Module 2 Revision:1

Street Geometry

The guidance given below relates to new residential roads being offered for adoption under s38 and minor adjustments to existing highways under s278.

Residential roads should be designed in accordance with the principles of the latest version of Manual for Streets. The geometry of streets should be designed to use self-enforcing speeds suitable for safe residential developments.

Carriageway Geometry

Highway Aspect	Requirement
Carriageway Width	Carriageway widths should follow the guidance given in Module 1 Street Hierarchy • Local Distributor Road ≤ 400 dwellings 7.3 m • Access Road Collector ≤ 300 dwellings 6.75m • Access Road Collector ≤ 200 dwellings 6.75m - relaxed to 5.5m where no bus access is required. • Access Road ≤ 50 dwellings 5.5m • Access Way ≤ 20 dwellings 5m
Carriageway Gradient	Maximum 1:20 unless site constraints preclude this then BCC will consider 1:12 for short distances (circa 10m) on Minor Streets Minimum 1:100 (1:80 for block paving) At junctions, the minor arm should not exceed 1:25 for the first 15m
Carriageway Crossfall	1:40
Horizontal Curvature (Minimum)	• Local Distributor Road ≤ 400 dwellings 90 m • Access Road Collector ≤ 300 dwellings 35-40m • Access Road ≤ 50 dwellings 20-25m • Access Way ≤ 20 dwellings 20-25m

Highway Aspect	Requirement
Vertical Curvature	Maximum 900m radius. Minimum 200m radius. The minimum length of curve should be 25m.
Vertical Features	Where ramps are required to denote shared space, the change in carriageway level should be no more than 100mm (75mm on bus routes) and ramp gradients no steeper than 1:15. Ramps should be formed from bituminous construction or speed check kerbs.
Turning Heads	To be determined by swept path analysis and min dimensions stated below – refer Figure 2a
Private Drives	Max gradient 1:20

Table 2.1 Carriageway Geometry

Footway Geometry

Highway Aspect	Requirement
Footway Width	Min 2m (4m within city centre where possible). Where street furniture e.g. bus stops restrict the footway width, the footway is to be widened to maintain the clear footway width.
Footway Gradient	Maximum 1:20 unless site constraints preclude this then BCC will consider 1:12 for short distances on Minor Streets – Reference Document BS8300-1
Footway Crossfall	1:40

Table 2.2 Footway Geometry

Verge Geometry

Highway Aspect	Acceptable Material	Requirement
Verge with Services/utilities	Macadam, Blockwork, Soft landscaping (excluding shrub and trees)	Min 2m
Verge with street lights, signs and other street furniture	Macadam, Blockwork, Soft landscaping (excluding shrub and trees)	Min 1.2m

Highway Aspect	Acceptable Material	Requirement
Verge without any street lights, signs and other street furniture or services	Macadam and Blockwork	Min 0.475m

Table 2.3 Verge Geometry

Widening at Bends

Widening on the inside of bends may be required along local distributors and access road collectors serving more than 25 dwellings in accordance with Table 4a, and should be discussed with the Engineer.

Centre Line Radius (m)	20	30	40	50	60	80
Mi. Widening (m)	0.60	0.40	0.35	0.25	0.20	0.15

Table 2.3 Carriageway Widening at Bends Geometry

Junctions

Intervisibility at junctions is critical for safety. Reference is to be made to the latest version of Manual for Streets for the visibility distances required. The vertical deflection of the carriageway must be taken into account as well as the horizontal geometry. In urban areas uncontrolled parking, street furniture and planting can all impact on junction visibility. Clear visibility must be provided for safe operation of the junction.

The separation of junctions to allow clear priority of vehicle movements and space for safe manoeuvring is also important. Junctions are to adequately separated as a minimum below

Type of Road		Spacing	
Road 1	Road 2	Opposite (m)	Adjacent (m)
Local Distributor Bus Route or Existing Classified Road	All other Roads	40	90
Access Collector Road	Access Road	20	40
Access Collector Road	Access Way or Mews Court	20	40
Access Road	Access Road	20	40
Access Road	Access Way or Mews Court	15	25

Table 2.4 Separation of Junctions

All junctions with the existing highway network will require radii to ensure that refuse vehicles can turn into the Streets (Collector Street, Main Street, Access Street, Minor Street) without conflicting with vehicles turning out of minor road. For all Streets, an entering refuse vehicle will be permitted to overrun the minor road centre line due to the low frequency of large vehicles entering and expected low vehicle speed.

The first 15m of all minor roads should have a maximum gradient of 1:25 to allow for safe operation of the junction.

Turning Heads

A turning area shall be provided at the end of each cul-de-sac. Examples shown in Figure 2a below are the preferred shapes for turning areas, with the minimum dimensions. As a minimum it should cater for a standard BCC refuse vehicle. All vehicles should be able to turn around in three manoeuvres and provide an area that will be easily maintained by a mechanical sweeper.

Turning areas should be in accordance with the (now superseded) 1:200 diagrams in Appendix 1 of Design Bulletin 32: 2nd Edition "Residential Roads and Footpaths", published by The Stationery Office.

These diagrams may be used for constructing the areas required for turning facilities based upon the largest type of vehicle likely to use the facility on a regular basis which will normally be a refuse collection vehicle.

Developers may wish to use an amorphous outline to the turning area provided the minimum turning area is contained within the shape. Care should be taken in avoiding the creation of sufficiently large areas which may encourage private car users to attempt a single U-turn manoeuvre or which would result in wasteful unused areas of carriageway.

Turning areas may be extended to a maximum of 25 metres beyond the tangent point of the radius kerb.

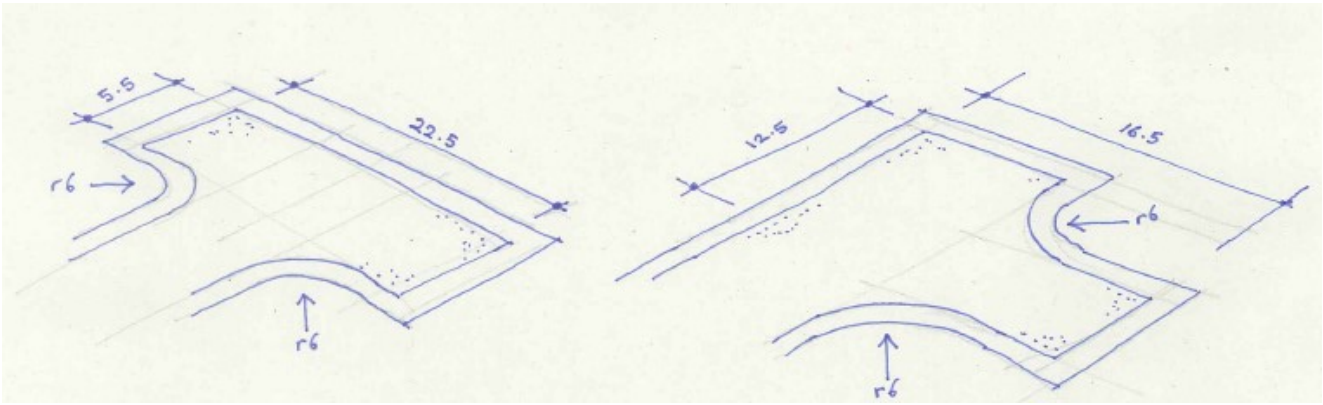


Figure 2a Turning Head - Typical Dimensions

Junction and Forward Visibility

Visibility splays are to be in accordance with the latest edition of Manual for Streets.

Nothing greater than 500-600mm in height should be permanently situated within visibility splays at road junctions. Planting of trees, shrubs etc. or other landscaping works may be permitted after consultation with the Engineer and subject to appropriate legal agreement for their maintenance.

Visibility splays are to be kept clear of obstructions including bus stop shelters and parked vehicles. Where parking bays block intended visibility splays, the parking bay is to be relocated or removed. A Traffic Regulation Order may be required to alter the parking arrangement. Paid parking bays that are extinguished will attract a compensation cost to Birmingham City Council. Where Bus stops need to be relocated the Developer is to liaise directly with Transport for West Midlands regarding the acceptability of the relocation.

Unobstructed forward visibility distances will be required on bends and should be measured between points 500-600mm above road level on a line parallel to the inside kerb 1.5 metres into the carriageway. Visibility should be related to traffic speed and stopping distances and a visibility curve can be constructed using stopping distances given in Table 2.4.

	Residential Road						Distributor Road	
Speed mph	5	10	15	20	25	30	35	40
Stopping Distance (m) adjusted for bonnet length	6	11	17	25	33	43	As DMRB	

Table 2.4 Typical Speed and Stopping Distances

Refuse Collection

Bin storage areas should be no further than 25 metres away from where a Refuse Collection Vehicle (RCV) can gain access.

The vehicle movement network should be designed to avoid the need to reverse, however where not possible, a RCV should not be expected to reverse a distance more than 12m.

The storage of waste bins on the public highway is not permitted and adequate provision for their storage must be made off the public highway. Waste collection points need careful consideration and planning so that they're accessible to a RCVs.

Bin presentation points need to be hardstanding (preferably porous) and easily cleanable.

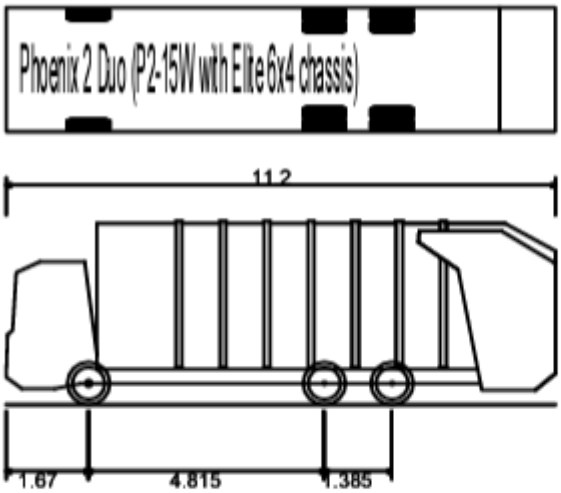
Where refuse collection points/bin stores are located, a dropped kerb is to be provided to facilitate the loading of the bins. The collection point should be located within 10m of the vehicle collection point.

Waste collection vehicles will not normally collect from private streets. Therefore, refuse collection points need to be located adjacent to the private site entrance.

Adoptable Highways should be designed to accommodate a refuse collection vehicle (RCV) with the following dimensions:

- Length = 11.2 metres
- Width = 2.53 metres
- Height = 3.751 metres
- Track width = 2.5m
- Turning circle (between kerbs) = 9.50 metres
- Lock to lock time = 4 secs

i.e. Pheonix Duo 2 (P2-15W with Elite 6x4 chassis)



Phoenix 2 Duo (P2-15W with Elite 6x4 chassis)	
Overall Length	11.200m
Overall Width	2.530m
Overall Body Height	3.751m
Min Body Ground Clearance	0.304m
Track Width	2.500m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	9.500m

Emergency Access

Where an emergency vehicle access is provided, it must not be presumed it will be for adoption and it must be laid out so that:

1. An alternative vehicle approach to the cul-de-sac is provided for the exclusive use of emergency vehicles. A suitable means of preventing the use by other vehicles must be provided at the time of construction.
2. The clear height (4 metres minimum) the width (3 metres minimum) and construction (Access Road Specification) is sufficient to allow the free passage of fire appliances
3. Neither end is likely to be obstructed by parked vehicles.

An emergency vehicle access may incorporate a pedestrian route but must not be used by statutory undertakers to accommodate underground services or public services.

A cul-de-sac may exceed 180 metres without a dedicated emergency access, provided that:

1) The carriageway width is increased to 7.3 metres for that length of carriageway longer than 180 metres. The reduction in width should then occur at a junction, **OR**
2) Written evidence is obtained by the developer from the emergency services stating that they do not require an emergency access.