

DESIGN AUDIT

REFERENCE DOCUMENT: DMRB CD 123 'Geometric design of at-grade priority and signal-controlled junctions'

PROJECT: A29 Lidsey Road, Woodgate – New priority access junction with A29 Lidsey Road including associated pedestrian crossing and cycle access.

DATE: 8th December 2021

DRAWINGS:

- HTp/2087/31/A – Proposed Site Access Arrangements
- HTp/2087/TR02/A – Refuse Collection Vehicle Site Access Swept Path Analysis
- HTp/2087/TR04 – 16.5M Articulated Vehicle Site Access Swept Path Analysis

CD123 'Geometric design of at-grade priority and signal-controlled junctions'

Section	Design Guide Reference	Summary	Provision	Commentary
Introduction	-	Background information.	-	Noted.
1 – Scope	-	Background information.	-	Noted.
2 – Junction selection	2.1	Priority junctions shall not be used on motorways or all-purpose dual three lane carriageways.	The proposed priority junction is not located on a motorway or a dual three lane carriageway.	The design accords with this clause.
	2.1.1	Priority junctions should not be located on a sharp curve on a major road.	The proposed priority junction is not located on a sharp curve on a major road.	The design accords with this clause.
	2.1.2	Priority junctions should only be located on level ground or where any approach that is on a downhill gradient does not exceed 2% over the applicable desirable minimum stopping sight distance (SSD).	The A29 past the site is level. The site access approach will be engineered to not exceed 2% – this will be demonstrated at the detailed design stage.	The design accords with this clause.
	2.1.3	The number of priority junctions providing access to the all-purpose trunk roads should be minimised.	The A29 (major road) is not a trunk road.	The design accords with this clause.
	2.2	Priority junctions that do not form a through route shall not be provided on overtaking sections.	The A29 past the site access is not an overtaking section.	The design accords with this clause.
	2.3	Simple priority junctions shall only be used on single-carriageway roads without a climbing lane.	The proposed junction is not a simple priority junction, nor is it located on a single carriageway road with a climbing lane.	The design accords with this clause.

	2.3.1	The selection of priority junction and major road central treatment for single carriageway roads should be determined based on the standard of major road and traffic flows on both the major and minor roads. Figure 2.3.1 illustrates approximate levels of provision for varying traffic flows. Figure 2.3.1 Approximate priority junction provision on single carriageway roads based on flows only	The A29 (major road) AADT flows are surveyed as being around 13,500 vehicles. The two way movements accessing the site (minor road) have been calculated to be around 459 vehicles daily. A ghost island junction is therefore appropriate to facilitate the number of vehicle movements expected at the proposed junction.	The design accords with this clause.
	2.3.2	At junctions where there are high seasonal variations, or short intense peaks in the traffic flows, then the appropriate seasonal or peak flows should be used.	The A29 past the site access does not exhibit short intense peaks and it is not expected to be subject to high seasonal variance.	The design accords with this clause.
	2.4	New priority junctions shall not be sited where they encroach on the visibility requirements of adjacent priority junctions on major roads with: 1) a speed limit of greater than 40 mph; or, 2) a speed limit of 40 mph or less, where the minor road forms part of a through route.	The speed limit of the A29 past the site is 50 miles per hour. The only existing access which would potentially be impacted by the proposed access is the private access 55 metres to the north serving Woodgate House and the fields to the west. This junction is understandably very lightly trafficked with no movements observed during site visits. Based on the topographical survey, the visibility splay to the south of the Woodgate House access is up to 2.4 x 100 metres. With the proposed development in place, the available visibility to the south will continue to be approximately 2.4 x 100 metres. The PICADY modelling within the Transport Assessments identifies that during the busiest hour the mean maximum queue at the minor arm of the proposed site access will be just 0.1 vehicles during the busiest period peak (i.e. the give way line will be vacant the vast majority of the time). Therefore, given that queueing traffic at either junction will be infrequent, it will be a very rare event that intervisibility is impacted. Relocating the proposed access south out of the visibility would result in a junction around 20-25 metres to the north of the BEW roundabout which would impact on the deliverability of the junction and associated wider residential development and rerouting of the A29.	A Departure from Standards 2087/DfS/01 has been prepared in relation to this clause.

	2.5 – 2.9	Clauses regarding WS2+1 roads which are not applicable to the proposed junction.	N/A.	N/A.
	2.10 – 2.11	Clauses regarding dual carriageways which are not applicable to the proposed junction.	N/A.	N/A.
	2.12	Priority junctions shall include a major road central treatment when the minor road flow exceeds 300 vehicles 2-way annual average daily traffic (AADT), or the major road flow exceeds 13,000 vehicles 2-way AADT.	The major road flows exceed 13,000 vehicles 2-way AADT and the minor road flows exceed 300 vehicles 2-way AADT. A major road central treatment of a ghost island is proposed and considered appropriate.	The design accords with this clause.
	2.13	Ghost islands shall not be used where overtaking opportunities on adjacent links are restricted.	The proposed site access is located on a stretch of A29 with no restrictions on overtaking to the north and south.	The design accords with this clause.
	2.13.1	On new single carriageways where overtaking opportunity is limited, ghost island junctions should be sited on non-overtaking sections.	The major road is not a new single carriageway.	The design accords with this clause.
	2.14	Ghost islands shall only be used where major road traffic flows allow traffic turning right out of the minor road to do so in one manoeuvre.	The major road traffic flows are suitable to allow vehicles to turn right out of the minor arm in one manoeuvre.	The design accords with this clause.
	2.14.1	On urban roads with a speed limit of 30 mph or less, where a ghost island cannot be accommodated, a passing bay as illustrated in Figure 2.14.1 may be used.	The major road past the site is not an urban road with a speed limit of 30mph or less.	The design accords with this clause.
	2.15 – 2.18.2	Clauses regarding single lane dualling central treatment which are not applicable to the proposed junction.	N/A.	N/A.
	2.19 – 2.19.1	Clauses regarding movements at single lane dualling and dual carriageway priority junctions which are not applicable to the proposed junction.	N/A.	N/A.
	2.20 – 2.21	Clauses regarding crossroads which are not applicable to the proposed junction.	N/A.	N/A.
	2.22 – 2.26	Clauses regarding staggered junctions which are not applicable to the proposed junction.	N/A.	N/A.
	2.27	Where the 85th percentile speed on the approach roads is greater than or equal to 104 kph (65 mph), a signal-controlled junction shall not be provided.	A signal controlled junction is not proposed. The speed restriction along the road is 50mph and based on observations compliance is good. It is therefore concluded that 85th percentile speed on the approach roads are very likely to be less than 65mph (104 kph).	The design accords with this clause.
	2.28 – 2.31	Clauses regarding direct accesses which are not applicable to the proposed junction.	N/A.	N/A.
3 – Visibility	3.1	On a minor road approach to a priority junction, there shall be unobstructed visibility of the junction from a distance corresponding to the desirable minimum SSD for the design speed of the minor road, including the 'give way' sign where present, as illustrated in Figure 3.1.	Noted.	-
	3.2	An approaching road user shall be able to clearly see the junction form from a minimum distance of 15 metres back along the centreline of the minor road, measured from the continuation of the line of the nearside edge of the running carriageway of the major road (as illustrated in Figure 3.2a and 3.2b).	The junction form is appropriate for an approaching road user to see the junction form from at least 15 metres back along the centreline of the minor road measured in accordance with the clause.	The design accords with this clause.
	3.3	Where a direct access crosses a footway, a visibility splay shall be provided in accordance with Figure 3.3.	The proposed junction is not a direct access.	N/A.

	3.4	Unobstructed visibility shall be provided at all priority junctions and direct accesses by a visibility splay formed between the following three points, as illustrated in Figure 3.4: 1) a point W corresponding to the intersection point between the minor road centreline and the major road edge of carriageway; 2) a point X setback along the minor road centreline measured from the continuation of the line of the nearside edge of the running carriageway of the major road; and, 3) a point Y on the major road nearside edge of carriageway, corresponding to the desirable minimum SSD for the speed of the major road measured along the edge of the major road carriageway from point W.	Visibility splays of 2.4 x 160 metres can be achieved at the site access which is commensurate with the junction form and speed restriction along this section of the A29.	The design accords with this clause.
	3.5	The speed of the major road for determining point Y in the visibility splay shall be based on: 1) design speed only for direct accesses and priority junctions on new major roads; 2) design speed only for priority junctions that form part of a through route on existing major roads; and, 3) design speed or speed measurement for direct accesses and priority junctions that do not form part of a through route on existing major roads.	Noted. The design speed has been based on the speed restriction and the minor arm will not form part of a through route for motor vehicles.	The design accords with this clause.
	3.6	A visibility splay to the right on the minor road shall be provided: 1) at all priority junctions and direct accesses where minor road traffic can join a 2-way major road; and, 2) at all priority junctions and direct accesses where minor road traffic can turn left to join a 1-way major road.	A visibility splay to the right on the minor road has been provided.	The design accords with this clause.
	3.6.1	Visibility splays to the right on the minor road should also be provided at priority junctions and direct access where minor road traffic can turn right to join a 1-way major road and there are contraflow provisions (e.g. for cyclists).	The major road is not one-way.	This clause is not applicable to the proposed junction.
	3.7	A visibility splay to the left on the minor road shall be provided: 1) at all priority junctions and direct accesses where minor road traffic join a 2-way single carriageway major road; 2) at all priority junctions and direct accesses where minor road traffic can turn right to join a 2-way dual-carriageway road and the central reserve gap is not wide enough to accommodate a waiting design vehicle; and, 3) at priority junctions and direct accesses where minor road traffic can turn right to join a 1-way major road.	A visibility splay to the left on the minor road has been provided.	The design accords with this clause.
	3.7.1	Visibility splays to the left on a 1-way road should also be provided at priority junctions and direct access where minor road traffic can turn left to join a 1-way major road and there are contraflow provisions (e.g. for cyclists).	The major road is not one-way.	This clause is not applicable to the proposed junction.
	3.7.2	On a 1-way major road, visibility splays may be provided in both directions for vehicles turning out of the minor road.	The major road is not one-way.	This clause is not applicable to the proposed junction.

	3.8	The minimum distance used to locate point X shall satisfy one of the following: 1) for direct access: a) 4.5 metres; or, b) 2.0 metres. 2) for simple priority junctions: a) 9.0 metres; or, b) 2.4 metres. 3) for all other priority junctions: a) 9.0 metres; or, b) 4.5 metres.	Noted.	-
	3.8.1 and 3.8.2	The minimum distance used to locate point X should be in accordance with a) for each junction/access type. Where it is not feasible to locate point X fully in accordance with a), the minimum distance used to locate point X should be as close to a) as practicable, but no less than b).	A visibility splay X (setback) distance of 2.4 metres is used on the visibility splay drawing HTP/2087/31. This reflects advice provided by WSCC on a similar ghost island junction with the A29 at Shripney.	The design accords with this clause.
	3.9	Where the line between points X and Y falls partially within the major road carriageway, an additional area shall be added to the visibility splay formed by drawing a line from X to a point tangential to the nearer edge of the major road running carriageway, as illustrated in Figure 3.9.	Noted – there are no such areas applicable to the site access proposals.	This clause is not applicable to the proposed junction.
	3.10	Where a priority junction/direct access is located on the outside of a major road curve, an additional area shall be added to the visibility splay in the verge on the inside of the major road curve, formed by a line between the following two points, as illustrated in Figure 3.10: 1) a point X at a set back distance of 2.4 m; and, 2) a point V on the major road offside edge of running carriageway, corresponding to the desirable minimum SSD for the speed of the major road.	The proposed priority junction is not located on the outside of a major road curve.	This clause is not applicable to the proposed junction.
	3.11	The desirable minimum SSD at all priority junctions shall not be available from an X distance greater than 9 metres.	The desirable minimum SSD at the priority junction is not available from an X distance greater than 9 metres.	The design accords with this clause.
	3.12	Unobstructed visibility shall be provided in the centre of the major road, on dual carriageway and SLD junctions where right turns are permitted, by a visibility splay formed between the following three points, as illustrated in Figure 3.12: 1) the intersection point between the centre of the opening and the offside edge of major road carriageway; 2) a point 2.4 metre setback along the centre of the opening measured from the continuation of the line of the offside edge of the running carriageway of the major road; and, 3) a point Y on the major road offside edge of carriageway, corresponding to the desirable minimum SSD for the design speed of the major road measured from the 2.4 metre setback point.	The major road is not a dual carriageway and the proposed junction is not in the form of single lane dualling.	The clause is not applicable to the proposed junction.

	3.13	Visibility splays in the central reserve of dual carriageways or SLD shall be provided in the following circumstances: 1) visibility splay A, as illustrated in Figure 3.12, where right turn into the minor road is permitted/and/or; 2) visibility splay B, as illustrated in Figure 3.12, where right turn out of the minor road is permitted.	The major road is not a dual carriageway and the proposed junction is not in the form of single lane dualling.	The clause is not applicable to the proposed junction.
4 – Geometric design of direct access	-	Section relates to direct accesses which is not applicable to the proposed site access arrangement	N/A.	N/A.
5 – Geometric design of priority junctions	5.1	The road camber on the major road shall be retained through the junction with the minor road graded into the channel line of the major road.	This can be achieved and will be demonstrated at the detailed design stage.	-
	5.2	Allowance shall be made for the swept turning paths of the worst case design vehicle which is expected to use the priority junction, unless: 1) the design vehicle is expected to form only a very small percentage of the total number of vehicles that will use the junction; and, 2) any swept path conflicts as a result of the design vehicle encroaching into other lanes will not occur on bends.	Swept path analysis drawing HTP/2087/TR02/A demonstrates that the proposed junction is capable of accommodating movements by 11.2 metre refuse collection vehicles which are the largest vehicle expected to regularly serve the site. Given the scale and nature of development, it is concluded that visits by large vehicles, including articulated vehicle, would form only a very small percentage of the total movements. From the swept path analysis drawing (ref: HTP/2087/TR04), the only encroachment into another lane is on a straight part of the minor arm.	The design accords with this clause.
	5.3	For priority junctions, the maximum gradient on the minor road approach shall satisfy one of the following over a minimum distance of 15 metres, measured from the edge of the major road carriageway: 1) 2%; or, 2) 4%.	Noted	-
	5.3.1	The maximum gradient on the minor road approach should be in accordance with 1).	Based on topographical surveys, the site is approximately the same level as the road across the highway verge, and the site rises to around 0.3 metres higher over a distance of 25 metres or so (around 1% gradient) – This will be demonstrated at the detailed design stage.	The design accords with this clause.
	5.3.2	Where it is not feasible to provide a maximum gradient on the minor road approach fully in accordance with 1), the maximum gradient should be as close to 1) as practicable, but no less than 2).	Based on topographical surveys, the site is approximately the same level as the road across the highway verge, and the site rises to around 0.3 metres higher over a distance of 25 metres or so (around 1% gradient) – This will be demonstrated at the detailed design stage.	The design accords with this clause.
	5.4	At new priority junctions, the angle of the minor road approach, measured over 15 metres from the edge of the major road carriageway, shall satisfy one of the following: 1) 90 degrees; or, 2) a minimum of 70 degrees.	Noted.	-

	5.4.1	The angle of the minor road approach should be in accordance with 1).	The approach angle of the minor road over 15 metres from the edge of the major road carriageway is 90 degrees.	The design accords with this clause.
	5.4.2	Where it is not feasible to provide the angle of the minor road approach fully in accordance with 1), the angle should be as close to 1) as practicable, but no less than 2).	The approach angle of the minor road over 15 metres from the edge of the major road carriageway is 90 degrees.	The design accords with this clause.
	5.5	At all priority junctions, corner radii shall be provided where the edge of the carriageways or kerb lines of the major and minor roads intersect at each corner where turning movements need to be accommodated.	Corner radii are provided.	The design accords with this clause.
	5.6	Corner radii shall be measured for simple priority junctions, and priority junctions with merge/diverge tapers or auxiliary lanes in accordance with Figure 5.6.	Noted.	-
	5.6.1	At simple priority junctions where no provision is to be made for the design vehicle, the minimum corner radii should be: 1) 6 metres in urban areas; and, 2) 10 metres in rural areas.	The access is not a simple junction.	This clause is not applicable to the proposed access.
	5.6.2	At simple priority junctions where provision is made for the design vehicle, the corner radii should be: 1) 10 metres in urban areas followed by a corner taper of 1:5 over a distance of 30 metres; 2) 15 metres in rural areas followed by a corner taper of 1:10 over a distance of 25 metres; and 3) 15 metres followed by a corner taper of 1:8 over a distance of 32 metres, when part of a staggered junction arrangement.	The access is not a simple junction.	This clause is not applicable to the proposed access.

	5.6.3	At ghost island junctions where no diverge or merge tapers are provided, the corner radii should be 15 metres followed by a corner taper of 1:6, over a distance of 30 metres.	Corner radii of 15.0 metres to the north south are proposed with no corner tapers.	The 15 metres corner radii and tapers are mostly for the benefit of large vehicles, especially articulated delivery vehicles. The development of 95 dwellings will generate a very small number of movements by large rigid vehicles (including refuse collection, larger delivery vehicles for items such as white goods and emergency services). A residential development is only expected to generate, at most, a very small number of articulated vehicles. The design does not accord with this clause. Swept path analysis drawings have been provided which demonstrate that a refuse collection vehicle (the largest vehicle expected to regularly serve the site) can turn at the junction convenient. Drawings have also been provided which demonstrate that it is possible for a 16.5 metre articulated vehicle to turn at the junction if required for rare occurrences. A Departure from Standard is not considered necessary as the clause is 'should'. This has been confirmed by the highway officer.
	5.6.4	At ghost island junctions, where a diverge taper/auxiliary lane is provided, the corner radii should be: 1) 15 metres followed by a corner taper of 1:6 over a distance of 30 metres at the merge; 2) a minimum of 20 metres at the end of the diverge taper/auxiliary lane where the major road design speed is 85 kph; or, 3) a minimum of 40 metres at the end of the diverge taper/auxiliary lane where the major road design speed is greater than 85 kph.	The proposed junction does not include diverge tapers.	This clause is not applicable to the proposed junction.
	5.6.5	At SLD, dual carriageway priority junctions, and where there is a mainline physical central island on a single carriageway road, the diverge corner radii should be: 1) 20 metres where no diverge taper/auxiliary lane is provided; or, 2) a minimum of 20 metres at the end of the diverge taper/auxiliary lane where the major road design speed is 85 kph; or, 3) a minimum of 40 metres at the end of the diverge taper/auxiliary lane where the major road design speed is greater than 85 kph.	The proposed junction is on neither a dual carriageway, nor single lane dualling.	This clause is not applicable to the proposed junction.

	5.6.6	At SLD, dual carriageway priority junctions, and where there is a mainline physical central island on a single carriageway road, the merge corner radii should be: 1) 20 metres where no merge taper/auxiliary lane is provided; or, 2) 25 metres where the major road design speed is 85 kph and a merge taper is provided; or, 3) 30 metres where the major road design speed is greater than 85 kph and a merge taper is provided.	The proposed junction is on neither a dual carriageway, nor single lane dualling.	This clause is not applicable to the proposed junction.																														
	5.7	Where a physical traffic island is provided on the minor road, the minor road approach lanes shall be 4.0 metres wide at the tip of the associated hatched marking.	A traffic island is not proposed on the minor road at the proposed site access junction.	The design accords with this clause.																														
	5.7.1	Where no physical traffic island is provided on the minor road, the existing minor road lane width should at least continue up until the start of the corner radius, or 'give way' line if no corner radius is to be provided.	The existing minor road does not narrow on the approach to the corner radius.	The design accords with this clause.																														
	5.8	Where a physical traffic island is provided on a minor road, the width of the minor road approach lane adjacent to the island at its furthest point from the major road (as illustrated in Figure 5.8) shall be: 1) 4.0 metres at simple priority and ghost junctions where there is a single lane at the 'give way' line; 2) 4.5 metres at SLD and dual carriageway junctions where there is a single lane at the 'give way' line; and, 3) 5.5 metres where the approach widens to two lanes at the 'give way' line.	A traffic island is not proposed on the minor road at the proposed site access junction.	The design accords with this clause.																														
	5.9	Where a physical traffic island is provided on a minor road, the width of the minor road exit lane adjacent to the island at its furthest point from the major road (as illustrated in Figure 5.8) shall be: 1) 4.0 metres at simple priority junctions; 2) 4.5 metres for ghost island junctions; and, 3) 5.0 metres for SLD and dual carriageway junctions	A traffic island is not proposed on the minor road at the proposed site access junction.	The design accords with this clause.																														
	5.10	For curves which have a radius of 90 metres or less, minimum lane widths shall be in accordance with Table 5.10. Table 5.10 Lane widening on curves of 90 metre radius or less <table><tr><th>Inside curve radius (metres)</th><th>Single lane carriageway or inside lane of two lane carriageway (metres)</th><th>Outside lane of two lane carriageway (metres)</th></tr><tr><td>10</td><td>8.4</td><td>6.5</td></tr><tr><td>15</td><td>7.1</td><td>6.0</td></tr><tr><td>20</td><td>6.2</td><td>5.6</td></tr><tr><td>25</td><td>5.7</td><td>5.2</td></tr><tr><td>30</td><td>5.3</td><td>5.0</td></tr><tr><td>40</td><td>4.7</td><td>4.6</td></tr><tr><td>50</td><td>4.4</td><td>4.3</td></tr><tr><td>75</td><td>4.0</td><td>4.0</td></tr><tr><td>90</td><td>3.8</td><td>3.8</td></tr></table>	Inside curve radius (metres)	Single lane carriageway or inside lane of two lane carriageway (metres)	Outside lane of two lane carriageway (metres)	10	8.4	6.5	15	7.1	6.0	20	6.2	5.6	25	5.7	5.2	30	5.3	5.0	40	4.7	4.6	50	4.4	4.3	75	4.0	4.0	90	3.8	3.8	The A29 passing the site has a curve radius greater than 90 metres and no additional curves are proposed.	This clause is not applicable to the proposed junction.
Inside curve radius (metres)	Single lane carriageway or inside lane of two lane carriageway (metres)	Outside lane of two lane carriageway (metres)																																
10	8.4	6.5																																
15	7.1	6.0																																
20	6.2	5.6																																
25	5.7	5.2																																
30	5.3	5.0																																
40	4.7	4.6																																
50	4.4	4.3																																
75	4.0	4.0																																
90	3.8	3.8																																
	5.11	For actual curve radii that fall between two curve radius values given in Table 5.10, the minimum lane width shall be interpolated.	Given 5.10, this is not applicable to the proposed junction.	This clause is not applicable to the proposed junction.																														

	5.12	On single-lane sections greater than 50 metres in length, there shall be sufficient carriageway space to allow a broken down vehicle to be passed by other vehicles.	Neither the A29 nor the access road will be single lane.	This clause is not applicable to the proposed junction.														
	5.12.1	For curves which have a radius of 90 metres or less, hard strips that provide an additional 2.5 metres minimum of carriageway space should be added to the single-lane carriageway widths given in column 2 of Table 5.10 to allow a broken down vehicle to be passed by other vehicles.	The A29 passing the site has a curve radius greater than 90 metres and no additional curves are proposed.	This clause is not applicable to the proposed junction.														
	5.13 – 5.16	Clauses regarding traffic islands on the minor road which are not applicable to the proposed junction.	N/A.	N/A.														
	5.17	Nearside diverging tapers and auxiliary lanes shall not be provided: 1) at simple junctions; 2) where the design speed of the major road is less than 85 kph; and/or, 3) at all other priority junctions that are on the inside of curves.	Neither nearside diverging tapers nor auxiliary lanes are proposed.	The design accords with this clause.														
	5.18 – 5.22.1	Clauses regarding diverge tapers and auxiliary lanes which are not applicable to the proposed junction.	N/A.	N/A.														
	5.23	Merging tapers shall only be used where the major road is a dual carriageway.	Merging tapers are not proposed. Notwithstanding this, the major road is not a dual carriageway.	The design accords with this clause.														
	5.24 – 5.26.1	Clauses regarding merging tapers and auxiliary lanes which are not applicable to the proposed junction.	N/A.	N/A.														
6 – Geometric design of major road central treatments	6.1	Carriageway widening for a central reserve treatment shall be formed using physical islands or islands defined by road markings.	Noted.	-														
	6.1.1	Central treatments for SLD and ghost islands, on single carriageways, should be developed to their maximum width using the tapers shown in Table 6.1.1. Table 6.1.1 Tapers for central islands on single carriageways <table><tr><th>Design speed (kph)</th><th>Taper for ghost island and SLD</th></tr><tr><td>50</td><td>1:20</td></tr><tr><td>60</td><td>1:20</td></tr><tr><td>70</td><td>1:20</td></tr><tr><td>85</td><td>1:25</td></tr><tr><td>100</td><td>1:30</td></tr><tr><td>120</td><td>-</td></tr></table>	Design speed (kph)	Taper for ghost island and SLD	50	1:20	60	1:20	70	1:20	85	1:25	100	1:30	120	-	Central treatments on the major road have been designed using a taper of 1:25 which is appropriate in accordance with a design speed of 80kph (50mph).	The design accords with this clause.
Design speed (kph)	Taper for ghost island and SLD																	
50	1:20																	
60	1:20																	
70	1:20																	
85	1:25																	
100	1:30																	
120	-																	
	6.1.2	The tapers given in Table 6.1.1 on single carriageway roads, should be developed: 1) symmetrically on straight sections of road; 2) asymmetrically towards the outside of the curve on curved sections of road; and, 3) asymmetrically away from the climbing lane on climbing lane sections.	The tapers have been developed symmetrically where the road is straight and asymmetrically towards the outside of the curve where the road is not straight.	The design accords with this clause.														
	6.1.3	For SLD, the central island should be introduced by means of hatched road markings until there is sufficient width to safely accommodate the keep left arrow traffic sign (at an appropriate size for the speed of the road) on the physical island.	The junction is not in the form of single lane dualling.	This clause is not applicable to the proposed junction.														

	6.1.4	Central treatments for dual carriageways should be developed to their maximum width using the tapers shown in Table 6.1.4. Table 6.1.4 Tapers for central islands on dual carriageways <table><tr><th>Design speed (kph)</th><th>Taper for dual carriageways</th></tr><tr><td>50</td><td>1:40</td></tr><tr><td>60</td><td>1:40</td></tr><tr><td>70</td><td>1:40</td></tr><tr><td>85</td><td>1:45</td></tr><tr><td>100</td><td>1:50</td></tr><tr><td>120</td><td>1:55</td></tr></table>	Design speed (kph)	Taper for dual carriageways	50	1:40	60	1:40	70	1:40	85	1:45	100	1:50	120	1:55	The major road at the proposed junction is not a dual carriageway.	This clause is not applicable to the proposed junction.																																															
Design speed (kph)	Taper for dual carriageways																																																																
50	1:40																																																																
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100	1:50																																																																
120	1:55																																																																
	6.1.5	The maximum island width should continue through the junction to the tangent point of the minor road radius and the edge of the major road carriageway.	The hatching is at its maximum and is maintained as a continuous width on the main road across the mouth of the minor arm.	The design accords with this clause.																																																													
	6.2	On WS2+1 roads where compact grade separation is not provided, central treatments shall be formed as shown in Figures 6.2a to 6.2f.	The major road is not in the form of WS2+1.	This clause is not applicable to the proposed junction.																																																													
	6.3	For all central treatments, the right turning lane shall be comprised of a turning length, deceleration length and direct taper length as shown in Figures 6.3a to 6.3e.	Noted.	-																																																													
	6.3.1	The deceleration lengths at left/right staggered junctions on an SLD or dual carriageway may lie side by side.	The junction is not a staggered arrangement.	This clause is not applicable to the proposed junction.																																																													
	6.4	The turning length shall be a minimum of 10 metres.	The turning length is 10 metres.	The design accords with this clause.																																																													
	6.5	Where capacity calculations indicate that for significant periods of time there can be vehicles queuing to turn right from the major road, the turning length shall be increased to accommodate the forecast maximum queue length.	Capacity calculations demonstrate that no additional queueing capacity is required.	The design accords with this clause.																																																													
	6.5.1	Where the turning length has been increased to the forecast queue length at a ghost island, physical islands should be provided within the hatched areas to provide greater protection to turning traffic.	Traffic islands are proposed to the north and south of the turning lane to provide greater protection for turning traffic.	The design accords with this clause.																																																													
	6.6	For right turning lanes, the direct taper length and the minimum deceleration length shall be provided in accordance with Table 5.22. Table 5.22 Diverge taper, auxiliary lane and right turn lane lengths for deceleration <table><tr><th rowspan="4">Design speed (kph)</th><th colspan="5">Diverge taper or auxiliary lane deceleration lengths (metres)</th><th rowspan="4">Direct taper (metres)</th></tr><tr><th colspan="2">On up gradient</th><th colspan="3">On down gradient</th></tr><tr><th rowspan="2">0 - 4 %</th><th rowspan="2">over 4%</th><th rowspan="2">0 - 4 %</th><th colspan="2">over 4%</th></tr><tr><th>Dual carriageways</th><th>Single carriageway (including ghost islands and SLD locations)</th></tr><tr><td>50</td><td>25</td><td>25</td><td>25</td><td>25</td><td>25</td><td>5</td></tr><tr><td>60</td><td>25</td><td>25</td><td>25</td><td>40</td><td>25</td><td>5</td></tr><tr><td>70</td><td>40</td><td>25</td><td>40</td><td>55</td><td>40</td><td>15</td></tr><tr><td>85</td><td>55</td><td>40</td><td>55</td><td>80</td><td>55</td><td>15</td></tr><tr><td>100</td><td>80</td><td>55</td><td>80</td><td>110</td><td>80</td><td>25</td></tr><tr><td>120</td><td>110</td><td>80</td><td>110</td><td>150</td><td>110</td><td>30</td></tr></table>	Design speed (kph)	Diverge taper or auxiliary lane deceleration lengths (metres)					Direct taper (metres)	On up gradient		On down gradient			0 - 4 %	over 4%	0 - 4 %	over 4%		Dual carriageways	Single carriageway (including ghost islands and SLD locations)	50	25	25	25	25	25	5	60	25	25	25	40	25	5	70	40	25	40	55	40	15	85	55	40	55	80	55	15	100	80	55	80	110	80	25	120	110	80	110	150	110	30	The design speed of the major road as determined by the speed restriction is 80 kph. The gradient of the major road is in the 0-4% range. Therefore the minimum deceleration distance is 55 metres and a direct taper of 15 metres should be provided. A deceleration distance of 18 metres is to be provided. It should be noted that vehicles using this deceleration length will have left a 30mph zone approximately 100 metres earlier (where the central hatching starts) and as such will be travelling much slower than the 50 mph speed restriction. A direct taper length of 15 metres is to be provided.	Departure from Standards form ref: 2087/DfS/02 has been prepared in relation to this clause.
Design speed (kph)	Diverge taper or auxiliary lane deceleration lengths (metres)					Direct taper (metres)																																																											
	On up gradient			On down gradient																																																													
	0 - 4 %	over 4%		0 - 4 %	over 4%																																																												
			Dual carriageways		Single carriageway (including ghost islands and SLD locations)																																																												
50	25	25	25	25	25	5																																																											
60	25	25	25	40	25	5																																																											
70	40	25	40	55	40	15																																																											
85	55	40	55	80	55	15																																																											
100	80	55	80	110	80	25																																																											
120	110	80	110	150	110	30																																																											

	6.6.1	The radii associated with the opening of the central reserve island for both SLD junctions (Figure 6.3d) and dual carriageway priority junctions (Figure 6.3e) should accommodate the turning movements of the largest vehicle type permitted to use the junction, such that overrunning of the physical islands are prevented.	The proposed junction does not single lane dualling nor a dual carriageway.	This clause is not applicable to the proposed junction.
	6.7	At ghost island junctions on WS2+1 roads, the through lane widths in each direction shall be 3.5 metres, exclusive of hard strips.	The major road past the site is not WS2+1.	This clause is not applicable to the proposed junction.
	6.8	At ghost island junctions on roads other than WS2+1 roads, the through lane widths in each direction shall be a minimum of 3.0 metres and a maximum of 3.65 metres wide, exclusive of hard strips.	The through lanes are 3.25 metres wide in both directions.	The design accords with this clause.
	6.8.1	At ghost island junctions on climbing lanes, the through lane widths in each direction should be 3.5 metres, exclusive of hard strips.	The major road past the site does not have a climbing lane.	This clause is not applicable to the proposed junction.
	6.9	The width of the right turning lanes on WS2+1 roads shall be 4.5 metres.	The major road past the site is not WS2+1.	This clause is not applicable to the proposed junction.
	6.10	The minimum widths of right turning lanes (excluding those on WS2+1 roads), shall satisfy one of the following: 1) 3.5 metres; or, 2) 3.0 metres for new junctions; or, 3) 2.5 metres for improvements to existing junctions.	The turning lane at the proposed site access junction is 3.5 metres wide.	The design accords with this clause.
	6.10.1	The widths of the right turning lanes should be in accordance with 1) for both new and existing junctions.	The turning lane at the proposed site access junction is 3.5 metres wide.	The design accords with this clause.
	6.10.2	Where it is not feasible to provide the widths of the right turning lanes fully in accordance with 1), the widths should be as close to 1) as practicable, but no less than 2) or 3) depending on whether the junction is new or existing.	The turning lane at the proposed site access junction is 3.5 metres wide.	The design accords with this clause.
	6.11	On urban roads the width of the right turning lane shall not exceed 5.0 metres.	The right turning lane at the proposed site access junction is less than 5.0 metres in width.	The design accords with this clause.
	6.11.1	On rural roads, with design speeds above 85 kph or where hard strips are present, the width of the right turning lane at new and existing junctions should not exceed 3.65 metres.	The junction is not existing.	This clause is not applicable to the proposed junction.
	6.12	At left/right staggered junctions, where the deceleration lengths have the potential to overlap, the width of the ghost island shall not be increased to make them lie side by side.	The junction is not a staggered arrangement.	This clause is not applicable to the proposed junction.
	6.13	At left/right staggered junctions, where the deceleration lengths have the potential to overlap, the starting points of the right turn lanes shall be joined by a straight road marking, as shown in Figure 6.13.	The junction is not a staggered arrangement.	This clause is not applicable to the proposed junction.
	6.14 – 6.20	Clauses refer to single lane dualling and dual carriageways which are not applicable to the proposed junction.	N/A.	N/A.
	6.21 – 6.24.1	Clauses refer to the physical central reserve layout on WS2+1 roads which are not applicable to the proposed junction.	N/A.	N/A.

	6.25	Dimensions for passing bays shall be based on swept path analysis and the number and size of vehicles expected to be waiting to turn right at a given time. Table 6.25N2 Geometric parameters for a passing bay <table><tr><th rowspan="2">Expected vehicles</th><th colspan="5">Dimensions (metres)</th></tr><tr><th>P1</th><th>P2</th><th>P3</th><th>P4</th><th>P5</th></tr><tr><td>Car and car</td><td>18.8</td><td>13.0</td><td>10.9</td><td>5.0</td><td>0.8</td></tr><tr><td>Car and HGV</td><td>28.7</td><td>18.5</td><td>15.2</td><td>5.0</td><td>1.35</td></tr><tr><td>HGV and HGV</td><td>30.5</td><td>33.2</td><td>15.2</td><td>5.0</td><td>2.8</td></tr></table>	Expected vehicles	Dimensions (metres)					P1	P2	P3	P4	P5	Car and car	18.8	13.0	10.9	5.0	0.8	Car and HGV	28.7	18.5	15.2	5.0	1.35	HGV and HGV	30.5	33.2	15.2	5.0	2.8	No passing bays are proposed at the junction.	This clause is not applicable to the proposed junction.
Expected vehicles	Dimensions (metres)																																
	P1	P2	P3	P4	P5																												
Car and car	18.8	13.0	10.9	5.0	0.8																												
Car and HGV	28.7	18.5	15.2	5.0	1.35																												
HGV and HGV	30.5	33.2	15.2	5.0	2.8																												
7 – Geometric design of signal-controlled junctions	-	Section refers to signal-controlled junctions which is not applicable to the proposed junction.	N/A.	N/A.																													
8 – Normative references	-	Section sets out other documents referred to within the document.	-	Noted.																													
9 – Informative references	-	Section sets out other documents referred to within the document.	-	Noted.																													

Further comments

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