

Major / Minor Priority Junction Check List
TD 42/95 - Geometric Design of Major / Minor Priority Junctions



Client	Persimmon Homes Thames Valley
Project	North Littlehampton Phase 2
Junction Location	Highdown Drive Ghost Island Priority Junction
Drawing reference	A/PHLYM.1/GA-2 Rev P12
Design Speed	70kph (40mph) & 60kph (30mph)
Prepared by	OJN/AB
Date	Nov-17

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2.11	Choice of Major/Minor Priority Junction Table 2/1 shows the major/minor priority junction forms considered suitable for various major road carriageway types in both urban and rural situations. This Table should be used as a starting point in choosing the most appropriate type of major/minor priority junction to use at a particular site.	Y	Ghost Island Right Turn Junction	
2.15	Simple Simple junctions are appropriate for most minor junctions on single carriageway roads, but must not be used for wide single carriageways or dual carriageways. For new rural junctions they shall only be used when the design flow in the minor road is not expected to exceed about 300 vehicles 2-way AADT, and that on the major road is not expected to exceed 13,000 vehicles 2-way AADT.	N/A	See 2.20	
2.16	At existing rural, and at urban junctions the cost of upgrading a simple junction to provide a right turning facility will vary from site to site. However, upgrading should always be considered where the minor road flow exceeds 500 vehicles 2-way AADT, a right turning accident problem is evident, or where vehicles waiting on the major road to turn right inhibit the through flow and create a hazard.	N/A	Not an existing junction.	
2.18	The decision to provide a right turning facility shall be made in accordance with the warrants given in paras 2.15 and 2.16. The choice of type of right turn facility to be used, however, will depend on the particular site characteristics.	N/A	No comment required	
2.20	Ghost Island Ghost islands shall be used on new single carriageway roads, or in the upgrading of existing junctions to provide right turning vehicles with a degree of shelter from the through flow. They are highly effective in improving safety, and are relatively cheap, especially on wide 2-lane single carriageway roads where very little extra construction cost is involved.	Y	Right turn ghost island provided	
2.21	Ghost islands shall not be used where overtaking opportunities on adjacent links are restricted or where traffic turning right out of the minor road would need to make this manoeuvre in two stages.	Y	Overtaking opportunities not restricted	
2.23	Single lane dualling shall normally be used on rural single carriageway roads that have good overtaking opportunities on adjacent links, and shall be used in preference to ghost islands where overtaking opportunities on adjacent links are restricted and where traffic turning right out of the minor road would need to make this manoeuvre in two stages. Because of the detailed nature of the single lane dualling layout, it is only appropriate for roads with hard strips.	N/A	No comments required.	
2.24	There are certain conditions under which a single lane dualling layout may be misinterpreted by drivers. Where a road contains alternating single and dual carriageway sections, a single lane dualling layout might lead drivers into mistaking the width of divided carriageway at the junction to think they are approaching a fully dualled section with overtaking opportunities. In addition, where a junction is proposed on a single carriageway within about 3 kilometres of the taper from a long length of dual carriageway, there may also be confusion if single lane dualling is introduced. In both of these cases, single lane dualling shall not be used. Single lane dualling shall not be used where there is a climbing lane in one direction through the junction.	N/A	No comments required.	

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2.26	Dual Carriageway Junctions Major/minor priority junctions may also be used on dual carriageway, but should never be provided on D3AP roads. The upper limit for minor road flows should be taken as about 3,000 vehicles AADT 2-way when considering providing a major/minor priority junction on continuous D2AP roads in rural areas. However, short lengths of full dualling (D2AP) just to incorporate a junction on otherwise single carriageway roads shall not be provided.	N/A	No comments required.	
-		N/A	No comments required.	
3.4	Horizontal Alignment Ideally, major/minor priority junctions should not be sited where the major road is on a sharp curve. However, where the siting of a major/minor priority junction on a curve is unavoidable, the preferred alignment is where T-junctions are sited with the minor road on the outside of the curve. This is especially important for junctions on climbing lane sections or dual carriageways, to ensure that minor road traffic has a clear view of vehicles on the major road that may be overtaking through the junction. Junctions on the inside of sharp curves are most undesirable.	Y	Junction provided with minor road on the inside of a curve on approach to a roundabout junction. Suitable visibility is achievable.	
3.6	Vertical Alignment The best locations for junctions are on level ground, or where the gradient of the approaches does not exceed 2% either uphill or downhill. Downhill approaches in excess of this figure, particularly on high speed roads, can induce traffic speeds above those desirable through the junction, and lead to a misjudgement of the approach speed by drivers entering from the minor road. Uphill approaches are also undesirable since it is difficult for drivers to appreciate the layout of a junction when they are approaching it on an up gradient. They cannot see the full layout from the lengths immediately on either side of the crest.	Y	Longitudinal gradient on the major road is 2% or less	
3.7	Where the minor road approaches the junction on an uphill gradient, drivers can often wrongly perceive the junction form, and will require a longer gap between vehicles to pull out onto the major road. This is undesirable, as is the case where the minor road approaches a junction on a downhill gradient, thus increasing the likelihood of vehicles overrunning the "Give Way" line.	Y	Minor Road approaches the major road at a gradient of 2%	
-	In such circumstances, a designer shall attempt to create a level section of at least 15 metres length adjacent to the major road.	Y	Gradient of 2% for approx. 31m approaching the major road	
5.3	Cyclists' Facilities Consideration should be given to cyclists where an existing cycle lane crosses the minor road (Fig 5/1). In this instance, the greatest danger has been found to be a collision with vehicles emerging from the minor road, and from motor vehicles turning right or left from the major road and thus cutting across the path of the cyclist.	Y	Cycle facilities provided off carriageway	
5.5	Bearing in mind the practicalities and economics, it is important to consider the provision of facilities that take cyclists away from the mouth of the junction. This will minimise the interaction between cyclists and motor vehicles and provide safe crossing points.	Y	Cycle facilities provided off carriageway	
5.6	Such facilities may include the following:- a. Shared use by pedestrians and cyclists of a displaced cycle track/footway with a controlled or uncontrolled crossing. b. A signposted alternative cycle route away from the junction. c. Full grade separation, for example by means of a combined pedestrian/cyclist subway system. If provision of any of these is not possible, then greater emphasis should be placed on the safety aspects of the design of the major/minor priority junction layout, by careful attention to the provision of crossing places. 5.7 In urban areas, if the volume of cyclists is significant, but not high enough to justify economically a grade separated crossing, then consideration may be given to signalising the whole junction.	Y	Cycle facilities provided off carriageway	
5.8	Equestrians' Facilities Where it is expected that there will be regular use of the junction approaches by ridden horses, of the order of more than 20 passages a week, consideration should be given to the provision of dedicated crossing places. Horses require longer headway between vehicles than cyclists and pedestrians, to allow an adequate margin of safety for crossing. Therefore, the location of such crossings should preferably be at some distance from the junction to permit suitable visibility by the rider. As set out in TA 57 (DMRB 6.3), the visibility distances recommended are considerably greater for equestrians than those set out in Chapter 7 of this standard.	N/A	No equestrian facilities provided	

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5.12	Pedestrians' Facilities The requirements of pedestrians should be carefully considered in the design and choice of major/minor priority junctions. Although it is preferable to provide separate pedestrian routes away from the junction, where road widths are less and traffic movements more predictable, this is rarely practical, in which case the following facilities should be considered:- a. A minor road central refuge at an unmarked crossing place (Fig 5/2) . b. Zebra crossing, with or without a central refuge. c. Displaced controlled pedestrian crossing. d. Subway or footbridge.	Y	Pedestrian routes are provided opposite the junction and across the junction on pedestrian desire lines	
5.15	Defined at-grade pedestrian crossing points on the minor road should be a minimum of 15m back from the "Give Way" line, and should be sited so as to reduce to a minimum the width to be crossed by pedestrians provided they are not involved in excessive detours from their desired paths. Central refuges should be used wherever possible, but not in the major road in a rural situation.	Y	Crossing point reasonable positioned in relation to desired pedestrians path.	
5.16	In urban areas, where large numbers of pedestrians are present, guard rails or other deterrents should be used to prevent indiscriminate crossing of the carriageway. The design of guard railing should not obstruct drivers' visibility requirements. Guard rails which are designed to maintain drivers' visibility of pedestrians through them, and vice versa, are available, but should be checked in case blind spots do occur. TA 57 (DMRB 6.3) refers.	Y	Volume of pedestrians not provided.	
6.1	The design of landscaping within the highway limits shall be carried out in consultation with appropriate specialists. The Design Organisation shall consider the maintenance implications and where the responsibility for maintenance is passed to a third party, maintenance standards must be agreed. If third parties wish to enhance the standard of planting or landscaping at major/minor priority junctions, for example with special floral displays, this shall be with the agreement of the Overseeing Organisation, and shall not compromise visibility or safety. Further advice is given in The Good Roads Guide, DMRB Volume 10.	Y	Landscaping shall be designed in sympathy with highway layout to ensure that it does not obstruct visibility splays or provide any unnecessarily onerous maintenance regime.	
7.2	Design Speed Geometric standards for junctions are related to the traffic speed of the major road, and for new roads this is the design speed as defined in TD 9 (DMRB 6.1.1). Reference should be made to TD 9 in order to determine the appropriate design speed.	Y	The Design has been subject to 70kph design speed because the speed limit of the major road is to be 40mph, the minor road will be 30mph.	
7.3	Visibility Minor road traffic has to join or cross the major road when there are gaps in the major road traffic streams. It is therefore essential that minor road drivers have adequate visibility in each direction to see the oncoming major road traffic in sufficient time to permit them to make their manoeuvres safely. This concept also applies to major road traffic turning right into the minor road. As well as having adverse safety implications, poor visibility reduces the capacity of turning movements. Visibility shall however, not be excessive as this can provide a distraction away from nearer opposing traffic.	N	4.5m x 120m is required and achievable to the right. 4.5m x 45m is achievable to the left up to the exit of roundabout eastern arm.	See 7.5 and 7.6 below
7.4	Drivers approaching a major/minor priority junction from both the major road and the minor road shall have unobstructed visibility as indicated in the following sections. The envelope of visibility for driver's eye height is as set out in TD 9 (DMRB 6.1.1.2.2).	N	Major road - design speed is 70kph (40mph). 120m forward visibility is required. This is achievable on plan when approaching the junction from the South. From the north only 45m forward visibility is achievable from the roundabout exit south to the junction. Minor road - design speed is 60kph (30mph). 90m is required on the minor road, approx. 58m is achievable. Horizontal geometry of Highdown Drive is constrained and the junction cannot be moved.	See 7.5 and 7.6 below
7.5	Visibility - Major Road Drivers approaching a major/minor priority junction along the major road approaches shall be able to see the minor road entry from a distance corresponding to the Desirable Minimum Stopping Sight Distance (SSD) for the design speed of the major road, as described in TD 9 (DMRB 6.1.1). This visibility allows drivers on the major road to be aware of traffic entering from the minor road in time for them to be able to slow down and stop safely if necessary.	N	Design speed is 70kph (40mph). 120m forward visibility is required. This is achievable on plan when approaching the junction from the South. At least 45m forward visibility is achievable approaching the junction from the north (45m from roundabout exit), approx. 60m from Roundabout circulatory carriageway	Departure from Standards Required - Southbound approach on Major Arm (Fitzalan Link) - Forward visibility from the exit from the roundabout is 45m but approx. 60m is achievable if measured from the mouth of the eastern arm (possible left turning traffic) and the roundabout circulatory carriageway (possible southbound traffic). The space available for the A259 roundabout is very limited. It is not possible to incorporate Highdown Drive into the roundabout. Highdown Drive has therefore been realigned in order to form a priority junction with the Fitzalan Link. This has been placed as far as possible to the south of the roundabout. Speeds for southbound vehicles leaving the roundabout are likely to be 30mph or less. This was included as Departure A within the RSA Brief for the RSA dated July 2017 and the Auditors reported "The Audit Brief provided to the Auditors identifies two relaxations and three departures from standards. The auditors have considered these together with the Designer's supporting comments. The Auditors are satisfied that no material increase in risk to road users will arise as a result of the proposed Relaxations and Departures."

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7.6	Visibility - Minor Road The principle of providing the required visibility for drivers approaching the junction from the minor road has three distinct features. a. Approaching drivers shall have unobstructed visibility of the junction from a distance corresponding to the Desirable Minimum Stopping Sight Distance (SSD) for the design speed of the minor road, as described in TD 9 (DMRB 6.1.1). This allows drivers time to slow down safely at the junction, or stop, if this is necessary. Where a "Give Way" sign is proposed the visibility envelope shall be widened to include the sign.	N	Design Speed is 60kph (30mph), therefore 90m forward visibility is required along minor road. 60m is achievable.	Departure from Standards Required - Minor Road approach (Highdown Drive) - is a residential single carriageway road with an 'S' bend on approach to the junction (which is necessary to achieve reasonable separation from the roundabout to the north). As a result, vehicles speeds are likely to be low on approach to the junction (~ 15mph), therefore MfS visibility splay should therefore, be considered appropriate and is achievable. This was included as Departure B within the RSA Brief for the RSA dated July 2017 and the Auditors reported "<i>The Audit Brief provided to the Auditors identifies two relaxations and three departures from standards. The auditors have considered these together with the Designer's supporting comments. The Auditors are satisfied that no material increase in risk to road users will arise as a result of the proposed Relaxations and Departures.</i>" **However, please note that this dimension is now 60m not 70m previously advised. However, the Designer considers that this is still adequate given the likely low speeds on approach as a result of the tight 'S' geometry on approach.**
7.6	b. From a point 15m 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 (not from the continuation of the back of the major road hardstrip if this is present), an approaching driver shall be able to see clearly the junction form, and those peripheral elements of the junction layout.	TBC	b) Visibility from 15m back is achievable.	
7.6	c. The distance back along the minor road from which the full visibility is measured is known as the 'x' distance. It is measured back along the centreline of the minor road from the continuation of the line of the nearside edge of the running carriageway of the major road. The 'x' distance shall be desirably 9m (but see para 7.8). From this point an approaching driver shall be able to see clearly points to the left and right on the nearer edge of the major road running carriageway at a distance given in Table 7/1, measured from its intersection with the centreline of the minor road. This is called the 'y' distance and is defined in Fig 7/1. Relaxations are not available for this distance.	N	c) 4.5m x 120m is required and achievable to the right. 4.5m x 45m is achievable to the left up to the exit of roundabout southern arm, 60m when measured to the roundabout circulatory carriageway.	Departure from Standards Required - Visibility to the left - The space available for the A259 roundabout is very limited. It is not possible to incorporate Highdown Drive into the roundabout. Highdown Drive has therefore been realigned in order to form a priority junction with the Fitzalan Link. This has been placed as far as possible to the south of the roundabout. Speeds for southbound vehicles leaving the roundabout are likely to be 30mph or less. This was implied by Departure A (see 7.5 above) within the RSA Brief for the RSA dated July 2017 and the Auditors reported "<i>The Audit Brief provided to the Auditors identifies two relaxations and three departures from standards. The auditors have considered these together with the Designer's supporting comments. The Auditors are satisfied that no material increase in risk to road users will arise as a result of the proposed Relaxations and Departures.</i>"
7.7	If the line of vision lies partially within the major road carriageway, it shall be made tangential to the nearer edge of the major road running carriageway, as shown in Fig 7/2.	Y	Visibility to the right drawn tangentially to the outside of the major road running carriageway as required.	
7.8	In difficult circumstances, the 'x' distance may be taken as a Relaxation from 9.0m to 4.5m for lightly trafficked simple junctions, and in exceptionally difficult circumstances, to 2.4m back from the nearer edge of the major road running carriageway. The 'x' distance, from which full 'y' distance visibility is provided, shall not be more than 9m, as this induces high minor road approach speeds into the junction, and leads to excessive land take.	N	4.5m x 120m is required and achievable to the right. 4.5m x 45m is achievable to the left up to the exit of roundabout southern arm, 60m when measured to the roundabout circulatory carriageway.	Relaxation Required - Visibility to the left and right is proposed to be relaxed to an 'x' distance of 4.5. 4.5m was indicated on the RSA dwgs and no adverse comments were made relating to this relaxation.
7.9	Similarly, although the 'y' distance shall always be provided, there is little advantage in increasing it, as this too can induce high approach speeds and take the attention of the minor road driver away from the immediate junction conditions. Increased visibility shall not be provided to increase the capacities of various turning movements.	Y	No excess visibility provided.	
7.10	These visibility standards apply to new junctions and to improvements to existing junctions.	N	4.5m x 120m is required and achievable to the right. 4.5m x 45m is achievable to the left up to the exit of roundabout southern arm, 60m when measured to the roundabout circulatory carriageway.	See above.
7.11	Where the major road is a dual carriageway with a central reserve of adequate width to shelter turning traffic, the standard visibility splay to the left is not required, but the central reserve to the left of the minor road shall be kept clear of obstructions for the appropriate 'y' distance, when viewed from an 'x' distance of 2.4m.	N/A	No comments required	
7.14	Design Vehicle Allowance shall be made for the swept turning paths of long vehicles where they can reasonably be expected to use a junction. Consideration shall also be given to the manoeuvring characteristics of these vehicles in the design of staggered junctions.	N/A	It is not anticipated that large articulated vehicles will be required to regularly access Highdown Drive. As a result, the alignment has been designed to accommodate the anticipated swept path of a 10m rigid vehicle.	

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7.17	Corner Radii Where no provision is made for large goods vehicles, it is recommended that the minimum circular corner radius at simple junctions should be 6m in urban areas and 10m in rural areas. Where provision is to be made for large goods vehicles, the recommended circular corner radius is:- a. 10m at urban simple junctions, followed by a taper of 1:5 over a distance of 30m, measured from the edge of the major road carriageway up the minor road in the case of the entry to the minor road, and followed by a similar taper measured from the centreline of the minor road along the major road for the entry to the major road. b. 15m at rural simple junctions, with tapers of 1:10 over a distance of 25m. c. 15m at ghost island junctions, with tapers of 1:6 over a distance of 30m. d. 15m at simple staggered junctions, with tapers of 1:8 over a distance of 32m. e. 20m radius in all other circumstances. These radii only apply where there are no nearside diverge tapers or lanes, or nearside merge tapers. Figures for these are given in paras 7.54 and 7.61 respectively.	Y	Exit radius of 8m (which is greater than 6m) from the minor road provided for the left-out movement.	
7.18	Where large goods vehicles comprise a significant proportion of the turning movements, use of the compound curve shown in Fig 7/3 is recommended.	N/A	No comment required.	
7.20	Through Lanes At ghost island junctions, the through lane in each direction shall not be greater than 3.65m wide, exclusive of hardstrips, but shall not be less than 3.0m wide.	Y	3m through lanes provided	
7.21	At single lane dualling junctions, the through lane in each direction shall be 4.0m wide exclusive of hardstrips. This width, with the hardstrips, will allow traffic to pass a stopped vehicle without leaving the paved width.	N/A	No comment required	
7.23	Minor Road Approaches On a minor road approach of nominal width 7.3m, where a channelising island, as described in Annex 2, is provided both lanes shall be 4.0m wide at the point where the hatched markings surrounding the channelising island begin. At the point where the channelising island commences, the widths on either side shall be as follows:- a. On the approach to the major road, 4.0m wide for a ghost island or 4.5m wide for single lane dualling or a dual carriageway, exclusive of hardstrips. If the approach on the minor road consists of two lanes, this dimension shall be 5.5m. b. On the exit from the major road, 4.5m wide for a ghost island or 5.0m wide for single lane dualling or a dual carriageway, exclusive of hardstrips. These dimensions are shown on Fig 7/7.	N	No channelising island provided	
7.24	If there are no channelising islands in the minor road, the nominal approach width should continue up until the tangent point of the curve to join the edge of the major road running carriageway.	N/A	No comments required.	
7.25	Carriageway Widths Around Curves Where carriageways are taken around short radius corners, added width shall be provided to cater for the swept area of larger goods vehicles and the "cut in" of trailer units. On single lane sections greater than 50m in length an allowance shall be made for broken down vehicles as in para 7.21. Table 7/2 shows the recommended minimum widths for various nearside corner radii based on the design vehicle. For radii above 100m, the standards set out in TD 9 (DMRB 6.1.1) shall be used.	N/A	N/A	
7.30	Tapers Central islands, whether for ghost islands (Fig 7/8) or single lane dualling (Fig 7/9) should normally be developed symmetrically about the centreline of the major road to their maximum width at the tapers shown in Table 7/3. 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.	Y	2.5m Central refuge provided with a 1:40 taper to the south	
7.32	Turning Lengths The turning length is provided to allow long vehicles to position themselves correctly for the right turn. The turning length shall be 10m long irrespective of the type of junction, design speed or gradient, measured from the centreline of the minor road. It is shown on Figs 7/4, 7/5 and 7/6.	Y	10m turning length provided	
7.33	Where capacity calculations indicate that for significant periods of time there will be vehicles queuing to turn right from the major road, the turning length shall be increased to allow for a reservoir queuing length to accommodate such vehicles. Where reservoir provision appears desirable at a junction with ghost islands, consideration shall be given to providing physical islands instead to afford greater protection to turning traffic. Where site conditions prevent this, the reservoir space may still be provided.	Y	No additional capacity for queuing required. PICADY indicates less than 1 PCU queuing.	

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7.34	The direct taper length is the length over which the width of a right turning lane is developed. For ghost islands and the physical islands in single lane dualling and dual carriageway junctions right turning lanes shall be introduced by means of a direct taper whose length is part of the deceleration length, and depends on the design speed. This taper length is given in Table 7/4.	N/A	Design speed 70kph. Direct taper length of 15m is required. 5m is provided, one step below (60kph)	Relaxation Required (one step) - This reduction is proposed at a reduced length to accommodate the access in the location shown because of proximity of roundabout junction to the north. This was included as Departure E within the RSA Brief for the RSA dated July 2017 and the Auditors reported "The Audit Brief provided to the Auditors identifies two relaxations and three departures from standards. The auditors have considered these together with the Designer's supporting comments. The Auditors are satisfied that no material increase in risk to road users will arise as a result of the proposed Relaxations and Departures."
7.35	Ghost Islands For new junctions, the desirable width of a ghost island turning lane shall be 3.5m, but a Relaxation to 3.0m is permissible. At urban and suburban junctions it can sometimes be advantageous to use a greater width not exceeding 5.0m to allow a degree of shelter in the centre of the road for large goods vehicles turning right from the minor road to execute the turn in two separate manoeuvres. On rural roads, with design speeds above 85kph or where hardstrips are present, widths greater than 3.65m are inadvisable because wide ghost islands in these situations create a sense of space that could encourage hazardous overtaking at junctions.	Y	3.5m turn lane provided	
7.36	For improvements to existing junctions where space is very limited a reduced width may be unavoidable. The width of ghost islands shall not be less than 2.5m.	N/A	Not an existing junction.	
7.37	At left/right staggered junctions, the deceleration lengths would overlap but the width of the ghost island shall not be increased to make them lie side by side. The starting points of the right turning section shall be joined by a straight line, which will mean at higher design speeds, the full width of the turning lane will not be developed until the end of the diverging section (as shown in Fig 8/3). The width of the turning lane shall be the full width of the ghost island.	N/A	No comment required	
7.38	Width of Physical Islands in the Centre At single lane dualling and dual carriageway junctions, the width of the central island at the crossing point shall be 10.0m, including central reserve hardstrips. This width will shelter most large goods vehicles turning right from the minor road, except for very long vehicles. In exceptional circumstances where use by very long vehicles is expected and a roundabout is not feasible, a width of 14.0m including hardstrips, will be needed to shelter the largest articulated vehicles (16.5m) and a width of 16.5m, including hardstrips, will be required to shelter drawbar trailer combinations (18.35m).	N/A	N/A	
7.39	The minimum width of a physical island, usually located at the end of the direct taper shall be 3.5m (shown in Figs 7/5 and 7/6).	N/A	N/A	
7.40	Right Turning Lanes The overall length of a right turning lane provided at ghost island, single lane dualling and dual carriageway junctions, will depend on the major road design speed and the gradient. It consists of a turning length, as described in paras 7.32 and 7.33, and a deceleration length. This component shall be provided in accordance with Tables 7/5a and 7/5b, in which the gradient is the average for the 500m length before the minor road.	N	Design speed is 70kph. Deceleration length of 40m required. 16m provided including the direct taper.	Departure from Standards required This reduction is proposed at a reduced length to accommodate the access in the location shown because of proximity of roundabout junction to the north. This was included as Departure C within the RSA Brief for the RSA dated July 2017 and the Auditors reported that "The Audit Brief provided to the Auditors identifies two relaxations and three departures from standards. The auditors have considered these together with the Designer's supporting comments. The Auditors are satisfied that no material increase in risk to road users will arise as a result of the proposed Relaxations and Departures."
7.42	Central Reserve Openings The opening in the central reserve for single lane dualling and dual carriageway junctions at the crossing point shall be 15.0m wide, as shown on Figs 7/5 and 7/6.	N/A	N/A	
7.46	Physical islands shall have an area of at least 4.5 square metres, and shall be treated to be conspicuous in poor lighting conditions. Smaller areas should be defined by road markings. The risk of overriding the islands can be reduced by offsetting the approach nose from the edge of the vehicle paths.	N/A	N/A	
7.47	Where a traffic island serves as a refuge for pedestrians it shall be at least 1.5m wide and have openings in the centre at carriageway level to make the crossing easier for pedestrians (see Fig 5/2). Opposite the refuge openings, dropped kerbs shall be installed for the same reason. A refuge beacon about 4-5m high may be placed between the bollards. Care shall be taken that street furniture does not obstruct the drivers' view of pedestrians.	Y	Traffic islands 2.5m and 3.3m at crossing points provided.	

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7.52	Diverging Tapers and Lanes Nearside diverging tapers shall not be provided at simple junctions (para 1.14). They shall be provided at junctions between "A" and "B" roads where the design speed for the A road is 85kph or above. They shall be provided at other junctions in the following circumstances for traffic in the design year:- a. Where the volume of left turning traffic is greater than 600 vehicles AADT.	N/A	No comments required	
7.52	b. Where the percentage of large goods vehicles is greater than 20%, and the volume of left turning traffic is greater than 450 vehicles AADT.	N/A	No comments required	
7.52	c. Where the junction is on an up or down gradient of greater than 4% at any design speed and the volume of left turning traffic is greater than 450 vehicles AADT. Where the major road flow is greater than 7000 - 8000 AADT then the above figures for turning traffic can be halved. At some junctions there may be safety benefits in providing nearside diverging tapers at lower flows.	N/A	No comments required	
7.53	They shall not be provided where the minor road is on the inside of a curve where traffic on the diverging lane could adversely affect visibility for drivers emerging from the minor road. They shall generally not be provided where the design speed for the major road is less than 85kph nor where the cost of provision is excessive. In that case adequate warning of the junction ahead must be provided.	N/A	No comments required	
7.54	Nearside diverging tapers shall be formed by a direct increase to a width of 3.5m contiguous to the corner into the minor road (preferably of radius at least 20m where the main road design speed is 85kph and at least 40m above this speed). The width around this corner will depend on the radius selected. A "Give Way" line shall be provided so that the left turning traffic gives way to the traffic turning right from the major road. The length of this lane is defined as being from the beginning of the taper up to the "Give Way" line, as shown in Fig 7/11.	N/A	No comments required	
7.55	The desirable length of a nearside diverging taper shall be that of the relevant deceleration length given in Tables 7/5a and 7/5b. Where there are severe site constraints this may be reduced by half as a Relaxation where the design speed is 85kph, but then a lane shall be at least 35m long.	N/A	No comments required	
7.59	Merging Tapers Merging tapers shall only be used at dual carriageway junctions. They shall be provided where a "B" road joins an "A" dual carriageway road having a design speed of 85kph or above. They shall be provided generally where the design speed is 85kph or above and the volume of left turning traffic in the design year exceeds 600 vehicles AADT. However, where the merging taper is for an up gradient of greater than 4%, or where the percentage of large goods vehicles exceeds 20% the threshold value may be reduced to 450 vehicles AADT. They shall never be used at single lane dualling junctions. They shall not be provided where the cost of provision would be excessive.	N/A	No comments required	
7.60	At some junctions on dual carriageways there may be safety benefits in providing merging tapers at lower flows.	N/A	No comments required	
7.61	A separate turning lane, preferably of radius at least 25m where the main road design speed is 85kph and at least 30m above this speed, shall be used to introduce the merging taper from the minor road. The initial width of the lane, which will depend on the radius of the turning lane determined from Table 7/2, should be decreased at a constant taper depending on the design speed (Fig 7/13).	N/A	No comments required	
7.62	The lengths of the tapers to be used are given in Table 7/6. The minimum initial width of a merging taper shall be 3.5m.	N/A	No comments required	
7.64	Stagger Distances For simple major/minor priority junctions with a right/left stagger, the minimum stagger distance shall be 50m. For a ghost island junction it shall also be 50m. For a junction with single lane dualling it shall be 40m, and for dual carriageways the distance shall be 60m. These are based on the distance required for manoeuvring the 18.35m drawbar trailer combination design vehicle between the two minor roads, and shall be provided on all new staggered junctions, including the upgrading of rural crossroads.	N/A	No comments required	
7.65	For simple left/right staggers, the minimum stagger distance shall be 50m. The minimum values for the other types of staggered major/minor priority junction are given in Table 7/7. For higher design speeds, this distance is based on the sum of the two deceleration lengths lying side by side plus the turning lengths (and queuing lengths, if appropriate) at each end, as indicated in the Table, otherwise it is based on the manoeuvring requirements of the design vehicle.	N/A	No comments required	

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Para	Design Standard	Design Complies Y/N	Design Checker Comment	Departure or Relaxation required - Designer's Comment
7.66	Skew Junctions The design parameters where the minor road approaches at an angle other than 90 degrees, for both left hand and right hand splay junctions, are shown in Fig 7/15. The parameters are set out in paras 7.20 - 7.48. For those locations where the major road is on a curve at the junction, the relevant design parameters are indicated in Fig 7/16.	N/A	Not a skew junction.	
7.67	Junctions on Climbing Lanes 7.67 For major/minor priority T-junctions located on a climbing lane, the key dimensions are shown in Fig 7/17.	N/A	No comments required	
7.68	Simple major/minor priority junctions and single lane dualling shall not be used within climbing lane sections, since problems of safety may arise.	N/A	No comments required	
7.69	Staggered junctions of other types shall be avoided on climbing lane sections. Both staggered junctions and climbing lanes on their own are situations requiring special driver concentration, and if provided in combination, the decisions required may be too confusing for some drivers.	N/A	No comments required	
7.72	Local Grade Separation For the left turn merge to the main road, the minor road channelising island shown in Figs 7/18 and 7/19 shall be designed so as to provide a constant width of turn into the major road. The width shall be determined from Table 7/2. The detail of the island as approached along the minor road is as set out in Annex 2. If there is a merging taper as shown in Figs 7/13 and 7/19, the widths and tapers shall be as set out in paras 7.58 - 7.62. The hatched markings shall be extended from the minor road centreline to link with those for the merge taper, the channelising island being provided within them, as in Figs 7/18 and 7/19.	N/A	No comments required	
7.73	For the left turn diverge from the major road, the channelising island described in para 7.72 and shown in Figs 7/18 and 7/19 shall be designed so as to provide a constant width around the turn to the minor road. The width shall be determined from Table 7/2. Where a nearside diverging taper or nearside auxiliary lane is present (see Figs 7/11 and 7/12), the hatched markings should be extended along their current path until the intersection with the centreline of the minor road, and the channelising island shall be provided within them. This is shown in Figs 7/18 and 7/19.	N/A	No comments required	
7.76	Drainage and Crossfall From considerations of surface water drainage and driver comfort, the road camber on the major road shall be retained through the junction and the minor road graded into the channel line of the major road. Checks shall be made for flat areas at all changes of gradient, superelevation or crossfall.	TBC	The junction levels and drainage shall be designed to accord with this requirement at detailed design stage.	
7.77	Traffic Signs and Road Markings The need for, and layout of, traffic signs and road markings is an integral part of the design process and no junction design is complete without these features having been included. Advance direction and warning signs shall be provided, and care must be taken with the positioning and size of signs at the junction itself so that they do not interfere with drivers' visibility requirements. These matters need to be considered from the earliest stage as they can fundamentally affect layout and hence land acquisition requirements. Advance signing on minor roads may need particularly careful consideration.	Y	Road markings and location of advance direction signs indicated in accordance with TSRGD's and TSM's.	
7.78	The policy and detailed guidance on these aspects are given in the Traffic Signs Manual, and reference shall always be made to the Manual for comprehensive advice.	Y	Road markings and location of advance direction signs indicated in accordance with TSRGD's and TSM's.	
8.1	The overall aim in designing a major/minor priority junction shall be to provide drivers with layouts that have consistent standards and are not likely to confuse them. Wherever practicable, the layout shall be designed so as to follow the traffic pattern, with the principal movements being given the easiest paths. This improves the smoothness of operation and makes it more readily understood by drivers. Unduly sharp radii or complex paths involving several changes in direction shall be avoided.	Y	Refer to AutoTRACK plots	

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Para	Design Standard	Design Complies Y/N	Design Checker Comment	Departure or Relaxation required - Designer's Comment
8.2	In Chapter 7, the components of design have been considered separately, but the final layout shall be looked at as a whole. It is important that, on entering a junction, drivers should be able to see and understand, both from the layout and advance traffic signs, the path they should follow, and the likely actions of crossing, merging and diverging vehicles.	N	Sharp radius on Highdown Drive approach to junction contrary to paragraph 8.2.	Departure from Standards required. Horizontal alignment of Highdown Drive is highly constrained and junction cannot be moved any further south. 'S' shaped approach geometry required to form junction with Fitzalan Link. This was included as Departure D within the RSA Brief for the RSA dated July 2017 and the Auditors reported that " <i>The Audit Brief provided to the Auditors identifies two relaxations and three departures from standards. The auditors have considered these together with the Designer's supporting comments. The Auditors are satisfied that no material increase in risk to road users will arise as a result of the proposed Relaxations and Departures.</i> "