

Introduction

The Staffordshire Authorities Residential Design Guide (RDG) produced in the year 2000 sets out broad principles in respect of design process and design layout. It extols many of the principles advocated in the Manual for Streets (MfS) and accordingly, in the short term, it is not the intention to change the Staffordshire Authorities Design Guide produced in 2000. It has been necessary to amend the technical appendices, however, produced in the year 2000, for various reasons, and a new set of technical appendices are now available on this web site.

The purpose of this particular Appendix A is to provide advice/clarity on issues raised in MfS and how these are to be dealt with in Staffordshire.

Advice/Clarity on Technical Design Issues

For advice about the following issues please refer to the MfS only:

- **Public transport;**
- **Footways and cycleways;**
- **Car Parking;**
- **Traffic signs and markings**
- **Street furniture**

For advice about Road Lighting in Staffordshire please refer to Technical Appendix B.

For advice about the following issues please refer to both the MfS and the RDG but also note the supplementary advice below:

- **Speed limit zone signs**
- **Speed control**
- **Visibility;**
- **Turning heads;**
- **Junction Radii for Priority Junctions**
- **Vertical alignment**

Speed Limit Zone Signs

All new residential developments containing a road system which measures more than 100 metres from the entrance to the development to the furthest extremity of the road system are to constitute, or form part of a 30 kph (20 mph) zone and will require the support of a Traffic Regulation Order which shall be secured by Staffordshire County Council. The cost of this shall be at the developer's expense and secured through the S38 Agreement.

Where speed restraint measures are to be used in 30 kph (20 mph) zones it should be noted that they do not require warning signs within the zone. Signs in accordance with the Traffic Advisory Leaflet published by the Dept. of Transport and an entrance Gateway are, however, required to indicate to drivers that they are entering a zone.

Speed Control

Vehicle speeds within new developments should normally be controlled via a three-dimensional approach to the design of both residential roads and buildings and not normally by using traffic-calming features (particularly vertical features such as humps).



To achieve effective speed restraint on residential roads the following should be avoided:

- long straights;
- shallow bends
- greater safe stopping distances and visibility sight lines at junctions than is necessary.

Where there are valid reasons why vehicle speeds cannot be controlled through site layout it may be necessary to consider physical traffic calming measures. Although they should always be used as a last resort, horizontal measures are preferable to vertical measures in new residential contexts. Vertical measures are inclined to result in additional maintenance attention and as such vertical speed control will require a commuted sum payment to cover future maintenance.

Where vertical or horizontal traffic calming measures are provided they should normally be in accordance with advice contained in the Traffic Advisory Leaflets published by the Department of Transport.

Particular care needs to be taken when choosing any type of traffic-calming measure on a proposed bus route. Furthermore, particular care is also required on key routes that are used or are likely to be used by the emergency services.

While certain types of traffic calming (particularly vertical measures such as road humps) can have potential road safety benefits, they can also adversely affect the response times of emergency vehicles. Where traffic calming is proposed on a key route, developers are advised to consult the emergency services at a very early stage.

Form and Spacing of Speed Restraint by Road Type

The form and spacing of speed restraint measures should reflect appropriate 'movement' and 'place making' objectives.

Visibility

The MfS document recommends a lesser stopping sight distance (SSD) and major road visibility distance ('Y' distance) than the Design Manual for Roads and Bridges (DMRB). This is based on a review of research undertaken in respect of driver perception-reaction time and use of a more appropriate deceleration rate.

For the purpose of determining appropriate SSD or 'Y' distance criteria either on new or existing streets consideration needs to be given to the prevailing conditions relating to:

- 85th percentile speeds;
- driver-perception-reaction time;
- deceleration rate.

The basic formula for calculating SSD's and 'Y' distances is as shown in table 7.5.3 of MfS.

It is important to consider the effects of these variables as to do otherwise may lead to greater distances than are necessary which can:

- cause safety problems. Research indicates that greater than necessary SSD's and 'Y' distances can increase the incidence of accidents;
- sterilise land from development;
- work against urban design objectives;
- prove to be costly to implement.



The variables that make up the SSD calculation are considered in more detail below.

Speed

As a general rule where the major road to which the access is to be formed is subject to an 85th percentile wet weather speed of more than 60 km/h (37 mph) the recommended SSD's in the Design Manual for Roads and Bridges may be more appropriate although see the note below relating to 'Deceleration Rate'.

Where 85th percentile wet weather speeds are less than 60km/h then the guidance relating to SSD's and 'Y' distances in MfS is generally more applicable but see the advice under 'Driver Perception-Reaction' and 'Deceleration Rate' below.

Speed is affected by street features. The influencing factors include carriageway width, the proximity of buildings in relation to the carriageway, carriageway edge markings, on-street parking and pedestrian activity. Indeed, some existing roads are deliberately traffic calmed by physical measures to restrain traffic speeds. Such factors should all be considered when calculating the appropriate SSD or 'Y' distance.

Driver Perception-Reaction Time

Where the built environment surrounding the road has 'side friction' (e.g. side roads, frontage access, pedestrian movement or other potential sources of hazard) within the driver's lateral vision where 85th percentile speeds are less than 60km/h (37mph) this would be more inclined to result in a 1.5 second driver perception-reaction time. In such circumstances, this should be the time incorporated into the SSD calculation.

Until more research has been undertaken the use of the 1.5 second driver reaction time shall be contained to those roads where 85th percentile speeds are less than 60km/h (37mph).

The presence of side friction is a matter of judgement and does not necessarily need to include all of the above factors. The likelihood will be that most roads within urban areas will have side friction. Some roads within urban areas, however, will have no side friction and the DMRB value of 2.0 seconds might be more appropriate in such circumstances. When considering development proposals along such roads consideration should be given to the effects this might have on increasing the driver reaction time.

Deceleration Rate

The rate of deceleration recommended in MfS can be used rather than the DMRB value which is more typically associated with snow covered roads. On this basis, a deceleration rate of 0.45g (4.41m/s squared) can be used. As deceleration rate is independent of speed this rate need not necessarily be limited to roads with speeds less than 85th percentile speeds up to 60 km/h (37mph).

For roads with 85th percentile speeds greater than 60km/h this would provide a hybrid with an SSD between MfS and DMRB.

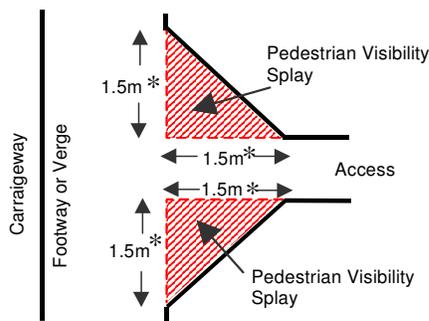
When considering the deceleration rate consideration should also be given to the gradient of the carriageway. It is recommended to make an allowance of 0.1 g + or - where gradients are in excess of 10%.



Pedestrian Visibility Splays

These are required at all egresses including private drive accesses. Sight splays are to provide 1.5 metres x 1.5 metres clear visibility at a height not exceeding 600 mm above the adjoining carriageway level. This may be achieved by:

- splaying back the building or wall abutting the entrance;
- by setting the building or wall back 1.5 metres behind the back edge of the footway;
- by widening the entrance by 1.5 metres each side.



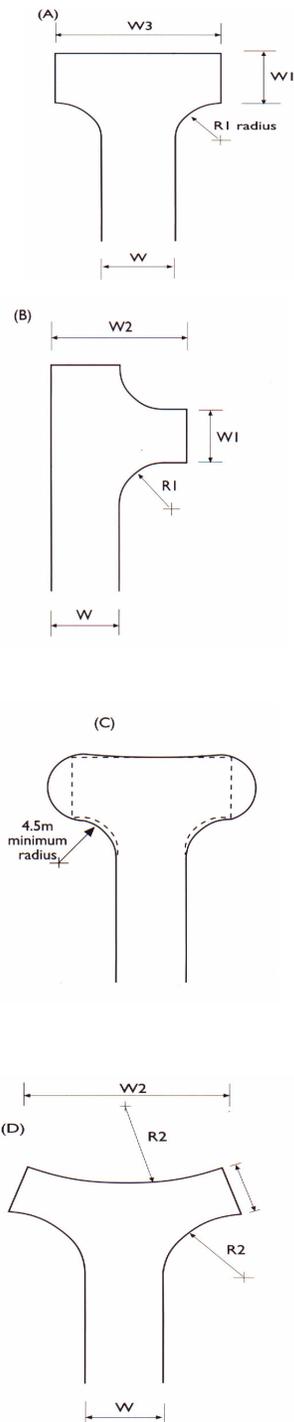
*Notes: The areas shown hatched should preferably be clear to ground level and in no case should any growth or other obstruction exceed 0.6m in height

The dimensions below are given as a guide where only conventional turning areas can be provided although if it can be demonstrated through a tracking assessment that the vehicular demands can be accommodated using a different or smaller space then these will be considered.

Turning Heads

These should be provided at the head of all cul-de-sac intended for adoption. As set out in MfS, however, it is not always necessary to use 'Y' or 'T' shaped turning heads as the turning space should relate to its environment. MfS advocates the use of different turning spaces and these are considered to be acceptable although these can in some contexts be demanding of space.





DIMENSIONS (metres)

W1	W2	W3	R1	R2
5	12	16	6	10

Junction Radii for Priority Junctions

The entry radii at priority junctions shall be a function of vehicular movement and pedestrian desire line. Large radii and tactile paving that is set back requires pedestrians to deviate from their desire line and are likely to be ineffective. The following are given as a guide although alternatives will be considered where an acceptable balance between the vehicular tracking demands at the junction and need to accommodate the pedestrian desire line has been met.

Main Rd	LDR (m)	Con (m)	Col (m)	Maj AR (m)	Min AR (m)	MAW (m0)
Side Rd						
LDR	10	-	-	-	-	-
Con	10	-	-	-	-	-
Col	10	-	10	-	-	-
Maj AR	<10	<10	<10	<6	-	-
Min AR	<10	-	<6	<6	<6	-
MAW	-	-	<6	<6	<6	<6

Vertical Alignment

The maximum gradient should be 6.7% (1 in 15). The minimum gradient should be 0.67% (1 in 150) but, where this is not practicable the advice of the highway authority should be sought.

Where Local Distributor Roads form a junction with District or Primary Distributor Roads the gradient should be 2.5% (1 in 40) for the first 15m rear of the edge of the priority road. At all other junctions, a maximum slope of 5% (1 in 20) should be maintained for at least 10m from the edge of the main carriageway.

Vertical Curves

The minimum lengths of vertical curves shall be as follows:-

Road Type	Min. Length (m)
Local Dist. Road	30
Collector Road	25
Major Access Road	20
Minor access Rd	20
Minor Access Way	15

