

INTERIM ADVICE NOTE 198/17

Existing Dual Carriageway All-Purpose Trunk Road Network: Additional Requirements and Relaxations

Summary

This document provides amendments and additional relaxations to the Design Manual for Roads and Bridges (DMRB) Requirements and Advice documents listed below, allowing greater flexibility when dealing with the constraints associated with enhancing existing elements of the existing dual carriageway all-purpose trunk road network in England.

Instructions for Use

This document is to be used in conjunction with:

TD 9/93	<i>Highway Link Design</i>
TD 22/06	<i>Layout of Grade Separated Junctions</i>
TD 27/05	<i>Cross-Sections and Headrooms</i>
TD 19/06	<i>Requirements for Road Restraint Systems</i>
IAN 149	<i>Existing Motorway Minimum Requirements</i>
TD 39/94	<i>The Design of Major Interchanges</i>
TD 40/94	<i>Layout of Compact Grade Separated Junctions</i>

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1. Introduction

1.1. Scope and Purpose

- 1.1.1. This document provides additional geometrical relaxations to the Design Manual for Roads and Bridges (DMRB) Requirements and Advice Documents (RAD) TD 9: Highway Link Design [Ref 1], TD 22: Layout of Grade Separated Junctions [Ref 2] and TD 27: Cross-Sections and Headrooms [Ref 3] allowing designers greater flexibility when dealing with the constraints associated with modifying existing dual carriageway all-purpose roads.
- 1.1.2. This document allows relaxations to elements of a design, when modifying existing dual all-purpose roads that, although not permitted by the parent DMRB document, would generally be approved if they were submitted to the Overseeing Organisation as a Departure from Standard.
- 1.1.3. The requirements in TD 9 [Ref 1], TD 22 [Ref 2] and TD 27 [Ref 3] shall be applied to the design in the first instance. Only where it is not considered practicable by the designer, in consultation with the Overseeing Organisation, to comply with the requirements of the parent document, may the relaxations contained in this document be applied. A Design Strategy Record (DSR) shall be produced by the designer to record justifications for additional relaxations.

1.2. Implementation

- 1.2.1. Subject to the requirements in paragraph 1.1.3, this document shall only be applied when modifying existing elements of dual carriageway all-purpose roads. For the construction of new elements, e.g. a new slip road, the parent DMRB documents shall be used.
- 1.2.2. The requirements and advice in this document shall not be applied to motorways, smart motorways, expressways or roads forming new routes. For existing motorways, reference shall be made to IAN 149: Existing Motorways: Additional Requirements and Relaxations [Ref 4]. For requirements and advice for smart motorways reference shall be made to IAN 161: Smart Motorways [Ref 5]. The modification of existing Hard Shoulder Running schemes shall be in accordance with IAN 111: Managed Motorways Implementation Guidance – Hard Shoulder Running [Ref 6].
- 1.2.3. The relaxations in this document amend a number of paragraphs in the DMRB parent documents. Where this occurs, the amended paragraph from the parent DMRB documents are noted at the end of the text.
- 1.2.4. If there is a discrepancy between the current version of the parent DMRB document and the version referenced in this document the designer, in consultation with the Overseeing Organisation, shall determine the most appropriate document to apply.
- 1.2.5. This document shall be implemented immediately, except where:
 - a) The procurement of works, at any stage from conception through design to completion of construction, has reached a point at which, in the opinion of the Overseeing Organisation, use of this document would result in significant additional expense or delay progress (in which case the decision shall be recorded in accordance with the Overseeing Organisation's procedure); or
 - b) A contract has terms which apply specifically to the implementation of new requirements.
- 1.2.6. No Departures from Standard are permitted from the relaxations in this document. Where a Departure from Standard is required, it shall be made against the original requirements within TD 9 [Ref 1], TD 22 [Ref 2] and TD 27 [Ref 3].

1.3. Relationship

1.3.1. This document should be used in conjunction with the following DMRB RADs:

TD 9	<i>Highway Link Design</i>
TD 22	<i>Layout of Grade Separated Junctions</i>
TD 27	<i>Cross-Sections and Headrooms</i>
TD 39	<i>The Design of Major Interchanges</i>
TD 40	<i>Layout of Compact Grade Separated Junctions</i>
TD 19	<i>Requirements for Road Restraint Systems</i>
IAN 149	<i>Existing Motorway Minimum Requirements</i>

1.4. Consultation

1.4.1. The Overseeing Organisation shall be consulted in the following circumstances:

- a) If verge widths at structures are reduced to zero, in order to consider the implications for routing and maintenance of underground equipment, and to consider the safety implications for road workers and any pedestrians who may exit a stricken vehicle.
- b) If a merge layout is amended in accordance with either paragraph 3.2.2 or 3.2.3 of this document.
- c) If a diverge layout is amended in accordance with paragraph 3.3.2 of this document.

1.5. Design Strategy Record

1.5.1. When applying this document in whole or in part, the designer shall develop a Design strategy Record (DSR). The DSR shall be developed and maintained from the operational concept stages through to project completion. The purpose of the DSR is to record key design decisions, constraints and assessments, in support of using the relaxations within this document in lieu of the requirements in the parent DMRB documents. The DSR content shall include the rationale behind the designer's decision making process.

1.5.2. As a minimum, the DSR shall record the following:

- a) Subject to paragraph 1.5.3 of this document, a causal analysis of the local Personal Injury Collision history to identify any performance issues or trends, comprising, as a minimum, the most recent 36 month period of verified Personal Injury Collision data.
- b) The consultation that has taken place in accordance with paragraph 1.4.1.
- c) The strategy for determining traffic flows to be used in design (including data source and design year).
- d) Where the additional relaxations outlined in Chapters 2, 3 and 4 of this document have been applied and the justification for using them.
- e) Any judgements on the application of this document in accordance with paragraph 1.2.4 of this document.
- f) Details of proposed mitigation to reduce any residual road safety risks related to the relaxed geometry, to an acceptable level.
- g) The cost and impacts of a scheme that would be compliant to the parent DMRB document.

- 1.5.3. If the project is following the Project Control Framework (PCF) it is acceptable for the DSR to cross reference the relevant sections in the Safety Plan PCF Product if this includes the collision history and detailed analysis required by paragraph 1.5.2 a) of this document.

1.6. Abbreviations

DMRB	Design Manual for Roads and Bridges
DSR	Design Strategy Record
IAN	Interim Advice Note
PCF	Project Control Framework
RAD	Requirements and Advice document
VRS	Vehicle Restraint System

1.7. Definitions

- 1.7.1. This IAN does not introduce any new technical definitions over and above those in TD 9 [Ref 1], TD 22 [Ref 2] and TD 27 [Ref 3]. The following general definitions are specifically relevant to the interpretation and application of the requirements and advice in this document.

Existing roads: Established operating roads on an existing route.

New route: New roads proposed on a new alignment. New junctions on existing roads are also defined as new build. This includes new slip roads.

2. Highway Link Design

2.1. General

- 2.1.1. This chapter shall be read in conjunction with TD 9 [Ref 1]. It is supplementary to TD 9 but does not supersede it. Together with TD 9, it shall be used to derive the appropriate geometric parameters.
- 2.1.2. This chapter increases the scope of relaxations provided in TD 9 [Ref 1] to allow consideration of alignment values, and combinations of those values, that would generally be approved if they were put to the Overseeing Organisation as Departure from the parent DMRB document.
- 2.1.3. The following paragraph in TD 9 [Ref 1] is amended when the IAN has been applied in accordance with Chapter 1.

2.2. Combinations of Relaxations

- 2.2.1. The relaxations below Desirable Minimum described in TD 9 paragraphs 2.8 to 2.12 inclusive, 3.4 to 3.6 inclusive, 4.9 to 4.12 inclusive and 4.14 to 4.16 inclusive may be used in combination for the following parameters on the existing dual all-purpose trunk road network:
 - a) stopping sight distance
 - b) horizontal curvature
 - c) vertical crest curves
 - d) absolute minimum for sag curves
- 2.2.2. This is a relaxation from TD 9 paragraph 1.24.

3. Layout of Grade Separated Junctions

3.1. General

3.1.1. This chapter shall be read in conjunction with TD 22 [Ref 2]. It is supplementary to TD 22 but does not supersede it. Together with TD 22, it gives requirements and advice for modification of grade separated junctions and interchanges on existing rural dual all-purpose trunk roads.

3.1.2. The following paragraphs, figures and tables in TD 22 [Ref 2] are amended when this IAN has been applied in accordance with Chapter 1:

2.29 - 'Designing Merges'

Figure 2/3 AP – 'All-Purpose Road Merging Diagram'

2.34 and 2.35 - 'Near Straight on Merge'

2.43 - 'Designing Diverges'

Figure 2/5 AP – 'All-Purpose Road Diverging Diagram'

2.46 and 2.47 - 'Near Straight on Diverge'

4.1 - 'Cross Sections'

4.7 - 'Horizontal and Vertical Alignment'

4.16 to 4.19 - 'Sight Distances'

4.22 - 'Merges and Diverges'

Table 4/3 - 'Geometric Design Parameters for Merging Lanes'

Table 4/4 - 'Geometric Design Parameters for Diverging Lanes'

4.36 - 'Weaving Lengths'

3.1.3. This IAN shall also be applied where TD 22 [Ref 2] is augmented by TD 39 *The Design of Major Interchanges* (DMRB 6.2.4) [Ref 7] or TD 40 *Layout of Compact Grade Separated Junctions* (DMRB 6.2.5) [Ref 8].

3.2. Designing Merges

3.2.1. Hourly flows for existing roads for the merge and mainline upstream, as determined in paragraph 1.5.2 of this document may be inserted into TD 22 Figure 2/3 AP to select a merge layout as shown in Figures 2/4.1 to 2/4.5 of TD 22 [Ref 2].

3.2.2. If the appropriate layout as derived from TD 22 Figure 2/3 AP [Ref 2] cannot be provided in full within the scheme constraints, the designer may investigate amending the layout by either of the following methods:

- a) The Road Class in TD 22 [Ref 2] Table 4/3 may be relaxed to the 'Urban Road Speed Limit 60 mph' as described in paragraphs 3.4.7 and 3.4.9 of this document.

This is a relaxation of TD 22 paragraph 4.22.

- b) Merge layouts derived from TD 22 Figure 2/3 AP [Ref 2] may be substituted as described below:

- Layout F may be substituted by Layout E.
- Layout C may be substituted by Layout B or A.
- Layout B may be substituted by Layout A.

3.2.3. Layouts E and F both provide lane gains. If the Overseeing Organisation has determined that no lane gains are to be introduced, Layouts E and F may be substituted as follows:

- Layout E may be substituted by Layout B.
- Layout F may be substituted by Layout C or H.
- No departure is required for the use of Layout H.

This is a relaxation of TD 22 paragraph 2.30 and Figure 2/4.5.

- 3.2.4. The revised layout may act as a throttle on the merging traffic and the merge flows should be reduced accordingly for subsequent capacity calculations on downstream elements of the network.

3.3. Designing Diverges

- 3.3.1. Hourly flows for existing roads for the diverge and mainline upstream, as determined in Paragraph 1.5.2 of this document may be inserted into TD 22 Figure 2/5 AP [Ref 2] to select a diverge layout as shown in Figures 2/6.1 to 2/6.4 of TD 22 [Ref 2].

- 3.3.2. If the appropriate layout as derived from TD 22 Figure 2/5 AP [Ref 2] cannot be provided in full within the scheme constraints, the layout may be amended by the following method:

- a) The Road Class in TD 22 [Ref 2] Table 4/4 may be relaxed to the 'Urban Road Speed Limit 60 mph' as described in Paragraphs 3.4.10 and 3.4.12 of this document.

This is a relaxation of TD 22 paragraph 4.22.

3.4. Geometric Requirements

Cross-Sections

- 3.4.1. For the purpose of designing junctions and interchanges, cross-sections for the mainline and all connector roads are given in TD 27 *Cross Sections and Headroom* (DMRB 6.1.2) [Ref 3] as amended by Chapter 4 of this IAN.

- 3.4.2. This is a relaxation of TD 22 paragraph 4.1.

Horizontal and Vertical Alignment

- 3.4.3. The geometric standards for horizontal and vertical alignment and stopping sight distance for the mainline through grade separated junction and connector roads shall be provided in accordance with TD 9 *Highway Link Design* (DMRB 6.1.1) [Ref 1] as amended by Chapter 2 of this IAN.

- 3.4.4. This is a relaxation of TD 22 paragraph 4.7.

Sight Distances

- 3.4.5. On merges and diverges for existing rural dual all-purpose trunk roads where the stopping sight distance requirements of TD 22 cannot be achieved, the existing sight distance shall be maintained as a minimum.

- 3.4.6. This is a relaxation of TD 22 Paragraphs 4.16 to 4.19.

Geometric Design Parameters for Merging Lanes

- 3.4.7. The merge layouts should be designed to TD 22 within the scheme constraints whether physical or financial. If the appropriate layout cannot be provided, the Road Class in TD 22 Table 4/3 [Ref 2] may be relaxed to the 'Urban Road Speed Limit 60 mph', as described below for merge layouts, and the appropriate geometric parameters applied.

- 3.4.8. This is a relaxation of TD 22 paragraph 4.22.
- 3.4.9. The geometric parameters for merging lanes may be relaxed to the minimum values given for 'Urban Road Speed Limit 60 mph'. The priority order given below shall be followed for reducing the geometric parameters. The hierarchy shall be applied in sequence, with the appropriate adjustment made to the related geometric parameter whenever practicable, before proceeding to the next level:
- Minimum Auxiliary Lane Length (4)
 - Length of Entry Taper (1) and Nose Length (3)

N.B. Figures in brackets refer to columns in TD 22 Table 4/3 [Ref 2].

Geometric Design Parameters for Diverging Lanes

- 3.4.10. The diverge layouts should be designed to TD 22 within the scheme constraints [Ref 2]. If the appropriate layout cannot be provided, the Road Class in TD 22 Table 4/4 [Ref 2] may be relaxed to the 'Urban Road Speed Limit 60 mph', as described below for diverge layouts, and the appropriate geometric parameters applied.
- 3.4.11. This is a relaxation of TD 22 Paragraph 4.22.
- 3.4.12. The geometric parameters for diverging lanes may be relaxed to the minimum values given for 'Urban Road Speed Limit 60 mph'. The priority order for reducing the geometric parameters is given below. The hierarchy shall be applied in sequence, with the appropriate adjustment made to the related geometric parameter whenever practicable, before proceeding to the next level:
- Length of Ghost Island Head (7)
 - Length of Exit Taper (1) and (2)
 - Length of Auxiliary Lane Taper (6)
 - Minimum Auxiliary Lane Length (5)
 - Nose Length (4)

N.B. Figures in brackets refer to columns in TD 22 Table 4/4 [Ref 2].

Near Straights

- 3.4.13. On existing slip roads, where the Near Straight is below the rural all-purpose road requirement, the existing length of Near Straight shall be maintained. If the existing layout does not include a Near Straight, a Near Straight is not required. The Near Straight length and nose length may be different. Reductions to the Near Straight length shall be considered the priority where there is a demonstrable benefit to other merge parameters; however this is usually restricted by the level difference between the mainline and slip road, and therefore not beneficial.
- 3.4.14. This is a relaxation of TD 22 paragraphs 2.34, 2.35, 2.46 and 2.47.

Weaving Lengths

- 3.4.15. If the weaving length L_{act} (actual weaving length available) is less than 1 kilometre, the existing distance between the tip of the merge nose of a junction and the tip of the diverge nose of the following junction shall be maintained.
- 3.4.16. This is a relaxation of TD 22 paragraph 4.36.
- 3.4.17. For amended weaving lengths where L_{act} is less than 1 kilometre, the minimum weaving length shall be derived from the upper graph in TD 22 Figure 4/14 [Ref 2]. If the L_{act} derived in this manner is not achievable within the scheme constraints, an alternative layout should be considered, such as dedicated lanes between junctions.

4. Cross-Sections and Headrooms

4.1. General

4.1.1. This chapter shall be read in conjunction with TD 27 [Ref 3]. It is supplementary to TD 27 but does not supersede it. Together with TD 27, it gives details of cross-sections and headrooms to be used on the existing dual carriageway all-purpose trunk road network. The following paragraphs, figures and tables in TD 27 [Ref 3] are amended when this IAN has been applied in accordance with Chapter 1:

4.2.1 - 'Paved Width'

4.9.6 - 'Auxiliary Lane Provision'

4.10.2 - 'Connector Road Lane Provision'

4.11.13 - 'Set-back'

5.2 - 'Non-Motorised User Provision at Structures'

Annex B of TD 27 – Rural Motorway Widening, Cross-Section and Layout at Physical Restraints

4.2. Application of Relaxations to Existing Highway Cross-Sections

4.2.1. In order to achieve the optimal cross-section on existing dual carriageway all-purpose roads, a balance should be reached between what is required by TD 27 [Ref 3] and what is achievable within the scheme constraints, whether physical or financial.

4.2.2. The dimensions of the components of the highway cross-section given in paragraph 4.2.1 of TD 27 [Ref 3] may be relaxed as set out in sections 4.3, 4.4 and 4.5 of this document.

4.2.3. This is a relaxation of TD 27 paragraph 4.2.1.

4.2.4. The following paragraphs cover the provision and width of highway cross-sections. This section shall be read in conjunction with TD 27 [Ref 3], TD 19 [Ref 9], TD 9 [Ref 1], and TD 22 [Ref 2].

4.3. Hardstrip Width (Mainline Nearside)

4.3.1. Where the existing route is a dual carriageway with no hardstrips or hardstrips that do not meet the requirements of TD 27, the existing provision may be retained.

4.3.2. This is a relaxation of TD 27 paragraphs 4.2.1, 4.9.6 and 5.2.

4.4. VRS Setback (Mainline)

4.4.1. At existing overbridges the nearside VRS (Vehicle Restraint System) set-back may be retained where scheme constraints prohibit compliance with TD 27 [Ref 3].

4.4.2. This is a relaxation TD 27 paragraphs 4.11.13, Table 4-1 and Annex B.

4.5. Paved Width (Connector Roads - Slip Roads)

4.5.1. On slip roads where the existing paved width, including lanes or hardstrips, do not meet the requirements of TD 27 [Ref 3], the existing provision may be retained. This further amendment to TD 27 is subject to meeting the requirements for the design flow ranges and connector road type as noted in TD 22 [Ref 2].

4.5.2. This is a relaxation TD 27 paragraphs 4.2.1, 4.9.6 and 5.2.

5. Withdrawal Conditions

- 5.1.1. This IAN shall become obsolete following the publication of a new RAD for defining either highway link design, the layout of grade separated junctions or cross-sections and headrooms which captures the information contained in this IAN.

6. **Contacts**

Users of this document are encouraged to raise any enquiries and/or provide feedback on its content and usage. The address for general enquiries and feedback is:

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7. Normative References

7.1.1. The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies.

Ref	Title	Publisher
1	Design Manual for Roads and Bridges, Volume 6, Section 1, Part 1: TD 9/93, Amendment No 1: Highway Link Design	The Stationary Office
2	Design Manual for Roads and Bridges, Volume 6, Section 2, Part 1: TD 22/06, Layout of Grade Separated Junctions	
3	Design Manual for Roads and Bridges, Volume 6, Section 1, Part 2: TD 27/05, Cross-sections and Headrooms	
4	Design Manual for Road and Bridges, IAN 149/17, Existing Motorways: Additional Requirements and Relaxations	
5	Design Manual for Roads and Bridges, IAN 161/15, Smart Motorways	
6	Design Manual for Roads and Bridges, IAN 111/09, Managed Motorways Implementation Guidance – Hard Shoulder Running	
7	Design Manual for Roads and Bridges, Volume 6, Section 2, Part 4: TD 39/94, The Design of Major Interchanges	
8	Design Manual for Roads and Bridges, Volume 6, Section 2, Part 5: TD 40/94, Layout of Compact Grade Separated Junctions	
9	Design Manual for Roads and Bridges, Volume 2, Section 2, Part 8: TD 19/06, Requirements for Road Restraint Systems	