

# **Noise Mapping and Action Planning Technical Guidance**

## **Noise from Railways**

Environmental Noise Regulations (Northern  
Ireland) 2006

February 2013

## Executive Summary

The European Parliament and Council Directive relating to assessment and management of environmental noise 2002/49/EC, commonly referred to as the Environmental Noise Directive (END), was published in the Official Journal of the European Communities in July 2002. The Directive requires Member States to produce strategic noise maps for road, rail, air traffic and agglomerations and to produce action plans to manage noise issues. The END complements existing EU legislation, which sets standards for noise emissions from specific sources.

The three main objectives of the Directive are as follows:

- To determine the noise exposure of the population through noise mapping;
- To make information on environmental noise available to the public; and
- To develop Action Plans based on the mapping results, to reduce noise levels where necessary, and to preserve environmental noise quality where it is good.

The Directive was implemented in Northern Ireland by the Environmental Noise Regulations (Northern Ireland) 2006 (the Regulations) which outline a number of stages for the management and where necessary, the reduction of environmental noise. The first two of these which relate to round 1 mapping and action planning are as follows:

Stage	Detail	Due Completion Date
1	Produce the first round of strategic noise maps for major, roads, rail, airports and agglomerations	31 March 2007
2	Competent Authorities to draw up first round Action Plans to manage noise	30 April 2008 (18 July 2008 for industry and consolidated plans)
3	Produce the second round of strategic noise maps for major roads, rail, airports and agglomerations	31 March 2012
4	Competent Authorities to draw up second round Action Plans to manage noise	30 April 2013 (18 July 2013 for industry and consolidated plans)

Stage one, the creation of the first round of strategic noise maps and preparation of action plans, has been completed and published on the Noise Northern Ireland website ([www.noiseni.co.uk](http://www.noiseni.co.uk)). Stage two was the preparation of Action Plans which outline the Competent Authorities' future intentions. All the round one Action Plans (roads, railways, industries, Belfast International Airport and George Best Belfast City Airport) have been agreed and adopted by the Minister following public consultation. Round 2 noise maps have been published. Following this, each Competent Authority will prepare its round 2 Action Plan.

The round one Action Plans were drafted as strategic documents, providing a high level overview of the Competent Authorities' aims for the future. As such, the Action Plans need to be supplemented by more detailed guidance in relation to actions which the Competent Authorities intend to take, particularly in relation to the identification of Noise Management Areas (priority areas/areas of concern).

This guidance is designed to help the Competent Authorities for noise mapping and action planning in the interpretation of the round 2 maps and subsequent maps and preparation of the round 2 and subsequent Action Plans. It sets out the proposed mechanisms and arrangements for the implementation of Action Plans and aims to inform the public, guide Competent Authorities, and provide a framework for all organisations involved in noise mapping and action planning.

The strategic noise maps are the starting point for action planning as they provide a focus for deriving Actions to reduce noise where it is deemed necessary. Action plans are designed to manage noise issues

and effects, including noise reduction where necessary. Plans for agglomerations shall also aim to protect quiet areas<sup>1</sup> against an increase in noise where appropriate. The END also specifies the minimum requirements for the content of each Action Plan.

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<sup>1</sup> Article 8(1)(b) of the END requires that Action Plans aim to protect quiet areas against an increase in noise. The Department of the Environment is the Competent Authority under the Regulation 40 for the identification of Quiet Areas. The Department will in due course be consulting on the policy for the identification and protection of Quiet Areas.

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# 1 Introduction

## 1.1 Scope and Purpose of Guidance

This guidance is issued by the Department of the Environment (the Department) under regulation 53 of the Regulations. Accordingly, Translink, on behalf of the Northern Ireland Transport Holding Company, which is the Competent Authority for railway noise mapping and action planning pursuant to the Regulations (Regulation 10 and 30), must have regard to this guidance when developing and implementing Action Plans. This guidance advises on the reporting of strategic noise maps and the presentation of results to the public. This guidance only applies to Translink as the Competent Authority for railways in Northern Ireland. Equivalent guidance has been drafted to assist the other Competent Authorities with respect to other noise sources.

Regulation 53 requires the Competent Authorities to “have regard to” this guidance. Thus, it does not impose mandatory requirements on the Competent Authorities over and above the obligations placed on them by the Regulations. The purpose of this guidance is to assist Translink as the Competent Authority for railways with noise mapping and action planning in order to comply with the END and the Regulations. This guidance is not intended to be unduly onerous for Competent Authorities and is broadly similar to that being adopted or approved in other parts of the UK. In particular, it is designed to assist and guide the Competent Authorities in the implementation of Action Plans which have been adopted by the Minister.

One of the first aims when embarking on a programme of noise management is to quantify the current noise environment. This provides a solid basis for formulating environmental noise management policy. It was in order to seek parity for this across the European Union that the European Parliament and Council adopted the END.

The END defines a common approach to noise assessment across the European Union. It aims to avoid, prevent or reduce, on a prioritised basis, the harmful effects of noise. The END works by:

- Determining exposure to environmental noise through noise mapping;
- Member States adopting Action Plans based upon noise-mapping results, with a view to preventing and reducing environmental noise and to preserve environmental noise quality where it is good; and
- Making information on environmental noise and its effects available to the public.

The END requires Member States to produce strategic noise maps for the main sources of environmental noise, i.e. major roads, major railways, major airports and agglomerations with a population of more than 250,000 persons and a certain population density in 2007. Further strategic maps covering more roads and railways and in agglomerations with a population of more than 100,000 persons, and a certain population density were to be made in 2012 and every 5 years thereafter. The mapping must determine results in terms of the harmonised noise indicators  $L_{den}$  (day-evening-night equivalent level) and  $L_{night}$  (night equivalent level). Results may also be generated in terms of other indicators. The maps are then to be used to assess the number of people potentially exposed to certain noise levels.

The second stage is the preparation of Action Plans, which are a legal requirement under the Directive and must be produced based on the results of the noise mapping. Action Plans must be drawn up by the relevant Competent Authorities in 2008, 2013 and every five years thereafter and from time to time whenever a major development occurs affecting the noise situation. Railways covered by this process are “Major railways” which are those experiencing more than 30,000 train passages per year<sup>2</sup>. The Regulations also require the Action Plans to be reviewed and revised if necessary.

Action Plans have to be developed in the context of the existing regulatory background and must include a description and assessment of the existing framework of control relating to railway noise. The Regulations

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<sup>2</sup> Regulation 3(10)

require that the public are informed and consulted about noise exposure, its effects and the measures proposed to address noise.

It is important to note that the END and Regulations do not set any limit value, nor do they prescribe detailed measures to be used in Action Plans. These remain at the discretion of the Competent Authorities and government of each Member State, as appropriate.

This guidance document should be read in conjunction with the following:

- Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise<sup>3</sup>;
- Environmental Noise Regulations (Northern Ireland) 2006<sup>4</sup>;
- Commission Recommendation 2003/613/EC of 6 August 2003 concerning the guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise, and related emission data<sup>5</sup>;
- EC recommended RM2007 "Reporting Mechanism proposed for reporting under the Environmental Noise Directive 2002/49/EC"<sup>6</sup>;
- European Commission Working Group Assessment of Exposure to Noise (WG-AEN), Position Paper, Good Practice Guide for Strategic Noise Mapping and the Production of Associated Data on Noise Exposure, Version 2, 13<sup>th</sup> August 2007<sup>7</sup>;
- European Commission Working Group Assessment of Exposure to Noise (WG-AEN), Position Paper, Presenting Noise Mapping Information to the Public, March 2008<sup>8</sup>;
- EEA Technical Report No. 11/2010: Good practice guide on noise exposure and potential health effects – October 2010<sup>9</sup>;
- World Health Organisation Night Noise Guidelines<sup>10</sup>; and
- World Health Organisation Guidelines on Community Noise<sup>11</sup>.

## 1.2 Regulatory Framework

The Environmental Noise Regulations (Northern Ireland) 2006 came into force on 20 October 2006 and apply to environmental noise levels in built-up areas, public parks or other quiet areas in agglomerations and other noise-sensitive buildings and areas. The Regulations apply to noise from road, railway and airport sources, as well as industrial noise. They do not apply to noise caused by the person exposed, from domestic or work activities or from neighbours. Nor does the legislation apply to noise inside a vehicle or noise from military activities in a military area. These Regulations were designed to transpose the END into Northern Ireland law.

If a proposed development is likely to be a source of noise, its location and measures regarding the level or timing of noise emissions may be controlled through the planning system. Existing sources of noise such as road or rail traffic are not subject to planning control, but they may be considered in the context of proposed development which may be affected by such sources.

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<sup>3</sup> Official Journal of the European Communities (OJEC) L189/12-25, 18 July 2002. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0049:EN:HTML>

<sup>4</sup> Available at [http://www.opsi.gov.uk/sr/sr2006/nisr\\_20060387\\_en.pdf](http://www.opsi.gov.uk/sr/sr2006/nisr_20060387_en.pdf)

<sup>5</sup> Official Journal of the European Union (OJEU) L212/49-64, 22 August 2003. Available <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003H0613:EN:HTML>

<sup>6</sup> Available at [http://www.circa.europa.eu/Public/irc/env/d\\_](http://www.circa.europa.eu/Public/irc/env/d_)

<sup>7</sup> Available at <http://www.scribd.com/doc/11960345/Good-Practice-Guide-for-Strategic-Noise-Mapping-and-the-Production-of-Associated-Data-on-Noise-Exposure>

<sup>8</sup> Available at <http://www.scribd.com/doc/11959575/Presenting-Noise-Mapping-Information-to-the-Public>

<sup>9</sup> Available at <http://www.eea.europa.eu/publications/good-practice-guide-on-noise>

<sup>10</sup> Available at [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0017/43316/E92845.pdf](http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf);

<sup>11</sup> Available at <http://www.who.int/docstore/peh/noise/guidelines2.html>

The strategic noise maps produced under the Regulations provide a snap shot of the noise impact arising from roads, railways, airports and industrial sources from a particular stretch of railway. Further information on the results of noise mapping is available on the Department of the Environment's website<sup>12</sup> and the Noise Northern Ireland website<sup>13</sup>.

The action planning process is designed to consider the results of the mapping and to identify whether there are any additional measures that might be taken to meet the Regulation's aims. It is important that the action planning process takes account of the existing legislation and guidance framework in Northern Ireland and is updated to reflect technical advances in noise abatement and research on the health effects of noise exposure. In particular this guidance covers the requirements to develop, review and revise Action Plans<sup>14</sup> for railways. The aim of their Action Plans is to, where possible, limit and where possible, reduce the number of people in Northern Ireland significantly affected by railway noise. However, any action which could be taken to assist in achieving this aim must be assessed in light of various factors, including likely noise reduction and the resultant health benefits, fiscal costs and overall proportionality of the proposed actions. Action Plans should be designed to manage noise issues and effects arising from railway noise, including noise reduction if necessary, and should cover the reporting of the Action Plan.

Action Plans must be produced based on the results of the noise mapping. The Regulations also require Action Plans to be reviewed and revised every 5 years and whenever a major development<sup>15</sup> occurs that affects the existing noise situation. It is for the Competent Authority to determine whether a change in situation constitutes a major development which would trigger a revision to the Action Plan. The Department of the Environment considers that a major modification to an existing development would also trigger a review of the Action Plan. Competent Authorities may wish to remap the immediate locality in which the development has occurred to identify the impact, if any, on the noise environment. Competent Authorities are expected to determine whether or not the development constituted a "major development" by considering the extent to which the development alters the conclusions previously drawn from the results of the noise mapping, about the overall noise impact from railways.

When assessing the extent to which the new development has altered the noise climate, Competent Authorities should consider:

- the increase in the number of people subjected to the increased noise;
- the number and spatial extent of the individuals affected by the higher noise levels;
- the existing noise climate;
- the actual noise increase in terms of decibels;
- the probability, duration and frequency of the increased noise;
- whether there is potential for the noise to increase further in the future;
- the vulnerability of the immediate area to noise from the proposed development;
- the probability and severity of health impacts expected as a result of the noise; and
- any other relevant factors.

Alternatively, Competent Authorities may want to develop criteria to assist in the determination of "major development". For example, a major development may be one which is likely to adversely affect a certain percentage of the local population. Irrespective of the method of determination adopted by the Competent Authority, it must be transparent and the Competent Authorities must be prepared to explain their decision-making procedures to the Department of the Environment and the public.

Each development and its potential noise impacts are different. As such, the Competent Authorities must determine each situation individually and based on its specific circumstances. This can be done in

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<sup>12</sup> Available at [http://www.doeni.gov.uk/index/protect\\_the\\_environment/local\\_environmental\\_issues/noise.htm](http://www.doeni.gov.uk/index/protect_the_environment/local_environmental_issues/noise.htm)

<sup>13</sup> Available at <http://www.noiseni.co.uk>

<sup>14</sup> Competent Authorities may wish to seek independent legal advice on the need to complete a Strategic Environmental Assessment on an Action Plan or any subsequent revisions to the plan.

<sup>15</sup> "Major development" when used in the context of the END does not have the same meaning as when used in planning legislation and policy documents



conjunction with the Department of the Environment and the Planning Department as appropriate, which will endeavour to assist the Competent Authority in assessing whether or not the Action Plan needs revising. The Department of the Environment considers that situations constituting major developments may include: the opening of a new bypass, national road, motorway, mineral workings or waste facilities; or the opening of a large new residential area. However, it must be borne in mind that the final determination of what constitutes a major development is a matter for the courts.

In the event that there is any disagreement between the Department of the Environment and the Competent Authority as to whether or not an Action Plan should be reviewed and possibly revised in light of a particular development, the Department reserves the right to invoke its powers under regulations 49 and 50 of the Regulations. Regulations 49(4) and 49(5) allow the Department of the Environment to exercise any of the Competent Authorities' functions, including revising Action Plans, where it considers that as a result of the Competent Authorities' act or omission, a requirement of the Regulations or the Directive is unlikely to be met. Regulation 50 allows the Department to recover, from the relevant Competent Authority, as a civil debt, the expenses incurred in exercising that Competent Authority's functions.

A glossary of the acoustic technical terms used in this Guidance is set out in **Appendix A**.

## **2 Objectives of the END**

### **2.1 Purpose and Scope of the END**

The END is a complex Directive relying heavily on the collection of data and computer modelling technology to support the development of noise maps and Action Plans. It is important to acknowledge that as computer processing power develops, the manner in which data are collected and managed by different organisations will also evolve. This development is likely to continue for some time. Thus, an approach for preparing noise maps and Action Plans that is considered appropriate today may not be appropriate in the future, if more powerful processing is available.

The Directive requires a strategic approach for noise mapping and defines, to an extent, what should be mapped and how the results should be described. This includes the common noise indicators ( $L_{den}$  and  $L_{night}$ ) and an ultimate desire for common assessment methods. This means that the results from the mapping phase of the END should be viewed as a good starting point for those bodies involved in noise regulation and control.

At a European level, there will also be developments over the longer term. In particular, the Commission intends to undertake a review of the END following the first round of Noise Mapping and Action Planning.

### **2.2 Competent Authorities and Key Partners**

In Northern Ireland Translink, on behalf of the Northern Ireland Transport Holding Company, will work with stakeholders and partners with an interest in the END, in particular those likely to implement the plans, when drawing up noise maps and Action Plans.

The following organisations and key partners will be involved in action planning for railways:

- The Northern Ireland Transport Holding Company (Translink);
- Department of the Environment;
- District Councils; and
- Northern Ireland Environment Agency.

## 2.3 Steering and Working Groups

In 2005 the Department of the Environment set up The Northern Ireland Environmental Noise Directive Steering Group (NIENDSG). The group aims to assist the Department and Competent Authorities develop strategic noise maps, Action Plans and a methodology with robust criteria for identifying the priorities for the Action Plans and finalising the location and protection of Quiet Areas, which are identified and designated by the Department of the Environment. The agreement of criteria should mean that the Candidate Noise Management Areas and final Quiet Areas selected are relevant, enabling the most appropriate and cost effective practical actions to be identified.

The steering group is made up of individuals from each of the Competent Authorities and the Department of the Environment. Consideration will continue to be given to the structure of and representatives involved in this group. Any guidance agreed by the NIENDSG should be considered by the Competent Authorities in carrying out their functions.

## 2.4 Programme and Key Dates

First round noise mapping was completed in 2007. The Competent Authorities prepared round one Action Plans and submitted them to the Department of the Environment for consideration. Following public consultation, appropriate revisions were made to the Plans and the Action Plans for roads, railways, industries and the two airports were agreed and adopted by the Minister, and are now policy pursuant to the Regulations.

A summary of the adopted Action Plans has been forwarded to the European Commission by the Department of the Environment as required by the END. Future timescales relating to the implementation of the END are listed below. The Department of the Environment will review its anticipated timetable regularly.

Action	Date
Completion of second round of noise mapping	2012
Completion of second round of Action Plans	2013

## 2.5 Environmental Noise Management

### 2.5.1 Overview of Environmental Noise Management

The Directive aims to prevent and reduce, where necessary, environmental noise through the adoption of Action Plans. It is therefore appropriate to provide a brief overview of current national guidance and practice in this area and a review of environmental noise management, including the tools available for the management of environmental noise pursuant to the Action Plan.

### 2.5.2 Current Community Noise Management Situation

As mentioned above, the Regulations address certain aspects of community noise, but there are other measures in place which address other aspects of community noise. A full list of all current policy together with the legislative and policy framework for environmental noise in Northern Ireland is included in **Appendix D**. **Appendix E** contains a brief summary of the policy and legislation relating to the control of noise in Northern Ireland.

Although not exhaustive, this overview of the current coverage of legislation, regulations and guidance indicates that there are some aspects of community noise management for which guidance or advice is available. However, there are many situations for which there are currently no direct guidelines or legislation.

Noise from individual railway vehicles is increasingly being controlled through legislation. The European Commission introduced a Technical Specification for Interoperability (TSI) to provide limits for noise emission from rail vehicles. Limits from rail plant and equipment are provided by Directive 2000/14/EC, which relates to noise emissions in the environment from equipment used outdoors.

The EC adopted a Technical Specification for Interoperability relating to rolling stock noise for conventional rolling stock in 2006 (Decision 2006/66/EC). This TSI states in its implementation section (chapter 7) that the Commission will consider options for retrofitting of existing freight wagons for noise reduction with stakeholders and the rail industry. The possibility of such an initiative is also reflected in the more recent Commission Communication on rail noise abatement (COM(2008)432). In this Communication, the Commission proposes a combination of measures including noise-differentiated access charges for freight vehicles and noise emission limits for all vehicles. The Commission proposes to implement the access aspects through a future recast of Directive 2001/14/EC, which provides for general requirements on access to and charging for the use of railway infrastructure. The TSIs (on convention and high speed rolling stock) include noise limits for starting noise, noise from stationary vehicles and by-pass noise. Many vehicles have already been introduced that meet these limits.

Further research managed by the Rail Safety and Standards Board has produced a long term trend line for the United Kingdom rail fleet in terms of its noise outputs, measures using the TSI criteria<sup>16</sup>. Both of the TSIs (covering conventional and high speed rolling stock) adopt a two-step approach to reduce the noise emissions limits over time. Furthermore, quieter disc brakes or composite brake block (as opposed to the noisier cast iron brake blocks) have been installed on many passenger vehicles and freight vehicles. Presently the noise TSI is under revision. The limits for start-up, pass-by and stationary noise are not expected to change. However, the methods used to determine how these limits are met will be revised to extend the test options available to stakeholders.

The Northern Ireland planning system plays an important role in supporting the overall management of noise. Regional planning policy and guidance emphasise the need to carefully consider noise in the design of new development proposals. As well as this, local development plans may include bespoke planning policies for controlling noise which are tailored to local circumstances. Noise is also a “material consideration” in the determination of individual planning applications. This means that, where appropriate, noise implications will be fully taken into account by the Planning Authority when considering development proposals.

To help ensure that the overall aims of noise Action Plans are fully realised, and that noise issues continue to be carefully considered through the planning system, the Department intends to include reference to the END requirements in a simplified high level statement of policy that the Environment Minister expects to be in place prior to the transfer of planning powers. This overarching policy document will inform the production of development plans by local authorities and will ensure that the inter-relationship between the planning system and the END is better reflected. It will also set out the core principles that planning authorities should observe in the formulation of local planning policy and in the exercise of local development management functions.

The Department also suggests that it and the other Competent Authorities will encourage the development of future policies at regional and local level to reflect the noise management procedures required pursuant to the END and set out in each individual Action Plan. The Department and other Competent Authorities will aim to liaise with relevant policy making bodies to encourage proper consideration of the noise management issues in policy development. Furthermore, the Department and Competent Authorities will work with relevant government departments to put forward proposals, where necessary, for relevant legislative or other

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<sup>16</sup> T835 Trends in GB rolling stock noise levels

regulatory changes to enable the identified actions to proceed (e.g. without altering the scope and application of the Noise Insulation Regulations).

### **3. Policy Perspective**

#### **3.1 European Policy**

Further to its 1996 Green Paper on Future Noise Policy (COM(96)540), the European Commission developed a new framework for noise policy, based on shared responsibility between the EU and national and local levels. The framework included measures to improve the accuracy and standardisation of data which would help improve the coherency of different actions. This document led to a comprehensive set of measures, including:

- The creation of a Noise Expert Network, whose purpose is to assist the Commission in the development of noise policy;
- The END requiring Competent Authorities in Member States to produce strategic noise maps based on harmonised indicators, inform the public about noise exposure and its effects, and draw up Action Plans to address noise issues; and
- The follow-up and development of existing EU legislation relating to sources of noise, such as motor vehicles, aircraft and railway rolling stock and the provision of financial support to different noise related studies and research projects; and
- Directive 2002/14/EC of the European Parliament and of the Council of 8 May 2000 on the approximation of the laws of Member States relating to noise emission in the environment by equipment for use outdoors.

#### **3.2 UK Policy**

The Department for the Environment, Food and Rural Affairs (Defra) and Devolved Administrations have ongoing noise research programmes, which includes surveys of public attitudes to different kinds of noise across the UK and investigations into various technical aspects of noise management. The project outputs inform government policy in both Westminster and the Devolved Administrations and the governments meet regularly to discuss the outcomes of research and to identify future research priorities.

#### **3.3 Northern Ireland Policy**

The English, Scottish and Welsh governments have implemented the END through their own transposing legislation and the END was implemented in Northern Ireland by the Regulations. These Regulations outline a number of stages to manage and, where necessary, reduce environmental noise in line with the requirements of the END. The first stage is strategic noise mapping followed by action planning.

The Regulations specify the general requirements for strategic noise maps. These are:

- Meet the objectives of Article 1(a) of the END;
- Use the supplementary indicators referred to in Schedule 3 of the Regulations;
- Be completed for the  $L_{den}$  and  $L_{night}$  indicators;
- Include all relevant roads, railways, airports and industrial sites affecting an agglomeration;
- Include all areas affected by designated major roads, railways and airports;
- Be completed using data no more than three years old;
- Satisfy the minimum requirements of schedule 1 of the Regulations which replicates most of Annex IV of the END;
- Present data on an existing or predicted situation in terms of a noise indicator, including breaches of any limit values, the number of people affected in a certain area, or the number of dwellings exposed to certain noise levels in a certain area; and

- Be completed using a method of assessment referred to in Schedule 2 of the Regulations.

The Regulations also specify the requirements for Action Plans. Action Plans must:

- (a) Meet the objectives of:
  - (i) preventing and reducing environmental noise where necessary, in particular where exposure levels can induce harmful effects on human health; and
  - (ii) preserving environmental noise quality where it is good;
- (b) Be designed to manage noise issues and effects, including noise reduction if necessary;
- (c) Aim to protect quiet areas in agglomerations, where appropriate, against an increase in noise;
- (d) Identify and address priorities for meeting the objectives set out in sub-paragraph (a);
- (e) Apply in particular to the most important areas as established by strategic noise maps;
- (f) Meet the requirements in Schedule 4 of the Regulations, which states that an Action Plan shall:
  - (i) meet the minimum requirements of Annex V of the Directive;
  - (ii) contain a summary covering all the important aspects referred to in Annex V of the Directive, not exceeding 10 pages in length; and
  - (iii) be clear and comprehensible; and
- (g) Be based on Noise Mapping results.

## 4. Strategic Noise Maps

### 4.1 Introduction to Noise Mapping

Noise Maps give an overall picture of an area's noise environment but should not be relied upon at a very local level without site-specific validation. As noise levels are predicted at a height of 4 meters, the results of the noise maps cannot be used to determine the noise at other elevations.

For the second round of strategic noise mapping and action planning the traffic flow threshold for major railways is reduced from 60,000 to 30,000 passages per year. **Appendix B** contains the definition of the railways for which noise maps must be produced.

### 4.2 Limitations of Strategic Noise Mapping

Noise maps are only as accurate as the data fed into the models that generate them. For the Round one mapping the data used were primarily those that were available. There was no specific validation of the input data nor was there any specific validation of the data with measurements and detailed site-specific studies. This means that some caution must be taken when interpreting the noise maps. The noise maps are based on predicted noise levels using a 10-metre grid spacing at a receptor height of 4 metres. The noise level for a given grid square is calculated for the centre of that grid square. Nonetheless, as strategic noise maps, the results do provide a good indication of the overall exposure of the population to environmental noise.

Finally, those working on Action Plans must bear in mind that annoyance due to noise is highly subjective and not determined solely by the number of decibels, but also by the nature of the noise, tonal component and the sensitivity of the hearer.

### 4.3 Analysis of Noise Maps

The Noise Maps are investigated using a series of analytical tools that sift and manipulate the vast amounts of electronic data. This facilitates an understanding of the number of people exposed to different noise levels, the number of buildings affected and the number of properties within agglomerations that have a quiet facade.

The general requirements for strategic noise mapping are set out in **section 3.3**.

## 4.4 The Strategic Noise Mapping Process

A seven step approach to noise mapping is recommended. Each stage is defined by preceding stages so that requirements and specifications are captured ahead of the datasets. The stages are:

- Stage 1 - Define Areas to be Mapped
- Stage 2 - Define Noise Calculation Methods
- Stage 3 – Develop Dataset Specification
- Stage 4 – Dataset Production
- Stage 5 – Develop Noise Model Datasets
- Stage 6 – Noise Level Calculations
- Stage 7 – Post Processing and Analysis

Following the assessment of noise levels, analysis is undertaken using datasets developed to present dwelling and population locations. This delivers the statistics required by the EC in accordance with the reporting requirements of the Directive (see **section 8**).

## 5. Action Planning

### 5.1 Introduction to Action Planning

Action planning is the process whereby environmental noise will be managed in line with the END. Action plans must be designed to manage noise issues and effects, including noise reduction if necessary. The Action Plan must aim to identify and protect quiet areas in agglomerations (once designated by the Department of the Environment) against an increase in noise. The procedure for identifying priorities for Action Plans is discussed in **section 6**.

When contemplating implementing noise mitigation measures in a particular area, the acceptability of the current noise in that area should be considered. If the noise levels are not deemed acceptable, further action to reduce the noise level should be considered as part of the action planning process. The question of “acceptability” of the current noise is one to be determined by the Competent Authority in conjunction with the Department. However, before any mitigation measures are implemented, other potential adverse side effects, such as impacts on air quality in the locality, should be considered.

### 5.2 Extent of Action Plans

Action Plans must be drawn up for places which are shown by the results of the noise mapping and subsequently verified locally, to experience high levels of environmental noise (see **section 6**). The Action Plans must be developed in the context of the existing regulatory background and must include a description and assessment of the existing framework controlling railway noise.

### 5.3 Schedule 4 of the Regulations

Action Plans must meet the requirements of schedule 4 of the Regulations which requires Action Plans to :

- Meet the minimum requirements of Annex V of the END; and
- Contain a summary covering all the important aspects referred to in Annex V of the END, not exceeding 10 pages in length. This limit is a requirement of the Directive.

### **General Requirements for Action Planning**

Action Plans must:

- Meet the objectives of Article 1(c) of the END;
- Be designed to manage noise issues and effects, including noise reduction if necessary;
- Aim to preserve quiet areas in agglomerations;
- Address priorities which must be identified having regard to guidance;
- Apply to the most important areas as established by strategic noise maps; and
- Meet the requirements of schedule 4 of the Regulations.

Annex V of the END sets out the minimum requirements of Action Plans.

### **Annex V of the END as it Applies to Railways**

An Action Plan must include:

- A description of the major railways and any other noise sources taken into account;
- The authority responsible;
- The legal context;
- Any limit values in place;
- A summary of the results of the noise mapping;
- An estimate of the number of people exposed to noise and identify problems and situations that need to be improved;
- A record of public consultations organised in accordance with article 8(7) of the END;
- Any noise reduction measures already in force and any projects in preparation;
- Actions which the competent authority intends to take in the next 5 years, including measures to preserve quiet areas;
- Long term strategy;
- Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment; and
- Provisions envisaged for evaluating the implementation and the results of the Action Plan.

The Action Plan should also contain estimates of the number of people affected (in terms

The following paragraphs provide guidance on how the various requirements of Annex V may be fulfilled.

#### **A description of the railways and any other noise sources taken into account**

This information will already have been compiled as part of the noise mapping process.

#### **The authority responsible**

Regulation 10 states the Northern Ireland Transport Holding Company (Translink) is the Competent Authority.

#### **The legal context**

Regulations 34 and 35 place the responsibility for preparing the Action Plan on The Northern Ireland Transport Holding Company. Action Plans must describe and assess the existing national and local framework controlling noise from railways. Such controls may include current government policies and guidance, the Regional Transportation Strategy for Northern Ireland<sup>17</sup> (currently being revised), the three transport plans for Northern Ireland<sup>18</sup> which take forward the Regional Transportation Strategy, wider policies such as the Regional Development Strategy 2025 or the Belfast Metropolitan Transport Plan and the Sub-Regional Transport Plan.

<sup>17</sup> Available at [www.drdni.gov.uk/rts](http://www.drdni.gov.uk/rts)

<sup>18</sup> Available at [www.drdni.gov.uk/index/transport\\_planning/tp-transport\\_plans.htm](http://www.drdni.gov.uk/index/transport_planning/tp-transport_plans.htm)

### **Any limit values in place**

Reference should be made to any restrictions such as legislation, planning conditions or other legal agreements which set or contain a constraint on the railway operations that could affect the level of noise generated. These may include any contour area limits or noise limits on carriages. For instance, new carriages must have drive-by noise levels surpassing EC/ECE70/157 and new rolling stock must meet the limits defined in Directive 96/48/EC on the interoperability of the trans-European high speed rail system. Implementation of these instruments should reduce railway noise as train fleets are renewed. Limits for rail plant and equipment are also set by Directive 2000/14/EC on noise from equipment used outdoors. In 2006 the European Commission introduced a Technical Specification for interoperability (TSI) which provided noise limits for rolling stock (Decision 2006/66/EC). These limit values may already have been described and reported as part of the noise mapping process.

### **A summary of the results of the noise mapping**

The summary should describe the noise impact of the railways on their surroundings and should indicate the noise indicators for which mapping was carried out and the area enclosed by the various contour bands.

Translink should determine the number of noise sensitive premises within the various contours and may choose to include other premises or specific land uses within the definition of sensitive premises depending on local circumstances and priorities. Where railways noise affects an agglomeration, the Competent Authority for the agglomeration should be contacted regarding Action Planning priorities.

### **An evaluation of the estimated number of people exposed to noise, identification of problems and situations that need to be improved**

Much of the information needed to perform this task will be available from the noise mapping results. However, further work or research may be needed to identify specific problems and situations that need improving.

### **A record of public consultations organised in accordance with article 8(7) of the END.**

The action planning process requires formal public consultation of the proposed Action Plan. Further guidance on this is provided in **section 9**. The Plan should include a description of the consultation, the responses received and how they were addressed.

### **Any noise reduction measures already in force and any projects in preparation**

Translink may have existing measures in place to mitigate noise impacts. As part of the noise mapping process information about such measures had to be provided to the Department of the Environment. Thus, this requirement can be met by reviewing the previously prepared information about noise control measures and updating it as appropriate.

### **Actions which the Competent Authority intends to take in the next 5 years, including measures to preserve Quiet Areas**

This comprises of a description of the actions to be implemented under the Action Plans. Such actions may involve transport planning, land use planning, implementation of measures at noise sources, use of quieter carriages, reduced sound transmission or regulatory or economic measures. Thus, Competent Authorities may need to engage with other entities in an effort to ensure the necessary action is taken and support given.

### **Long term strategy**

Translink should describe the likely future development of the rail network and the management of the consequential noise impact should also be outlined.

### **Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment**

Any new noise control measure that is considered for inclusion in the Action Plan must consider the costs and the benefit expected.



### **Provisions envisaged for evaluating the implementation and the results of the Action Plan**

The Action Plan must show how the outcome of any measure implemented will be monitored. Translink should consider providing an update, locally and on a periodic basis of the implementation process and where appropriate, take into account any changes in local circumstances.

### **The Action Plan should also contain estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed or other)**

The Action Plan must state the expected outcome of any proposed measure, for example, the reduction in the number of people affected.

## **5.4 Competent Authority for Developing Action Plans**

The Competent Authority is responsible for ensuring that an Action Plan is developed, but the necessary powers to implement the actions may rest with other bodies. In such cases the Department of the Environment intends that these powers should remain with the bodies already holding them but expects the Competent Authorities to fully engage with such bodies to ensure that appropriate actions which complement each other are incorporated within Action Plans.

Once adopted, the Competent Authority should treat the Action Plans as policy under the Regulations. Other bodies involved in the process, such as the Planning Department, may take the plans into account as a 'relevant' or 'material' consideration when making a policy decision and exercise their duties to ensure that the aims of the Action Plans are achieved. The content of the Action Plans may be a consideration for other bodies making decisions, such as the Planning Authority.

The Competent Authorities may want to consider whether actions to reduce the current and future noise environment are necessary. Areas of current good noise environment can be protected by the designation of Quiet Areas, which is undertaken by the Department of the Environment. Where it is decided that the current noise levels need reducing, it is recommended that a staged approach is adopted. This is discussed below in the section relating to the identification of action planning priorities.

## **5.5 The Action Planning Process**

As a first priority the Competent Authority will consider the measures to be taken in areas shown by the noise maps to have residential premises exposed to high noise levels greater than 50db  $L_{Aeq, 18h}$  and  $L_{Aeq, 16h}$ . More generally, the Competent Authority may examine the day, evening and night results produced from the noise mapping and consider whether there are any features of the noise impact that might be managed further or if there are any measures that might be taken to improve the management of the railway noise. When considering the potential measures to be adopted, Competent Authorities should assess their effectiveness and cost in the wider context. This would include, for example, positive impacts on health or quality of life, a potential benefit for the local economy or whether the potential measure may have adverse environmental impacts on air quality. A balance also needs to be struck between the positive effects of the adopted measures and the potential adverse impacts of such measures on economic development. Efforts should be made to implement measures in an integrated manner, in an attempt to assist in developing an innovative, productive and stable economy which promotes the environment.

The Competent Authority may also consider other measures to manage environmental noise and must ensure that Action Plans apply to the priority areas identified by noise mapping and comply with current legislation.

Translink as the Competent Authority must keep the Planning Department informed of alterations it makes so that the Planning Authority is fully aware of the current state of the locality when determining planning applications and developing legislation, policy and guidance.

## 5.6 Wider Considerations

When considering any new noise management measure within the Action Plan, Translink must bear in mind the legislation and guidance referred to in **Appendices D and E** together with the following;

- Regional Development Strategy 2025;
- Local Area Development Plans;
- Planning Policy Statements and Planning Supplementary Guidance;
- A Planning Strategy for Rural Northern Ireland;
- Regional Transportation Strategy for Northern Ireland 2002-2012;
- Belfast Metropolitan Transport Plan 2015;
- Regional Strategic Transport Network Transport Plan 2015;
- Sub-Regional Transport Plan 2015;
- Sustainable development objectives, plans and policies;
- Planning Agreements;
- Air Quality Regulations and Air Quality Action Plans;
- Renewable Energy Action Plans;
- Local Authority Open Space policies;
- Mosaic GI strategy for Northern Ireland;
- Emerging Climate change initiatives;
- Spatial Data Strategy;
- Urban Regeneration Strategies;
- Noise Abatement Policies; and
- Noise Insulation Regulations (Northern Ireland) 1995.

## 5.7 Current Status of Action Plans

There are five first round t Action Plans in Northern Ireland:

- Roads Noise Action Plan;
- Railways Noise Action Plan;
- George Best Belfast City Airport Noise Action Plan;
- Belfast International Airport Noise Action Plan; and
- Industry Noise Action Plan<sup>19</sup>.

# 6 Identification of Action Planning Priorities

## 6.1 Background

By way of background and to assist the public in understanding the steps that have been taken so far, set out below is a summary of the round one noise mapping and action planning that has been undertaken by the Department of the Environment and the Competent Authorities. The five Action Plans have been adopted or approved by the Minister and are currently being implemented by the relevant Competent Authorities until they are superseded by subsequent Action Plans.

The round one Action Plans are high level strategic plans which outline the general basis upon which the Competent Authorities and the Department of the Environment aim to tackle environmental noise in line with the requirements of the Directive. This guidance builds on the outline aims and objectives set out in the adopted Action Plans and aims to provide detailed assistance in the implementation of the Plans for the next

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<sup>19</sup> All adopted Action Plans are available on the Department of the Environment website at [http://www.doeni.gov.uk/index/protect\\_the\\_environment/local\\_environmental\\_issues/noise.htm](http://www.doeni.gov.uk/index/protect_the_environment/local_environmental_issues/noise.htm)

four years or until the Plans are reviewed. Due to the progressive nature of noise mapping and the evolution of action planning and the Directive itself, the Department may be issuing further guidance under Regulation 53 of the Regulations. Competent Authorities should give any future guidance issued by the Department of the Environment due regard.

## 6.2 Procedure

The selection process adopted for the identification of Candidate Noise Management Areas and Noise Management Areas was developed by the Department of the Environment following discussions with the NIENSG, other Devolved Administrations and DEFRA. The Department of the Environment developed a methodology and ITool (interactive population exposure computer programme) specifically for this purpose. The ITool allows the Competent Authorities to identify, assess and subsequently designate Candidate Noise Management Areas and Noise Management Areas for protection in the first round Action Plans. The approach is a two stage process:

1. Analysis of Strategic Noise Maps for each individual noise source<sup>20</sup>; and
2. Application of the ITool<sup>21</sup>.

This procedure is similar to that adopted in England and Wales and requires the use of noise maps together with the ITool. This approach was agreed by the NIENSG.

## 6.3 Analysis of Strategic Noise Maps

Analysis of the strategic noise maps aimed to identify the number of people in dwellings affected by different levels of noise for each source. To achieve this, population exposure assessments for individual residential dwellings were undertaken at 1dB intervals across the Agglomeration and Belfast International Airport. Exposure assessments were carried out for the following scenarios:

- Major roads and agglomeration roads:  $L_{A10, 18h}$  and  $L_{Aeq, 16h}$  are the primary indicators but other supplementary indicators can also be used.
- Agglomeration railways:  $L_{Aeq, 18h}$  and  $L_{Aeq, 16h}$  are the primary indicators but other supplementary indicators can also be used;
- Agglomeration Industry:  $L_{Aeq, 16h}$  is the primary indicator but other supplementary indicators can also be used;
- Belfast International and George Best Belfast International Airport:  $L_{Aeq, 16h}$  is the primary indicator but other supplementary indicators can also be used...

To assess fully the population exposure, two additional data sets (Residential Pollution Location Dataset and GIS Dataset) were used. The former contained information on the location of people and dwellings whilst the latter assisted with mapping the results.

## 6.4 Determination of Noise Levels to be used in ITool

The ITool combines the noise data gained from the analysis of the noise maps with a Residential Population Location dataset, allowing spatial analysis of exposure to be reviewed and the most exposed façade of the buildings to be identified. The ITool is an interactive programme that allows the user to input differing noise levels to identify the spatial extent, exact location and number of individuals exposed to that particular level.

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<sup>20</sup> However, in cases where other noise sources are contributing to the overall noise level (identified by comparing individual noise source maps to the consolidated map), Competent Authorities should work together to identify the most appropriate noise management options.

<sup>21</sup> The use of GIS and spreadsheet software.

As the coverage of the strategic noise mapping is significant, it is not practical to attend and assess every noise sensitive building within the area mapped. It is therefore necessary to develop a means of identifying the most important locations via, for example, establishment of a noise level which may be used as the commencement point for a review process.

In order to identify appropriate noise levels, which could be inputted into the ITool as different scenarios to assist in the identification of areas of differing noise exposure, and ultimately the determination of Candidate Noise Management Areas, other Member State's guidance was reviewed. It is likely that the Department and the Competent Authorities will bear the guidelines referred to below in mind when considering the identification of Noise Management Areas as part of the action planning process.

England and Wales Planning Policy Guidance 24<sup>22</sup> suggests that planning permission for new housing should not normally be granted where railway noise exceeds 66 dB  $L_{Aeq,16hr}$  and 59 dB  $L_{Aeq,8hr}$ . The Noise Insulation Regulations (Northern Ireland) 1995 set a level of 68 dB  $L_{A10,18hr}$  above which a noise insulation package must be offered to property owners in the event that other conditions specified in the Regulations are met. Annex 1 of the Scottish Planning Advice Note 56 on Planning and Noise<sup>23</sup> contains similar advice.

The proposed onset levels for assessment of noise mitigation measures for railway noise in the Republic of Ireland, are:

- 68 dB,  $L_{den}$ ; and
- 59 dB,  $L_{night}$ .

The proposed onset levels for assessment of noise level preservation where they are good, are:

- 55 dB,  $L_{den}$ ; and
- 45 dB,  $L_{night}$ .

i.e. noise levels should be less than these values.

These levels reflect an annual average 24 hour period.

Guidelines produced under the auspices of the World Health Organisation<sup>24</sup> make a number of recommendations for noise levels in specific in order to avoid certain effects occurring. Examples of the guidelines are:

- 55 dB  $L_{Aeq}$ , day, outdoor living area, avoid the majority of people from being seriously annoyed;
- 50 dB  $L_{Aeq}$ , day, outdoor living area, avoid the majority of people from being moderately annoyed;
- 35 dB  $L_{Aeq}$ , day, dwelling indoors, avoid the majority of people from being moderately annoyed; avoid speech interference effects;
- 30 dB  $L_{Aeq}$ , night, inside bedrooms, to avoid sleep disturbance; and
- 45 dB  $L_{Aeq}$ , night, outside bedrooms with open window, to avoid sleep disturbance.

In reality, any large city is likely exceed these WHO values. However, all the aforementioned guidelines provide a useful frame of reference for noise management going forward. The Department and Competent Authorities may take account of these values or adopt them in conjunction with using the Interactive Exposure Analysis Tool when identifying Candidate Noise Management Areas.

## 6.5 Application of the ITool

Based on the population exposure information gained from the analysis of the noise maps, noise levels were classified in 1dB intervals from 50dB upwards, with values greater or equal to 80dB classified as  $\geq 80$  dB.

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<sup>22</sup> Available at <http://www.communities.gov.uk/publications/planningandbuilding/ppg24>

<sup>23</sup> Available at <http://www.scotland.gov.uk/Publications/1999/04/PAN56>

<sup>24</sup> Berglund B., Lindvall T. & Schwela D. (Eds) *Guidelines for community noise*, World Health Organisation, London, March 1999, Published 2nd of March 2000

The ITool can then be used to analyse this information in conjunction with a Residential Population Location Dataset to allow spatial analysis of exposure to be reviewed and the most exposed façade of buildings to be identified. Once noise exposure levels are assigned to buildings, the ITool can then be used to assess various noise threshold scenarios, revealing the spatial distribution and numbers of people exposed to the noise level adopted in that particular scenario.

The ITool is an interactive programme that allows the user to input differing noise levels to identify the spatial extent, exact location, number of individuals and percentage of the population exposed to that particular level. This provides the Competent Authority with an illustration of the noise environment, from which it can determine the areas it would consider making Candidate Noise Management Areas based on the area and number of individuals affected by various noise levels. The ability to trial various scenarios enables the Competent Authority to assess the positive impact that designation of a particular Noise Management Area would have, in terms of the number of people or percentage of the population benefitting from the noise reduction. The ITool also allows the Department and Competent Authorities to compare and evaluate fully all the options available.

The NIENDSG agreed that the  $LA_{10\ 18}$  and  $LA_{eq16}$  indicators should be used for prioritisation and that as a first priority the Competent Authority should identify the total population affected by noise levels of more than 50 db  $LA_{eq18h}$  and  $LA_{eq16h}$  from railways. From that the Competent Authority should identify where the 1% of the population that are affected by the highest noise levels from roads are located according to the results of the strategic noise mapping ("Important Areas") and target these areas for investigation with a view to becoming Candidate Noise Management Areas.

As required by END, Competent Authorities must work to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. To achieve this, Competent Authorities should consider investigating beyond the top 1% of the population affected in situations where this could be advantageous in reducing noise exposure and the effects of noise. Competent Authorities can also examine the  $L_{day}$ ,  $L_{eve}$  and  $L_{night}$  results to consider whether or not there are any additional features of the noise impact from railways that could be managed further, in an effort to reduce population exposure and improve the noise situation for those most affected by airport noise.

## **6.6 Identification of Candidate Noise Management Areas**

Having identified areas containing the 1% of the population most affected by noise, the Competent Authority then need to assess the extent to which noise needs to be reduced in these areas and prioritise the areas most in need of protection through designation as formal Noise Management Areas. It is considered that attention could be focused on the locations where most people are exposed to the highest noise levels or where sensitive receptors are located.

Candidate Noise Management Areas are areas identified by high levels of environmental noise and the aim is to reduce, where possible, noise in such areas by making them formal Noise Management Areas. Candidate Noise Management Areas should be listed in the Competent Authority Action Plans which are released to public consultation, prior to being submitted to the Department of the Environment. The identification of such areas will be determined based on various factors, including proportionality and cost-benefit, which is discussed further in **section 6.7**. Identification is based primarily on human exposure to average noise levels over a prolonged period of time and adverse effects on human health and quality of life. Following an area or areas being identified as a Candidate Noise Management Area(s), the Competent Authority should consult with the Department of the Environment and relevant stakeholders. The consultation should include maps showing the locations of Candidate Noise Management Areas before they are finally designated.

## 6.6.1 Validation

Following the identification of Candidate Noise Management Areas it is necessary for Competent Authorities to confirm that the noise levels indicated by the strategic noise maps are actually experienced in those areas. Thus, a degree of field work may need to be undertaken prior to any designation of formal Noise Management Areas. Such field work can also identify if noise sensitive rooms are on the most exposed façade of the building or if noise mitigation measures are already in place.

Any validation of the noise levels produced by the noise mapping presents several challenges. Firstly, the maps reflect the position for an average 24 hour period over a year. Strictly, therefore, any validation monitoring should occur over a year. Secondly, the measured noise levels may be different from the mapped levels because the traffic flows or other input data have changed since the maps were made. Thirdly, the maps reflect the noise from specific sources: a sound level meter will measure all the noise affecting a location and not just the noise from the source of interest. None of these challenges are insurmountable, but simply monitoring the noise may not be the most cost-effective method of confirming whether the action planning efforts are being focussed on the right areas.

The approach to validation adopted in Scotland is similar to that used in Northern Ireland. The noise levels at certain points predicted by the noise models and reflected in the noise maps are verified by relevant stakeholders. The noise levels at certain locations, annoyance response to the noise, number of people affected, nature of the properties in the area (residential/commercial, sensitive/non-noise sensitive), nature of the noise source, and recent changes to road or urban landscape are examined in Candidate Noise Management Areas. This is done in order to fully appreciate the nature of the Candidate Area before a balanced judgment regarding the declaration of formal Noise Management Areas is made.

## 6.7 Identification of Formal Noise Management Areas

### 6.7.1 Review of Possible Prevention and Mitigation Measures

Once the existing noise impact has been confirmed for the Candidate Noise Management Areas under review, potential noise mitigation measures and costs and benefits should be also investigated by the Competent Authority prior to formal designation as Noise Management Areas. There are a wide range of potential direct and indirect noise mitigation measures. Some act at a national or regional level, others may be localised, some relate to vehicle manufacture, whilst some directly mitigate noise and others act to avoid noise. However, not all measures are available to the relevant authorities and thus they may not be implemented following assessment of the potential measures. Potential options include:

- Carriage noise emissions and rail noise regulations set at EU level;
- Noise regulations which would be set at national level;
- Transport policy objectives set at regional level;
- District council and Government Departments' powers;
- Railhead grinding;
- Fleet renewal;
- Carriage manufacture/design controlling noise at source and reducing engine noise;
- Electrification of lines;
- Altering the type of rolling stock using a particular rail corridor;
- Managing traffic, for example to reduce start up, acceleration and braking noise;
- Replacement of tread brakes with disc brakes;
- Greasing rails on tight corners;
- Reducing the number of wheel profiles in use to improve contact at the wheel/rail interface;
- Congestion management schemes to divert railways from sensitive premises; and
- Design and layout of developments or urban landscape to ensure that noise insensitive buildings are used as barriers to protect sensitive structures.

## 6.7.2 Comparison of Possible Mitigation Measures

Monetary assessments of noise reduction are becoming increasingly common to ensure that the financial costs of implementing measures are proportional to the noise reduction benefits likely to be achieved, and to maximise value for money. Some assessments are based on property values while others consider the willingness of residents exposed to noise to pay, and as such, tend to lead to differing suggested levels of financial benefit. Any analysis undertaken should also address construction, maintenance and lifetime costs together with other relevant issues, such as additional journey times, increased air pollution or diversion of noise to other locations. Competent Authorities undertaking a cost-benefit analysis of the mitigation options may wish to consider the guidance within the CSF Evaluation Units report from 1999<sup>25</sup>. Or examples of noise mitigation measures within the EC, such as Silence (Quieter Surface Transport in Urban Areas)<sup>26</sup>. However, cost is likely to be a major determining factor.

Whilst there is no precise methodology for assessing the health benefits derived from specific noise reduction, there is a variety of research that may assist Competent Authorities in comparing and assessing noise mitigation measures. This research will also assist in prioritising the Candidate Areas which will most benefit from designation as Noise Management Areas. Research includes:

- The Night Noise Guidelines for Europe, World Health Organisation 2009<sup>27</sup>; and
- Estimating Dose-Response Relationships Between Noise Exposure and Human Health Impacts in the UK, Dr Bernard Berry and Dr Ian Flindell 2009<sup>28</sup>.

The benefits gained from noise reduction must also be viewed in terms of the health advantages. The adverse health effects of noise include discomfort, annoyance, interrupted sleep, irritability, inability to relax, poor concentration, reduced productivity, abnormal hormone responses and mental stress. More serious health implications include deafness (occupational and blast deafness), circulation problems, aggravation of gastro-intestinal conditions, psychological conditions, fatigue and headaches as well as impaction upon metabolism and the immune system. However, many of these conditions can be a consequence of several non-noise related factors and as stated above, the costs (fiscal and non-fiscal) should be proportionate to the anticipated benefit.

The benefit of noise reduction may also be viewed in terms of decibels, number of people affected, duration of noise or financial benefits. Approaches to assessing noise reduction include:

- HEATCO project (HEATCO, Developing Harmonised European Approaches for Transport Costing and Project Assessment, Final Technical Report, December 2006);
- WG-HSEA reports, Web TAG (Department for Transport, Transport Analysis Guidance, Noise, TAG Unit 3.3.2, November 2006); and
- STAG (Transport Scotland, Scottish Transport Appraisal Guidance, 6.11 Noise and Vibration, September 2006).

The extent of noise reduction may be a reasonably simple assessment if global, international or national source related measures are being considered, but may be more complex if local measures are being reviewed. Assessment of noise reduction may involve the use of the strategic noise models to undertake scenario testing.

### 6.7.2.1 Cost Benefit Analysis

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<sup>25</sup> Community Support Framework (CSF) Evaluation Unit, *Proposed Working Rules for Cost Benefit Analysis*, June 1999

<sup>26</sup> Available at <http://www.silence-ip.org/>

<sup>27</sup> Available at [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0017/43316/E92845.pdf](http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf)

<sup>28</sup> Available at <http://www.defra.gov.uk/environment/quality/noise/igcb/documents/executive-summary.pdf>

The financial impact of noise on society has been estimated at 0.2 - 2% of GDP. In addition the European Commission Green Paper (1996) noted that noise contributes greatly to reducing city dwellers' quality of life and can cause severe health problems. There is a clear benefit to society in reducing environmental noise. However, reducing noise levels will often involve interventions at a significant cost. Competent Authorities and their key partners within the working groups will be required to develop prioritisation criteria for identifying areas of concern. Such areas of concern may need further consideration to determine whether practical and cost effective noise mitigation measures can be taken. The budget can be allocated to permit the implementation of such measures where benefit is justified.

It is likely to be appropriate to develop a five year plan of interventions to achieve the desired levels of improvement.

Useful criteria to consider when developing any prioritisation matrix may include:

- Identifying the noisiest locations that affect the most people;
- Identifying the location of nearby sensitive buildings;
- Minimising whole life cost;
- Including interventions within existing maintenance or improvement programmes; and
- Minimising disruption.

A timetable and programme for interventions should then be agreed and included in the Action Plan. The number of properties and people benefiting from, and the cost of the interventions should be included in the Action Plan.

Deliberation of the action to be undertaken, including consideration of the factors discussed above will result in one of four outcomes. Such detail should be provided with a draft or revised Action Plan.

1. If there are financial resources immediately available and it is clear that the proposed actions will provide the expected benefit, the Competent Authority will determine a timetable for implementation.
2. If there is an appropriate action but no financial resources available, the Competent Authority can secure such resources to carry out the work by obtaining an increased budget or re-prioritising existing budgets, possibly in future financial years. If finance is secured, a timetable for implementation will be set.
3. No action is possible because either there is no appropriate measure to take (e.g. reasonable sound insulation already exists, or a noise barrier is at the optimum size) or a technical issue prevents implementation (e.g. ground conditions prevent a barrier being erected). The Competent Authority must justify its decision to the Department of the Environment.
4. No action is possible because there would be significant adverse non-acoustic effects (such as safety, air pollution, congestion or increased journey times) that could not be mitigated by the proposed measure. The Competent Authority must inform the Department of the Environment of the justification for its decision.

For each Candidate Noise Management Area the Competent Authority will identify proposed actions to meet the objectives or state why no further action can or needs to be taken. Any such action must be considered by the Competent Authorities in light of the planning system and regulatory framework prior to being recommended for designation. The Competent Authorities should work with the Department of the Environment and other relevant authorities and bodies to establish a clear framework of responsibility so that railway noise is properly managed in the context of sustainable development and that the role of each body is clearly understood by the public.



Where the Competent Authority identifies a potentially beneficial action for which it is not the managing authority or organisation (i.e. the Competent Authority is not the correct body to implement the action), it should liaise with the relevant authority to discuss the viability of action or support the other authority in undertaking the desired actions.

Railway noise is currently managed in accordance with Council Directive 96/48/EC on the interoperability of the trans-European high speed rail system and conventional rolling stock (2001/16/EC), which specifies maximum noise emission from trains. Noise related procedures regarding rail operations include Traction Instruction TI05-01-001 "Noise Abatement DE-Dietrich Head End Power" which ensures Enterprise locomotives shut down their head-end power unit whilst moving between York Road Depot and Central Station.

Implementation of Noise Action Plans should start as soon as the plans are adopted. The Plans should be published by the Department of the Environment as a public document in an electronic format within 28 days of being informed that they are adopted. The summary document should be made available in both electronic and paper formats in the same timescale.

## **7 Public Consultation, Adoption and Participation**

### **7.1 Overview of the Process**

The Competent Authorities will have acquired information as part of the Action Planning process and reached a view on whether or not the current noise impact is acceptable and current noise control measures are adequate. In coming to this view, the Competent Authorities will have considered the noise maps, contents of this guidance, relevant policy statements and, if applicable, the Regional Transportation Strategy for Northern Ireland 2002 – 2012 and Regional Strategic Transport Network Transport Plan 2015.

Competent Authorities should assemble this information and proposals for a way forward into a Draft Noise Action Plan for wider public consultation. The Round one Action Plans which have now been adopted are high level strategic plans. Following the application of the procedure for the identification of Candidate Noise Management Areas (outlined above), it is anticipated that the Draft Round Two Noise Action Plans will identify the Candidate Noise Management Areas and the specific actions which the Competent Authorities intend to take in order to manage the noise environment in those areas.

The various steps in the process of identifying and designating Candidate Noise Management Areas are set out below:

1. Use of the ITool to identify Candidate Noise Management Areas;
2. Competent Authorities undertake public consultation on the Candidate Noise Management Areas as part of their Action Plan;
3. Further appraisal of the Candidate Noise Management Areas;
4. Formal designation for the Noise Management Areas;
5. Revision of the Action Plans if necessary.

### **7.2 Consulting the Public**

The Regulations require Competent Authorities to consult the public when preparing and revising Action Plans:

### **Action Plans – Public Participation**

In preparing and revising Action Plans Competent Authorities must ensure that -

- The public is consulted about proposals for Action Plans;
- The public is given early and effective opportunities to participate in the preparation and review of the Action Plans;
- The results of the public participation are taken into account;
- The public is informed of the decisions taken; and
- Reasonable time frames are provided allowing sufficient time for each stage of public participation.

Competent Authorities should also liaise with the local Planning Authority and other local authorities affected by the particular railway. The Competent Authorities may also wish to consult local amenity groups with whom they would normally engage over railway issues.

Once the Draft Noise Action Plan which lists Candidate Noise Management Areas has been prepared a formal public consultation exercise should be undertaken by the Competent Authority in advance of submitting the draft Action Plan to the Department of the Environment. The consultation document must include prominently displayed wording identifying it as a draft subject to public consultation and adoption. The extent and nature of the consultation should be proportionate to the actions being proposed. The Department considers that the minimum period for a formal consultation exercise is 8 weeks; 12 weeks is the standard period. Depending on the importance and likely impact of the Action Plan, the Competent Authority should normally consider holding some seminars or organising other alternative channels for consultation during this period to help individuals and organisations in the wider community in formulating their responses. It is important to bear in mind the requirements of groups which may have special needs and be prepared to make available key documents in alternative formats, such as braille, large print or alternative languages.

In addition, Competent Authorities and the Department of the Environment should actively seek comments from:

- Other relevant government departments;
- Northern Ireland Environment Agency Industrial Pollution and Radio Chemical Inspectorate
- Department of Regional Development;
- Competent Authorities in adjacent areas and neighbouring Member States;
- Local and regional authorities;
- Local and national pressure groups;
- NGOs;
- Relevant professional bodies; and
- Local citizen groups.

Competent Authorities should examine and reflect upon the comments received from the consultation process and finalise the Draft Noise Action Plan, including a description of the comments received and a reasoned justification for the response to the issues raised. The Competent Authority shall include with the Draft Noise Action Plan, which is submitted to the Department of the Environment, a schedule of all those individuals and organisations who responded to the consultation (unless they indicated that they did not wish to appear in such a schedule).

Following public consultation the Draft Noise Action Plan should include, in a separate Appendix, the railway specific information that was relied upon to develop the Action Plan. The level of detail should be such that it is possible to clearly understand the background to the content of the Action Plan, both in terms of actions that are included and those that are not.

The Draft Round 2 Noise Action Plan should be submitted to the Department of the Environment no later than 30 April 2013. All documents must include prominently displayed wording identifying them as a drafts subject to formal adoption and approval by the Department and Environment Minister.

The Department will decide whether or not the Draft Noise Action Plan and summary comply with the Regulations and whether or not to adopt the plan. If the requirements are met, the Department of the Environment will recommend that the Environment Minister adopts the Action Plan. If the requirements of the Regulations are not met, the Competent Authority will be required to make the necessary changes to the Draft Noise Action Plan or summary. Following revision, the draft Noise Action Plan must be resubmitted to the Department by an agreed date.

### **7.3 Liaison with relevant District Councils**

The Competent Authorities will liaise with the relevant district councils about progress and the outcome of deliberations on possible action to be taken.

Given that one of the aims of Action Plans is to protect formally identified Quiet Areas in agglomerations (Article 8(1)(b) of the END), the Competent Authorities need to consider whether the proposed measures might conflict with the Quiet Area objectives, when such areas are designated by the Department of the Environment. The Department will, in due course, be consulting on the policy on the identification of Quiet Areas and district councils and Competent Authorities should refer to any such guidance when assisting the Department of the Environment in identifying such areas. The Competent Authorities should liaise with relevant district councils and Departments, such as the Planning Authority, to avoid a conflict of interest arising and to agree the best way forward.

### **7.4 Revision of Action Plans**

The Regulations contain a continuing obligation on Competent Authorities to review (and revise, if necessary) Noise Action Plans every 5 years and whenever a “major development”<sup>29</sup> that affects the current noise situation occurs. It is for the Competent Authority to determine whether a change in situation constitutes a “major development” triggering revision to the Action Plan. In doing so Competent Authorities should consider the extent to which the development alters the conclusions previously drawn from the results of the noise mapping about the overall noise impact from road traffic. Further guidance on what constitutes a major development is contained in **section 1.2**, but the Department considers the following to be examples of major developments: the opening of a new bypass, national road, motorway, mineral workings or waste facilities; or the opening of a large new residential area. However, it must be borne in mind that the final determination of what constitutes a major development is a matter for the courts.

Where the Competent Authority considers that the Action Plan needs revising in light of a major development, the process described above regarding identification and prioritisation of Noise Management Areas and consultation should be followed.

The Competent Authorities may wish to agree to carry out an informal review of the implementation of the Action Plan as part of their continuing engagement with relevant stakeholders and the NIENDSG. The process and timing for any informal review should be jointly agreed between the Competent Authority and the relevant parties. Such reviews could form part of any environmental reporting that is already undertaken.

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<sup>29</sup> Major development” when used in the context of the END does not have the same meaning as when used in planning legislation and policy documents

## 8 Reporting Requirements

### 8.1 Reporting Mechanism

Member States within the EC must submit the results of the strategic noise mapping and action planning to the Commission. As the designated national authority it is the Department of the Environment's responsibility to report the results to the Commission.

The EC have published a recommended reporting mechanism. Electronic Noise Data Reporting Mechanism (ENDRM)<sup>30</sup> sets out 11 Data Flow templates covering the Member States reporting obligations under the END. The Data Flows cover the first and second round implementations of the END with deadlines ranging from 2005 to 2014. Second round noise mapping results are required to be submitted to the Commission by 31 December 2012.

The information is reported to the Commission by the Department of the Environment. The information may be updated at anytime by the Department of the Environment. Thus, the Competent Authorities should update the Department of the Environment of any changes in information that are pertinent to the report as the project extent is clarified prior to approaching the commencement of the noise mapping.

### 8.2 Information to be sent to the Department of the Environment

The Regulations allow for some scope by the Competent Authorities to select the method of assessment to be used for the noise mapping, as well as the use of supplementary noise indicators in addition the required assessment of  $L_{den}$  and  $L_{night}$ .

The noise mapping bodies are to have made second round strategic noise maps by 30 June 2012 in respect of the calendar year 2011. The Competent Authorities are to submit the following to the Department of the Environment by 31 July 2012:

- Results of the strategic noise mapping, in an electronic format to be agreed with the Department of the Environment; and
- Draft Strategic Noise Mapping Report.

The designated noise mapping bodies for the agglomerations should liaise and submit a single set of strategic noise mapping results relating to roads, rail, airports and agglomerations and a single consolidated Draft Strategic Noise Mapping Report.

### 8.3 Information to be made available to the Public

Within the context of the Regulations and Directive the strategic noise maps are to serve as a public statement of the extent to which environmental noise currently affects the area covered by the maps. They are also intended to provide the basis of evidence for the development of noise Action Plans. The Action Plans are to serve as a public statement delivering the central tenet of the Directive. They should communicate to the public the effects of environmental noise, the extent to which such noise currently affects the area covered by the Action Plan and the proposed approach to managing noise in those areas.

Dissemination of information to the public should be via any appropriate means, including use of available information technologies and should be in accordance the Regulations. Action Plans should be made available to the public within one month of the date they are adopted. The Directive states that dissemination should be in "accordance with relevant EC legislation, in particular Council Directive 90/313/EEC of 7 June 1990 on the freedom of access to information on the environment". This legislation has subsequently been

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<sup>30</sup> [http://circa.europa.eu/Public/irc/env/d\\_2002\\_49/library?l=/reporting\\_mechanism/reporting\\_mechanism&vm=detailed&sb=Title](http://circa.europa.eu/Public/irc/env/d_2002_49/library?l=/reporting_mechanism/reporting_mechanism&vm=detailed&sb=Title)

repealed and replaced by Directive 2003/4/EC of 28 January 2003 on public access to environmental information which is transposed by the Environmental Information Regulations SI 2004 No. 3391.

The European Commission Working Group Assessment of Exposure to Noise (WG-AEN) has developed Position Papers and Good Practice Guides on Noise Mapping (Good Practice Guide for Strategic Noise Mapping and the Production of Associated Data on Noise Exposures, Version 2, 13 August 2007<sup>31</sup>).

## 9 Long Term Strategies

### 9.1 Introduction to Long Term Strategies

The Department of the Environment recognises that environmental noise must be managed as part of a long term strategy which runs beyond each fiveyear Action Plan. Thus, the following issues should be borne in mind by the Competent Authorities, other relevant authorities and stakeholders when considering how best to manage environmental noise.

### 9.2 Improving the Information Available to the Public

The Department continually updates the information on its website and on the Noise NI website. It is recognised that better information on the roles and responsibilities of the organisations involved in noise management and of the schemes already in place to address noise, should be available to the public. To this end, Competent Authorities, district councils and stakeholders are encouraged to provide such information on their websites.

### 9.3 Improving the Information for Noise Mapping

It is evident that a more robust and reliable system of data collection, management and control is needed to enable the strategic noise mapping to take full account of all the input variables affecting the noise levels generated. Thus, the Department shall endeavour to liaise with the relevant bodies and NIENDSG to improve data quality and coverage for future noise mapping.

### 9.4 Improving the Evidence Base for Assessing Noise Impacts

The Department recognises that there is scope to improve information on noise impact, particularly the effects on sensitive receptors. For instance, better understanding of the effects of night noise and the role of the  $L_{den}$  is required. The World Health Organisation has published its Night Noise Guidelines for Europe and the European Commission is also researching these issues. Action Plans should be updated to reflect the findings of ongoing research and new evidence on the impact of noise.

### 9.5 European Engagement

The Department of the Environment will continue to engage with Europe on initiatives seeking to reduce railway noise and on measures to mitigate such noise. Such initiatives include the EU – funded QCITY (Quiet City Transport) and SILENCE (Quieter surface transport in urban areas) projects. The former focuses on noise in urban areas and the development of tools for effective policy making, while the latter addresses urban noise by taking a longer term scientific approach.

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<sup>31</sup> WG-AEN GPG v2. Available from: <http://ec.europa.eu/environment/noise/pdf/gpg2.pdf>; Presenting Noise Mapping Information to the Public, March 2008. Available from: [http://circa.europa.eu/Public/irc/env/noise\\_map/library?l=wgaen\\_001\\_2008doc/EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/env/noise_map/library?l=wgaen_001_2008doc/EN_1.0_&a=d); and Mapping Software Catalogue, April 2008. Available from: [http://circa.europa.eu/Public/irc/env/noise\\_map/library?l=/catalogue\\_versapr08xls/\\_EN\\_1.0\\_](http://circa.europa.eu/Public/irc/env/noise_map/library?l=/catalogue_versapr08xls/_EN_1.0_)

## **9.6 Cross Policy Coordination**

The Department, of the Environment together with other governmental departments, shall endeavour to achieve cross policy coordination of noise related issues. This may include addressing the management of Noise Management Areas and the protection of Quiet Areas potentially within Local Area Development Plans or other local policy documents where appropriate. The noise actions set out in Actions Plans should also recognise wider national and local government policy, including that relating to air quality and climate change.

## **9.7 Revision of Assessment Methods**

The Department intends to work closely with relevant government bodies to assist with revision of the calculations of and procedures for measuring and assessing airport noise.

## **9.8 Research into Noise Reduction and Mitigation**

The Department of the Environment will continue to encourage the development of and research into railway noise mitigation techniques.

## **9.9 Best Practice Management**

The Department of the Environment will encourage all Competent Authorities to adopt good practice approaches to the assessment and management of noise.

## **9.10 Noise Indicators**

The NIENSG will consider and evaluate the implications of using the  $L_{den}$  and  $L_{Aeq}$  indicators as a means of understanding the effects of railway noise.

## **9.11 Action Plan Review**

The Department of the Environment will review the issues raised in the Action Plan when the second round of action planning occurs in 2012/2013.

## Appendix A

### Glossary of Acoustic Technical Terms

Action Plan	<p>Plans designed to manage noise issues and effects, including noise reduction if necessary. An Action Plan must include:</p> <ul style="list-style-type: none"> <li>• A description of the agglomeration, major roads, major railways and major airports and other noise sources taken into account;</li> <li>• The authority responsible;</li> <li>• The legal context;</li> <li>• Any limit values in place in accordance with Article 5 of the END;</li> <li>• A summary of the results of the noise mapping;</li> <li>• An evaluation of the estimated number of people exposed to noise, identification of problems and situations to be improved;</li> <li>• A record of the public consultations organised in accordance with Article 8(7) of the END;</li> <li>• Any noise-reduction measures already in force and any projects in preparation;</li> <li>• Actions which the Competent Authorities intend to take in the next five years, including any measures to preserve Quiet Areas;</li> <li>• Long-term strategy;</li> <li>• Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment; and</li> <li>• Provisions envisaged for evaluating the implementation and the results of the Action Plan.</li> </ul> <p>The actions which the Competent Authorities intend to take in the fields within their competence may include:</p> <ul style="list-style-type: none"> <li>• Traffic planning;</li> <li>• Land-use planning;</li> <li>• Technical measures at noise sources;</li> <li>• Selection of quieter sources;</li> <li>• Reduction of sound transmission; and</li> <li>• Regulatory or economic measures or incentives.</li> </ul> <p>Each Action Plan should contain estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed, or other).</p>
Agglomeration (first round)	A part of a territory, delimited by the Member State, having a population in excess of 250,000 persons and a population density such that the Member State considers it to be an urbanised area. The population density must exceed 500 persons per square kilometre.
Agglomeration (subsequent rounds)	A part of a territory, delimited by the Member State, having a population in excess of 100 000 persons and a population density such that the Member State considers it to be an urbanised area. The population density must exceed 500 persons per square kilometre.
Attributable Data	A trait, quality, or property describing a geographical feature, e.g. vehicle flow or building height
Attributing (Data)	The linking of attribute data to spatial geometric data
ASL	Above Sea Level

Competent Authority	<p>The Competent Authorities will be responsible for aspects such as making and where relevant, approving noise maps and Action Plans for agglomerations, major roads, major railways and major airports. They will also be responsible for delimiting Quiet Areas within agglomerations and open countryside, and collecting noise maps and Action Plans.</p> <p>The Competent Authorities are as follows:</p> <ul style="list-style-type: none"> <li>• Agglomerations – Department of the Environment</li> <li>• Major roads – Department for Regional Development</li> <li>• Major railways – Northern Ireland Transport Holding Company</li> <li>• Major airports – Airport Operator</li> </ul>
Data	Data comprises information required to generate the outputs specified, and the results specified.
Decibel (dB)	<p>The human ear can detect sound waves exerting pressures ranging from 20 micropascals up to 100,000,000 micropascals. Because these numbers are so unwieldy a logarithmic scale (the decibel scale) is used.</p> <p>The typical threshold of human hearing, 20 micropascals, is set as 0 decibels. It follows from this that the loudest sounds we can hear before suffering immediate hearing damage (around 100,000,000 micropascals) corresponds to around 130-140 decibels.</p> <p>Typically, an increase/decrease of ten decibels is perceived by listeners as a doubling/halving in loudness (Doubling/halving the sound power of the source, however, only results in an increase/decrease of three decibels. The response of the human ear is non-linear in energy terms.)</p>
dB(A)	<p>The human ear is most sensitive to sound waves with frequencies of a few thousand Hz. A sound wave with the same sound pressure amplitude outside this range will sound noticeably quieter than one in this range. Describing the loudness of a sound purely in terms of decibels based on sound pressure can therefore be misleading.</p> <p>When measuring sound, it is therefore standard practice to break it down into frequency bands and apply a correction to each band depending on the sensitivity of the typical human ear to the frequencies in that band, before combining them into an overall 'A-weighted' sound pressure level.</p> <p>A-weighted decibels are a good indication of perceived loudness for broadband noise (noise covering a broad range of frequencies), but they sometimes underestimate the effect of low-frequency noise.</p>
END	Directive 2002/49/EC of the European Parliament and Council relating to the assessment and management of environmental noise, otherwise known as the Environmental Noise Directive.
GIS	Geographical Information System
ISO	International Standards Organisation



LAeq,T	The A-weighted equivalent continuous sound pressure level which is a notional continuous level that, at a given position and over the defined time period, T, contains the same sound energy as the actual fluctuating sound that occurred at the given position over the same time period, T.
Lday	The LAeq over the period 0700 – 1900, local time (for strategic noise mapping this is an annual average).
Levening	The LAeq over the period 1900 – 2300, local time (for strategic noise mapping this is an annual average).
Lnight	The LAeq over the period 2300 – 0700, local time (for strategic noise mapping this is an annual average).
LAeq,16h	The LAeq over the period 0700 – 2300, local time (for strategic noise mapping this is an annual average).
Lden	The LAeq over the period 0000 – 2400, but with the evening values (1900 – 2300) weighted by the addition of 5 dB(A), and the night values (2300 – 0700) weighted by the addition of 10 dB(A).
Limit Values	Member States are required to inform the Commission of existing limit values or limit values in preparation (Article 5, paragraph 4 of the END). These must be expressed in terms of the noise indicators $L_{den}$ and $L_{night}$ .
Major Airport	The END defines a major airport as: a civil airport, designated by the Member State, which has more than 50,000 movements per year (a movement being a take-off or landing), excluding those purely for training purposes on light aircraft (Article 3(p)). In the UK a light aircraft is generally considered to be one with a maximum take-off weight authorised (MTWA) of less than 5,700 kilogrammes. In the UK a civil airport is one operated by civil authorities and so excludes those operated by the military. In any event, military activity in a military area is excluded from the END (Article 2, paragraph 2).
Major Railway	The END defines a major railway as: a railway designated by the Member State which has more than 30,000 train passages per year' (approximately 80 train passages per day) (Article 3(o)). However, for the first round of mapping in 2007 the qualifying figure is 60,000 train passages per annum (Article 7, paragraph 1).
Major Road	The END defines a major road as: a regional, national or international road, designated by the Member State, which has more than 3 million vehicle passages per annum' (approximately 8,200 vehicles per day) (Article 3(n)).
Noise Bands required by the END	Areas lying between contours of the following levels (dB): $L_{den} < 55, 55 - 59, 60 - 64, 65 - 69, 70 - 74, \geq 75$ $L_d < 55, 55 - 59, 60 - 64, 65 - 69, 70 - 74, \geq 75$ $L_e < 55, 55 - 59, 60 - 64, 65 - 69, 70 - 74, \geq 75$ $L_n < 45, 45-49, 50 - 54, 55 - 59, 60 - 64, 65 - 69, \geq 70$ Notes: 1) It is recommended that class boundaries be at .00, e.g. 55 to 59 is actually 55.00 to 59.99. 2) The assessment and reporting of the 45 – 49 dB band for $L_{night}$ is optional under the Regulations.
Noise Mapping	The presentation of data on an existing or predicted noise situation in terms of a noise indicator.

Noise Mapping (Input) Data	Two broad categories: (1) Spatial (e.g. road centre lines, building outlines); and (2) Attribute (e.g. vehicle flow, building height – assigned to specific spatial data).
Noise Mapping Software	Computer program that calculates required noise levels based on relevant input data
Noise Model	All the input data collated and held within a computer program to enable noise levels to be calculated.
Noise Model File	The (proprietary software specific) project file(s) comprising the noise model
Output Data	The noise outputs generated by the noise model
Processing data	Any form of manipulation, correction, adjustment factoring, correcting, or other adjustment of data to make it fit for purpose (includes operations sometimes referred to as 'cleaning' of data).
Quiet Area	Article 3(l) and 3(m) of the END define a 'quiet area in an agglomeration' as an area, delimited by the Competent Authority, for instance which is not exposed to a value of $L_{den}$ or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source.
Round One	The noise mapping and action planning process is to be taken forward on a five-year rolling programme. The first round of mapping and action planning applies to the largest of the agglomerations (including the industries and ports within them), the busiest major roads and railways and all major airports. The thresholds determining which agglomerations, major roads, major railways and major airports should be mapped during the first round are set out in Article 7 paragraph 1 and are as follows: <ul style="list-style-type: none"> <li>• Agglomerations - only those which have a population in excess of 250,000 persons;</li> <li>• Major roads - only those which more than 6 million vehicle passages a year;</li> <li>• Major railways - only those that have more than 60,000 train passages per year;</li> <li>• All airports within round one agglomerations and major airports.</li> </ul>
Round Two	<ul style="list-style-type: none"> <li>• Agglomerations - only those which have a population in excess of 100,000 persons;</li> <li>• Major roads - only those which more than 3 million vehicle passages a year;</li> <li>• Major railways - only those that have more than 30,000 train passages per year;</li> <li>• All Airports within round one and any which have since expanded and meet the criteria of the END.</li> </ul>
Spatial (input) Data	Information about the location, shape, and relationships among geographic features, for example road centre lines and buildings.
WG - AEN	Working Group – Assessment of Exposure to Noise

## Appendix B

### Definition of Railways for which Noise Maps must be produced

B1 Under the Regulations Noise Maps must be made if:

1. It is a railway with more than 30,000 train passages per year (approximately 80 train passages per day).
2. Railways near to agglomerations must also be mapped regardless of the level of traffic where the level of activity means that railway noise causes
  - (a) an  $L_{den}$  value of 55 dB(A) or greater; or
  - (b) an  $L_{night}$  value of 50 dB(A) or greater;anywhere within the agglomeration.

B2 An agglomeration is defined as an area having a population in excess of 100,000 persons and a population density equal to or greater than 500 people per km<sup>2</sup>; and which is considered urbanised.

For the first round of mapping, reported in 2007, the population threshold is 250,000 and in the Regulations these agglomerations are described as 'first round agglomerations'.

## Appendix C

### Guidance on Information to be contained in Noise Action Plans

The Draft Noise Action Plan must at least include the information required by Annex V of the Directive and set out an approach to protecting Quiet Areas. In addition the Draft Noise Action Plan should include, in a separate Appendix, the specific information that was relied upon to develop the Action Plan.

The following is a possible framework setting out the information to be contained within a noise action plan. Any items not specifically mentioned in this framework, but which are mentioned in the main body of the guidance document, the Regulations or Directive should be included.

#### Executive Summary

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  - Preparation of strategic noise maps
  - Purpose and scope
  - Noise Mapping bodies responsible
  - Development of the noise action plans
  - Extent/range
  - Public participation and their role
  - Implementation of the plans (5 year time scale)

##### 2. Existing noise management legislation and guidance

- 2.1 National legislation or guidance, including:
  - Noise Act
  - Pollution Control and Local Government (Northern Ireland) Order 1978
  - Transport Strategy
  - IPPC Licensing
  - Noise Insulation Regulations (Northern Ireland) 1995
  - Building Regulations
  - Land Compensation Act 1973
  - include description of any statutory limit values in place or in preparation.
- 2.2 Regional or local legislation or guidance, including:
  - Planning policy
  - Local guidelines
  - Any currently in preparation

##### 3. Description of the Area to which the Action Plan Relates

- 3.1 Extent of the area (e.g. boundaries of the agglomeration and how this was defined. In relation to the extent of major sources (rail, road, airport etc.) outside of agglomerations, the action plans must extend to “near” these sources. Thus, there needs to be a clear definition given for “near”.
- 3.2 Description of the topography/geographical location.
- 3.3 Description of the general population (numbers, distribution patterns, housing types (single dwelling, multi-dwellings, etc.)).
- 3.4 Location of noise sensitive groups (e.g. schools, hospitals and other noise sensitive buildings and areas).

3.5 Description of the main infrastructure/services.

#### **4. The Competent Authority for Action Planning**

4.1 Name and contact details for the Competent Authority

4.2 Description of other bodies of relevance

4.3 Description of associated working groups/steering groups, where relevant

4.4 Description of any noise-reduction measures already in force within the action planning area, or projects in preparation.

#### **5. Summary of the Results of the Noise Mapping**

5.1 Overview of the preparation of the noise map

- Who, when, where etc

- Data sources

- Methodology

5.2 Presentation of results

- Noise contour maps for action planning area

- Summary exposure statistics for action planning area

- Area, dwellings and people in various noise bands, per source

5.3 Limitations of the maps/results (consideration should be given to the inclusion of measures to address these deficiencies as part of the implementation plan).

#### **6. Identification of areas to be subjected to noise management activities**

6.1 Description of the criteria/decision matrix to be used for the identification of areas qualifying for action

- Confirmation of onset of assessment thresholds

- Confirmation of protection thresholds for Quiet Areas

- Confirmation of approach to determining Quiet Areas in agglomerations

6.2 Application of the criteria/matrix.

6.3 Results of the analyses, if available. If not available, a description of when they will be available.

#### **7. Mitigation and Protection Measures**

7.1 Description of how areas above onset of assessment criteria will be processed

7.2 Description of how areas below protection threshold will be preserved

7.3 Description of how areas between the thresholds will be managed

7.4 Discuss any known future developments within the action planning area and describe how noise impact from these are / will be managed

7.5 Describe how extent of noise impact will be confirmed

7.6 Review of possible mitigation measures, where necessary

- if locations not yet identified, discuss process and sources of examples

- discuss potential for noise mitigations measures

- discuss measures applicable at different levels of responsibility

- discuss potential noise reduction achievable and costs associated (if known)

7.7 Discuss how noise reduction effects of potential measures will be assessed

7.8 Discuss budgets, cost-effectiveness assessment, cost-benefit analysis etc.)

7.9 Outcome (selection of the most appropriate mitigation/protection measures).

#### **8. Public Participation**

- Why, when, how. Submission / contact details etc.

#### **9. Implementation Plan**

- Plan should span a five year period commencing in 2008 and finishing in 2013 and finish with next round of noise mapping and action planning

9.1 Roles and Responsibilities.

9.2 Targets and Objectives.

- Long term aims/objectives/strategy of action planning regarding management of noise
- Over next 5 years, and beyond to subsequent rounds

### 9.3 Programme of Works

- broken down per year

### 9.4 Evaluation, Review and Corrective Action Programmes

- Ongoing review:
  - State how often reviews of progress against the original programme of works will be undertaken;
  - Evaluate the outputs of the measures taken and any corrective actions/changes to the original programme to be undertaken as a result of the evaluation;
  - Identity the responsible bodies;
- End of Program review;
- A description of how the progress and results of the Action Plan will be evaluated and measured in 2013 when the second round action plan is drawn up

## 10. Summary and Conclusions

### **Appendix A:**

Glossary of Acoustic Technical terms

### **Appendix B:**

Definition of Railways for which Noise Maps must be Produced

### **Appendix C:**

Guidance on the Information to be Contained in Noise Action Plans

### **Appendix D:**

List of Current Policy together with the Framework for the Management of Environmental Noise

### **Appendix E:**

Policy and Legislation relating to the Control of road noise in Northern Ireland

## Appendix D

### List of Current Policy and the framework for the Management of Environmental Noise

Land Acquisition and Compensation (Northern Ireland) Order 1973  
Pollution Control and Local Government (NI) Order 1978  
Noise Insulation Regulations (NI) 1995  
The Environmental Assessment of Plans and Programmes Regulations (NI) 2004  
The Civil Aviation Act 2006  
Environmental Noise Regulations (Northern Ireland) 2006.  
The Clean Neighbourhoods and Environment Act 2012.

#### Relevant Policy and Guidance Publications.

Control of Noise (Code of Practice for Construction and Open Sites) Order (NI) 2002  
Land Compensation - Your Rights Explained DOE (NI)  
BS 5228 Noise & Vibration Control on Construction and Open Sites  
Part 1 1997 - Code of Practice for basic info and procedures for noise & vibration control  
Part 2 1997 - Guide to noise & vibration control legislation for construction and demolition including road construction and maintenance  
BS 5228 Part 4 1992 - Code of Practice for noise and vibration from piling operations  
BS 6472 1992 - Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80 Hz)  
BS 7385 Part 1 1990 – Evaluation and Measurement for Vibration in Buildings – Guide for measurement and evaluation of their effects on buildings  
BS 7385 Part 2 1993 - Evaluation and Measurement for Vibration in buildings - Guide to damage levels from ground borne vibration  
BS 7445 Part 1: 1999 - Description and measurement of environmental noise  
BS 7445 Part 2: 1999 - Guide to the acquisition of data pertinent to land use  
BS 7445 Part 3: 1999 - Guide to the application of noise limits  
BS 8233 1999 - Sound Insulation and noise reduction for buildings – Code of Practice  
DEFRA - Low Frequency Noise 2002  
Delivering the goods – a toolkit for improving night time-deliveries Freight Transport Association in consultation with Department for Transport  
Calculation of Railway Noise 1995 Department of Transport  
The Noise Insulation (Railways and other Guided Transport Systems) Regulations 1996  
DEFRA – A Review of Published Research On High Freq. Noise and It Effects – May 2003 Development Control Advice Note 10 (Revised) Environmental Impact Assessment (August 1999)  
Transport Assessment; Guidelines for Development Proposals in N. Ireland Nov 06 DRD/DOE  
ODPM -PPG24: Planning and Noise (1994)

## Appendix E

### Policy and Legislation relating to the control of Noise in Northern Ireland

#### **The Clean Neighbourhoods and Environment Act 2012**

This Act provides district councils additional powers to deal with noise and statutory nuisance.

#### **Pollution Control and Local Government (Northern Ireland) Order 1978**

Article 40 of this Order gives district councils power to deal with construction noise.

#### **Regional Transportation Strategy for Northern Ireland 2002 – 2012**

This requires the environmental impact including noise to be assessed for noise improvement schemes and the effects of any noise to be considered when determining the feasibility of any such scheme.

#### **Pollution Control and Local Government (Northern Ireland) Order 1978**

Article 38 of this Order gives district councils power to deal with noise from premises (including land) which they consider amounts to a statutory nuisance. The powers apply to the control of existing noise and where a noise is expected to occur or reoccur. Where a council is satisfied a nuisance exists, it is required to serve a legal notice requiring the abatement of that noise nuisance.

#### **Transport Planning**

When proposing the construction of a new road or additional carriageway, a noise impact assessment must be carried out as part of the Environmental Statement, which is issued in accordance with EC Directive 85/337 EEC (as amended). The potential noise impact should be assessed for all properties within 300m of each new road or proposed alteration or carriageway.

Current policy also requires an impact assessment to be carried out if there is an expected increase of 1dB LA<sub>10,18h</sub> from the existing road when alterations are carried out (Design Manual for Roads and Bridges, Vol 11, Section 3, Part 7, (HA 213/08 (August 2008))). The process which tends to be followed is set out in the Design Manual for Roads and Bridges (Design Manual for Roads and Bridges, Vol 11, Section 3, (HA 213/08, August 2008)). Mitigation such as optimising the route alignment and the use of noise barriers, either through landscaping or purpose built walls or fences, should be included in the road design to minimise any adverse noise impact. The impact assessment process also has regard to the protection of tranquil areas in general, through consideration of the impact on landscape.

Whilst conditions relating to noise can be set as part of a planning permission, there is currently no specific policy or guidance which addresses the issue of noise at the planning stage. However, noise is referred to in several other Planning Policy Statements and noise is a material consideration which is taken into account in the making of planning decisions.

#### **Land Use Planning**

In dealing with planning applications involving noise that would be generated by the proposed development or existing noise to which the development would be subjected, the Planning Authority consults the appropriate Environmental Health Department and relevant Competent Authority.

It is not the purpose of the planning system to intervene in existing noise problems arising from lawful land use activity and the planning system should not be used to achieve objectives relating to other legislation. Whilst there is no specific policy guidance which addresses the issue of noise in the Northern Ireland



planning regime, noise is referred to in several Planning Policy Statements and it is recognised that where relevant, noise is a material consideration in the determination of planning applications. Therefore the Northern Ireland planning system has a role to play in preventing and minimising the impact of noise through its influence in the layout and design of new developments and consideration of the resulting amenity impacts which is a fundamental part of the development management process. The key question is whether a proposed development would unacceptably affect the amenity of the surrounding neighbours/properties or likewise whether a noise-sensitive development would be incompatible with existing noisy activities in the area. However, the Planning Authority will base its decisions on planning applications on planning grounds alone. It will not use its planning powers to secure objectives achievable under non-planning legislation.

### **Transport Analysis Guidance**

This is published by the Department for Transport (available at [www.webtag.org.uk](http://www.webtag.org.uk)). The guidance assists in setting objectives, identifying problems, developing solutions, creating a transport model to appraise solutions, and providing general advice on the appraisal of major transport schemes.

**Design Manual for Roads and Bridges Volume 11** (Environmental Assessment) (Highways Agency, 1994).

Please see above for more information.

### **Noise Insulation Regulations (Northern Ireland) 1995**

These Regulations apply to all Department of Regional Development proposals and enable a resident, subject to increased noise from a new or altered road, to benefit from a reduction in noise level inside their homes by means of double windows, supplementary ventilation and where appropriate venetian blinds and double doors.

### **Land Compensation Act 1973**

This provides for monetary compensation to those homeowners affected by the new or improved highway to account for any loss in value of the property that has occurred as a result of the road. The assessment, which is carried out by surveyors, is purely subjective and claims for compensation must be made within a certain period of time.

### **Building Regulations**

The Buildings Regulations, which are administered by District Councils in Northern Ireland, ensure the safety, health and welfare of people working in and around buildings. The Department of Finance and Personnel has prepared technical guidance on their implementation.

For buildings constructed in the vicinity of noise sources such as roads, it would be appropriate for specific façade noise insulation to be a requirement of the construction, potentially with a pre-completion sound insulation test required prior to habitation. This would help to ensure that the design targets of the construction are met in practice.

British Standard 8233:199 (BS8233:1999, Sound Insulation and Noise Reduction in Buildings – Code of Practice) provides design advice for various buildings, including dwellings and offices in order to mitigate the effects of noise from road traffic. Advice is provided on what constitutes reasonable or good standard in terms of internal noise levels and on what mitigation might be used to achieve those levels.

Building Bulletin 93 (BB93 Acoustics Design of Schools, A Design Guide, 2003) provides guidance on acoustics in schools including target noise levels for the indoor and outdoor environment in order to secure an appropriate acoustic environment for teaching. Following the guidelines in BB93 is one way of ensuring that new schools comply with the requirements of the Building Regulations (Northern Ireland) 2000.

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