary, acquire land or rights over land either by agreement or compulsorily for the accommodation of signs.

3.4 Removing unlawful traffic signs

3.4.1. Traffic signs in use on the highway must either be prescribed by TSRGD as amended, or be specially authorised by the national authority. Signs that are neither prescribed nor authorised are obstructions on the highway and must be removed.

3.4.2. Each edition of TSRGD has given dates by which certain obsolete signs become unlawful and thus need to be removed or replaced. Equally, the signs relating to any regulatory measure that is no longer in force (for example, superseded parking restrictions) should be removed.

3.4.3. Traffic authorities should consider requiring the removal of any object or device erected privately on land adjacent to their roads which has the apparent or express intention of guiding, warning or directing road users.

3.4.4. United Kingdom sign designs are Crown copyright, but, as they are part of legislation, they can be reproduced freely. When prescribed traffic signs are used irresponsibly, action should be taken by local authorities to secure their removal.

3.4.5. Under sections 69 and 70 of the Road Traffic Regulation Act 1984, the national authority has powers to ensure the removal of any unlawful or badly deployed traffic sign, object or device for the direction or guidance of people using the roads.

4 CLASSIFICATION OF SIGNS

4.1 General

4.1.1. Signs are used to control and guide traffic and to promote road safety. Warning signs for instance, will not enhance road safety if used widely where there is no unusual degree of danger. On the other hand, their omission is not in the best interests of road users where guidance, control or danger warrants the use of a sign. The advice given in subsequent chapters of the Manual should therefore be closely followed.

4.1.2. There are three main classes of upright traffic signs. Each class has a distinctive basic shape and, as explained in later chapters, certain colour conventions apply.

4.2 Warning signs

4.2.1. These signs give warning of a hazard ahead and are mainly prescribed in Schedule 2 of TSRGD, but are also to be found in Schedule 14, if relating to traffic control or pedestrian crossings, or in Schedule 13 for temporary situations. Warning signs are generally triangular in shape and, with the exception of the Give Way warning sign (diagram 501, S2-6-1, see Chapter 4), the apex is uppermost. They are sometimes supplemented by rectangular plates which give additional information. For some signs a plate is compulsory.

4.2.2. The structure in TSRGD Schedule 2 provides a blank template for warning sign combinations, together with the permitted size ranges for triangles and supplementary plate x-heights as illustrated in **Figure 4-1**. This provides the starting point from which warning signs are created from component elements. An example of a warning sign supplemented by a rectangular plate is illustrated in **Figure 4-2**. Advice on the use of warning signs is given in Chapter 4. Advice on the appropriate use of warning markings is contained in Chapter 5.

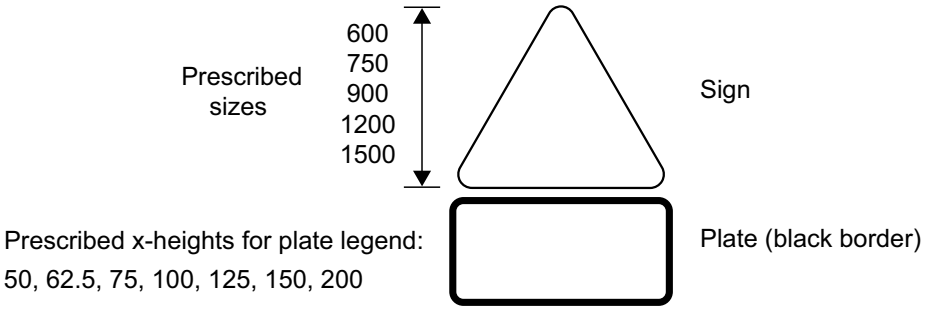

Figure 4-1 Warning sign template

Figure 4-2 Simple sign combination

4.3 Regulatory signs

4.3.1. These include all signs that give notice of requirements, prohibitions or restrictions. They indicate either what road users must do or what they must not do. Regulatory signs are prescribed in Schedules 3 to 10 of TSRGD, with those relating to temporary situations or traffic control measures in Schedules 13 and 14. Examples of regulatory signs are shown in Figure 4-3. Those directed at moving traffic are generally circular in shape, with the notable exception of STOP and GIVE WAY signs and signs indicating priority lanes. Many of them may or must be supplemented by plates beneath, building on the message given by the sign. Other signs for static traffic include the rectangular signs indicating on-street parking controls. Regulatory signs are dealt with in Chapter 3.

Figure 4-3 Regulatory signs

4.3.2. For regulatory signs indicating the beginning of a restriction, requirement, prohibition or speed limit, care should be taken to ensure that, where a single terminal sign is used, it is clearly visible to road users and does not give rise to issues relating to road safety or enforcement.

4.3.3. In deciding the appropriate provision of terminal signs, the following factors should be taken into account:

- turning angles
- road geometry including vertical alignment
- one way traffic conditions
- sign mounting height.

4.3.4. In some instances, adequate visibility might require a sign to be placed on the off-side of the road. Care is required to ensure that, at a junction, it is clear which road a single sign applies to.

4.3.5. While the financial incentive to place only one terminal sign is obvious, there will be many situations where two signs are necessary. Drivers should not be placed in the situation where they might not see the sign before making a manoeuvre at a road junction.

4.4 Informatory, directional and tourist signs

4.4.1. These signs normally give road users information about a route or places and facilities of particular value or interest. They are prescribed in Schedules 11 and 12 of TSRGD (and Schedule 13 for temporary situations) and examples are shown in **Figure 4-4**. Most informatory signs are rectangular, including advance direction signs (ADS) placed in advance of a junction. Direction signs at junctions (often known as flag-type signs) usually have one end pointed; and traffic authorities should refer to Chapter 7 for advice on these signs. Moreover, traffic authorities should continue to refer to LTN 1/94 (see **1.6.1**) and consult the Department for Transport for advice on matters not dealt with in that document.

Figure 4-4 Informatory, Directional and Tourist Signs

4.4.2. TSRGD allows for a 'building block' approach for directional signs contained in Schedule 12. The majority of signs are now prescribed as sign elements rather than complete signs with individual diagram numbers. This introduces greater design flexibility. The dimensions of these elements are specified in stroke widths rather than millimetres, in line with design details shown on working drawings and in Chapter 7. This ensures that the signs have the correct proportions.

4.4.3. Certain signs having specific design proportions, and therefore not fitting the approach explained above, are prescribed as complete illustrations.

4.4.4. Tourist signs should only be provided for major destinations and not for facilities used primarily by local residents. They should only be provided where existing directional signs are not sufficient. For most tourist destinations, it is likely that signing would only be appropriate within the last two or three miles, or from where the route diverges from that to the nearest town or village.

4.4.5. In TSRGD, a "tourist destination" is defined as:

a) Tourist Information Centre or Point;
b) a permanently established attraction or facility (other than a leisure facility) which—
   i) attracts or is used by visitors to an area;
   ii) is open to the public without prior booking during its normal opening hours; and
   iii) is recognised as a tourist attraction or facility by the appropriate national promoter of tourism;

c) a village, town or city that is of particular interest to tourists;
d) a route that is of particular interest to tourists.

4.4.6. The “national promoter of tourism” is defined as:

a) in relation to England, the British Tourist Authority (trading as “VisitEngland”);
b) in relation to Scotland, VisitScotland;
c) in relation to Wales, Welsh Ministers, (using the branding “Visit Wales”).

4.4.7. In Northern Ireland there is no direct equivalent to the term “national promoter of tourism” in the Traffic Signs Regulations (Northern Ireland) 1997. Tourism Northern Ireland is the official body responsible for the development of tourism and marketing of Northern Ireland as a tourist destination.

4.4.8. Leisure facilities which may be provided with a brown sign are indicated in the TSRGD description of the relevant symbol in S-12-14, 15, 16 and 18. Unlike tourist destinations, they do not require recognition by the appropriate national promoter of tourism.

4.4.9. Greater flexibility on the design of boundary signs has been introduced to enable authorities to foster a sense of place, and the historic and geographic qualities often associated with particular areas. The permitted variants for boundary signs to diagram 2403.1 (S11-2-82) have been expanded to allow signs to show the boundary of a National Park, area of outstanding natural beauty (in England and Wales) or a National Scenic Area (in Scotland).

4.4.10. Boundary signs may now incorporate photographic or other images showing an item of local interest (diagram 2404, S11-2-83). Whenever such signing is proposed, careful consideration should be given to what can be instantly recognisable from a moving vehicle. Consideration should also be given to how the image performs in all lighting conditions. More effective images are likely to be those depicting landmarks, buildings or structures that are synonymous with the area, city or town. Photographs showing generic features such as natural scenery are less likely to create an instant association with a particular place. In common with all traffic signs, sponsorship and advertising on boundary signs is not permitted. Examples are shown in **Figure 4-5**.

4.4.11. TSRGD also allows the signing of historic county boundaries, although these may not be placed as a substitute for administrative boundaries, which remain prescribed. It should be noted that photographs are not permitted to mark the boundary of an historic or ceremonial county.

Figure 4-5 Examples of boundary signs incorporating photographic or other image

4.5 Design of signs

4.5.1. In order to perform the function for which they are intended, it is essential that signs can be read and understood by road users in good time for subsequent actions to be carried out safely. This includes signs having appropriate illumination. Signs should be adequate in design and construction without being over-designed.

4.5.2. The conspicuity of a sign depends on both its size and its contrast with its surroundings. It is also important to follow the design rules (see Chapter 7) for the positioning and spacing of characters and symbols. The design rules have been developed to maximise legibility without wasting space.

4.5.3. For safety reasons, drivers should not need to divert their eyes more than ten degrees away from the road ahead, meaning that the message on a sign must be fully absorbed before a driver reaches that position. As speeds increase, so must the legible distance, in order that the sign can be assimilated without unduly distracting attention from the road ahead. The effect of the line of approach of a vehicle has to be considered separately as part of the design process to ensure the satisfactory performance of the sign (see section **5**).

4.5.4. These considerations have led to the design of signs of different sizes to suit different traffic speeds. Larger signs are needed on higher speed roads to ensure visibility but smaller signs will generally suffice where speeds are lower. However, target value needs to be considered, for example in busy shopping streets where small signs could be missed. A larger sign is often preferable to the use of a backing board. Appropriate sign sizes are addressed in the Appendices to the applicable Chapter.

4.5.5. The lettering prescribed for nearly all signs is sentence case Transport alphabet. One alphabet, Transport Medium, is for use with light lettering on a dark background and a second, heavier one, Transport Heavy, for dark lettering on a light background. A range of numerals, separators and other characters is also available for each alphabet. There is, additionally, a

special range of characters for the route numbers on motorway signs. These alphabets are prescribed in Schedule 17 of TSRGD and detailed on working drawings. Advice on their use is contained in Chapter 7.

4.5.6. In addition to distinctive shapes, different classes of sign have distinctive colour combinations. The number of different colour combinations that can be usefully used is limited by technical requirements; **Appendix A** lists the colours with their specifications. Subsequent Chapters describe their use in detail.

4.5.7. Satisfactory design of sign faces for directional signs will result in signs that are well laid out, give clear and unambiguous messages to drivers and are balanced in appearance. Drivers will be in no doubt as to the correct route to follow to their destination, leaving them better equipped to negotiate busy and complex junctions. Chapter 7 gives detailed advice on the layout of signs, alphabets, spacing and size of letters. For bespoke signs and those not covered directly in Chapter 7, reference should always be made to the working drawings (see **1.5.4**).

4.5.8. The colour of the backs of most signs and their stiffening channels must be grey, black or in a non-reflective metallic finish, as should the fixing clips. BS EN 12899 1:2007 requires that certain information is displayed on the back of conforming traffic signs and direction 8 permits both this and other information relating to ownership and maintenance requirements to be displayed. The lettering may be in a contrasting colour and character heights are limited. No coloured or reflective background is permitted; lettering must be applied directly to the sign back or by means of a transparent adhesive label or one which has the same background colour as the sign back.

5 POSITIONING OF SIGNS

5.1 General

5.1.1. This section describes the decision-making process involved in choosing a location for an upright traffic sign. The positioning of signs has to be considered very carefully to ensure that they are legible from the approaching road user's point of view, but also do not impede the view of other road users, including pedestrians, cyclists, motorcyclists and equestrians, particularly on side roads or in accesses. Environmental aspects need to be considered so as to minimise visual intrusion as well as the need for clear signing of legal requirements.

5.1.2. From the approaching road user's viewpoint there are four aspects to the positioning of a traffic sign:

a) its siting along the road in relation to the junction, hazard, or other feature to which it applies;
b) its lateral placement in relation to the edge of the carriageway and other features of the cross-section;
c) its height above the road; and
d) its orientation.

5.1.3. The limits of Traffic Regulation Orders and physical constraints imposed by the road layout will have an influence on sign siting.

5.2 Siting along the road

5.2.1. In order to allow a road user adequate time to comply safely with its message, each sign, should be sited at the correct distance before the site to which it relates. This excludes regulatory signs which have to be sited at a specific point. The correct distance will generally depend on the prevailing traffic speed on the road and the complexity of the traffic manoeuvre required. The recommendations set out in the relevant Chapter or in LTN 1/94 (see **1.6.1**) should be followed.

5.2.2. Signs are designed for the symbols and legends to be recognisable and fully legible from defined distances depending on their type and the speed of traffic. It is essential that the whole sign face is visible from these distances and over the entire reading range, and not obscured by intervening obstructions. Detailed advice is published in Chapters 3, 4 and 7 for regulatory, warning and directional signs respectively.

5.2.3. Road users are accustomed to signs being on the near side of the road and such positioning should be the general practice. However, siting on the off side is appropriate in certain circumstances – for example where there are difficulties in siting on the near side, or where a direction sign is located opposite or in the entrance to a side road. Worthwhile economies might be gained at some locations, such as at T-junctions, where one structure carrying direction signs facing both ways will suffice instead of a sign on the near side for each approach. At sharp left-hand bends, siting on the off side might not only be appropriate but preferable, although consideration must be given to the risk of the sign being obscured by oncoming vehicles, or leading drivers to pass on the right-hand side.

5.2.4. The off-side siting of signs also occurs where signs need to be erected on both sides of a carriageway or on one-way streets. Provision of warning signs on both sides of the road is also sometimes appropriate on multi-lane roads, particularly in situations such as the end of a dual carriageway or the approach to a roundabout on a high-speed road.

5.2.5. Other methods of siting are sometimes required. For instance, flag-type direction signs are usually placed on the far side of the head of the T-junction for drivers approaching on the stem. At vehicle underpasses, overhead signs might be more appropriate, while signs on roundabouts and refuges are also specially sited.

5.2.6. In siting signs, the advice given in subsequent Chapters should be closely followed, although it will not always be possible to adhere precisely to this advice due to site limitations. Variations in distance of up to 10% are generally permissible, but if an appreciably greater variation seems to be required, other solutions should be investigated. Steps should be taken to deal with obstructions to the visibility of signs if the signs cannot be sited elsewhere. Overhanging trees and shrubs should be cut back and bus stops moved if necessary. Waiting or loading might have to be prohibited if the sign cannot be sited to be free from such obstructions.

5.2.7. Permanent features that cannot be easily altered, such as bends, hill crests, narrow verges, buildings etc., will necessitate the special siting of signs. It is preferable to increase the standard distance between the sign and the site to which it relates rather than decrease it, but such increase should not be more than the 10% tolerance mentioned in **5.2.6**. If a suitable site cannot be found within these tolerances, then a decrease should be investigated. Chapter 4 contains detailed advice on the siting of warning signs and the use of distance plates.

5.2.8. For speed limits and other traffic restrictions, a terminal sign or pair of signs must be placed at or as close as practicable to the point specified in the Traffic Regulation Order. It is of the greatest importance that such signs are placed in a position of good visibility. As the lengths of restrictions themselves might be influenced by the best sign positions, due consideration should be given to the precise siting of terminal signs before any Traffic Regulation Orders are made or even published for consultation. However, care should always be taken to avoid long lengths of unnecessary restrictions. At a junction, speed limit signs have historically been positioned up to 20 m into the mouth of a side road. This distance is considered sufficiently close to meet the placing requirement described above where it is not convenient to place the signs any closer to the actual commencement point.

5.2.9. It is essential that road users have an unobstructed view of traffic signs. The distance which should be kept clear of obstructions to the sight line is known as the clear visibility distance. The higher the prevailing traffic speed, the greater this distance. It is important, therefore, that sight lines are maintained so that vegetation (including seasonal growth), subsequent building development and other features such as shop signs and awnings do not obscure traffic signs. It is equally important to ensure that signs are not placed where they will obstruct the view of other signs and it is essential to ensure that they, themselves, do not obstruct sight lines, e.g. for vehicles emerging from a side road or access.

5.2.10. More advice is given on detailed siting and visibility distances in the relevant parts of subsequent Chapters. This has been produced from observation of existing examples and consideration of ways of overcoming the various disadvantages. These disadvantages should be evaluated very carefully when considering solutions to non-standard layouts.

5.3 Lateral placement

5.3.1. To prevent damage from passing vehicles, signs should be set back from the edge of the carriageway. Wherever possible, signs should be set at the back of the footway or highway. Lateral placement at roundabouts should also allow for circulatory visibility.

5.3.2. Consideration should be given to the needs of all road users, including pedestrians, cyclists and equestrians, as these could affect the choice of site (see **6.1.3**).

5.4 Mounting heights

5.4.1. Signs should be mounted such that the lower edge of the sign is generally between 900 mm and 1500 mm above the highest point of the adjacent carriageway. Signs mounted at the lower end of this range benefit from receiving the most illumination from vehicle headlamps, but they are also prone to soiling due to spray from passing vehicles. Mounting heights at the higher end of the range should be used where this or obscuration by other vehicles is likely to be a problem. Speed limit signs and other safety-critical signs will not normally be mounted lower than 1500 mm above the carriageway.

5.4.2. Where signs are erected above footways and cycle tracks, adequate clearance must be allowed for pedestrians, cyclists and equestrians. Interim Advice Note 195/16 'Cycle Traffic and the Strategic Road Network' requires a minimum height for such structures of 2300 mm for pedestrians and 2400 mm for cyclists. However, to minimise the environmental impact of signs, particularly large directional signs, consideration should be given to adopting lower mounting heights. A minimum clearance of 2100 mm should be maintained over footways, 2300 mm over cycle tracks or shared-use facilities and 2700 mm over equestrian routes.

5.4.3. Detailed consideration may be necessary for the combined effects of location and mounting height at some junctions in order to take account of the differing eye heights of drivers of cars, lorries and other road users. The aim is to optimise the benefits and minimise the disadvantages to any one category of road user at a given site. Alternatively, use of LED-powered internally-illuminated signs might be considered (see section **11**). If signs are to be externally lit, the signs should be raised to take into account the risk of vandalism.

5.4.4. Regulatory signs must be placed as near as practicable to the start of a restriction and it is preferable to place them on the back line of the footway, or the verge where no footway is present. They should not be placed right on the corner of the junction, or right on the kerb side. Signs at a junction should be set back from the road, where practical, to aid driver's visibility when turning in to that road. Setting a sign in this manner makes it aesthetically more attractive, less liable to damage, and more readily visible to road users who need to see it. It may also be sensible to angle signs at junctions slightly towards the side road carriageway so that they can be seen by turning traffic (particularly at night where signs are not directly lit and need to be illuminated by headlamps).

5.4.5. The fixing bands that attach the sign to the support should be tight enough and of an appropriate design to stop signs slipping or twisting around, or being deliberately rotated to give incorrect information to drivers. Designers should ensure adequate consideration is given to fixings/support for sign plates as this is one of the main causes of failure. Manufacturers should supply suitable and appropriate fixings in accordance with their own declaration of performance to prevent panel separation, twist or slippage, including appropriate torque settings.

5.5 Orientation

5.5.1. Signs normally face oncoming traffic. The main exceptions to this are those signs indicating on-street parking controls, which should be parallel to the edge of the carriageway, and some flag-type direction signs, which by their nature have to point approximately in the direction to be taken. Parking signs along red routes should face oncoming traffic to avoid drivers committing an offence by stopping to read them (see Chapter 3 for further advice).

5.5.2. On unlit roads in particular, specular reflection from traffic signs can be troublesome. To eliminate or minimise its effect, signs should be set at angles such that they face slightly away from the beam direction of headlights from approaching vehicles within a distance of 200 metres. On a straight length of road, the horizontal axis of a sign should be set at an angle

of 95° away from the general alignment of the near side edge of carriageway on the approach side (see **Figure 5-1**). Signs sited on left-hand bends should be set at an angle of 95° measured clockwise from a line joining the edge of the carriageway at the sign with a point on the same edge of carriageway 200 metres in advance of the sign (see **Figure 5-2**).

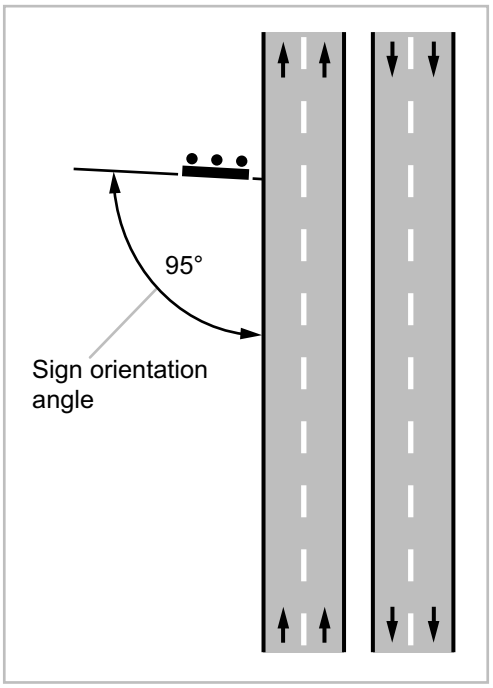

Figure 5-1 Orientation of sign on straight lengths of road

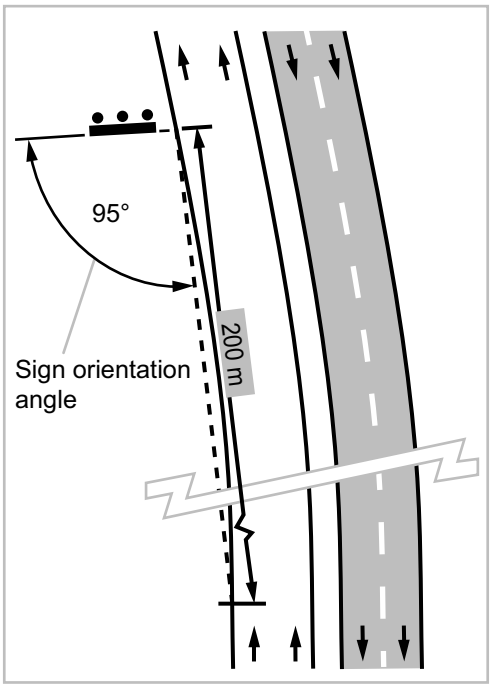

Figure 5-2 Orientation of a sign on a left-hand bend

5.5.3. On some bends and complicated road alignments, compromise solutions might have to be adopted, but generally it will be adequate on a right-hand bend for a sign to be set at an angle of 90° to a line tangential to the near side edge of the carriageway at the point where the sign is erected (see **Figure 5-3**). On motorways and other roads with hard shoulders 3 m wide or more, the angle of 95° should be reduced to 93° in both instances. On roads other than motorways, subject to a speed limit of 50 mph or less, the distance of 200 metres should be reduced to 100 metres. On minor roads, with limited forward visibility, even this figure might not be achievable, in which case, the actual clear visibility distance to the sign should be used.

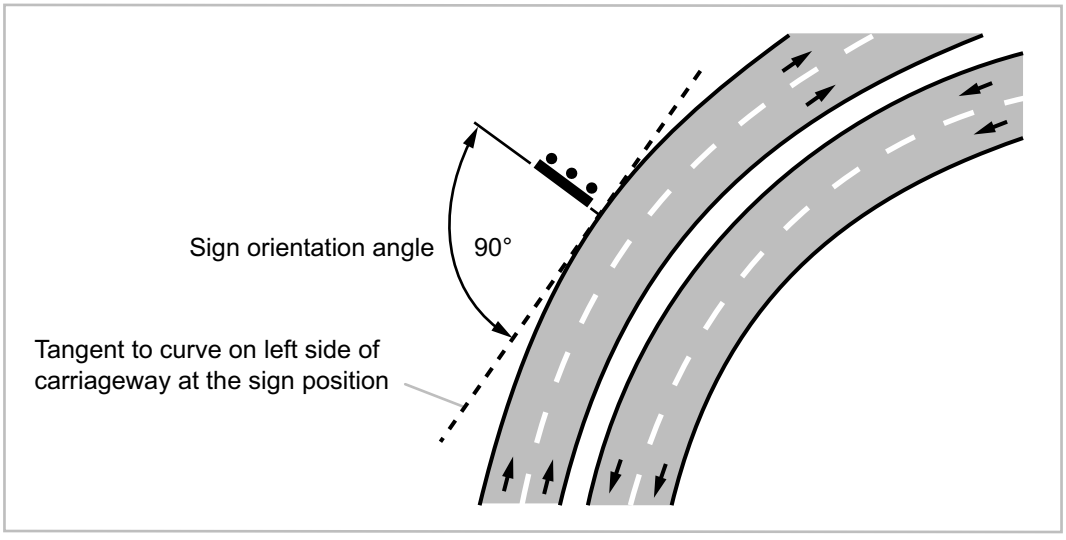

Figure 5-3 Orientation of sign on a right-hand bend

6 MOUNTING SIGNS

6.1 Support structures

6.1.1. Signs should be mounted so that they are visible, but not intrusive. Designers should consider the look of the road as a whole, and ensure that, where possible, appropriate sign supports are consistent in their design and parallel in location.

6.1.2. Designers should consider the possibility of mounting signs on walls (provided that they are not more than 5 metres from the edge of the carriageway), railings and other street furniture to reduce the need for separate supports. Under section 74 of the Road Traffic Regulation Act 1984, London traffic authorities have powers to place signs on privately owned railings and walls. Elsewhere this may only be done by agreement with the owner of the property.

6.1.3. Sign supports located in footways can create hazards, particularly for blind or partially sighted people, and obstructions for people with pushchairs and wheelchairs. Where posts are erected on footways, there should preferably be 1500mm, with an absolute minimum of 1000 mm, of unobstructed width. Where supports are erected on footways, the signs on them should be mounted at the appropriate height (see **5.4**). Supports not readily visible to pedestrians or cyclists may be provided with a yellow or white band in accordance with the requirements of direction 8(2). Alternatively, cantilever arrangements or adequately stiffened sign plates allowing signs to be mounted on more widely spaced supports, might be considered.

6.1.4. Supports provided to mount a sign should not project above the sign or lighting unit. Where possible, the mounting should allow some angular adjustment of the sign before locking in its final position. However, where a sign is mounted on a single support, the fixings should be designed in such a way that the sign cannot subsequently be rotated from its correct orientation. Where enlargement of a support is needed to house control equipment, it should be provided at the base of the support.

6.1.5. The Schedule-specific Directions also specify those signs that may be mounted on bollards. Regulatory roundels, where placed on retroreflective self-righting bollards within a street-lit area, must be reflectorised as a minimum. It remains a requirement that those signs mounted on internally illuminated bollards must be directly lit.

6.1.6. Due to their position adjacent to the carriageway, traffic signs can themselves be a potential hazard. This is particularly true on high-speed roads. The provision of safety barriers to prevent collisions can be expensive. Wherever possible, traffic signs should be positioned behind existing barriers, for example, on the approach to a bridge abutment. Where this is not possible, designers should consider the use of passively safe supports as an alternative to installing a length of barrier for the sole purpose of preventing collisions with the sign. Passively safe supports should conform to a performance class of BS EN 12767:2007, and guidance is available in the Institute of Highway Engineers, ‘Sign Structures Guide: Support Design for Permanent UK Traffic Signs’. Consideration should also be given to ensuring electrical safety in the event of damage to the sign support.

6.2 Design of support structures

6.2.1. Supports for most signs may be of any single colour or their natural colour (direction 8(1)), while those for hazard markers to diagrams 560 may also be black and white (S2-8-5(2)(b)). Uniformity in this respect improves the appearance of the street environment.

6.2.3. Sign supports should be designed to accommodate the total area exposed to the wind of the signs they are to support. The attachment of larger or additional signs to existing supports should only be carried out after checking the adequacy of the supports and foundations, taking account of any reduction in strength due to corrosion. When existing supports are inadequate for the total loading, they should be replaced rather than being supplemented with additional supports. Further advice, and recommended classes and values for properties such as wind load, are contained in the Institute of Highway Engineers, 'Sign Structures Guide: Support Design for Permanent UK Traffic Signs'.

6.2.4. To reduce street clutter, lighting columns may be used to mount smaller traffic signs, provided that their location is appropriate and that they are adequate structurally. Most modern columns are designed to support a sign of up to 0.3 m² (category A of PD 6547:2004+A1:2009 table 3). A sign larger than a parking plate should not be attached to a lighting column unless its adequacy to support the sign has been checked in accordance with PD 6547 or the manufacturer's literature.

6.2.5. For existing lighting columns, the design check should take account of the structural condition of the column. Attachment of signs to lighting columns should be by external bands or clamps that will not damage the column or its protective coating.

6.3 Multiple signs on a support structure

6.3.1. Generally, not more than two signs should be erected on any one support. Where a sign requires a supplementary plate, the combination of sign and plate may be regarded as one sign as shown in **Figure 6-1**. Exceptionally, three signs may be mounted on one support, provided none requires a supplementary plate. The exception to this is traditional fingerpost signing, which may have four or more signs per assembly.

6.3.2. A warning sign or signs should not be mounted on the same support as a Stop, Give Way or terminal speed limit sign when facing the same direction. Sign combinations, excluding terminal speed limit signs, that may be mounted together should be placed in the following order from top to bottom. For further advice, see Chapter 3:

a) Stop or Give Way or any triangular warning sign or signs;
b) speed limit signs;
c) other circular signs;
d) rectangular signs.

6.3.3. Generally, no assembly of multiple signs should be taller than 4 metres above ground level, but this may be exceeded to obtain visibility of the signs at particularly difficult sites. However, account should always be taken of the potential environmental impact of tall and cluttered sign assemblies. Sign structures over 7 m total height on motorways and trunk roads (and on local roads if the authority uses DMRB standard BD 2) require a Category 0 structural approval.

6.3.4. It should be borne in mind that high-mounted signs might receive little light from vehicle headlamps, particularly on dipped beam. This especially adversely affects the drivers of HGVs, who are already disadvantaged because of their high seating position above their vehicle's headlamps. Where such signs are not directly lit and rely on reflectorisation to be seen at night, they are likely to be less conspicuous and less legible than lower mounted signs.

6.3.5. All proposed assemblies should be critically examined to ensure that the intended messages are clear and that there is no ambiguity. This is of particular importance where a supplementary plate with the legend "End" is used to indicate the termination of a prohibition or

restriction. For example, where a speed limit repeater sign is erected on the same support as a clearway sign accompanied by an “End” plate, the plate should be butted directly up to the base of the clearway sign. The speed limit sign should be mounted at the top of the assembly, with space equal to twice the width of the red border between the roundels, to ensure that there is no ambiguity (see **Figure 6-1**).

6.3.6. Where rectangular signs are mounted together or a supplementary plate is mounted below a triangular sign, the signs should be separated by a space not exceeding the x-height of the lettering on the lower sign. In all other cases signs may be butted together one above the other.

6.3.7. Where two or more warning signs are to be erected together, the sign relating to the hazard first encountered should be placed uppermost.

Figure 6-1 Appropriate assembly

7 SIGN BACKGROUNDS

7.1 General

7.1.1. In addition to optimising the design of individual signs and sign assemblies, it is important that designers also take into account the background and general environment against which the sign will be viewed.

7.1.2. The effectiveness of a traffic sign is dependent on it being seen clearly by approaching road users and this is affected by the sign's setting. In particular, some smaller signs might fail to stand out against a multi-coloured background.

7.1.3. Advertisements behind or near signs can prove distracting; those that flash or are brightly illuminated might cause road users to miss signs.

7.1.4. Wherever possible, signs should not be positioned in locations where they will be in deep shadow for much of the day, for example below bridges. Where this is unavoidable, lighting the signs or the use of fluorescent yellow backing boards can improve conspicuity.

7.1.5. While a sign's setting might be satisfactory when it is newly erected, signs can lose their effectiveness over time because of changes in their setting, such as building works or foliage growth and deterioration of the sign itself. Consideration should be given to the impact of new developments, to ensure planting of trees and shrubs does not interfere with a sign. Environmental landscaping on new developments should not interfere with existing signs. These points should be borne in mind when siting new traffic signs, when carrying out routine maintenance and in the exercise of the control of advertisements under the planning regulations.

7.2 Backing boards

7.2.1. Where it is impossible to avoid a poor or distracting background, it can be partially screened using a suitable backing board as illustrated in **Figure 7-1**. Using a backing board can also result in a neater assembly than a collection of individual signs, but their use can sometimes result in over intrusive assemblies, so should be used sparingly. Advice on the use of backing boards can be found in Chapters 3, 4 and 7.

7.2.2. Yellow backing boards are intrusive; they should be used sparingly, and not as a matter of course. They can reduce the attention drivers give to other, more important, signs and over use could eventually devalue their attention-attracting benefits. Similarly grey backing boards can be intrusive especially if used as an inexpensive means to attach small signs to widely spaced supports.

Figure 7-1 Effective use of backing boards

8 MAINTENANCE OF SIGNS

8.1 General

8.1.1. Traffic signs are erected to perform a specific function and it is very important that they are adequately maintained in order to preserve their original effectiveness and general condition. In addition to compromising road safety or compliance with statutory provisions, it is a waste of a public asset to allow signs to lose their effectiveness.

8.1.2. Over time, signs gradually become faded and their retroreflective properties diminish. This will reduce both conspicuity and legibility by day and by night. Signs also become less effective when they are dirty, damaged or displaced as a result of vehicle impact or vandalism. Damaged or dirty signs also discredit the traffic authority and lessen road users' respect for the signs. A periodic inspection of signs should be made to ensure their early repair and/or replacement when necessary. After-dark inspections should be made of lit and reflectorised signs, or a retroreflectometer may be used to measure the latter.

8.1.3. Excessively discoloured or faded signs (e.g. white backgrounds that have become grey or brown, or red borders faded to pink) and signs where the legend or graphic is peeling are not effective and need to be replaced.

8.1.4. Maintenance of signs should therefore include inspection of three main characteristics: visual, electrical and structural condition. Advice can be found in TD 25, 'Inspection and Maintenance of Traffic Signs on Motorways and All-purpose Trunk Roads' and 'Well-managed Highway Infrastructure: A Code of Practice' (published by UK Roads Liaison Group). Signs should also be checked for manufacturing defects during their warranty period.

8.1.5. Regular cleaning of signs is essential and this should be carried out in accordance with the manufacturer's instructions to prevent damage to the sign face or any protective overlay. No firm guidance can be given about frequency of cleaning, as dirt deposit will vary with site conditions. Signs located where they are subject to heavy soiling from passing traffic (e.g. low mounted verge signs) or algal growth (a common problem with signs beneath tree canopies) will need more frequent cleaning.

8.1.6. Neglect reduces the contrast between the sign and its surroundings, making it less likely to be noticed by drivers. It also reduces the contrast between legend and sign background, making the sign more difficult to read. Moreover, dirt seriously reduces light transmission through retroreflective sheeting; dirty signs are far less effective at night. While this is particularly true of unlit reflectorised signs, where the incident light has to pass twice through the retroreflective sheeting, it also seriously affects the performance of both internally and externally lit signs.

8.1.7. It is also essential to maintain the necessary clear visibility distance to traffic signs. Regular inspections should be made, particularly in summer when the rapid growth of foliage and grass is most likely to cause obscuration. Examples of obscuration by dirt and growth of foliage is shown in **Figure 8-1**. Advice on clear visibility distances for different types of sign is given in Chapters 3 and 4 and in LTN 1/94 (see **1.6.1**).

8.1.8. The same is true of road markings. Good road markings have a proven record of enhancing road safety. Advice for trunk roads can be found in TD 26, 'Inspection and Maintenance of Road Markings and Road Studs on Motorways and All-purpose Trunk Roads'. Advice is also available in the UK Road Liaison Group's document 'Well-managed Highway Infrastructure: A Code of Practice'.

Figure 8-1 Sign obscuration

9 REMOVING SIGNS AND SUPPORTS

9.1 General

9.1.1. Redundant signs and their supports should be removed when installing new signs. Before new signs are installed designers should undertake a review to determine whether any sign information could be rationalised or removed to reduce sign clutter. Other options may include retaining, amending, relocating or removing the existing sign. When removing illuminated signs, the electric cable should be disconnected at its source so that disused live cables are not left in the ground.

9.1.2. There are many examples of supports all over the country with no sign on them. An 'empty' support may indicate the loss of an important sign (due to theft, structural failure, accidental or malicious damage) that might need urgent replacement. Once it has been established that a sign is no longer required, the empty support should be removed so that it does not present a hazard to road users, road workers or an unlawful obstruction of the highway. When removing supports, consideration should be given to removing any projecting concrete foundations or support sockets as well. Further guidance is available in TD 25 'Inspection and Maintenance of Traffic Signs on Motorway and All-purpose Trunk Roads'.

9.1.3. Temporary signs should only be used where a clear need has been identified. In most cases this would be for road safety reasons, for example where there is a new road layout. Signs for new housing developments should not be placed by default, and may not be erected without the permission of the highway authority. In all cases, temporary signs must be removed within the time limits set out in TSRGD to safeguard their effectiveness. For example:

- all temporary (white-on-red) signs should be removed as soon as they are no longer needed. Signs such as 'NEW ROAD LAYOUT AHEAD' must be removed no later than 3 months after the completion of the works.
- black-on-yellow temporary signs for new housing developments (diagrams 2701 and 2701.1) must be removed within 6 months of completion of the development.

9.1.4. TSRGD requires a "remove by" date to be placed on the back of temporary signs to diagrams 7014, 7014.1 and 7032, and their variants, a measure aimed at helping authorities keep track of when signs should be removed, and enabling local residents to request removal if a sign is left in place too long.

10 SPECIFICATION FOR SIGNS

10.1 General

10.1.1. Traffic signs and road markings should conform to relevant British Standards, many of which are English language versions of adopted European Standards. Where a National Annex has been published, this sets out recommended performance classes most suitable for UK conditions and practice. Specifiers should note that it is not sufficient to simply require compliance with a Standard. The required performance class or classes must be specified to avoid the risk of suppliers providing the lowest performance class, which will seldom be adequate.

10.1.2. **Appendix B** lists those relevant British Standards current at the time of publication of this Chapter. Designers and specifiers should ensure that they are using the most up-to-date Standard and National Annex (where available). Reference should be made to the British Standards Institution's website at:

www.bsigroup.com

11 ILLUMINATION OF SIGNS

11.1 General

11.1.1. The term “illumination” covers any means by which a sign is made visible at night. Methods of illumination include direct lighting of a sign, the use of retroreflective material in its manufacture, or both. Designers should consider carefully whether those signs that are not legally required to be lit may nevertheless need direct lighting in order to be seen at night. It should be noted that the ageing process means that older drivers require progressively more light to maintain reading performance. Dimmer signs therefore take longer to recognise and read, reducing the time available for drivers to take appropriate action.

11.1.2. Where internal or external lighting is to be provided, designers should consider the level and uniformity of luminance across the whole sign face. This is particularly important in locations with high ambient light levels such as town centres where an unlit sign might blend into the background and not be seen by road users.

11.1.3. It is essential to ensure that external lighting units do not obscure the sign face at any point within the reading envelope (see **Figure 11-1**). Care should be taken to avoid light spill from the traffic sign luminaire adversely affecting drivers in opposing traffic streams. This extends from the visibility distance to the cut-off point where the angle between the line of sight to the sign and either the line straight ahead (for verge-mounted signs – see Appendix D in Chapter 7), or the horizontal line (for gantry mounted signs) reaches 10° (see **Figure 11-2**). This can be overcome by the use of grey blanking screens.

Figure 11-1 Sign obscured by lighting unit

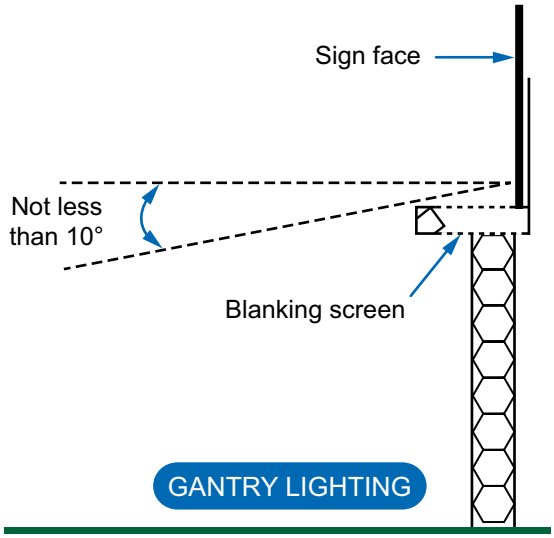

Figure 11-2 Use of blanking screens

11.2 Legislation

11.2.1. Traffic signs must be illuminated in accordance with regulation 8, which also introduces specific illumination requirements set out in individual Schedules.

11.2.2. Regulation 8 introduces the default requirement for upright signs to be illuminated throughout the hours of darkness by internal or external lighting or be reflectorised. This applies to all traffic signs unless other requirements are specified elsewhere in the Schedules. Therefore, when assessing the applicable regulations and directions for any given sign, if illumination requirements are not specified, then the default position applies.

11.2.3. The categories of signs listed below must be illuminated throughout the hours of darkness by internal or external lighting when placed within a street lit area:

- warning and regulatory signs for railway and tramway level crossings
- height restrictions and warnings at low bridges or structures
- warning of requirement to “Stop” or “Give Way” ahead (diagram 501)
- speed limit terminal signs on trunk or principal roads
- regulatory signs including “stop”, “give way”, “no entry”, compulsory / banned manoeuvres, vehicle restrictions (including for low and narrow bridges) and terminal signs indicating vehicle restrictions or bus / tram only”
- motorway entry, exit and cantilever / gantry-mounted signs

11.2.4. There are relaxations on lighting signs within 20 mph speed limits or zones and those mounted on self-righting bollards.

11.2.5. Where a sign is required to be illuminated by internal or external lighting, a means of lighting should be provided specifically to illuminate it. That light source could be mounted on the same structure, or be a remote source, such as a spot light, dedicated to the sign in question.

11.2.6. It should be noted that traffic authorities may provide lighting for any sign if they consider that some or all categories of road users need the sign to be lit. Notwithstanding the obvious financial and environmental benefits of removing sign lighting, it is recommended that robust risk analysis should underpin any decision to do so on a case-by-case basis where appropriate.

11.2.7. Where lighting of a traffic sign is optional, site checks should be made during the hours of darkness to ensure that adequate visibility standards are achieved. If reflectorisation does not produce satisfactory performance (including for drivers of HGVs), the sign should be lit. In deciding whether to rely on reflectorisation alone, the following factors should be taken into account. Some of these factors can reduce the amount of light from a vehicle’s headlamps which falls on a sign and is reflected back to the driver, or otherwise seriously compromise the effectiveness of retroreflectivity and hence the sign’s conspicuity or legibility:

- ambient light levels
- location
- sign complexity and amount of information that can be assimilated
- turning angles
- junction layouts
- one-way traffic conditions
- sign mounting height
- signs mounted on the off side of the carriageway
- proportion of heavy goods vehicles and relevance of the sign to them.

11.2.8. The default illumination requirement (see **11.2.2**) applies to any traffic sign within a 20 mph limit or a 20 mph zone. These need not have internal or external lighting, but must be reflectorised. For clarity, this relaxation does not apply to speed limit terminal signs placed at the boundary between a 20 mph speed limit and another speed limit on trunk or principal roads, which must still be lit. Height restriction signs mounted on a bridge or other structure must also be lit.

11.2.9. Where a sign needs to be lit, but street lighting is turned off during part of the hours of darkness, the sign must also be reflectorised unless the sign remains fully lit when the street lights are extinguished.

11.2.10. On unlit roads, reflectorisation generally produces an adequate level of sign luminance from a vehicle's headlamps. In areas of street lighting, however, much higher levels of luminance are required to ensure that signs are always sufficiently conspicuous. Retroreflective materials cannot guarantee luminance levels comparable to those provided by designated lighting in all locations. High performance microprismatic materials achieve high luminance for many drivers in defined situations, but not for all drivers in all circumstances.

11.2.11. When signs are reflectorised, all parts of the sign face not coloured black must be reflectorised (regulation 8). Partial reflectorisation is unlawful, as is partial lighting. Special requirements apply to the carriageway edge warning signs to diagram 560 (S262) which must only be reflectorised.

11.3 Lighting and reflectorisation

11.3.1. Developments in sign lighting technology now mean that traffic authorities have a wide range of products from which to choose.

11.3.2. Authorities should consider whether the lighting unit can provide light from renewable sources, such as solar power. This has the added benefit of reducing works associated with the provision of an electrical connection, and the financial burden of providing a permanently wired power connection.

11.3.3. LED light sources greatly reduce energy consumption, minimise or eliminate intrusive light spill and provide more uniform luminance. LEDs have also enabled very slim internally-illuminated signs which are no more intrusive than an unlit plate sign.

11.3.4. Low voltage systems can also greatly reduce lead-in times for new or replacement installations. These technologies should be taken into account when choosing the appropriate method of illumination, as direct lighting might still be a cost-effective option.

11.3.5. Neither the method nor the level of sign lighting is regulated. The same is true of reflectorisation. However, the UK National Annex to BS EN 12899-1 specifies different performance classes for each characteristic of traffic signs for UK practice; as well as specifying requirements in respect of light sources, lighting units and electrical equipment.

11.4 Road markings

11.4.1. Road markings fall into two categories: those which must be illuminated with retroreflecting material and those subject to provisions specified elsewhere in the Schedules. Regulation 9 and the General Directions to individual Schedules set out the detailed requirements. See Chapter 5 for further details.

11.4.2. Road markings to diagrams 1013.1 and 1013.5 (S9-6-23 & 24) must be further illuminated by means of road studs. All road studs used on the public highway must satisfy the minimum performance classes set out in direction 7. If it is of a type not covered by BS EN 1463-1:2009 (for example, a light-emitting stud) it must be approved in writing by the national authority before it is used on the highway.

12 SOURCES OF FURTHER ADVICE

12.1 General

12.1.1. The Government website www.gov.uk contains traffic signs working drawings, Traffic Advisory Leaflets, Local Transport Notes, Circulars and other advice.

12.2 Design Manual for Roads and Bridges (DMRB)

12.2.1. The DMRB provides a comprehensive manual system which accommodates current Standards, Advice Notes and other published documents. While most relate to Trunk Road works, some advice is applicable to local traffic authorities.

- TD 25 'Inspection and Maintenance of Traffic Signs on Motorway and All-purpose Trunk Roads'
- TD 26 'Inspection and Maintenance of Road Markings and Road Studs on Motorways and All-purpose Trunk Roads'
- TD 52 'Traffic Signs to Tourist Destinations and Leisure Facilities in England – Trunk Roads'
- TD 53 'Traffic Signs to Retail Destinations and Exhibition Centres in England & Wales – Trunk Roads'
- TD 54 'Design of Mini-Roundabouts'
- TD 70 'Design of Wide Single 2+1 Roads'
- TA 92 'Crossover and Changeover Design'

The DMRB was in the process of being updated at the time of publication and designers should check the latest status of these documents before use.

www.standardsforhighways.co.uk/ha/standards

12.3 Manual for Streets

12.3.1. 'Manual for Streets' and 'Manual for Streets 2' contain useful guidance on the principles of sign design and placement.

www.gov.uk/government/publications/manual-for-streets

12.4 Institute of Highway Engineers guidance

12.4.1. The Institute of Highway Engineers' 'Sign Structures Guide: Support Design for Permanent UK Traffic Signs' contains useful guidance on sign structures.

www.theihe.org/news/publications

APPENDIX A

Standard colours for traffic signs

The colours used for sign faces must conform to the chromaticity requirements specified in BS EN 12899 1:2007(a). The National Annex recommends appropriate classes for UK use. However, as an aid to comparison, the table below lists the equivalent colours from BS 381C.

Colour (from BS EN 12899-1)	Equivalent colour (from BS 381C)
White	N/A
Yellow	No 355 (Lemon)
Orange	No 557 (Light Orange)
Red	No 537 (Signal Red)
Blue	No 109 (Middle Blue)
Green (see Note)	No 225 (Light Brunswick Green)
Dark green (see Note)	No 226 (Middle Brunswick Green)
Brown	No 411 (Middle Brown)
Grey	No 693 (Aircraft Grey)
Black	N/A

NOTE: Primary route direction signs, as well as panels and patches indicating primary routes on other signs, are “dark green”, previously known as “Worboys green”. A small number of signs (e.g. Quiet Lane signs and direction signs for emergency vehicles) use “green”, which is lighter.

Standard colours for road markings

The colours white, yellow and red are prescribed for road markings.

The colours used for road markings must conform to the chromaticity requirements in BS EN 1436.

The standard colour for waiting and loading restriction road markings is No. 355 (Lemon). No. 309 (Canary) is also acceptable. However, in environmentally sensitive areas No. 310 (Primrose) or No. 353 (Deep Cream) may be used. The numbers referenced are the equivalent colours from BS 381C.

Black material for masking road markings (for example, during road works) must conform to BS 7962:2000 with Amendment No 1, dated 2004, or an equivalent EEA Standard. There is currently no European Standard for this material.

Instead of white road markings, colour-contrasting surfacing, or paving in a different pattern or appearance may now be used to distinguish parking areas from the surrounding carriageway. More advice is given in Chapter 3.

APPENDIX B

British Standards for traffic signs

- BS EN 12899 – Fixed Vertical Road Signs:
  - Part 1:2007 – Fixed signs (with National Annex)
  - Part 2:2007 – Transilluminated traffic bollards
  - Part 3:2007 – Delineator posts and retroreflectors
  - Part 4:2007 – Factory production control
  - Part 5:2007 – Initial type testing
- BS EN 13422:2004+A1:2009 – Vertical road signs. Portable deformable warning devices and delineators. Portable road traffic signs, cones and cylinders.
- BS 8442:2015 – Miscellaneous road traffic signs and devices. Requirements and test methods.

British Standards for road marking materials

- BS EN 1423:1998 – Drop on materials. Glass beads, antiskid aggregates and mixtures of the two.
- BS EN 1424:1998+A1:2003 – Premix glass beads.
- BS EN 1436:2007+A1:2008 – Road marking performance for road users.
- BS EN 1790 – Material specifications. Preformed road markings.
- BS EN 1824:1998 – Road trials.
- BS EN 1871:2000 – Physical properties.
- BS EN 12802:2000 – Laboratory methods for identification.
- BS EN 13197:2001 – Wear simulators, turntable.
- BS EN 13212:2001 – Requirements for factory production control.
- DD ENV 13459-1:1999 – Quality control. Sampling from storage and testing.
- DD ENV 13459-2:1999 – Quality control. Guidelines for preparing quality plans for materials application.
- DD ENV 13459-3:1999 – Quality control. Performance in use.
- BS 7962:2000+A1:2004 – Black materials for masking existing road markings. Specification.

Other relevant British Standards

- BS EN 40-3 – Lighting columns. Design and verification (and PD 6547:2004+A1:2009 – Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3).
- BS EN 1991-1-1-4:2005 – Eurocode 1. Actions on structures. General actions. Wind actions. (and National Annex in a separate volume.)
- BS EN 12352:2006 – Traffic control equipment. Warning and safety light devices (with National Annex)
- BS EN 1463-1:2009 – Road marking materials. Retroreflecting road studs. Initial performance requirements.
- BS EN 1463-2:2000 – Road marking materials. Retroreflecting road studs. Road test performance specifications.

- BS EN 12767:2007 – Passive safety of support structures for road equipment. Requirements, classification and test methods.
- BS 1376:1974 – Specifications for colours of light signals.
- BS 381C:1996 – Specification for colours for identification, coding and special purposes.

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