

Introduction to the NRA Design Manual for Roads and Bridges

March 2013

Summary:

This Introduction provides information on the NRA Design Manual for Roads and Bridges for the design of national road schemes in Ireland.

**VOLUME 0 INTRODUCTION AND
CONTENTS**
SECTION 1 GENERAL PROCEDURES

PART 2

NRA GD 01/13

**INTRODUCTION TO THE NRA DESIGN
MANUAL FOR ROADS AND BRIDGES
(NRA DMRB)**

Contents

Chapter

1. Introduction
2. Use of the Manual for the Design of Roads
3. Coverage of the Manual
4. Structure of the Manual
5. Document Control
6. References
7. Enquiries

Annex A: Substitutions to Documents

1. INTRODUCTION

March 2013 Update

0.0 The following amendments are made in the March 2013 update:

- The title of this document was amended to NRA GD 01/13, in keeping with the convention established in the UK DMRB.
- A minimum professional recognition requirement has been added (effective from 19 December 2013) for national road scheme designs.
- A number of minor corrective modifications were made to reflect current practice.

The Manual

- 1.1 The NRA DMRB is based on the UK Highway Agency's DMRB and adapts it for use on national roads in Ireland through a series of implementation documents. These take the form of NRA Addenda to the individual documents contained in the UK DMRB and, in some cases, complete replacement NRA Standards. The titles of NRA DMRB documents that replace UK DMRB documents include the prefix "NRA". At present the NRA DMRB only implements the design standards contained in Volumes 1,2,4,5,6,7,8 and parts of 3 and 9 of the DMRB.
- 1.2 This Introduction provides information on the use of the manual for the design of national road schemes in Ireland. In addition to information regarding the structure of the DMRB it provides information about the structure of and background to the NRA DMRB. Particularly it sets out the basis on which the documents are prepared, how they should be used, how the series documents of both the UK DMRB and the NRA DMRB should be accommodated within the manual, and how future additions and updating are to be handled.
- 1.3 Documents (new and amended) in the UK DMRB are published quarterly, together with an index containing revised volume contents pages and an alpha-numeric listing of the documents in the manual. Similarly updates of the NRA DMRB are published intermittently on the NRA Standards Website.

Use of the Manual for National Roads

- 1.4 The UK DMRB has been prepared by the UK Highways Agency specifically for use when assessing and designing trunk roads (including motorways) in the UK. The definition of a trunk road is equivalent to that of a national road in Ireland. The documents in the NRA DMRB have been prepared by the National Roads Authority specifically to implement parts of the UK DMRB for use when assessing and designing national roads (including motorways) throughout Ireland, subject to any restrictions contained in the individual implementation documents.
- 1.5 The UK DMRB contains a mix of Standards and Advice Notes. The NRA DMRB formally implements those Standards which shall be applied to national roads in Ireland. A number of Advice Notes in the UK DMRB have not been formally adopted for application in Ireland. However, Advice Notes provide useful background reading to the UK DMRB Standards. In some instances the advice may be relevant for Irish roads, but the Advice Notes do not affect or alter any of the information given in the Standards as applied in Ireland. Users of the NRA DMRB are, therefore, encouraged to use the Advice Notes in the UK DMRB as background guidance to the application of the Standards, while taking account of national differences highlighted in the NRA Addenda and equivalent NRA Standards.

- 1.6 Some Standards and Advice Notes of the UK DMRB are considered as conflicting with current practice in Ireland or of no relevance. These documents are specifically excluded from the NRA DMRB.

Use of the Manual for Regional and Local Roads

- 1.7 The UK DMRB sets a standard of good practice that has been developed principally for trunk roads in the UK. Similarly the NRA DMRB sets a standard of good practice intended principally for national roads in Ireland. Both documents may also be applicable in part to other roads with similar characteristics. Where they are used for local road schemes, it is for the relevant Road Authority to decide on the extent to which the documents in the manual are appropriate in any particular situation.
- 1.8 While the requirements given in the manual may be the best guidance available to Road Authorities, such authorities should ensure that their application to local road schemes does not compromise safety, result in poor value for money, or have an unacceptable impact on the environment. It is recommended that any Road Authority making use of the manual should establish formal procedures for considering whether it is appropriate to depart from particular requirements (see paragraphs 1.20 to 1.23).

Implementation

- 1.9 The individual documents in the manual are to be implemented in accordance with the instructions given with that particular document. The inclusion of the document in the manual simply provides a controlled procedure for its retention and updating.

1.10 The NRA DMRB shall be used forthwith for all schemes for the construction and/or improvement of national roads.

1.11 While the NRA DMRB is for use on national roads in Ireland, it is noted that all roads affected by national roads projects shall also be designed in accordance with this Standard unless otherwise agreed with the relevant Road Authority.

- 1.12 The use of the UK DMRB Standards as implemented by the NRA Addenda and NRA Standards for schemes which do not involve the construction and/or improvement of a national road should be agreed with the relevant Road Authority (see Paragraphs 1.5 and 1.6).
- 1.13 Where a scheme requires the use of superseded UK DMRB standards with their corresponding superseded NRA Addenda or superseded NRA DMRB Standards, Designer should confirm the application of these Standards with the relevant Road Authority.

Terminology

- 1.14 In UK DMRB documents published before April 1994, the term “Overseeing Department” was used for reference to the relevant UK government departments. More recently, the term “Overseeing Organisation” has been used.
- 1.15 When using the UK DMRB as implemented by the NRA DMRB in Ireland, the terms “Overseeing Department” and “Overseeing Organisation” refer to the National Roads Authority.
- 1.16 Other terms which are specific to the United Kingdom also need to be replaced as appropriate. The most commonly required substitutions are listed in Annex A.

NRA Manual of Contract Documents for Road Works (MCDRW)

- 1.17 There are some cross-references in the UK DMRB to documents in the “Manual of Contract Documents for Highway Works” (MCHW). This is a complementary manual to the UK DMRB that contains documents relating to contract document compilation, specifications, contractual details, method of measurement and other guidance covering contractual issues. The MCHW contains the UK Specification for Highway Works and the Highway Construction Details, which are incorporated directly into contracts by reference. It should be noted that there is a certain amount of interlinking between the UK DMRB and these latter two documents. The equivalent documents for application in Ireland are the NRA Specification for Road Works and the NRA Road Construction Details which form Volumes 1 and 4 of the NRA “Manual of Contract Documents for Road Works” (MCDRW). Where cross-references to the MCHW documents require amendment for compatibility with the NRA documents the amendment is included in the relevant NRA Addenda.

Scope

- 1.18 The manual embodies the collective experience of the Overseeing Organisations, their agents and design organisations, in both Britain and Ireland, over many years, and as such, represents a guide to good practice. It provides technical requirements and guidance resulting from research and practical experience in the management of the UK trunk road and Irish national road systems. It is continuously reviewed, to keep abreast of changes in practice and developments in technology, to improve safety, to reduce environmental impact and to give better value for money.

1.19 The manual has been prepared for use by appropriately qualified and experienced professional staff. It is not a statutory or regulatory document, nor a training manual; neither does it cover every point in exhaustive detail. Many matters are left to the professional expertise and judgement of users, while others are covered elsewhere, in Irish, British or European standards, in codes of practice and in specifications which are cross-referenced in the text. The technical requirements given in the manual must be adhered to for national roads unless a Departure is approved (see paragraphs 1.20 to 1.23 below).

Relaxations and Departures

- 1.20 In some instances (particularly in Volume 6, Road Geometry) the technical requirements in a document prescribe a number of levels of provision. In such cases the particular requirements must be met, but the user has discretion to relax the criteria within certain limits if it is not practical to meet the absolute criteria in full. This could be, for example, for reasons such as linking into the existing road network or to reduce the impact on property or the environment, where safety issues are not compromised and the cost of complying with the full requirements could not be justified.

1.21 Relaxations may be introduced at the discretion of the Designer, having regard to the advice given in this document and all the relevant local factors. Careful consideration must be given to layout options incorporating Relaxations, having weighed the benefits and any potential disbenefits. Particular attention should be given to the safety aspects and the environmental and/or cost benefits which would result from the use of Relaxations. The Designer shall record the fact that a Relaxation has been used and the corresponding reasons for its use. The record shall be endorsed by the Design Organisation’s senior engineer responsible for the scheme. The Design Organisation shall report all Relaxations incorporated into the design as part of the project report at the end of each project management phase (refer to the National Roads Project Management Guidelines).

- 1.22 Where special circumstances arise and the straightforward application of the technical requirements cannot be justified for some reason, such as the environmental impact or cost, users are encouraged to come forward with Departures which go beyond Relaxations to propose additional criteria (for aspects not covered by existing documents) based on a reasoned assessment. All proposals for Departures must be submitted to the National Roads Authority for consideration on their merits. Applications for all Departures shall be made in accordance with the procedures outlined in NRA GD 1 'Departures from Standards and Specification' contained in Volume 0, Section 1, Part 2 of the NRA DMRB.

Professional Recognition and the NRA DMRB

- 1.24 From 19th December 2013, the NRA will require all those signing-off designs for national road schemes, under the NRA DMRB, to be recognised as professional engineers under Directive 2005/36/EC of the European Parliament and of the council on the recognition of professional qualifications. The title of Chartered Engineer (CEng) is the relevant professional title in Ireland.

Legislation

- 1.25 The NRA DMRB does not make reference to all legislation that may be applicable to national road projects. Anyone engaged in the design or construction of national roads must comply with all applicable current legislation.

NRA Standards Website

- 1.26 The NRA maintains a website specifically dedicated to the NRA Standards and Specifications. The website is located at the following address and contains the current and archived versions of all NRA standards and specifications:

Web-site: <http://nrastandards.nra.ie>

2. USE OF THE MANUAL FOR THE DESIGN OF ROADS

2.1 The manual supports policy, administrative and technical procedures which are required to ensure that the Overseeing Organisations operate in an efficient and effective manner. Particular volumes and documents contain technical requirements and guidance on a wide range of topics, such as:

- (a) technical and other procedures and methods to be employed;
- (b) analytical criteria to be used;
- (c) appraisal requirements;
- (d) dimensional requirements;
- (e) numerical and statistical data.

2.2 The documents give guidance and set technical requirements for the economic and engineering criteria which apply to the national road network and are an essential component in obtaining quality. They:

- (a) define the quality of the national road network in terms of value for money consistent with adequate safety and durability, while taking into account the impact on the environment and costs;
- (b) provide a sound and rational basis on which competitive tenders can be sought;
- (c) develop and promulgate good practice whilst encouraging innovation;
- (d) facilitate quality control of design, construction and maintenance;
- (e) define methods for assessing maintenance requirements when evaluating options;
- (f) define methods for monitoring the performance of the network.

2.3 The documents in the DMRB fall into two categories: standards (technical requirements) and advice notes. The function of each of these is:

Standards – these set out the Overseeing Organisation’s technical requirements applicable to those roads for which they are responsible. Generally the use of the Standards is a requirement for the relevant Overseeing Organisation’s roads except where Departures are agreed. Certain Standards include a combination of technical requirements, advice and guidance within a single document. In these documents mandatory technical requirements are distinguished by the use of a text box as illustrated below.

3.7 The criteria given in Table 3 shall apply for all situations where the

Advice Notes – these amplify and advise on particular technical requirements. They also provide guidance (representing best practice) to users. They advise on matters that should be taken into account according to local circumstances for a particular requirement on a scheme. The NRA DMRB does not formally implement most of the Advice Notes contained in the UK DMRB. However users of the NRA DMRB are encouraged to use the Advice Notes in the UK DMRB as background guidance to the application of the Standards, while taking account of national differences.

NRA Interim Advice Notes – NRA Interim Advice Notes are issued by the NRA from time to time. They shall be used as directed by the NRA for specific road projects. They are standards under development and shall be used in conjunction with the NRA DMRB and NRA MCDRW and may incorporate amendments to documents in these manuals.

- 2.4 The Overseeing Organisations have procedures for issuing documents giving guidance on problems which need to be addressed urgently where it would take too long to publish a new document or amend one that is already in the manual. In such instances the National Roads Authority will issue guidance, in the form of an Interim Advice Note, directly to those users working on national road schemes that may be affected. Such guidance will normally have a limited life before being incorporated into the manual.

3. COVERAGE OF THE MANUAL

NRA Design Manual for Roads and Bridges

- 3.1 The NRA DMRB has evolved from the UK DMRB, which forms the basis for large parts of the NRA Manual. Where use is made of the UK DMRB, reference is made to all standards and advice notes applicable for use in Ireland. Not all parts of the UK DMRB are applicable in Ireland. Furthermore, some parts of the NRA DMRB are substantially, or completely, different to the corresponding part within the UK DMRB. Only those parts of the UK DMRB specifically referenced in the NRA DMRB are applicable for use in Ireland.

NRA Volume Contents

- 3.2 The NRA Volume Contents and Alpha-numeric Index to the Design Manual for Roads and Bridges (Section 0 Part B in Volume 0) contains volume contents pages for each volume of the NRA DMRB.

NRA Addenda

- 3.3 In addition to the commonly required substitutions identified in Annex A, individual documents require specific changes when used for schemes in Ireland. These changes are included in the NRA DMRB as NRA Addenda on the NRA standards website and should be used in conjunction with the UK DMRB document. The quarterly NRA Alpha-numeric Index lists those NRA Addenda that are current.

Documents not applicable to Ireland

- 3.4 Volumes 10, 11, 12, 13, 14 and 15 of the DMRB are not currently implemented for use in Ireland. Where individual documents in Volumes 1, 2, 3, 4, 5, 6, 7, 8, and 9 are not for use on schemes in Ireland, they are identified as such in the relevant section of the NRA Alpha-numeric Index.

National Roads Authority Documents

- 3.5 The NRA DMRB has in some cases replaced parts of the UK DMRB with standards developed solely for use in Ireland. Such NRA standards include stand-alone replacements of the equivalent standard in the UK DMRB, and merged standards, which combine and replace the equivalent standards in the UK DMRB. Such standards are assigned a prefix of NRA to distinguish them from the other parts of the NRA DMRB.

Examples of this are shown below:

“TD 9/93 Highway Link Design”
is replaced for use in Ireland by
“NRA TD 9/10 Road Link Design”*

and

“TD 41/95 Vehicular Access to All Purpose Trunk Roads and TD 42/95 Geometric design of Major/Minor Priority Junctions”
are replaced for use in Ireland by
“NRA TD 41-42/09 Geometric design of Major/Minor Priority Junctions and Vehicular Access to National Roads”*

4. STRUCTURE OF THE MANUAL

Introduction

- 4.1 The UK DMRB is made up of separate volumes with each being divided into a number of sections. Documents are allocated to a volume and section according to their subject matter. The NRA DMRB maintains this structure such that the NRA implementation documents can be easily referred into the UK document.
- 4.2 The UK DMRB as implemented for use in Ireland comprises the following volumes:
- Volume 1 Highway Structures: Approval Procedures and General Design
 - Volume 2 Highway Structures: Design (Substructures and Special Structures), Materials
 - Volume 3 Highway Structures: Inspection and Maintenance
 - Volume 4 Geotechnics and Drainage
 - Volume 5 Assessment and Preparation of Road Schemes
 - Volume 6 Road Geometry
 - Volume 7 Pavement Design and Maintenance
 - Volume 8 Traffic Signs and Lighting
 - Volume 9 Traffic Control and Communications
- 4.3 The remaining volumes of the UK DMRB, which are used in the United Kingdom but have not been implemented in Ireland, are:
- Volume 10 Environmental Design
 - Volume 11 Environmental Assessment
 - Volume 12 Traffic Appraisal of Road Schemes
 - Volume 13 Economic Assessment of Road Schemes
 - Volume 14 Economic Assessment of Road Maintenance
 - Volume 15 Economic Assessment of Road Schemes in Scotland.

NRA Standards Website

- 4.4 The NRA DMRB can be obtained electronically (in Adobe PDF format) from the NRA Standards Website, which includes links to the relevant parts of the UK Highways Agency Standards Website, as necessary (<http://nrastandards.nra.ie>).
- 4.5 Where the NRA DMRB refers to a UK DMRB document that has been deleted or superseded, the UK document is available from the NRA standards website attached to the corresponding NRA addenda.

Document Reference

- 4.6 All documents in the UK DMRB are allocated to a volume, then split into sections and parts (note – pre 1992 documents do not have a part). A document reference system made up of a number prefixed by HD, HA, BD, BA, TD, TA, (nominally highways, bridges and traffic) pre-dates the UK DMRB in England and continues to be allocated to new documents in addition to a part number within the appropriate section and volume. For ease of cross-referencing the NRA documents use the same referencing system with the additional prefix NRA, ie, NRA BD, NRA HD and NRA TD. For example:

BD 20/92 (UK DMRB 2.3.1) – defines “Design Manual for Roads and Bridges, Volume 2, Section 3, Part 1, Bridge Bearings. Use of BS 5400: Part 9: 1983”. The NRA Volume Introduction to Volume 2 defines that this Standard should be read in conjunction with an NRA Addendum contained in the NRA DMRB, and dated December 2000, when used for schemes in Ireland.

NRA TD 9/10* (NRA DMRB 6.1.1) – defines a National Roads Authority document contained in the NRA DMRB which replaces “UK DMRB Volume 6, Section 1, Part 1, TD 9/93, Highway Link Design”.

- 4.7 The documents assigned to each volume and section of the UK DMRB are listed in the quarterly index of contents pages. The UK DMRB Alpha-numeric Index lists current documents according to their Document Reference to facilitate location of specific documents within the manual. An NRA Alpha-numeric Index is issued as NRA DMRB documents are published; this provides the user in Ireland with a clear summary of the current state of implementation of the NRA DMRB.

Documents Published Since May 1992

- 4.8 Generally all new UK DMRB documents (published since May 1992) have a common format and are jointly published by the Overseeing Organisations of England, Scotland, Wales and Northern Ireland. To enable the NRA replacement documents to be integrated into the UK DMRB, NRA documents follows this common format. Text is arranged in a two-column layout with headers and footers. Each document is subdivided into chapters which contain numbered paragraphs.
- 4.9 Headers contain information which identifies the individual document by its document reference and part number together with the section and volume of the manual in which it is located. Footers contain the page number and the publication month and year. The information in the header and footer of a page uniquely identifies the position of that page within the manual. This is essential for document control for a loose-leaf structured manual.

5. DOCUMENT CONTROL

Introduction

- 5.1 Overall document control for the NRA DMRB is provided through the Alpha-numeric Index. Standards and Advice Notes are deleted from the Alpha-numeric Index only when they have been withdrawn. Tables 1 to 4 of Chapter 2 of the Alpha-numeric Index detail all the documents that have been Introduced or Withdrawn from the NRA DMRB and the UK DMRB since the previous publication.
- 5.2 The National Roads Authority maintains control and archive copies of all documents in the NRA DMRB, through the NRA Standards Website. Where the NRA DMRB refers to an archived UK DMRB document, that document is available on the NRA Standards Website, appended to the bottom of the relevant NRA document. In the UK, old or superseded UK DMRB standards, UK MCHW Specification documents or UK Interim Advice Notes (IANs) can be requested directly from the UK Highways Agency by e-mailing a request to their enquiries e-mail address, below:

Standards_Feedback&Enquiries@highways.gsi.gov.uk

In addition, each Overseeing Organisation and the Stationery Office Ltd maintain, control and archive copies of all documents in the UK DMRB.

Publication

- 5.3 Within the UK DMRB the volume contents pages are revised and issued at quarterly intervals to coincide with the publication cycle for new or amended documents. They are available as a separate document entitled “DMRB – Volume Contents and Alpha-numeric Index” (DMRB 0.1.1) from UK Highways Agency Standards Website, below:

<http://www.dft.gov.uk/ha/standards/index.htm>

Revised volume contents pages have footers which indicate the date of issue, e.g. August 1997, etc.

- 5.4 A similar NRA Alpha-numeric Index (NRA DMRB 0.1.1) is available on the NRA Standards Website. This is an index listing the NRA Standards and Advice Notes applicable in Ireland. It also lists UK DMRB Standards and Advice Notes adopted for use in Ireland and the NRA Addenda to those Standards and Advice Notes. It is revised and issued periodically.

Documents

- 5.5 All NRA DMRB documents are published on the NRA Standards Website. Recent changes since the previous publication are outlined in the introduction to the NRA Alpha-numeric Index to the Design Manual for Roads and Bridges (Volume 0, Section 1, Part 1), also available on the NRA Standards Website.

Minor Amendments

- 5.6 Minor amendments to the NRA DMRB are published on the NRA Standards Website and also indicated within the NRA Alpha-numeric Index to the Design Manual for Roads and Bridges.

6. REFERENCES

6.1 The following documents are referred to in this Introduction:

Highways Agency and others. Manual of Contract Documents for Highway Works (MCHW):

Volume 1: Specification for Highway Works

Volume 3: Highway Construction Details

National Roads Authority. National Roads Project Management Guidelines.

National Roads Authority. Manual of Contract Documents for Road Works:

Volume 1: Specification for Road Works.

Volume 4: Road Construction Details

7. ENQUIRIES

- 7.1 All technical enquiries or comments on this document or any of the documents listed as forming part of the NRA DMRB should be sent by e-mail to infoDMRB@nra.ie, addressed to the following:

Head of Network Management, Engineering Standards & Research
National Roads Authority
St Martin's House
Waterloo Road
Dublin 4



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Pat Maher
Head of Network Management,
Engineering Standards & Research

ANNEX A : SUBSTITUTIONS TO DOCUMENTS

The following substitutions are to be used for terms which commonly occur in UK DMRB documents when such documents are applied for use on NRA schemes:

Term in UK DMRB Document	Applied to NRA Schemes
Department	National Roads Authority
Departmental Standard	Standard
Department of Transport	National Roads Authority
Overseeing Department	National Roads Authority
Overseeing Organisation	National Roads Authority
References to individual Divisions, Regions or Operating Units within the Department of Transport or the Highways Agency	National Roads Authority
Secretary of State for Transport	Minister for Transport, Tourism and Sport
Highway	Road
Trunk Road	National Road
Heavy Goods Vehicle (HGV)	Heavy Commercial Vehicle (HCV)
Large Goods Vehicle	Heavy Commercial Vehicle (HCV)
Approval in Principle (AIP)	Preliminary Approval