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1 INTRODUCTION

Rodgers Leask have been commissioned by Gallagher Estates to undertake a site access appraisal for a potential gypsy and traveller transit site located at Cot Hill Junction, Newport.

As part of the appraisal a site access layout has been designed in accordance with Gwent County Council ‘Highways Design Guide for Residential and Industrial Estate Roads’ and the Highway Agency’s document ‘TD 22-05: Layout of Grade Separated Junctions’. The site access layout can be found in Appendix 1. The gypsy and traveller site access has then been analysed in terms of its geometric feasibility.

2 SITE ACCESS APPRAISAL

The site access layout (Appendix 1) shows two potential access points on to the proposed gypsy and traveller site. The first option shows access to the site from Cot Hill via a new road junction. The second option shows access to the site from the A48 via a left turn lane / slip road.

The site access layout has been run through ‘Autotrack’ vehicle tracking analysis software to ensure adequate access for a 4x4 vehicle towing a touring caravan as stipulated in the Welsh Assessment Government ‘Good Practice Guide in Designing Gypsy Traveller Sites in Wales’. Road tracking analysis can be found on drawing No. SK08 (Appendix 1). Reference should be made to the Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads, (Appendix 2) and TD 22-05: Layout of Grade Separated Junctions (Appendix 3).

Several problems exist for both options 1 and 2 in respect of the provision of adequate stopping distance. The main issues can be summarised as follows:

Site Access Option No.1 – Left/Right Turn Off Cot Hill

- Inadequate Visibility/Stopping Distance when Exiting the Gypsy and Traveller Site (Appendix 1: drawing No. SK80, Point No.1) – Due to the proposed residential development directly to the east of the potential gypsy site, the gypsy and traveller site access will have a visibility splay that is restricted to the back edge of the public footpath (Appendix 1: drawing No. SK80). In order to achieve the 70m visibility splay required by the Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads, (Appendix 2), the site entrance will need to be relocated and moved towards Cot Hill Junction. This will result in the site entrance being located unacceptably close to Cot Hill Junction as the Highways Agency restricts the distance between two junctions to 90m in order to provide an adequate stopping distance. In light of this the proposed gypsy and traveller site access would be deemed unsatisfactory and would not comply with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads.

- Inadequate Visibility/Stopping Distance from Cot Hill Junction (Appendix 1: drawing No. SK80, Point No.2) – As outlined above, the site entrance will need to be located as close as practically possible to the Cot Hill Junction. This will result in restricted visibility for drivers turning off the A48 onto Cot Hill. If for example, a vehicle towing a touring caravan was waiting to turn right into the proposed gypsy and traveller site off Cot Hill, then a vehicle turning onto Cot Hill from the A48 would not have adequate visibility/stopping distance (Appendix 1: drawing No. SK80, Point No.2). In light of this the proposed gypsy and traveller site access would be deemed unsatisfactory and would not comply with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads.

- Inadequate Visibility/Stopping Distance when Approaching the Gypsy and Traveller Site Entrance from Milton Hill (opposite direction to the A48) – In order to overcome the previous two points and provide the required stopping distance from Cot Hill Junction, it would be necessary to locate the gypsy and traveller site access a minimum of 90m from Cot Hill Junction. This would not be feasible as the proposed gypsy and traveller site entrance
would then have a restricted visibility splay and vehicles approaching the site entrance from Milton Hill would not have adequate visibility/stoppping distance from a vehicle turning out of the gypsy and traveller site entrance. In light of this the proposed gypsy and traveller site access would be deemed unsatisfactory and would not comply with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads.

- **Vertical Alignment (Appendix 1: drawing No. SK80, Point No.4)** – Due to the difference in levels between the Cot Hill Junction and the proposed Gypsy and Traveller site access (3.5m), vehicles approaching the site from the A48 would have reduced visibility/stoppping distance when approaching a vehicle waiting to turn right into the proposed gypsy and traveller site. In light of this the proposed gypsy and traveller site access would be deemed unsatisfactory and would not comply with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads.

- **Right Turn Lane for Vehicles Approaching the Gypsy and Traveller Site Entrance from Cot Hill Junction** – Due to the restrictions in width it is not possible to provide a right turn lane for vehicles approaching the gypsy and traveller site entrance from the A48. In light of this the proposed gypsy and traveller site access would be deemed unsatisfactory and would not comply with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads.

**SITE ACCESS OPTION No. 2 – LEFT TURN IN/OUT OFF A48**

- **Weaving Lengths** – A ‘Weaving Section’ is the length of carriageway between a successive merge or lane gain and diverge or lane drop, where vehicles leaving the mainline at the diverge or lane drop have to cross the paths of vehicles that have joined the mainline at the merge or lane gain. (See Figure 2/9 and Figures 4/9 to 4/14, Appendix 4).

The A48 has a speed limit of 50mph. TD22/05: Layout of Grade Separated Junctions, states that for an urban road ‘Weaving Lengths’ are to be measured as per Figure 1/1 (Appendix 3). Figure 1/1 shows that for a design speed of 50mph (80kph) the minimum weaving length is to be 250m. As can be seen on drawing No. SK80 (Appendix 1), limitations in site length mean that locating an access off the A48 would not comply with TD 22-05: Layout of Grade Separated Junctions and would be deemed unsatisfactory.

**3 CONCLUSIONS**

The proposed Cot Hill gypsy and travellers site has a number of restrictions with regards to providing satisfactory site access in accordance with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads (Appendix 2) and TD 22-05: Layout of Grade Separated Junctions (Appendix 3). Several problems exist for both options 1 and 2 in respect of the provision of adequate stopping distance. The site access layout demonstrates that there is limited space to locate a site entrance off Cot Hill Junction. The A48 access would also be unfeasible due to the length of the proposed site and the location of Cot Hill Junction.

In conclusion, we believe that it would not be possible to provide satisfactory site access to the proposed Cot Hill gypsy and travellers site in accordance with Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads and TD 22-05: Layout of Grade Separated Junctions.
APPENDIX 1

Site Access Layout
Consulting Civil & Structural Engineers

- Distance between junctions less than 60m required by design guide.
- Access to U-turn junction would require vehicle turning of insufficient size available for vehicle less than 5m.
- Vehicles entering site have poor visibility to the left.
- Vertical Alignment - Excessive level difference from Cot Hill Junction to site access.
- Wrekin Access 1 solution - Firstly move proposed T junction and access from Wrekin Access 3 solution - Provision of entry bay for will require pedestrian to cross the junction at grade, within a crossing distance in excess of 18m.
APPENDIX 2

Gwent County Council Highways Design Guide for Residential and Industrial Estate Roads
Visibility at Junctions

Visibility standards at junctions for roads where the speed limit or actual vehicles speeds are 50 kph (30 mph) or greater are contained in Department of Transport Advice Note TA 20/84. For vehicles speeds below 50 kph (30 mph) advice is given in Design Bulletin 32.

Welsh Office Planning Policy Guidance Note PPG 13 Appendix C, combines the advice of these two aforementioned documents.

The following information and Figure 4 is extracted from PPG 13.

"New accesses onto roads should wherever possible be on level ground or in hollows where there is good visibility. They should not be near the crest of a hill, near a sharp bend or where there are double white lines (indicating restricted forward visibility). At eye level (defined as 1.05 metres above road level) there should be a clear view over the whole area shaded in figure 4 below.

A 'minor road distance' of 9 metres is the normal requirement for new junctions and for the improvement of existing junctions between access roads and district or local distributor roads. The provision will be required where the 'minor road' is busy (eg where it serves as a main connection between the public road system and a housing estate development or an industrial estate) but would not apply at junctions or accesses within estates. For less busy, simple and very minor junctions and busy private accesses (eg those serving a factory, a free standing shop or a petrol filling station) a minor road distance of 4.5 metres will normally be the acceptable minimum. For other types of access serving single dwellings or a small cul-de-sac of a half dozen dwellings, the minimum acceptable minor road distance is 2.4m. In urban areas with a speed limit of 30 mph or less this distance may be reduced to 2 metres. Only in exceptional circumstances should a distance of less than 2.4m be considered for an access with multiple usage."

![Diagram of Visibility Splays](image)

FIGURE 4. Visibility Splays
TABLE 3A

<table>
<thead>
<tr>
<th>Major Road Speed kph (mph)</th>
<th>120</th>
<th>100</th>
<th>85</th>
<th>70</th>
<th>60</th>
<th>50</th>
<th>50</th>
<th>40</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(75)</td>
<td>(62)</td>
<td>(53)</td>
<td>(44)</td>
<td>(37.5)</td>
<td>(300)</td>
<td>(300**)</td>
<td>(25)</td>
<td>(20)</td>
</tr>
<tr>
<td>Major Road Distance (metres)</td>
<td>295</td>
<td>215</td>
<td>160</td>
<td>120</td>
<td>90</td>
<td>70</td>
<td>60</td>
<td>45</td>
<td>33</td>
</tr>
</tbody>
</table>

TABLE 3B

<table>
<thead>
<tr>
<th>Speed Limit kph (mph)</th>
<th>110</th>
<th>96</th>
<th>80</th>
<th>64</th>
<th>50</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(70)</td>
<td>(60)</td>
<td>(50)</td>
<td>(40)</td>
<td>(30*)</td>
<td>(30**)</td>
</tr>
<tr>
<td>Major Road Distance (metres)</td>
<td>295</td>
<td>215</td>
<td>160</td>
<td>120</td>
<td>90</td>
<td>60</td>
</tr>
</tbody>
</table>

* Where major road is not an access road but a higher category road.

** Where major road is an access road with speeds universally below Speed limit.

TABLE 3. Visibility Standards

The ‘major road distance’ will depend on the speed of traffic on the major road: the appropriate distance can be read off Table 3A or 3B. If the highest traffic speed on the road in wet weather (excluding the fastest 15% of vehicles) is known then this speed - or the next highest speed which appears on the table - should be used as the major road speed in Table 3A to arrive at the appropriate ‘major road distance’. Where there is a speed limit and the actual speed of traffic on the major road is not known it will normally be necessary to provide for ‘major road distances’ as shown in Table 3B.

As a general rule the following vision splay criteria will normally be applied to development proposals:

(i) Private drive or access road serving up to 6 dwellings will require a vision splay minor road ‘x’ distance of 2.4 metres.

(ii) An access road serving, between 6 and 20 dwellings will require a vision splay minor ‘x’ distance of 3.0 metres.

(iii) An access road serving between 21 and 50 dwellings will require a vision splay minor road ‘x’ distance of 4.5 metres.

(iv) An access road/approach road serving between 51 and 150 dwellings will require a vision splay minor road ‘x’ distance of 6.0 metres.

(v) An approach road serving between 151 and 300 dwellings will require a vision splay minor road ‘x’ distance of 9.0 metres.
300 dwellings will normally be the maximum allowed off one access point.

Visibility splays for junctions are part of the highway and must be included in the adoptable area. Therefore, it is not permissible for such areas to lie within private gardens or grounds.

The location of grouped parking in the visibility zones of bends, or junctions will not be permitted.

When different gradients meet in the longitudinal plane it will be necessary to provide a smooth transition between them. The minimum length of summit transition curve should be calculated to provide clear visibility over the length of the stopping distance for the speed of the road, at a height of 600mm above the adjacent road levels.

Where road curvature would cause the sight line to exclude part of the carriageway from the visibility zone, the sight line should be moved back to meet the edge of the carriageway.

Where an emerging vehicle crosses a footway at a lightly used access, for example from the driveway of a dwelling, pedestrians will not have sufficient warning of its approach. It should be noted that in such cases a sight splay of 3m x 3m will be required to be maintained by the owner of the land such that there is no obstruction to vision above a height of 0.6 metres above the adjoining road level.
Horizontal Alignment and Forward Visibility

Local Distributors

Requirements for distributor roads as defined in paragraph 1.57 of DB32 revised are given in the Department of Transport's Directive TD 9/93.

Other Residential Roads

Minimum requirements for each type of residential road are given in Part 2, sections 3 and 4 of this document.

On residential roads which do not serve as distributor roads however, smaller radii and shorter stopping sight distances as shown in Table 4 may be accepted.

It is suggested that the combination of restraints may be effective in reducing speeds, and that the effectiveness of restraints may be enhanced by changes in pavings, planting and other features which indicate to drivers that they are in residential surroundings where careful driving at slow speeds is expected - features such as:

(a) curving alignments and varying carriageway widths;
(b) trees, bollards and buildings forming gateways at entrances to villages and housing estates and at narrowings and delineating changes in direction at 90 degree bends, chicanes and islands;
(c) low shrubs and hedges delineating the boundaries between carriageways and private and common open spaces (see guidance on visibility in Part 2 Section 3);
(d) changes in surface materials and edge restraints highlighting the location of speed restraints and reducing the apparent widths of carriageways.

<table>
<thead>
<tr>
<th>Group (B) Road Type</th>
<th>Minimum Centre-line Radius (m)</th>
<th>Minimum Stopping Sight Distance (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Square</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Mews Court</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Access Way</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Access Road</td>
<td>29</td>
<td>45</td>
</tr>
</tbody>
</table>

Table 4 Minimum Stopping Sight Distances and Horizontal Radii on Residential Roads Subject to 30 mph Speed Limit
To construct a forward visibility curve around a bend as shown in Figure 5.

(a) A line shall be drawn to represent the path of the driver's eye, 1.5 metres into the carriageway measured from where the inner kerb would be if there was no carriageway widening, or on the centreline of the traffic lane if the carriageway is greater than 6.0 metres wide.

(b) The required stopping distance commensurate with the centre-line radius of the carriageway shall be ascertained from Table 4, and measured back along the vehicle path from tangent Point A.

(c) The stopping distance shall then be divided into equal increments of approximately 3 metres and the increment points numbered in sequence.

(d) The same stopping distance with the same number of increments shall then be repeated around the curve, finishing at a full stopping distance beyond the tangent Point B.

(e) The area which has to be kept clear of obstruction to visibility shall then be constructed by joining points of the same number together i.e., 1 to 1, 2 to 2 etc.

FIGURE 5. Forward Visibility Curve
APPENDIX 3

TD 26-05: Layout of Grade Separated Junctions
PART 1

TD 22/05

LAYOUT OF GRADE SEPARATED JUNCTIONS

SUMMARY

This Standard sets out the layout requirements for merge and diverge at grade separated junctions, and for weaving sections, at various levels of traffic flow. It is essential that comprehensive attention is paid to design if safe and efficient junctions are to be achieved. The effective performance of junctions is crucial to the efficient operation of the route. This Standard has been revised to take into account changes made in the revised TD 27/05 “Cross-Sections and Headrooms”. A full revision of TD 22 is expected to be published later in 2005.

INSTRUCTIONS FOR USE


2. Remove TD 22/92 from Volume 6, Section 2 which is superseded by this Standard and archive as appropriate.

3. Insert TD 22/05 into Volume 6, Section 2.

4. Please archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.
Successive Merges or Diverses within Interchanges

4.19 Where there are closely spaced successive merges or diverses within a junction or interchange (Figure 4/7), the minimum spacing between the tips of noses shall be 3.75V m, where V is the design speed in Kph for the mainline, subject to the minimum requirements for effective signing and motorway signalling. If the merges or diverses are on a connector road, the design speed shall be that for the connector road.

Lane Drop/Lane Gain and Through Carriageway

4.20 Where a dual 3 lane operational carriageway is to be reduced to dual 2 lanes through a junction, provision must be made for maintenance activities, incidents and for future contra-flow systems during major maintenance. This means that the mainline carriageway shall be constructed through as 3 lane (with hard shoulder) with the left hand lane normally hatched out and not used for traffic during normal operation. This repeats advice in TA 48 (DMRB 6.2.2), para 5.22. Regular use of the left hand lane can inhibit joining traffic, which, under these conditions, can be heavy, and this, in effect, destroys the concept of lane balance.

Weaving Lengths

4.21 Weaving lengths can be measured as in Figure 1/1 in standard layouts and in Figures 4/7-4/11 where the layout has special features.

4.22 On Rural Motorways, the Desirable Minimum weaving length shall be 2 kilometres. However, in extreme cases with traffic forecasts at the lower end of the range for the specific carriageway (Table 2 in TD 20 (DMRB 5.1)), an Absolute Minimum distance of 1 kilometre can be considered. Above about 3 kilometres apart, merges and diverses tend not to interact and can be considered as separate entities, since weaving ceases to occur. The maximum possible weaving length can thus be taken as 3 kilometres. This would appear to be the case up to and including weaving sections 5 lanes wide.

4.23 For Rural All-Purpose Roads with design speeds of 120 or where speed limits have been imposed to create a design speed of 100A kph, the Desirable Minimum weaving length shall be 1 kilometre with an Absolute Minimum of 450m for the extreme cases with traffic forecasts at the lower end of the range for the specific carriageway as mentioned in 4.22. Here, for example, on carriageways up to 3 lanes wide, the maximum distance over which successive merges and diverses are likely to interact and cause weaving is around 2 kilometres and this should be taken as the maximum weaving length.

4.24 For Urban Roads as defined in para 1.20, the design flows shall be inserted in Figure 4/12 to obtain a minimum weaving length (L.min). This shall then be compared to the Design Speed related Absolute Minimum weaving length in Figure 4/12 and the greater of the two lengths taken as the minimum length of weaving section, subject to minimum signing requirements.

Figure 4/7: Example of Successive Merges/Diverses
D is the hourly flow from para 3.2 and V the design speed (km/hour) of the mainline upstream of the weaving section.

To determine the minimum length of weaving section ($L_{min}$) for insertion within the formula of Paragraph 2.26:

1. For known total weaving flow and chosen $D/V$ value, read off the minimum length of weaving section from the graph above.
2. Check the absolute minimum weaving length allowable for chosen design speed from the graph on the left.
3. Select the greater of the two lengths.

Figure 4/12: Weaving Length Diagram for Urban Roads
APPENDIX 4

TD 25-05: Layout of Grade Separated Junctions
Layout of Grade Separated Junctions

Summary: This standard sets out the design requirements and methodology for the geometric design and layout of grade separated junctions on trunk roads and motorways. It revises and combines the previous standard (TD 22/92) and advice note (TA 48/92). It takes into account the amendments included in the interim revision (TD 22/05).
delay. The Design Organisation must confirm its application to particular schemes with the Overseeing Organisation.

Definitions

1.7 The terminology used in this standard follows, where possible, the definitions contained in BS 6100: Subsection 2.4.1: 1992.

1.8 The following additional terms have been defined for use in this Standard (see also Figure 1/1).

1.9 Auxiliary Lane: An additional lane at the side of the mainline carriageway to provide increased merge or diverge opportunity or additional space for weaving traffic. See Figure 2/4.1B and Figure 2/6.3D Option 2.

1.10 Connector Road: A collective term for interchange links, link roads, slip roads and loops.

1.11 Design Organisation: The organisation commissioned to undertake the various phases of scheme preparation.

1.12 Downstream: That part of the carriageway(s) where the traffic is flowing away from the section in question.

1.13 Fork: An at-grade junction of two roads, usually within an interchange, which diverge from the approach road at similar angles. Usually both diverging roads have equal status. (For a fork junction, as defined in BS 6100: Subsection 2.4.1, the minor road deviates from the straight major road.) See Figure 4/6.

1.14 Ghost Island: An area of the carriageway suitably marked to separate lanes of traffic travelling in the same direction on both merge and diverge layouts. The purpose of the ghost island at a merge is to separate the points of entry of two slip road traffic lanes. At a diverge it is to separate the points of exit to a slip road. See Figures 2/4.4F, 2/6.1B Option 1 and 2/6.3D Option 1.

1.15 Interchange: A grade separated junction that provides free flow from one mainline to another.

1.16 Interchange Link: A connector road, one or two way, carrying free flowing traffic within an interchange between one level and/or direction and another. See Paragraphs 4.2 and 4.3.

1.17 Lane Gain: A layout where a merging connector road becomes a lane or lanes of the downstream main carriageway. See Figures 2/4.3E, 2/4.4F and 2/4.5G.

1.18 Lane Drop: A layout where a lane or lanes of the upstream carriageway becomes the diverging connector road. See Figures 2/6.2C, 2/6.3D and 2/6.4E.

1.19 Large Goods Vehicle (LGV): A goods vehicle, the permissible maximum weight of which exceeds 7.5 tonnes.

1.20 Link Road: In the context of junctions, a one way connector road adjacent to but separate from the mainline carriageway carrying traffic in the same direction, which is used to connect the mainline carriageway to the local highway network where successive direct connections cannot be provided to an adequate standard because the junction spacing is too close. See Figure 5/6.

1.21 Loop: A connector road, one or two way, which is made up of the elements of the loops shown in Figure 4/1 and which passes through an angle in the range of approximately 180 to 270 degrees. The loop is considered to extend to the end of the near straight length of road contiguous with the back of the diverge or merge nose.

1.22 Low Radius: A radius between the minimum loop radius in Table 4/2 and the Two Steps below Desirable Minimum Radius with Superelevation of 7% as required by TD 9 (DMRB 6.1.1) for the slip road or interchange link design speed.

1.23 Mainline: The carriageway carrying the main flow of traffic; generally traffic passing straight through the junction or interchange.

1.24 Near Straight: A length of road with a radius no less than the Desirable Minimum Radius with Superelevation of 5% as required by TD 9 (DMRB 6.1.1) for the mainline design speed.

1.25 Nose: A paved area, approximately triangular in shape, between a connector road and the mainline at a merge or diverge, suitably marked to discourage drivers from crossing it.

1.26 Overseeing Organisation: The highway or road authority for the road construction or improvement scheme.
1.27 **Parallel Merge/Diverge:** A layout where an auxiliary lane is provided alongside the mainline carriageway. See Figures 2/4.1B, 2/4.5H, 2/6.1B Option 2 and 2/6.3D Option 2.

1.28 **Reserved Lane:** A lane carrying traffic that is segregated from weaving traffic.

1.29 **Rural Road:** As defined in TA 46 (DMRB 5.1.3), namely all-purpose roads and motorways that are generally not subject to a local speed limit.

1.30 **Slip Road:** A connector road within a junction between a mainline carriageway and the local highway network, or vice versa, which meets the local highway network at-grade. Traffic using a slip road usually has to give way to traffic already on the mainline or on the local highway network. See Paragraph 4.2.

1.31 **Taper Merge/Diverge:** A layout where merging or diverging traffic joins or leaves the mainline carriageway through an area forming a funnel to or flare from the mainline carriageway. See Figures 2/4.1A and 2/6.1A.

1.32 **“Tiger Tail”:** A ghost island layout at a diverge utilising TSRGD diagram 1042.1 to separate the points of exit to a slip road. So called because the vertical sign used to inform drivers of the layout incorporates an illustration that resembles a tiger’s tail. See Figures 2/6.1B Option 1 and 2/6.3D Option 1.

1.33 **Upstream:** That part of the carriageway(s) where traffic is flowing towards the section in question.

1.34 **Urban All-Purpose Road (UAP):** An all-purpose road within a built up area, either a single carriageway with a speed limit of 40 mph or less or a dual carriageway with a speed limit of 60 mph or less.

1.35 **Urban Motorway:** A motorway with a speed limit of 60 mph or less within a built up area.

1.36 **Weaving Section:** The length of the carriageway between a successive merge or lane gain and diverge or lane drop, where vehicles leaving the mainline at the diverge or lane drop have to cross the paths of vehicles that have joined the mainline at the merge or lane gain. See Figure 2/9 and Figures 4/9 to 4/14.

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**Mandatory Sections**

1.37 Mandatory sections of this document are contained in boxes. The Design Organisation must comply with these sections or obtain agreement to a Departure from Standard from the Overseeing Organisation. The remainder of the document contains advice and explanation, which is commended to users for consideration.

**Departures from Standards**

1.38 In exceptional situations, the Overseeing Organisation may be prepared to agree to a Departure from Standard where the standard, including permitted Relaxations, is not realistically achievable. Design Organisations faced by such situations and wishing to consider pursuing this course must discuss any such option at an early stage in design with the Overseeing Organisation. Proposals to adopt Departures from Standard must be submitted by the Design Organisation to the Overseeing Organisation and formal approval received before incorporation into a design layout.

**Relaxations**

1.39 In difficult circumstances Relaxations may be introduced at the discretion of the Design Organisation, having regard to all relevant local factors, but only where specifically permitted by this standard. Careful consideration must be given to layout options incorporating Relaxations, having weighed the benefits and any potential disbenefits. Particular attention must be given to the safety aspects (including operation, maintenance, construction and demolition) and the environmental and monetary benefits/disbenefits that would result from the use of Relaxations. The consideration process must be recorded. The preferred option must be compared against options that would meet full standards.
2.72 In calculating the number of traffic lanes required (paragraph 2.71) a fractional part will inevitably require a decision to round up or down. If it is possible to vary the position of the junctions and thus increase or decrease the weaving length, the fractional part will converge approximately to a whole number of lanes and the decision is simplified. However, if this is not possible the decision becomes more difficult. Where the fractional part is small and is combined with a low weaving flow rounding down is suggested, whereas a high fractional part with a high weaving volume suggests rounding up. For example the addition of a fourth lane would have operational advantages in releasing the two middle lanes for weaving traffic. Other factors which may influence the decision are:

i. the number of lanes required for merging and diverging (paragraphs 2.29 and 2.43);
ii. when the fractional part is about 0.5 the uncertainty of the design flows (Chapter 3) suggests always rounding up from 2 to 3 lanes;
iii. on recreational routes there can be a high proportion of drivers who are not local and therefore behave less efficiently than commuters would at the same flow levels;
iv. the consequences of under provision should be borne in mind, as the acquisition of land at a later date could be costly or impossible;
v. relevant environmental factors should be taken into account.

Figure 2/9  Terms used in Weaving

\[ Q_{nw} \text{ (non-weaving flow)} = \text{Flow 1} + \text{Flow 4} \]
\[ Q_{w1} \text{ (major weaving flow)} = \text{greater of Flow 2 or Flow 3} \]
\[ Q_{w2} \text{ (minor weaving flow)} = \text{lesser of Flow 2 or Flow 3} \]
Weaving Lengths

4.34 Weaving lengths must be measured as shown in Figures 4/9 – 4/13.

4.35 For Rural Motorways, the desirable minimum weaving length must be 2 kilometres. Above about 3 kilometres apart, merges and diverges tend not to interact and can be considered as separate entities, since weaving ceases to occur. The maximum possible weaving length can thus be taken as 3 kilometres. This would appear to be the case up to and including weaving sections 5 lanes wide. The weaving formula is not to be used for weaving lengths above 3 kilometres. The requirements for weaving for MSAs on rural motorways are as for rural motorway junctions.

4.36 For Rural All-Purpose Roads the desirable minimum weaving length must be 1 kilometre. On carriageways up to 3 lanes wide, the maximum distance over which successive merges and diverges are likely to interact and cause weaving is around 2 kilometres and this should be taken as the maximum weaving length. The weaving formula is not to be used for weaving lengths above 2km.

4.37 For Urban Roads as defined in Chapter 1, the design flows must be inserted in Figure 4/14 to obtain a minimum weaving length ($L_{wm}$). This must then be compared to the Design Speed related Absolute Minimum weaving length in Figure 4/14 and the greater of the two lengths taken as the minimum length of weaving section, provided that signing requirements can be met.

4.38 For All-Purpose Roads, the minimum length between a grade separated junction designed to this standard and an at-grade junction (including roundabouts), service area, lay-by or direct access must be the desirable minimum weaving length as defined in paragraph 4.36 for rural roads or the minimum length of weaving section as derived from paragraph 4.37 for urban roads.

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A - Merge, Weaving Length and Diverge

B - Parallel Merge/Diverge as for Taper Merge/Diverge by Notional Layout

N.B. See Figure 4/13 for measurement of weaving length for ghost island layouts.

Figure 4/9 Definition of Terms used in Weaving and Measurement of Weaving Length for Taper and Auxiliary Lane Layouts
"Lact"

\[ d = 100\,\text{m for design speeds of 120/100 kph} \]
\[ d = 50\,\text{m for design speeds of 85 kph and below} \]

Figure 4/10: Lane Gain/Lane Drop

"Lact"

Figure 4/11: Lane Gain only

"Lact"

\[ d = 100\,\text{m for design speeds of 120/100 kph} \]
\[ d = 50\,\text{m for design speeds of 85 kph and below} \]

Figure 4/12: Lane Drop only

N.B. See Figure 4/13 for measurement of weaving length for ghost island layouts.

Figure 4/10 – 4/12  Definition of Terms used in Weaving and Measurement of Weaving Length for Lane Gain and Lane Drop Layouts