

DS.114

Highway visibility

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1 Introduction

1.1 Notes

- a. This standard explains requirements about visibility between road users. This often has a considerable influence on the arrangement of streets.
- b. See standard DS.900 for definitions of terms used in this design standard. Note in particular the definitions for 'should', 'will', 'may', 'level 1 departure', 'level 2 departure' and 'approving officer' as used to describe requirements.
- c. See SSDM/PR procedure PC.082 about the status of any revised version of this standard that may be issued during the active life of a project.
- d. See the SSDM webpages at www.southwark.gov.uk/ssdm for a list of frequently asked questions about the design of streets and spaces.

1.2 Discussion

- a. Providing adequate visibility between street users is important to everyone's safety. Visibility should generally be sufficient to allow road users to see potential conflicts or dangers in advance of the distance in which they will be able to break and come to a stop.
- b. Stopping distances vary with vehicle type and speed. However, research now suggests that providing excessive visibility can also introduce dangers as it may increase the speed that people drive or ride at.
- c. Common law provides that drivers should take the road as they find it and moderate their use of it to conditions. Consequently, in some instances heavily restricted visibility may be appropriate providing that it promotes caution in road users and suitable speeds and behaviours in response. Examples might be tight bends in the road that are strongly defined by enclosing buildings, so that the presence of the bend and need to slow is unmistakable. However, care must be taken to avoid concealing users (particularly small children) within areas where visibility is otherwise consistent. Examples might include visibility traps created by large items of street furniture close to the road side.

2 Requirements

2.1 Visibility at major/minor priority junctions

NOTE 1: Major/minor priority junctions are those where two roads meet - with traffic along one of these having priority over the other through the junction. T junctions are a common form. Priority may be either formal (owing introduction of giveaway road markings and traffic signs) or informal (owing to priorities implied by tight geometry or other design features). The minor road is that on which users of the carriageway should give way. The major road is that on which they have priority. Note that this does not include roundabouts or signal controlled junctions.

NOTE 2: See also standard DS.002 about providing waiting restrictions around junctions for road safety purposes. These apply irrespective of visibility requirements.

- a. A clear visibility splay that is unimpeded by any significant obstructions (see section 2.9) should be maintained at all such junctions. That splay should exist between the following points.
 - i. A point located on the minor road at a distance of (X) metres back from the edge of the major road carriageway.
 - This point is measured back from the actual or notional centre line of the minor road.
 - If a side road includes a Traffic Island in the junction mouth then the carriageway is that on the side of Island from which traffic will enter the junction space.
 - The value of (X) should be 2.4m. This may be reduced to 2.0m on 20mph streets by level 1 departure is agreed. This will general only be appropriate where traffic flows and very low.
 - ii. A point on the nearside of the major road carriageway on the approach to the junction from that direction (normally to the right of any user exiting from the minor road).
 - This should be located a distance of (Y) metres along the main road carriageway (measured along the real or notional edge of carriageway) from the notional centre line of the minor road carriageway from which the (X) distance in 'i' is taken.
 - In most instances, the edge of carriageway along the major road should be taken to be the nearside kerb edge. However, if it can be demonstrated to the satisfaction of approving officers that Build Outs or other nearby permanently occupied features will cause vehicles to move away from the edge of the kerb as they approach the junction then, subject to level 1 departure, it may be off-set into the carriageway by an agreed distance.
 - The value of (Y) should be based on the stopping sight distance. This should be 25m on 20mph streets and 43m on 30mph streets. However, see section 2.9 about the potential use of reduced stopping sight distance values.
 - iii. A point on the far-side of the main road carriageway on the approach to the junction (normally to the left of any user exiting from the minor road). This should be located
 - at a distance of (Y) metres along the main road carriageway (measured along the notional centre line of the road) from the notional centre line of the minor road carriageway from which the (X) distance in 'i' above was measured.
 - on a line drawn perpendicular to this notional centre line of the major road. Normally this will be on the real or notional centreline of the major road defining the limit of the running lane that may be used by approaching vehicles. However, if permanent or foreseeable temporary features (like parked cars) are likely to cause approaching vehicles to move out into the real or notional opposing lane when approaching the junction (or where contra flow cycle lanes exist on one way streets) then it should be drawn to the near side kerb edge of the major road carriageway (or other point

agreed with Approving Officers). Approving Officers have discretion to instruct this if they believe this will be the case.

- The value of (Y) should be based on the stopping sight distance. This should be 25m on 20mph streets and 43m on 30mph streets. However, see section 2.9 about the potential use of reduced stopping sight distance values.

Visibility within the splay defined by the above should also be checked in the vertical plane as section 2.8.

- b. On existing streets where built form limits visibility (e.g. buildings or walls tightly enclose a junction) then - to improve this – designers should consider using alternative forms of junction control and/or introducing footway Build Outs to move forward the give way line.

NOTE: See standard DS.118 for further information about footway Build Outs.

2.2 Visibility at Signalised Junctions

NOTE: See also standard DS.002 about providing waiting restrictions around junctions for road safety purposes. These apply irrespective of visibility requirements.

- a. Information will be added here in future. In the meantime, visibility requirements will be agreed on a case specific basis with approving officers prior to the commencement of Phase B *Outline Design* or (if that Phase is not being undertaken) Phase C *Detailed Design* (see note).

NOTE: See SSDM/PR procedure PC.002 for further information about Phases and Workstages.

2.3 Visibility at roundabouts

NOTE: See also standard DS.002 about providing waiting restrictions around junctions for road safety purposes. These apply irrespective of visibility requirements.

- a. Information will be added here in future. In the meantime, visibility requirements will be agreed on a case specific basis with approving officers prior to the commencement of Phase B *Outline Design* or (if that Phase is not being undertaken) Phase C *Detailed Design* (see note).

NOTE: See SSDM/PR procedure PC.002 for further information about Phases and Workstages.

2.4 Visibility at Vehicle Crossings

2.4.1 On entry to the carriageway

- a. If Vehicle Crossings are located on Classified Roads (A or B Roads) then a visibility splay as per that required for major/minor priority junctions (see section 2.1) should be provided for vehicles emerging into the carriageway at the interface with this.
- b. In circumstances other than the above, no visibility splay at this location is required. However see also
 - i. standard DS.002 about providing waiting restrictions through and in the vicinity of Vehicle Crossings. These apply irrespective of visibility requirements
 - ii. section 2.4.2 about visibility splays for at the interface between private hard standings and the Vehicle Crossing plateau for emerging vehicles

2.4.2 On entry to the Highway from private hard standings

- a. At the interface between a private hard standing and the rear limit of the Highway at a Vehicle Crossing, vehicle users emerging from the latter should be provided with a clear visibility splay in both directions that is unimpeded by any significant obstructions (see section 2.9). This is so that they can see pedestrians who may be passing along the footway. That splay should exist between the following points.
- i. A point off-set 1.5m from the real or notional limit of either edge of the private drive or hard standing positioned 2.4m back from the interface with the Highway. Separate such points should be established for each side of the private drive or hard standing
 - ii. A point located on the interface between the private hard standing or drive and Highway, offset beyond the real or notional limit of the former along this by
 - 0.6m for Vehicle Crossings leading to residential premises
 - 1.5m for Vehicle Crossings leading to commercial premises

A separate such point should be identified to each side of the crossing

Visibility within the splay defined by the above should also be checked in the vertical plane as section 2.8.

NOTE: Normally achieving the above visibility splay will mean chamfering or otherwise indenting property lines to the edge of the drive at the interface with the Highway. Low railings, planting or bollards may all be means of achieving this.

2.5 Visibility at Formal Crossings

NOTE: Designers should also see standard DS.002 about requirements for the provision of waiting restrictions at Formal Crossings for road safety purposes. These apply irrespective of visibility requirements.

2.5.1 Formal Crossings located along links (away from junctions) and on major roads at major/minor priority junctions

- a. A clear visibility splay that is unimpeded by any significant obstructions (see section 2.9) should be provided between waiting pedestrians and users of the carriageway approaching in the nearside lane. This area is defined between the following points but should include also the entire area of the carriageway to the off-side of the line formed from these.
- i. A point on the nearside approach to the crossing along the major road (normally to the right of any user waiting to cross).
 - This should be located a distance of (Y) back from the nearest edge of the blister tactile surfaced waiting area of the crossing along the edge of the carriageway
 - In most instances, the point should be off-set from the near-side edge of the carriageway by 1.0m. However, if it can be demonstrated to the satisfaction of approving officers that Build Outs or other nearby permanently occupied features in the carriageway will cause approaching vehicles to be positioned even further from the near-side kerb then, subject to level 1 departure, it may be off-set into the carriageway by an agreed distance. Approving officers also have discretion to instruct lesser distances, though they should do so only in exceptional circumstances such as where a carriageway is very narrow.
 - The value of (Y) should be
 - 25m on 20mph streets if these are not also principle roads
 - 43m on 30mph streets or 20mph streets that are also principle roads

However, see also section 2.9 about potential use of lesser values.

- ii. The entire back edge of the blister tactile waiting area of the Formal Crossing (excluding any leg).

Visibility within the splay defined by the above should also be checked in the vertical plane as section 2.8.

2.5.2 Formal Crossings to side roads at major/minor priority junctions

- a. The judgement of what represents suitable visibility is left to the discretion of designers (see note 1). However, proposals should be reviewed in light of the findings of Road Safety Audits and revised where appropriate. Normally this review will take place as part of a following Quality Audit (see note 2).

NOTE 1: A common-sense approach should be taken. Basing visibility requirements on rigid vehicular stopping sight distance values and splays is unlikely to be appropriate since users of the carriageway will typically slow to conduct their turns. They are also likely to be more prepared for the possibility that pedestrians might attempt to cross the road than in other locations. However, this depends upon good awareness of the crossing and road geometry that enforces slower speeds. Use of tight corner radii and Raised Table features to slow vehicles, and landscaping treatments that communicate the potential for crossing conflict are likely to assist with achieving this. See also standard DS.206 about maximum set-back distances from junctions for Formal Crossings.

NOTE 2: Where they have concerns about the suitability of proposals then approving officers may make the adequacy of these a Point Of Enquiry in the Audit Brief for the Road Safety Audit. See procedure PC.040 for further information about Road Safety Audits. See procedure PC.022 for further information about Quality Audits.

2.5.3 Formal Crossings forming part of a Signalised Junction

- a. See section 2.2.

2.6 Visibility at cycle access dropped kerbs (including those providing access to cycle tracks)

NOTE: Designers should also see standard DS.002 about requirements for the provision of waiting restrictions at cycle access dropped kerbs for road safety purposes. These apply irrespective of visibility requirements.

2.6.1 Those providing access to or from a Cycle Track

- a. At junctions between cycle tracks and carriageways, visibility should be provided as per the requirements for other types of road junctions in other sections of this standard. Visibility for and of pedal cycle users should be no different to that for motorised vehicles.

NOTE: Where cycle tracks run parallel to the carriageway along their edge, and exit at near parallel onto them then visibility arrangements will be agreed on a case specific basis.

2.6.2 Those providing access to Stands on a footway

- a. Where dropped kerbs are provided only to allow access to pedal cycle stands located on a footway (or a private hard standing immediately adjoining the Highway) then a clear visibility splay that is unimpeded by any significant obstructions (see section 2.9) should be provided between cyclists waiting to leave the footway via this and users of the carriageway approaching in the nearside lane. This splay is defined between the following points but should include also the entire area of the carriageway to the off-side of the line formed from these.
 - i. A point on the nearside approach to the dropped kerb along the major road (normally to the right of any user waiting to cross).

- This should be located a distance of (Y) back from the nearest edge of the dropped kerb (excluding any associated flares) crossing along the edge of the carriageway
- In most instances, the point should be off-set from the near-side edge of the carriageway by 1.0m. However, if it can be demonstrated to the satisfaction of approving officers that Build Outs or other nearby permanently occupied features in the carriageway will cause approaching vehicles to be positioned even further from the near-side kerb then, subject to level 1 departure, it may be off-set into the carriageway by an agreed distance. Approving officers also have discretion to instruct lesser distances, though they should do so only in exceptional circumstances such as where a carriageway is very narrow.
- The value of (Y) should be
 - 25m on 20mph streets
 - 43m on 30mph streets

However, see also section 2.9 about potential use of lesser values.

- ii. A point representing the position of the cyclist waiting to enter the carriageway located
 - In the centre of the length of dropped kerb
 - off-set back perpendicular from the edge of carriageway by 0.80m

2.7 General forward visibility along links

- a. Users of the carriageway should be provided with forward visibility that exceeds their stopping sight distance.
 - i. This should be established as explained in section 7.8.1 of Manual for Streets (Department for Transport, 2007).
 - ii. The off-set from the edge of carriageway taken as the viewing position of drivers or riders should be 1.5m for both motorists and pedal cyclists
 - iii. The stopping sight distance should be 25m on 20mph streets and 43m on 30mph streets. On cycle tracks, it should be 9m (this assumes a 10mph design speed). See section 2.9 about the potential use of reduced stopping sight distance values.
 - iv. Visibility should also be checked in the vertical plane as section 2.8.
- b. Where traffic signals and other important signs are provided along carriageways then forward visibility should be checked to ensure that drivers have sight of these. Particular care should be taken in checking that tree canopies do obscure visibility in the vertical plane.

2.8 Considering visibility in the vertical plane

- a. Visibility checks between (X) and (Y) points (and resulting overall splays) should also be undertaken for the vertical plane. The driver or rider's view at the (X) point should be modelled between 1.05m and 2.0m above ground. They should have clear visibility, unimpeded by significant obstructions (see section 2.8), of all areas of the splay between 0.6 and 2.0m above surface level.

2.9 Use of reduced visibility values

- a. Where referenced to this section then reduced (Y) values may be used by level 1 departure. This may be justified either by

- i. reduced vehicle speeds and consequent reduced stopping sight distances. Distances should then be calculated in accordance with methodology explained in section 10.1 of Manual for Streets II (Chartered Institute of Highways and Transportation, 2010) having corrected for bonnet length and deceleration rate.
- ii. other features that give confidence that street users will proceed with sufficient caution and awareness of the potential for incidents such that the arrangement would operate safely.

Where approving officers are satisfied that such a reduction might be reasonable then level 1 departure should be given first In Principal Only. This must be provided in advance of issuing information for any Road Safety Audit (if one is required within that Phase). The acceptability of stopping sight distances should be made a Point Of Enquiry in the Audit Brief. Final Confirmation of the level 1 departure should be subject to consideration of the Audit Report findings. This will normally take place within a following Quality Audit (see note).

NOTE: See SSDM/PR procedure PC.040 for further information about Road Safety Audits and procedure PC.022 for information about Quality Audits.

2.10 Significant obstructions within visibility splays

- a. Items that significantly obstruct visibility and which therefore should not be located within visibility splays include
 - i. walls that are $\geq 0.6\text{m}$ in height
 - ii. motor vehicles parked at the road side
 - iii. bus cages (since unless level 1 departure is agreed it should be assumed that they are permanently occupied by buses)
 - iv. trees trunks (or tree guards) with a mature stem diameter $\geq 0.45\text{m}$ at heights between 0.6m and 2.0m above ground level (see note)
 - v. tree canopies
 - vi. litter bins higher 0.6m and wider than 0.45m
 - vii. seating with back rests
 - viii. utility or signal control cabinets that are higher than 0.6m and wider than 0.45m
 - ix. phone kiosks
 - x. bus shelters
 - xi. advertisement boards
 - xii. any other structure that is higher than 0.6m and wider than 0.45 is not sufficiently visually permeable

NOTE: Trees will not achieve their mature diameter for several decades until after planting out. The stem diameter at planting will always be much narrower than this. It is therefore important that designers are aware of the mature stem diameter that existing or proposed trees will ultimately achieve. Approximate values for approved trees can be found in the SSDM/SER/Tree palette. Where it is permitted to use non-approved trees or these are encountered then values will be advised by approving officers on a case specific basis.

- b. Existing trees with diameters $\geq 0.45\text{m}$ (as 'a.v') should not be removed where they pose an obstruction to visibility. Instead
 - i. junctions should instead to be remodelled so that the trunk is no longer located in the visibility splay; and/or

- ii. other physical measures should be taken to reduce the risk of conflict (e.g. changing the type of junction control or reducing vehicle speeds such that the necessary stopping sight distance can be reduced).
- c. Proposals to locate pedal cycle stands within visibility splays will be considered on a case specific basis. Individual stands located at reasonable distances from one another are unlikely to be considered obstructions - particularly if they are angled with awareness of visual permeability. However, dense groupings of stands within the line of visibility are unlikely to be acceptable since – once occupied with cycles – they are together likely to obscure views.

NOTE: Where approving officers are uncertain whether or not proposals are likely to be acceptable then this should be made a Point Of Enquiry within a Road Safety Audit. The final decision whether or not to permit this should then be taken following consideration of the RSA Audit Report findings. Normally these will be considered in a following Quality Audit. See SSDM/PR procedure PC.040 for further information about Road Safety Audits and procedure PC.022 for information about Quality Audits.