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Introduction to the NRA Design Manual for Roads and Bridges

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About TII

Transport Infrastructure Ireland (TII) is responsible for managing and improving the country's national road and light rail networks.

About TII Publications

TII maintains an online suite of technical publications, which is managed through the TII Publications website. The contents of TII Publications is clearly split into 'Standards' and 'Technical' documentation. All documentation for implementation on TII schemes is collectively referred to as TII Publications (Standards), and all other documentation within the system is collectively referred to as TII Publications (Technical). This system replaces the NRA Design Manual for Roads and Bridges (NRA DMRB) and the NRA Manual of Contract Documents for Road Works (NRA MCDRW).

Document Attributes

Each document within TII Publications has a range of attributes associated with it, which allows for efficient access and retrieval of the document from the website. These attributes are also contained on the inside cover of each current document, for reference. For migration of documents from the NRA and RPA to the new system, each current document was assigned with new outer front and rear covers. Apart from the covers, and inside cover pages, the documents contain the same information as previously within the NRA or RPA systems, including historical references such as those contained within NRA DMRB and NRA MCDRW.

Document Attributes

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NRA DMRB and MCDRW References

For all documents that existed within the NRA DMRB or the NRA MCDRW prior to the launch of TII Publications, the NRA document reference used previously is listed above under 'historical reference'. The TII Publication Number also shown above now supersedes this historical reference. All historical references within this document are deemed to be replaced by the TII Publication Number. For the equivalent TII Publication Number for all other historical references contained within this document, please refer to the TII Publications website.

Introduction to the NRA Design Manual for Roads and Bridges

December 2013

Summary:

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

December 2013 Update

The following general amendments are made in the December 2013 update:

- General changes have been made to simplify the document and reflect the particulars of the Manual as a stand-alone document. Various chapter and paragraph numbers have changed as a result.

The following specific amendments are made in the December 2013 update:

- Paragraph 1.22 is corrected to refer to NRA GD 100 Departures from Standards and Specification;
- Paragraph 1.24 on Professional Recognition and the NRA DMRB has been deleted from the June 2013 version. This requirement is now replaced by NRA GD 102 Approval and Sign-off Requirements for Design Documentation on National Road Schemes; and
- Paragraph 4.2 now includes Volume 0 Introduction and General Requirements.

**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**

Contents

Chapter

1. Introduction
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1. INTRODUCTION

The Manual

- 1.1 The NRA Design Manual for Roads and Bridges (DMRB), hereinafter referred to as the Manual, was first published in 2000. It is currently available in electronic format from the NRA Standards website at <http://nrastandards.nra.ie>. This now forms the only controlled source for the current documents, replacing the hardcopy format previously used. This introduction provides information on the use of the Manual for the design of National Road schemes in Ireland. It sets out the basis on how the Manual should be used and how future additions and updates are handled.
- 1.2 The various documents contained in the Manual have been, and continue to be, developed to ensure that the NRA has a comprehensive set of design standards and guidance for the design of roads and bridges in Ireland. A key feature of this system is the provision of a comprehensive archive of all superseded or deleted documents. This feature allows users to view a document that was current at any point in time.
- 1.3 Documents within the Manual are revised and published by the NRA as required, together with an index containing revised contents pages and an alpha-numeric listing of the documents in the Manual (see NRA GD 02).

Use of the Manual

- 1.4 The Manual has been prepared specifically for the design, construction and management of National Roads in Ireland. It contains a mix of Standards and Advice Notes. A number of these documents have not been formally implemented by the NRA but are included as 'background reading' indicating good practice for the activity, or materials, under consideration: These documents are identified in NRA GD 02. Users are encouraged to use them as additional guidance to the application of the implemented Standards and Advice Notes.

Use of the Manual for Regional and Local Roads

- 1.5 The Manual sets a standard of good practice that has been developed principally for the National Road Network in Ireland. It is also applicable to other roads with similar characteristics. Where they are used for regional and 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.
- 1.6 While the requirements given in the Manual may be the best guidance available to road authorities, such authorities should ensure that their application to regional and 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 1.14 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.
- 1.8 The Manual shall be used forthwith for all schemes for the construction and/or improvement of National Roads.

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- 1.9 While the Manual has been devised specifically for use on National Roads, it is noted that all roads affected by National Road projects shall also be designed in accordance with the Manual.
- 1.10 The use of the Manual 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).

NRA MCDRW

- 1.11 The NRA Manual of Contract Documents for Road Works (MCDRW) is a complementary suite of documents containing information relating to contract document compilation, specifications, contractual details, method of measurement and other guidance covering contractual issues. These documents are incorporated directly into contracts by reference. The NRA MCDRW consists of four volumes as follows:

Volume 1: NRA Specification for Road Works

Volume 2: Notes for Guidance on the Specification for Road Works

Volume 3: Method of Measurement for Road Works and Notes for Guidance on the Method of Measurement for Road Works

Volume 4: Road Construction Details

The NRA MCDRW is available in electronic format on the NRA Standards website at <http://nrastandards.nra.ie/nra-mcdrw-documents>. As for the NRA DMRB, this is the only controlled source for the current documents.

Scope

- 1.12 The Manual embodies the collective experience of the NRA, regional authorities, their agents and design organisations 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 Irish National Road system. 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 The Manual has been prepared for use by appropriately qualified and experienced professional staff. It is not a statutory or regulatory document. It is not intended to be a training manual and nor 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 National or European standards, codes of practice and specifications: where relevant these 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 1.14 to 1.17 below).

Relaxations

- 1.14 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.
- 1.15 Relaxations may be introduced at the discretion of the designer, having regard to the advice given in the Manual 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 NRA Project Management Guidelines).

Departures from Standards

- 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 from Standards 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 100 'Departures from Standards and Specification' contained in Volume 0, Section 1, Part 2 of the Manual.
- 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.

Legislation

- 1.18 The Manual 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.

Construction Products

- 1.19 In compliance with the Construction Products Regulation (EU) No 395/2011 (CPR), all construction products covered by a harmonised European product standard (hEN) must have a Declaration of Performance (DoP) and a CE mark in order for them to be placed on an EU market. All parties working on NRA funded schemes (for the construction, maintenance and/or improvement of national roads) must comply with the CPR. This requirement applies throughout all volumes and parts of the Manual, where a hEN is applicable.
- 1.20 The NRA in consideration of the basic requirements for construction works has herein set out the regulations for products incorporated into National Roads in Ireland for both harmonised and non-harmonised product standards.

NRA Standards Website

- 1.21 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 National Road Network operates 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 Manual fall into two categories: Standards (technical requirements) and Advice Notes; the function of each of these is as follows:

Standards – these set out the National Road Authority’s technical requirements applicable to those roads for which they are responsible. The use of the Standards is mandatory except where Departures are agreed. Some Standards include a combination of technical requirements, advice and guidance within a single document. In these documents mandatory technical requirements are indicated by the wording used. For example, in the following clause, the use of the word “shall” indicated that the requirement is mandatory:

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. Many of the Advice Notes contained in the Manual are not formally implemented, having been adopted from the UK Design Manual for Roads and Bridges. Users of the Manual are encouraged to use these Advice Notes as background guidance to the application of the Standards, while taking account of national differences.

2.4 Periodically, the NRA also publishes other documentation in the form of Interim Advice Notes and Technical Bulletins, which sit outside of the NRA DMRB. The function of these is as follows:

NRA Interim Advice Notes – NRA Interim Advice Notes (IANs) 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 and/or specifications under development to be used in conjunction with the NRA DMRB and NRA MCDRW and may incorporate amendments to documents in these manuals.

NRA Technical Bulletins – NRA Technical Bulletins (TBs) communicate important standards-related changes and developments to practitioners of the NRA DMRB and NRA MCDRW. As well as providing information on recent changes and updates to standards-related documentation, NRA TBs may include background information on policy issues behind revisions and other topics considered to be of interest and relevance to NRA standards and specification users. NRA TBs are provided for information only and are not intended as a formal part of the NRA DMRB or NRA MCDRW.

- 2.5 The NRA has 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. ORGANISATION OF THE MANUAL

Contents List and Index for the Manual

- 3.1 NRA GD 02 Volume Contents and Alpha-numeric Index to the NRA Design Manual for Roads and Bridges (NRA DMRB Volume 0 Section 1 Part 1) contains volume contents pages for each volume of the NRA DMRB.

Structure of the Manual

- 3.2 The NRA 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.
- 3.3 The NRA DMRB as implemented for use in Ireland comprises the following volumes:
- Volume 0 Introduction and General Requirements
 - 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

Documentation

- 3.4 The NRA DMRB contains documents that are:
- Stand-alone NRA Standards and Advice Notes;
 - Standards and Advice Notes derived from the UK DMRB amended for use in Ireland by way of an NRA Addendum; or
 - Standards and Advice Notes referenced from the UK DMRB for use as ‘background reading’, but not formally implemented in the NRA DMRB.

NRA GD 02 Volume Contents and Alpha-numeric Index to the NRA Design Manual for Roads and Bridges identifies the status of each document referenced within the NRA DMRB.

NRA Standards Website

- 3.5 The NRA DMRB is available electronically (in Adobe PDF format) from the NRA Standards Website at: <http://nrastandards.nra.ie>.
- 3.6 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. Current UK DMRB documents can be downloaded at:
<http://www.dft.gov.uk/ha/standards/dmrb/>

Document Reference

- 3.7 All documents in the NRA 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 is made up of a number prefixed by HD, HA, BD, BA, TD, TA, (nominally highways, bridges and traffic). Thus NRA TD 9/10 (NRA DMRB 6.1.1) defines a National Roads Authority document contained in the NRA DMRB Volume 6, Section 1, Part 1.
- 3.8 The documents assigned to each volume and section of the NRA DMRB are listed in NRA GD 02: “Volume Contents and Alpha-Numeric Index to the NRA Design Manual for Roads and Bridges”. The alpha-numeric index is re-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.

4. DOCUMENT CONTROL

Introduction

- 4.1 Overall document control for the NRA DMRB is demonstrated 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 since the previous publication.
- 4.2 The National Roads Authority maintains control and archive copies of all documents in the NRA DMRB, through the NRA Standards Website.

Publication

- 4.3 The NRA issues periodic updates to the NRA Standards website. These updates are notified to all subscribed users of the website. Notification is in the form of an e-mail with attached lists of different types of documentation updated, including documentation forming part of;
- NRA DMRB
 - NRA MCDRW
 - NRA IANs
 - NRA TBs

These update notifications are also loaded to the NRA Standards website under the 'Recent Changes' page, linked here: <http://nrastandards.nra.ie/recent-changes-to-nra-mcdrw>

Documents

- 4.4 All NRA DMRB documents are published on the NRA Standards Website. Recent changes since the previous publication are outlined in the introduction to NRA GD 02 (Volume 0, Section 1, Part 1), also available on the NRA Standards Website.

5. REFERENCES

5.1 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

6. ENQUIRIES

- 6.1 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:

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