

Introduction to the NRA Design Manual for Roads and Bridges

December 2000

Summary :

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

Note:

The layout and format of this document are modelled closely on the UK Highways Agency's Introduction (Document 1.0.1). Wherever practicable, paragraph numbering follows that of Document 1.0.1.

**VOLUME 1 HIGHWAY STRUCTURES -
APPROVAL PROCEDURES
AND GENERAL DESIGN**

**SECTION 0 PUBLICATION
PROCEDURE**

PART A

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

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1. INTRODUCTION

The Manual

1.1 The “Design Manual for Roads and Bridges” (DMRB) was introduced in 1992 in England and Wales, and subsequently in Scotland and Northern Ireland. A modified version, the “National Roads Authority Design Manual for Roads and Bridges” (NRA DMRB) is formally introduced for use in Ireland from 2001. The DMRB provides a comprehensive manual system which accommodates, within a set of loose-leaf volumes, all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads (including motorways) in the United Kingdom. It has developed from a number of separate series of documents previously published by the Overseeing Organisations of England, Scotland, Wales and Northern Ireland. These documents, together with later additions, have been gathered together in a consistent series of volumes within the manual to help in meeting the requirements of quality assurance procedures.

1.1A The NRA DMRB takes the 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 DMRB and, in some cases, complete replacement NRA Standards. At present the NRA DMRB only implements the design standards contained in Volumes 1,2,4,5,6,7,8 and part of 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. It replaces Volume 1 Section 0 Part 1 of the DMRB. 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 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 DMRB are published quarterly, together with an index containing revised volume contents pages

and an alpha-numeric listing of the documents in the manual. Corresponding updates of the NRA DMRB are published each quarter.

Use of the Manual for National Roads

1.4 The DMRB has been prepared by the UK Overseeing Organisations 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 DMRB for use when assessing and designing national roads (including motorways) throughout Ireland, subject to any restrictions contained in the individual implementation documents.

1.4A The 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. With a few exceptions, Advice Notes in the DMRB have not been adopted for application in Ireland. However, Advice Notes provide useful background reading to the 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 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.

Use of the Manual for Regional and County Roads

1.5 The 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 local Road Authority to decide on the extent to which the documents in the manual are appropriate in any particular situation.

1.6 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 local Road Authority making use of the manual should establish formal procedures for considering whether it is appropriate to depart from particular requirements (see paragraphs 1.15 to 1.17).

Implementation

1.7 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.

1.7A Unless otherwise noted in the individual document, the DMRB Standards as implemented by the NRA Addenda and NRA Standards should be used forthwith for all schemes for the construction and/or improvement of national roads. Similarly any DMRB Standards issued subsequently should be used once they have been implemented in Ireland by the issue of corresponding NRA Addenda.

1.7B The Standards should be applied to the design of schemes already being prepared unless, in the opinion of the National Roads Authority, application would result in significant additional expense or delay progress. In such cases, Design Organisations should confirm the application of Standards to particular schemes with the National Roads Authority.

1.7C The use of the 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).

Terminology

1.8 In 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.

1.9 When using the DMRB as implemented by the NRA DMRB in Ireland, the terms “Overseeing Department” and “Overseeing Organisation” refer to the National Roads Authority.

1.10 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.

1.11 There are some cross-references in the DMRB to documents in the “Manual of Contract Documents for Highway Works” (MCHW). This is a complementary manual to the 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 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.” 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

1.12 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.

1.13 (Not used)

1.14 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 1.15 to 1.17 below).

Relaxations and Departures

1.15 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.

1.15A 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).

1.16 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.

1.17 Users must ensure that any proposal involving a Departure from technical requirements is formally approved by the National Roads Authority prior to incorporation into the design. Approval cannot and will not be given retrospectively for Departures exposed at a later stage.

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 three categories: standards (technical requirements),

advice notes and combined documents. 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.

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 any of the Advice Notes contained in the DMRB. However users of the NRA DMRB are encouraged to use the Advice Notes in the DMRB as background guidance to the application of the Standards, while taking account of national differences.

Combined Documents – these are Standards which include technical requirements, advice and guidance within a single document. In these documents 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 ...

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 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. It will not be published formally nor be

available from the Government Publications Sales Office.

Safety, Health and Welfare at Work (Construction) Regulations 1995

2.5 The Safety, Health and Welfare at Work (Construction) Regulations 1995 impose duties on designers of construction projects to avoid foreseeable risks to health and safety or reduce these risks so far as is reasonably practicable so that a project can be constructed, used, maintained and demolished safely. Designers also have to ensure that the design includes adequate information about any aspect of the project which might affect health or safety and to co-operate with the project supervisor or other designers on such matters.

2.6 In requiring designers to conform to specific requirements in the manual, the National Roads Authority is aware of the need for them to comply with the above regulations. However, the National Roads Authority also has a duty to the travelling public to ensure, so far as is reasonably possible, a balance in safety between them and that of the workforce. The requirements of the manual take this into account. It is also important when considering the Relaxation of, or Departure from, any requirements in the manual that users ensure that health and safety standards are not compromised.

3. COVERAGE OF THE MANUAL

Pre-May 1992 Documents

3.1 The DMRB contains some old style UK Department of Transport documents, and although these are gradually being updated some still remain. A few of these are modified by addenda when used in Scotland or Northern Ireland. There are also Scottish Office documents, in the form of technical memoranda, within the manual. For use in Ireland the Department of Transport documents should be used, as implemented by the NRA DMRB.

3.2 (Not used).

Scottish and Northern Ireland Addenda

3.3 Various documents in the DMRB require specific changes when used for schemes in Scotland and Northern Ireland. These are included in the DMRB as Scottish Addenda and Northern Ireland Addenda. These are printed on purple and buff coloured paper, respectively, and are identified in the volume contents pages by the suffix “Scottish Addendum applicable for use in Scotland” and/or “Northern Ireland Addendum applicable for use in Northern Ireland”. These addenda should be ignored when the DMRB is applied to schemes in Ireland.

3.4 (Not used)

Scottish Office and Northern Ireland Documents

3.5 In some cases documents annotated as not applicable for use in Scotland and/or Northern Ireland are replaced for use in Scotland or Northern Ireland by specific Scottish Office documents or old style DoE Northern Ireland documents. These are included within the DMRB and are identified in the volume contents pages by the suffixes “For use in Scotland only” or “For use in Northern Ireland only”. In addition to the above, certain Scottish Technical memoranda remain available. Although these are not included in the DMRB they are listed in the quarterly index

published by the UK Stationary Office. These Scotland and Northern Ireland specific documents should be ignored when the DMRB is applied to schemes in Ireland.

NRA Volume Introductions

3.6 To avoid confusion and provide ready reference to definition of the implementation of the DMRB for use on schemes in Ireland, separate National Roads Authority introductions to each volume of the DMRB are provided in the NRA DMRB. These volume introductions take the place of the volume contents pages as supplied with the DMRB; it is intended that the user insert these at the front of the relevant volume of the DMRB. These volume introductions are referenced as Section 0 Part A of the particular volume (Section 0 Part C in Volume 1).

NRA Addenda

3.7 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. Loose-leaf copies are printed on pale green paper for ease of identification and it is intended that the user insert these in front of the relevant document within the DMRB. The quarterly NRA Alpha Numeric Index and Volume Introductions list those NRA Addenda that are current.

Documents not applicable to Ireland

3.8 Volumes 3, 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, 4, 5, 6, 7, 8, and 9 are not for use on schemes in Ireland, they are identified as such in the NRA introductions to each volume.

National Roads Authority Documents

3.9 In some cases the UK DMRB documents are replaced for use on schemes in Ireland by National Roads Authority documents. For ease of reference these are identified using the same standard number as those which they replace, with the addition of the prefix NRA. For example:

“TD 9/93 Highway Link Design”

is replaced for use in Ireland by

“NRA TD 9/00 Road Link Design”.

The European Economic Area

3.10 All documents in the manual have to comply with European Union law. This has particular implications for those which contain requirements for, or advice about, products. In such cases the National Roads Authority must allow for the mutual recognition on the basis of “equivalence” of products complying with relevant standards and technical specifications of other member states of the European Economic Area.

3.11 The criteria for mutual recognition are different depending on whether the requirements for the product have statutory force or whether they are given effect only by public purchasing specifications. The latter is the case for most documents in the manual. The only exception to the requirement to allow for mutual recognition on the basis of “equivalence” is in publications for use in public purchasing contracts and where specification is made by reference to a European Standard.

3.12 In order to make the position clear to users, it has been agreed with the European Commission that documents containing product requirements which have no statutory force will contain a statement at the front of the document to indicate that they are for use in connection with public purchasing contracts. The statement will not be included in documents which introduce statutory requirements or which contain no requirement for products.

4. STRUCTURE OF THE MANUAL

Introduction

4.1 The 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 inserted in the relevant locations within the DMRB binders.

4.2 The DMRB as implemented for use in Ireland comprises the following volumes:

NRA DMRB Folio A

This contains all the NRA implementation documents required when Volumes 1 and 2 of the DMRB are used on schemes in Ireland

NRA DMRB Folio B

This contains all the NRA implementation documents required when Volumes 4 to 9 of the DMRB are used on schemes in Ireland.

Volume 1 Highway Structures: Approval Procedures and General Design

Volume 2 Highway Structures: Design (Substructures and Special Structures), Materials

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

4.2A The remaining volumes of the DMRB, which are used in the United Kingdom but have not been implemented in Ireland, are:

Volume 3 Highway Structures : Inspection and Maintenance

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.

Binders

4.3 Purpose-made binders to contain the documents in the DMRB, (including section dividers), can be obtained from the UK Stationery Office Ltd. For some volumes, continuation binders are required as there is insufficient space for all documents in one binder. These are labelled with the volume number and a, b, etc. The NRA DMRB is contained in its own binders of matching type for use as a reference document. It is intended that additional copies of the coloured loose-leaf implementation documents be inserted at the appropriate points in the DMRB binders.

Document Reference

4.4 All documents in the 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 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 (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 when used for schemes in Ireland.

NRA TD 9/00 (NRA DMRB 6.1.1) – defines a National Roads Authority document contained in the NRA DMRB which replaces “DMRB Volume 6, Section 1, Part 1, TD 9/93, Highway Link Design”.

4.5 The documents assigned to each volume and section of the DMRB are listed in the quarterly index of contents pages. The DMRB Alpha-Numeric Index lists current documents according to their Document Reference to facilitate location of specific documents within the manual (see Paragraph 5.3). A replacement NRA quarterly index of contents is also issued; this provides the user in Ireland with a clear summary of the current state of implementation of the NRA DMRB (see Paragraph 5.3A).

Documents Published Since May 1992

4.6 Generally all new 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 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.

4.7 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 The manual system has been designed to ensure that publications can be used in a quality controlled environment. Overall document control is provided through the volume contents pages. The yellow instruction sheets issued with each document detail actions to be taken when inserting the document into the manual. Control within each document is achieved through the Registration of Amendments pages which list those pages that have been amended (if any). Standards and Advice Notes are deleted from the volume contents pages only when they have been withdrawn. If they have been superseded, then the document reference will normally remain but the year suffix will change, i.e. BD 20/92 would become BD 20/00.

5.2 Each Overseeing Organisation and the Stationery Office Ltd maintain, control and archive copies of all documents in the DMRB. The National Roads Authority also maintains control and archive copies of all documents in the NRA DMRB.

Publication

5.3 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 1.0.2) from The Stationery Office Ltd, bookshops or agents. Revised volume contents pages have footers which indicate the date of issue, e.g. August 1997, etc.

5.3A A similar NRA Alpha-numeric Index (NRA DMRB 1.0.B) is available from the National Roads Authority. This contains volume contents pages listing the Standards, NRA Addenda and NRA Standards applicable in Ireland and also listing the Advice Notes. It is revised and issued quarterly.

5.4 The superseded contents pages should be archived as they are an additional means of identifying documents that have been superseded or withdrawn.

Alpha-Numeric Index

5.5 A full Alpha-numeric Index based on the document reference is included with the volume contents pages (see paragraphs 5.3 and 5.3A above). This allows users easily to locate particular documents which may be applicable to more than one subject area. The index also lists those documents added to and withdrawn from the manual since the previous index was published.

New Documents

5.6 All new documents are published as a loose-leaf package in a shrink wrapped cover. Documents are differentiated by colour of cover; blue for Standards and combined documents and green for Advice Notes. NRA Addenda have pale green pages, while NRA Standards have white covers and pale green pages. All documents include a yellow instruction sheet which gives:

- a) the location of the new document within the manual;
- b) details of superseded document(s) within the manual;
- c) any other relevant instructions.

Amendments

5.7 Amendments are published as loose-leaf replacement pages for insertion in the particular document. An amendment package includes:

- a) a yellow instruction sheet;
- b) a revised front cover with reference to the amendment;
- c) a revised document contents page containing reference to the amendment;
- d) revised Registration of Amendments pages noting which pages have been replaced;
- e) the replacement pages.

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

Safety, Health and Welfare at Work (Construction) Regulations 1995.

7. ENQUIRIES

7.1 All technical enquiries or comments on this Standard should be sent in writing to:

Head of Project Management and Engineering
National Roads Authority
St Martin's House
Waterloo Road
Dublin 4



.....
E O'CONNOR
Head of Project Management and Engineering

ANNEX A : SUBSTITUTIONS TO DOCUMENTS

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

Term in 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 the Environment and Local Government
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

