



Guidance Note for Noise Action Planning

For the first round of the
Environmental Noise Regulations 2006

July 2009

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Purpose of this Document

The objective of this guidance note is to provide practical information, advice and guidance to designated Action Planning Authorities on the development of noise action plans under the Environmental Noise Regulations.

This guidance note is issued as applicable only to the development of noise action plans with reference to the first round of the Regulations. It is currently planned that a revised guidance document will be issued ahead of the second round of action plans in 2013.

This guidance note provides a review of the background, aims and objectives of the Regulations. It also sets out a recommended approach to the development of a noise action plan and a framework process for the assessment of options for action. It also sets out a first proposal for indicative noise levels, as assessed by the strategic noise mapping, above which the framework process would be followed.

Finally the guidance draws attention to the minimum requirements of an Action Plan, as defined within the Regulations and Directive, and offers practical advice on how these requirements may be met.

This 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, Official Journal of the European Communities (OJEC) L189/12-25, 18 July 2002;
- Environmental Noise Regulations 2006, S.I. No. 140 of 2006;
- 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, Official Journal of the European Union (OJEU) L212/49-64, 22 August 2003;
- EC recommended RM2007 “*Reporting Mechanism proposed for reporting under the Environmental Noise Directive 2002/49/EC*”;
- EPA “*Guidance Note for Strategic Noise Mapping*”, July 2009;
- 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, 13th August 2007; and
- European Commission Working Group Assessment of Exposure to Noise (WG-AEN), *Position Paper, Presenting Noise Mapping Information to the Public*, March 2008.

The Guidance Note should not be considered as a legal document, nor does it purport to provide comprehensive legal advice or guidance on all acoustical matters. If, in any circumstance, the recommendations contained in this guidance seem to be at variance with the Directive, or Regulations, then the text of the Directive must be applied in the first instance, or the Regulations in the second. In many situations it may be necessary to seek expert advice and assistance.

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1 Introduction

1.1 Background

This guidance is designed to help relevant designated Action Planning Authorities (APAs) with their noise action planning duties under Article 11 of the Environmental Noise Regulations 2006, S.I. No. 140 of 2006 (Regulations).

It aims to support those action planning authorities in carrying out some of their duties under the Regulations. In particular, it covers the requirements to develop Action Plans designed to manage environmental noise issues and effects arising from road traffic, railways, major industrial sites and aircraft departing from and arriving at airports, including noise reduction if necessary. It also covers the reporting of the Action Plan. Action Plans have to be developed in the context of the existing regulatory background and must include a description and assessment of the existing noise management framework (see 2.19 'The legal context').

A glossary of acoustic and technical terms used is set out in Appendix A.

1.2 Role of this Guidance

This document is designed to provide a guide to action planning authorities about the process and requirements of action planning and the submission of the Action Plan to the Environmental Protection agency (EPA).

1.3 Why prepare an Action Plan?

Directive 2002/49/EC of the European Parliament and of the Council relates to the assessment and management of environmental noise, and is commonly referred to as the Environmental Noise Directive or END¹.

The aim of the Directive is:

“to define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise”.

And to that end three stages are set out:

- Undertake strategic noise mapping to determine exposure to environmental noise;
- Ensure information on environmental noise and its effects is made available to the public;
- Adopt action plans, based upon the noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.

¹ Official Journal of the European Union, L 189, 12-25, 18 July 2002.

Available from: <http://eur-lex.europa.eu/JOIndex.do?ihmlang=en> [accessed May 2008]

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 in 2007 and those with a population of more than 100,000 persons in 2012 and subsequent rounds.

Strategic noise mapping was undertaken during 2007 by the designated noise mapping bodies. They were required to undertake the assessment of noise levels from roads, railways, airports and industry within the agglomeration of Dublin, and from major roads across Ireland.

Using these noise level results with population distribution information, derived from census and GeoDirectory data, the noise exposure of the population living within the assessment areas was estimated. The EPA was required to report to the European Commission relevant information on population exposure to noise. This information was delivered to the EC in December 2007.

Information on environmental noise and its effects, including the results of the strategic noise mapping, and its effects will be made available to the public by the EPA in the near future. This will help towards achieving the aims of the second stage of the Directive.

The third phase of the work under the Directive requires certain designated Action Planning Authorities to produce Action Plans for the first round during 2008, for the second round in 2013 and every five years thereafter. The EPA is required to submit summaries of the Action Plans to the EC no later than 18th January 2009. Action Plans must be produced based on the results of the noise mapping. It is also required to review and revise the action plans if necessary from time to time and whenever a major development² occurs affecting the existing noise situation.

It is the responsibility of the Action Planning Authority to determine whether a change in situation within the area covered by the action plan constitutes a major development which would trigger a revision to the Action Plan. Some situations which could be considered to constitute a major development may include: the opening of a new bypass, national road or motorway; the opening of a large new residential area or construction of a large number of residential properties. A major development could be considered to have occurred if it is known, or thought likely, that greater than 10% of the exposed population within the area of an action plan have experienced a change in the prevailing noise situation of greater than 3dB L_{den} or L_{night} . When such a situation arises the Action Plan should be revised as necessary within the regular 5 year revision cycle required under the Regulations, and such a revision may require a reassessment of the strategic noise maps and the population exposure assessment.

1.4 Statutory Background

This guidance is issued by the Environmental Protection Agency, pursuant to the Regulations³.

In Ireland, the END is transposed by the Regulations and this guidance makes specific reference to clauses in these Regulations. The END is transposed separately in each Member state of the EU.

² The term 'major development' is not defined in the Regulations or the END.

³ Article 5 (2), 11 (3) (a) and 11 (3) (b)

1.5 Scope of the Action Plans

The Action Plans are to be drawn up as part of the third phase of work under the Directive. The Regulations set out to:

“provide an implementation in Ireland of a common approach within the European Community intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.”⁴

The Regulations are to apply to environmental noise to which people are exposed, in particular in built up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, near hospitals, and near other noise-sensitive buildings and areas.⁵

The Regulations shall not apply to noise caused by an exposed person, noise from domestic activities, noise created by neighbours, noise at work places, noise inside means of transport, or noise due to military activities in military areas.⁶

In the context of the Regulations, environmental noise is defined as unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity.⁷

Furthermore the Action Plans are not to cover the whole of Ireland, rather the areas covered by the Action Plans are defined as those areas which are affected by environmental noise, as identified by the strategic noise mapping. This is further discussed in Section 2.1 below.⁸

1.6 Timetable

The mapping for those agglomerations and major sources affected by the Regulations was completed in 2007. The following timetable applies with regard to Action Plans for the first round:

- 18 July 2008 – Action Planning Authorities to issue their Draft Action Plans for a Consultation period of a minimum of 6 weeks for consultation, and a further 2 weeks for submissions, to all relevant stakeholders including the EPA and the public;
- 31 October 2008 – Action Planning Authorities to submit their Action Plans to the EPA;
- 30 November 2008 - Action Planning Authorities to submit their Summaries of Action Plans to the EPA;
- 18 January 2009 – Summaries of Action Plans to be submitted to the European Commission (EC).

⁴ Article 4 (1)

⁵ Article 4 (2)

⁶ Article 4 (3)

⁷ Article 3 (1)

⁸ Article 11 (1)

1.7 Overview of Environmental Noise Management

The Directive aims to prevent and reduce, where necessary, environmental noise through the adoption of action plans. The action plans are to act as a means of managing environmental noise.

The Regulations define the term “acoustical planning” as:

“controlling future noise by planned measures, such as land-use planning, systems engineering for traffic, traffic planning, abatement by sound-insulation measures and control of noise sources”

It is therefore considered appropriate to provide a brief overview of environmental noise management and a review of current national guidance and practice in this area; as such provisions could become the tools available for assessment and protection within the scope of an action plan.

1.7.1 Aspect of Noise Management

In order to understand the position of environmental noise control within the wider landscape of noise management it is worth considering the draft I-INCE publication “A Global Approach to Noise Control Policy”⁹ which classifies three areas of noise policy:

- Occupational Noise
 - Unwanted sound in the workplace, indoors or outdoors, caused by sources in the vicinity of a workplace;
- Community Noise
 - Unwanted sound in a non-occupational setting, indoors or outdoors, caused by sources over which an individual has little or no control, including sounds produced by neighbours; and
- Consumer Product Noise
 - Unwanted sound at the position of a user or bystander of a noise-producing product over which an individual may have some control, including noise in passenger compartments of vehicles, but excluding occupational and community noise.

The I-INCE description of community noise covers a wide range of situations:

- New roads, railways, airports, industry or recreational activities adjacent to residential properties or noise sensitive premises such as schools or hospitals, or recreational spaces;
- New residential properties or noise sensitive premises such as schools or hospitals, adjacent to existing roads, railways, airports, industry or recreational activities;
- The development of mixed residential/commercial use buildings, and multi-part residential buildings;
- The management of noise levels within noise sensitive properties, such as schools and hospitals, to address external noise break-in, as well as room to room transmission and noise levels within public spaces;
- Noisy neighbours, barking dogs;

⁹ Noise Control Engineering. J. 52 (6), 2004 Nov–Dec

- Gardening machinery, construction activities, ice cream vans and street cleaning;
- Air-conditioning equipment;
- Public house, night clubs, restaurants or other recreational activities; and
- Industrial operations, workshops and factories.

The Environmental Noise Regulations are designed to cover environmental noise as defined as:

“unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity”¹⁰.

The Regulations are thus concerned with certain aspects of the I-INCE description of community noise, whilst other aspects could be described as noise nuisance or neighbourhood noise issues. Occupational and consumer product noise are covered by separate Regulations^{11,12}.

It is suggested that a fully encompassing noise management policy would provide guidelines, targets, and possibly limits across all aspects of occupational, community and consumer product noise, backed up by legislative powers and regulations as appropriate.

There are a number of means of addressing the range of policy areas described by I-INCE. Some are best served by regulation, type approval testing and certification, others may be addressed in some way through the planning process for new or altered developments, whilst others may need to be addressed as noise nuisance issues where best practical means, or best available technology approaches could be appropriate.

1.7.2 Current Community Noise Management Situation

As mentioned above the Regulations address certain aspects of the wider definition of community noise, and there are currently a number of other measures in place which address other aspects of community or neighbourhood noise. The following section provides a brief overview of these other measures.

- **Environmental Protection Agency Act 1992**

The existing statutory provisions have primarily come about on foot of the Environmental Protection Agency Act of 1992. Sections 106 to 108 of the Act are of direct relevance, and may be summarised as follows:

- 106 gives the relevant Minister certain powers to regulate noise that may give rise to a nuisance or be harmful to health or property;
- 107 gives powers to local authorities and the EPA to serve notice to take steps to control noise;

¹⁰ Article 3 (1)

¹¹ Safety, Health and Welfare at Work (Control of Noise at Work) Regulations 2006 (S.I. No. 371 of 2006)

¹² European Communities (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006, (S.I. No. 241 of 2006)

- 108 sets out a process whereby noise issues may be taken to the District Court, which may make an order requiring that the person or body responsible for the noise takes steps to eliminate or ameliorate the noise in question.

It is considered appropriate that all Action Planning Authorities should include a policy statement regarding their aims and objectives when utilising the provisions within the EPA Act. This will help to promote implementation of the Act.

It is noted that at present there is no clear official or statutory guidance which could help promote the effectiveness or clarity of the provisions within the Act; however, within the framework of the Regulations the EPA may consider it appropriate to develop such guidance in the future.

- **Planning**

Whilst Local Authorities have it within their powers to set conditions relating to noise as part of a planning permission, there is currently no national policy or guidance which addresses the issue of noise during planning. This can lead to inconsistencies in relation to both the assessment and conditioning of planning applications.

The National Roads Authority has published the document “*Guidelines for the Treatment of Noise and Vibration in National Road Schemes*”, which sets out the procedure to be followed in respect of “the planning and design of national road schemes”. Given the lack of detailed planning guidance relating to other sources of noise, the approach and limits set out by the NRA have been applied to other scenarios. For example, planning conditions relating to new residential developments alongside existing roads may call for the façade level to be limited to the design goal given in the NRA document. This is not the correct approach and does not represent the optimum approach for ensuring good residential amenity. The NRA’s construction noise and vibration limits have also been reproduced extensively in quite unrelated contexts. In the absence of other relevant guidance the NRA guidelines are becoming a *de facto* standard, albeit one likely to be used out of context.

The Department of the Environment, Heritage and Local Government (DEHLG) has published the following documents relating to sustainable development in the urban environment:

- Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities), September 2007;
- Sustainable Residential Development in Urban Areas: Consultation draft guidelines for Planning Authorities, February 2008; and
- Urban Design Manual: A best practice guide (A companion document to the Draft Planning Guidelines on Sustainable Residential Development in Urban Areas), February 2008.

The document dealing with Design Standards for New Apartments calls for “*attention at the design and construction stages to prevent undue noise transmission between units*”. There is no mention of appropriate design goals

or the methodology to be employed, other than reference to Part E of the Building Regulations (see below).

The consultation draft guidelines for Sustainable Residential Development highlight the need to *“Deliver a quality of life which residents and visitors are entitled to expect, in terms of amenity, safety and convenience”*. They go on to state that *“Privacy is an important element of residential amenity”*. Whilst they are not mentioned specifically, environmental noise and noise transfer between dwellings are both key considerations in respect of amenity and privacy.

The Urban Design Manual lists Privacy & Amenity as one of twelve key issues, with specific reference to the need to prevent sound transmission in homes by way of appropriate acoustic insulation or layout. There is some comment in relation to the use of appropriate building materials and also the zoning of dwellings to minimize the potential for excessive noise transfer.

- **IPPC Licensing**

Certain activities that are required to be licensed may be subject to noise conditions. The relevant guidance is set out in the EPA publication *“Guidance Note for Noise in Relation to Scheduled Activities”*. This document contains suggested noise limits of 55 dB(A) $L_{Ar,T}$ for daytime and 45dB(A) $L_{Aeq,T}$ for night-time; with said limits to be applied to *“sensitive locations”*. Whilst these limits have a very specific application, they have appeared in many different contexts and often form the basis for conditions in planning permissions.

- **Wind Energy Planning Guidelines**

With specific regard to wind energy developments, this DEHLG document suggests a *“lower fixed limit of 45dB(A) or a maximum increase of 5dB(A) above background noise at nearby noise sensitive locations”*. The latter requirement may be relaxed in areas with low background levels. A fixed limit of 43dB(A) at night-time is deemed appropriate as there is no requirement to protect external amenity.

- **Quarries and Ancillary Activities**

This publication contains a discussion of the primary sources of noise associated with quarrying and offers guidance in relation to the correct approach to be followed in respect of assessment and mitigation. Suggested noise limit values are 55dB $L_{Aeq,1hr}$ and 45dB $L_{Aeq,15min}$ for daytime and night-time respectively, although more onerous values may be appropriate in areas with low levels of pre-existing background noise. In respect of blasting, reference is made to EPA guidance to the effect that *“blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125dB(Lin) max. peak with a 95% confidence limit”*.

- **Building Regulations**

The current Irish Building Regulations call for certain constructions to offer “reasonable resistance” to both airborne and impact sound. In the absence of any form of objective criterion, reference is often made to the guidance values put forward in the “Similar Construction” method described in Technical Guidance Document E.

For buildings constructed in the vicinity of noise sources it would be appropriate for specific façade noise insulation values, based upon a target internal noise level, to be a stated 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.

Although it is not exhaustive, this brief 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.

Whilst the EPA, NRA and some Local Authorities have made progress in certain areas, the guidance or limits which do exist only cover a restricted number of the possible situations where noise is an issue to be addressed, and this increasingly means that these existing measures are being quoted out of context.

If the overall aims of noise action plans are to be realised, it is important that the planning of new residential properties, or other noise sensitive buildings, is carefully considered and suitable conditions applied to ensure that they do not just produce an increase in the population exposed to high levels of environmental noise. Aspects such as façade orientation, room usage, façade construction, window construction, use of passive or active air vents, site boundary noise mitigation, creation of quiet gardens or courtyards, could all be imposed as conditions during planning to help reduce the exposure of the population.

It is suggested that the framework of the Regulations and the Action Plans creates an opportunity to set out design targets and guidance at national or local level in order to help ensure that future developments include provisions to protect the population from the effects of environmental noise. Planning guidance relating to noise would help to support the aims of the Environmental Noise Regulations and Noise Action Plans by providing tools for the planners to use when assessing and granting new developments.

1.8 Structure of this Guidance

Section 2 contains information about the requirements of Action Plans.

Section 3 provides guidance on issues to consider when determining how to fulfil the action planning requirements of the Regulations.

Section 4 gives guidance on how to meet the requirements for public participation in the action planning process and provides information on the finalisation and publication process.

Section 5 provides guidance on the reporting requirements

The text is supported by text boxes that summarise the key parts of the Regulations and Directive.

Appendix A provides a short glossary of acoustic terms.

Appendix B provides a list of background reference material and information sources.

Appendix C sets out an overview of the recommended approach to determining actions to be undertaken.

Appendix D presents an example of a prioritisation decision support matrix

Appendix E sets out guidelines on information to be contained in noise action plans.

Appendices F and G provide extracts from the ENDRM for major roads and agglomerations.

Appendix H presents an extract from ENDRM section 6 Reporting of Supplementary Information.

Appendix I presents a copy of the ENDRM plan-sum template.

Appendix J sets out a recommended colour scheme for presentation of noise level bands.

2 Requirements for Action Plans

2.1 General Requirements for Action Plans

The Regulations state that the designated action planning authorities for drawing up Action Plans for:

- The agglomeration of Dublin are:
 - Dublin City Council;
 - Dun Laoghaire / Rathdown County Council;
 - Fingal County Council; and
 - South Dublin County Council.¹³
- Major railways are:
 - the local authority, or local authorities, within whose functional area or areas the railway is located.¹⁴
- Major roads are:
 - the relevant local authority or local authorities within whose functional area or areas the road is located.¹⁵
- Major airports are:
 - the local authority or local authorities within whose functional area the airport is located.¹⁶

The Action Plan must refer to places near the major roads¹⁷, major railways¹⁸ and major airports¹⁹, and within any relevant agglomeration²⁰, which means those places affected by noise from the major sources, as shown by the results of the noise mapping, and all locations within any relevant agglomeration.

Note 1: This means that Article 7(b), (c) and (d) should be interpreted to mean “any local authority or local authorities within whose functional area or areas are affected by the noise from the (road or railway or airport)”

Note 2: Noise from major sources is regarded as affecting an area if it causes either an L_{den} value of 55 dB(A) or greater or an L_{night} value of 50 dB(A) or greater anywhere within an area.

The Action Plans must meet several general requirements, set out below:

¹³ Article 7(b)

¹⁴ Article 7(c)

¹⁵ Article 7(d)

¹⁶ Article 7(e)

¹⁷ Article 11 (1) (b)

¹⁸ Article 11 (1) (c)

¹⁹ Article 11 (1) (d)

²⁰ Article 11 (1) (a)

- The Action Plan must be designed to manage noise issues and effects, including noise reduction if necessary²¹.
- The Action Plan must satisfy the minimum requirements of the Fourth Schedule of the Regulations²², which in turn is a replication of most of Annex V of the END. See Section 2.3 below.
- The Action Plan must aim to protect quiet areas in first round agglomerations^{23,24}. For the current round of action planning, this requirement will affect:
 - major roads whose noise affects first round agglomerations
 - major railways whose noise affects first round agglomerations
 - major airports whose aircraft noise affects first round agglomerations
 - roads, railways lines, industrial sources and airports located within a first round agglomeration, or the buffer around the agglomeration, whose noise affects first round agglomerations

Note 3: Noise from sources is regarded as affecting a first round agglomeration if it causes either an L_{den} value of 55 dB(A) or greater or an L_{night} value of 50 dB(A) or greater anywhere within a first round agglomeration.

- The Action Plan must aim to protect quiet areas in open countryside^{25,26}.
 - major roads whose noise affects open countryside
 - major railways whose noise affects open countryside
 - major airports whose aircraft noise affects open countryside

Note 4: Noise from major sources is regarded as affecting open countryside if it causes either an L_{den} value of 55 dB(A) or greater or an L_{night} value of 50 dB(A) or greater anywhere within the open countryside.

- The Action Plan must address priorities which must be identified by having regard to any guidance published pursuant to Article 5²⁷. See Section 3.
- The Action Plan must apply in particular to the most important areas as established by strategic noise maps²⁸. See Section 3.

Appendix E sets out general guidelines on the possible contents of a noise action plan.

²¹ Article 3 (1)

²² Article 5 (a)

²³ Article 3 (1) and 11 (5) (b)

²⁴ The detailed identification of quiet areas is to form part of the duties of the action planning authorities responsible for preparing Action Plans for first round agglomerations.

²⁵ Article 3 (1) and 11 (5) (b)

²⁶ The detailed identification of quiet areas is to form part of the duties of the action planning authorities responsible for preparing Action Plans for first round agglomerations.

²⁷ Article 11 (3) (b) (i)

²⁸ Article 11 (3) (b) (ii)

Box 1
General requirements for Action Planning

Action Plans must

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

2.2 Fourth Schedule of the Regulations

The Fourth Schedule of the Regulations sets out the minimum requirements for Action Plans. These requirements are a replication of most of Annex V of the END.

Box 2
Annex V from the END

An Action Plan must at least include the following elements:

- a description of the agglomeration, the major roads, the major railways or major airports and other noise sources taken into account,
- the authority responsible,
- the legal context,
- any limit values in place in accordance with Article 5,
- a summary of the results of the noise mapping,
- an evaluation of the estimated number of people exposed to noise, identification of problems and situations that need to be improved,
- a record of the public consultations organised in accordance with Article 8(7),
- any noise-reduction measures already in force and any projects in preparation,
- actions which the action planning authorities intend to take in the next five years, including any measures to preserve quiet areas,
- long-term strategy,
- financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment,
- provisions envisaged for evaluating the implementation and the results of the action plan.

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

Annex V of END

Annex V of the END sets out the minimum requirements of Action Plans. These minimum requirements are shown in Box 2. Appendix E sets out guidance on how the minimum requirements set out in Annex V of the Directive may be incorporated into a noise action plan.

The Summary of the noise Action Plan which is to be produced should include the main elements of each of the minimum requirements set out in Annex V of the Directive.

In the following paragraphs, guidance is given on how the various elements of Annex V might be met. Appendix E contains further information along with a possible framework layout for a noise action plan.

A description of the agglomeration, the major roads, the major railways or major airports and other noise sources taken into account

This information will have already been gathered as part of the data that had to be submitted to the EPA as part of the noise mapping. No other noise sources will have been taken into account.

The authority responsible

This is the name and contact details of the designated APA for preparing the Action Plan, as defined in the Regulations.

The legal context

This requires reference to the Regulations which place the responsibility of preparing the Action Plan onto the APAs. Thus reference to the relevant Article should be made. Action Plans must include a description and assessment of the existing national and local framework of control directly or indirectly relating to the management of noise from the source e.g. current government policies, planning guidelines, statutory instruments, any local planning agreements and restrictions, any local voluntary agreements, noise preferential routes, Master Plans, strategic policies etc.

Any limit values in place

Reference should be made to any planning conditions or other agreements that set a constraint on operations that could affect the level of noise generated. These limit values may have already been described and reported as part of the noise mapping process.

A summary of the results of the noise mapping

These results should include, for the various noise indicators for which mapping was carried out, the area enclosed by the various contour bands. The area information will have already been determined through the noise mapping work.

The APA should determine the number of noise sensitive premises that lie within the various contour bands. Housing, hospitals and schools should generally be regarded as noise sensitive premises. APAs may chose to include other premises or specific types of land use within this definition depending on local circumstances and priorities, in which case they should present a clear description of all premises and/or land types deemed to be noise sensitive. The premises information may have already been determined through the noise mapping work.

Where noise from a major source affects an agglomeration then liaison with other APAs responsible for action plans within the agglomeration should form part of determining priorities.

The aim of this requirement is to provide a description of the current noise impact of the noise source on its surroundings.

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

APAs should determine the population exposure information for the various noise indicators for which mapping was carried out. The population exposure information will have already been determined through the noise mapping work.

Guidance on the identification of problems and situations that need to be improved is given in Section 3.

A record of the public consultations organised in accordance with Article 8(7)

Part of the action planning process requires formal public consultation to occur regarding the proposed Action Plan²⁹. More guidance is provided in Section 4.

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

Noise sources may have existing measures in place to manage and mitigate noise impacts. This may include procedures such as impact assessment guidelines, noise complaint handling protocols, development planning guidelines, noise insulation schemes, noise barrier construction projects etc. As part of the noise mapping process, information about such measures had to be provided to the Department. This requirement can be met by reviewing the previously prepared information about noise control measures and updating it as appropriate.

Actions which the action planning authorities intend to take in the next five years, including measures to preserve quiet areas

This element will comprise a description of the outcome of the deliberations as described in Section 3.

Long term strategy

Action Planning Authorities should set out a strategic policy objective for the management of environmental noise. Additionally APAs should describe any likely

²⁹ Article 11 (6)

future developments, and reference should be made to how the consequential noise impact would be managed.

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

Any new noise control measure that is considered for inclusion as part of the Action Plan must take into account the cost of implementation and the likely benefit expected to be accrued. (see also Section 3).

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

The Action Plan must show how the outcome expected from any measure that is to be implemented will be monitored. APAs should consider providing an update, locally, on a periodic basis that takes any changes in local circumstances into account.

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

The Action Plan must contain an indication of the expected outcome of any proposed measures, for example, in terms of the reduction in the number of people affected, etc.

3 Framework for Action Plans

3.1 Framework for Action Plans

The aims and objectives of the Directive state that the adoption of action plans should be concerned with:

“preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.”³⁰

This implies two scenarios which are to be addressed by the action plans:

- Protection of the future noise climate; and
- Reduction of the existing noise climate where necessary.

The future noise climate is protected via a combination of the existing noise control measures, which should be outlined within the Action Plan, and any further actions proposed as part of the Action Plan.

See Appendix E for guidance on the contents of a noise action plan.

3.1.1 Protection of the future noise climate

In order to avoid harmful effects of environmental noise in the future it is necessary to put actions in place which will provide adequate protection from the potential impacts of new developments, and will preserve and maintain areas with environmental noise levels deemed to be good.

Quiet areas are to be defined, identified and designated³¹ and are to be regarded as areas where environmental noise levels are deemed to be good.

In areas not designated as Quiet Areas, and likewise not considered to be an area where reduction of the existing noise climate is necessary, it is relevant to consider the potential noise impact of a proposed future development in the context of the existing environmental noise climate, and relevant guidance on control of noise exposure for noise sensitive premises. In the majority of cases it would be expected that this would most appropriately be managed through the planning process, including existing provisions for Environmental Impact Assessments, but may also include the provision of licenses for some operations. It is important to recall that environmental noise impact may not be assessed in isolation, rather taken into consideration and balanced with other relevant factors including sustainability, need, economic and social benefits etc.

3.1.2 Reduction of the existing noise climate where necessary

Action planning authorities will primarily have two pieces of information available to them for action planning. These are:

- The current noise impact as shown by the results of the noise mapping³²; and

³⁰ END Article 1

³¹ Article 3 (1)

- The current noise control measures which are in place.

When addressing the question of where noise reduction measures may be deemed necessary, the Action Planning process requires consideration to be given regarding the following:

- Is the current noise impact acceptable³³?
- If the answer is yes, then it can be assumed that the current noise control measures are adequate.
- If the answer is no, then further action is required and this action will be proposed as part of the Action Plan under the terms of the Regulations.

The general approach to the assessment of the actions for reduction of the existing noise climate where necessary could be:

- Determine the extent of noise exposure when assessment is considered necessary;
- Review strategic noise maps to identify priorities;
- Confirm the extent of impact;
- Review the possible mitigation measures; and
- Make a recommendation.

See Appendix C for a flow diagram illustrating the overall process.

3.2 Effects of Noise

There are many different effects of noise, and individuals experience each of them to different degrees. It is known that noise can disturb human activity, by causing distraction or by physically interfering with it. These effects can include:

- General detection/distraction;
- Speech interference;
- Disruption of work/mental activity; and
- Sleep disturbance.

Any of these can lead to annoyance and possibly more overt reactions, including complaints.

In addition there are physiological effects that can occur including stress and other health effects³⁴. The nature of these effects is much less certain, although it is known that noise can cause a variety of biological reflexes and responses referred to as stress reactions. Whether, over a period of time, these reactions could lead to

³² Action planning authorities will need to form a view on whether the results of the noise mapping are typical and should clearly state whether there were any unusual circumstances in the assessment year.

³³ See subsequent guidance on determining acceptability

³⁴ Exposure to noise can cause direct auditory effects, i.e. noise induced hearing loss.

Exposure to environmental noise tends to be at a level where the risk of this effect occurring is very small.

clinically recognisable disease is unclear. The possibility that severe annoyance might itself induce stress cannot be ignored³⁵.

At the present state of technology, noise tends to be an inevitable consequence of a mature and busy society. People enjoy a benefit from road, rail and air transport and industrial processes, and this benefit manifests itself in terms of business, leisure, the movement of goods and employment. When managing the environmental noise that arises from transportation noise sources, a balance must be struck.

3.3 Aims and objectives of Action Plans

Within the framework of the END, and the context of sustainable development, the overall aim of managing environmental noise is to avoid, prevent and reduce the harmful effects due to long term exposure to environmental noise, which would in turn promote good health and a good quality of life.

As indicated above, the emphasis of the END and the Regulations is on “important” areas as established by the strategic maps. Therefore APAs should primarily design their Action Plans with the twin aims of:

- Avoiding significant adverse health impacts from noise; and
- Preserving environmental noise quality where it is good.

3.4 Guidance on preserving environmental noise quality

Measures to preserve the quality of environmental noise levels, or avoid harmful effects, may be required in two generalised scenarios:

- Designated quiet areas; and
- Areas not designated as Quiet Areas, nor considered as areas where reduction of the existing noise climate is necessary.

Below is a brief discussion on aspects associated with these two general scenarios.

3.4.1 Quiet Areas inside agglomerations

Under the Regulations it is required to delimit quiet areas within agglomerations³⁶.

The strategic noise maps developed during the first phase of effort under the Regulations provide an assessment of environmental noise levels across the whole of the agglomeration for roads, railways, industrial and air traffic noise sources; and therefore may assist with the identification of quiet areas. At present there is no universally accepted definition of what constitutes a Quiet Area within an agglomeration, and thus a policy approach and some form of definition needs to be developed by the APAs and sent out within the Action Plan.

There are a number of possible means of defining quiet areas within agglomerations, from purely noise related criteria to wider definitions which take into account related aspects such as land use, local amenity value, accessibility and historic usage.

³⁵ The World Health Organisation provides a range of evidence on the effects of exposure to environmental noise

³⁶ Article 3 (1)

It is suggested at this stage that consideration is given to a means of defining quiet areas within agglomerations. As an example, a possible means of identifying areas for consideration as Quiet Areas may be to cross reference the areas of the noise maps below 55 dB L_{day} with a dataset of public open spaces to produce a list of potential quiet areas.

Public open spaces could be considered to include areas such as:

- Recreational areas;
- Playing fields;
- Playgrounds;
- Public parks and gardens;
- Beaches;
- Nature reserves;
- Cemeteries;
- River banks; and
- Canals.

The Action Planning Authority may also wish to consider a second category of locations such as the grounds around potentially noise sensitive premises such as:

- Places of worship;
- Hospitals, including nursing and convalescence homes;
- Educational institutions;
- Childcare\crèche facilities;
- Offices; and
- Some livestock farms.

In drawing up criteria and an approach for identifying Candidate Quiet Areas, APAs may wish to consider relevant research into urban quiet areas such as Symonds Group³⁷, Defra/TRL³⁸ and van den Berg³⁹.

It is also considered relevant to consider that some public open spaces, which an APA may wish to protect through designation, may currently have low levels of environmental noise as indicated by the strategic noise mapping, yet have much higher existing noise levels due to other noise sources not considered within the scope of the mapping, such as recreation, entertainment or neighbourhood noise. Similarly there may be other areas which an APA may wish to designate, due to usage and utility, despite having a reasonably high level of environmental noise as indicated by the strategic noise mapping. Should an APA wish to include the designation of such areas within the category of Quiet Areas, it is suggested that the selection criteria or decision matrix developed is able to identify and propose such areas, and that a reasoned case for designation is developed for each area which may not initially be obviously Quiet.

³⁷ Symonds Group Ltd. Report on the definition, identification and preservation of urban and rural quiet areas. Final Report 4E 59492, 2003. Symonds Group Ltd, East Grinstead, UK.

³⁸ Department for Environment, Food and Rural Affairs, *Research into quiet areas - Recommendations for identification*, (Authors TRL Limited), 2007.

³⁹ van den Berg M M H E and van den Berg G P. *Quiet areas: health issues and criteria*. Proceedings of Euronoise 2006, Tampere, Finland, 2006

The list of potential quiet areas could then be taken under consideration, given knowledge of the nature and usage of the locations identified, before being taken to consultation with the public, the EPA, and other relevant stakeholders, as a list of Candidate Quiet Areas. Following the consultation process, a final list may be drawn up for submission to the EPA and Minister for designation.

Once designated an accompanying policy statement would be required within the Action Plan setting out to what extent they are to be protected from environmental noise, and how this protection could be delivered e.g. whether future noise reductions are proposed, or whether planning controls will be exercised to prevent any increase in environmental noise. It would be appropriate that draft versions of this policy statement, and associated protection measures, form part of the consultation process on Candidate Quiet Areas.

Noise Action Plans for locations outside agglomerations, near major sources, do not have a statutory requirement to identify and delimit quiet areas within the areas covered by the noise action plans. Action Planning Authorities may, however, form the view that some locations within the action plan area would benefit from identification as Quiet Areas. In such cases APAs are at liberty to follow the approach set out above and delimit Quiet Areas within their Action Plans.

3.4.2 Quiet Areas in open country

Under the Regulations it is required to delimit quiet areas in the open country⁴⁰.

The requirement for such an area is that it is “*undisturbed by noise from traffic, industry or recreational activities*”. In the context of the scope of the Regulations it can be seen that the strategic noise mapping undertaken as part of the first phase of the Regulations will not provide a resource which may be extensively used to help identify quiet areas in open country. This is partially due to the nature of the assessed noise sources, which do not include recreational activities, and partially due to the area of coverage of the strategic noise mapping, which is near to major sources, and therefore not locations which will be undisturbed by them.

Whilst the results of the strategic noise mapping may not provide a clear indication of the location of areas which would be usefully designated as quiet areas in open country, it is recommended as a useful provision within the Regulations for APAs who wish to offer a level of protection for undisturbed areas which provide public amenity.

Action Planning Authorities drawing up Action Plans for areas near major sources outside agglomerations may consider widening the scope of coverage of the Action Plan to include Quiet Areas in Open Country away from the major sources, and delimit such areas for approval. In such cases APAs may wish to consider relevant research into rural quiet areas, and tranquillity, such as that by Waugh and Durucan⁴¹, Symonds Group⁴² and Campaign to Protect Rural England⁴³.

⁴⁰ Article 3 (1)

⁴¹ Environmental Protection Agency, Environmental Quality Objectives – Noise in Quiet Areas (2000-MS-14-M1), Environmental RTDI Programme 2000 – 2006. (Authors Waugh, D., Durucan, et. al.), 2003.

⁴² Symonds Group Ltd. *Report on the definition, identification and preservation of urban and rural quiet areas*. Final Report 4E 59492, 2003. Symonds Group Ltd, East Grinstead, UK.

In the context of the Regulations, it is recommended that any areas put forward for designation as Quiet Areas in Open Country would have low levels of environmental noise, and be predominantly free of long term noise effects from human activity.

3.4.3 Planning

The planning system can have a significant influence on the control of exposure to environmental noise, and may play a key role in the improvement of amenity. The appropriate use of the planning system can be used to help avoid, or minimise, the adverse impacts of noise without placing unreasonable restrictions on development.

There are two main scenarios in development where noise could be viewed as a material consideration:

- Bringing people to noise
 - New housing, hospital, school, nursing home etc developments near to existing road, rail, industrial or airport noise;
 - Noise levels outside the façade, in gardens, in public open spaces;
 - Noise levels inside the building.
- Bringing noise to people
 - New or altered roads, railways, industrial sites or airports or commercial developments which would alter the noise environment in the vicinity of noise sensitive locations.

Experience in other EU countries suggests that the guidance and/or limit values for the two types of scenarios are not necessarily the same, and that extent of change may be as relevant to the consideration of impact as the actual level of noise.

In order to successfully use the planning process to help avoid, or minimise, noise exposure in a consistent manner it is considered appropriate for guidance on noise exposure levels to be considered within the proposal and design stage of planning applications.

In the scenario where new residential properties, or other noise sensitive premises, are introduced into an existing climate of environmental noise, there is currently no clear guidance. Until specific planning guidance on noise is forthcoming from DEHLG, it is recommended that Action Planning Authorities take under consideration the planning policy guidance notes issued by the Department of Environment in England⁴⁴, and The Scottish Office⁴⁵.

In the scenario where new, or altered, sources of noise are introduced to existing residential properties, or other noise sensitive locations, there are currently a number of guidance documents which cover some of the situations which may arise, as discussed in Section 1.7.2 above. Where existing guidance does not cover the situation under consideration, the Action Planning Authorities may take under

⁴³ CPRE, *Tranquillity Mapping: Developing a Robust Methodology for Planning Support - Technical Report on Research in England*, January 2008 (revised).

⁴⁴ DoE, Planning Policy Guidance Note PPG24: Planning and Noise, September 1994.

⁴⁵ The Scottish Office, Planning Advice Note PAN 56: Planning and Noise, April 1999.

consideration the planning advice notes from Department of Environment in England⁴⁶, The Scottish Office⁴⁷, and BS 4142⁴⁸.

It is recommended that the Noise Action Plans contain a review of the use of the planning system to help manage the effects of environmental noise within the area covered. It is also recommended any evaluation criteria to be used are specified, or relevant documents referenced. Action Planning Authorities are also at liberty to determine that any approach to controlling environmental noise through the use of planning policy set out within the Action Plan, may be made relevant to the whole area under control of the APA, if considered appropriate, and not restricted solely to the area covered by the strategic noise mapping.

3.4.4 Sound Insulation

Whilst the control of external levels of environmental noise constitutes one aspect of noise management, and aims to provide benefit to amenity spaces, the control of noise levels within residential properties, and other noise sensitive premises, may also play an important role.

To complement the planning guidelines on exterior noise levels, it may be considered appropriate to consider aiming to achieve target internal noise levels within noise sensitive rooms such as living rooms and bedrooms. In the case of new development, or conversions, these targets may be introduced through the use of appropriate planning conditions, and possibly some form of pre-completion testing as used in a number of other EU countries.

BS 8233⁴⁹ provides guidance on suitable internal noise levels within residential properties, whilst further guidance on suitable internal levels in other noise sensitive premises may be sought from WHO Guideline values 2000, BS 8233:1999 and CIRIA/BRE⁵⁰.

When aiming to achieve target internal noise levels, it would normally be appropriate to request supporting evidence in respect of the façade's resistance to sound transmission, which could be in the form of suitable certified test results or calculations using the methodology within BS 8233 or BS EN 12354-3⁵¹.

It may also be appropriate to discuss the layout of the development with the applicants, and consider façade orientation, location of noise sensitive rooms within the building and location of amenity open spaces. A number of approaches to building design and site layout are discussed by the Mayor of London⁵², and Higgitt *et al*⁵³.

⁴⁶ DoE, Planning Policy Guidance Note PPG24: Planning and Noise, September 1994.

⁴⁷ The Scottish Office, Planning Advice Note PAN 56: Planning and Noise, April 1999.

⁴⁸ BS 4142:1997. *Method for Rating industrial noise affecting mixed residential and industrial areas*, British Standards Institution (BSI), London 1997.

⁴⁹ BS 8233:1999. *Sound insulation and noise reduction for buildings. Code of practice*, British Standards Institution (BSI), London 1999.

⁵⁰ Miller, J, *Sound control for homes (R127M)*, CIRIA/BRE, 1993.

⁵¹ BS EN 12354-3:2000 *Building acoustics. Estimation of acoustic performance in buildings from the performance of elements. Airborne sound insulation against outdoor sound*, London 2000.

⁵² Mayor of London, *Southern City – The Mayor's Ambient Noise Strategy*, March 2004

⁵³ Higgitt, J., Whitfield, A. and Groves, R., *Quiet Homes for London: Review of Options and Initial Scoping Study – Final Report*, Prepared for Greater London Authority, July 2004.

3.5 Guidance on reduction of the existing noise climate where necessary

It is recommended that a stated approach is followed to identify potential locations for actions, review possible actions and determine the cost effectiveness of actions, prior to determination of any proposed action. This provides a clear traceable decision process, whilst ensuring that options are reviewed at each stage of the process.

An overview of the recommended approach is shown in Appendix C.

3.5.1 Extent of noise exposure when assessment is considered necessary

The management of environmental noise under the Regulations introduces the potential for actions and controls on existing transportation noise sources to an extent not previously seen. As the coverage of the strategic noise mapping is significant, it is not considered practical to undertake a detailed assessment of need for every noise sensitive premises within the extent of the Action Planning areas. It is therefore necessary to develop a means of identifying the most important locations via some form of decision support matrix or selection process.

The commencement of this process requires some form of noise level value, or noise level values, which may be used as the commencement point for a review process. Set out below are recommended noise levels, as indicated by the strategic noise mapping, for the onset of the assessment process. They do not constitute any form of design guideline for noise management, nor do they necessarily indicate that at or above such levels the environmental noise should be considered undesirable. They are set out as a starting point in a process which seeks to identify locations exposed to existing levels of environmental noise for which it may be considered necessary to address the exposure through mitigation measures.

At some point in the future it may be considered appropriate to develop guidelines on noise limit values, or other relevant criteria for assessment of environmental noise. Indeed the EPA is responsible to report to the Minister in due course in this regard⁵⁴. However at present these do not represent EPA or Ministerial policy, and it is for each Action Planning Authority to determine whether the proposed onset of assessment levels are suitable for their purpose within their own action planning area.

3.5.1.1 World Health Organisation

Guidelines produced under the auspices of the World Health Organisation⁵⁵ make a number of recommendations for noise levels in specific environments which will minimise the health impact of environmental noise. In the context of the WHO definition of health as *“a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”* these guideline values can be seen as aspirational targets based on the precautionary principle.

The guidelines set out a number of external and internal values for daytime and night-time noise levels which aim to minimise all identified adverse health effects, including annoyance, for residential properties and other noise sensitive premises.

Examples of the guideline values:

⁵⁴ Article 11 (4)

⁵⁵ Berglund B., Lindvall T. & Schwela D. (Eds) *Guidelines for community noise*, World Health Organisation, London, March 1999, Published 2nd of March 2000.

- 55 dB L_{Aeq} , day, outdoor living area, serious annoyance;
- 50 dB L_{Aeq} , day, outdoor living area, moderate annoyance;
- 35 dB L_{Aeq} , day, dwelling indoors, moderate annoyance;
- 30 dB L_{Aeq} , night, inside bedrooms, sleep disturbance; and
- 45 dB L_{Aeq} , night, outside bedrooms with open window, sleep disturbance.

In reality, any large city with a long history is likely to have many situations exceeding the WHO guideline values, however the guidelines provide a frame of reference for decisions on planning controls and noise management going forward.

3.5.1.2 Airports

The assessment of noise from aircraft in flight has commonly been undertaken within Europe using an “average summer’s day” $L_{Aeq,16hr}$ noise level indicator. This is somewhat different to the “annual average day” L_{den} , L_{day} , $L_{evening}$, and L_{night} indicators assessed under the Regulations. Unfortunately this means that the assessed noise levels, contour extents, and numbers of people exposed are not directly comparable between the two assessments.

In the UK the DfT uses a level of 57 dB $L_{Aeq,16hr}$ as the onset of community annoyance, although there is likely to be a section of the community that may be severely annoyed below this level. PPG24 suggests that planning for new housing should not normally be granted for levels above 66 dB $L_{Aeq,16hr}$ and 57 dB L_{night} . The UK Air Transport White Paper⁵⁶ also required airport operators with immediate effect to “offer households subject to high levels of noise (69 dB $L_{Aeq,16hr}$ or more) assistance with the costs of relocating”.

The Fingal County Council Area Plan proposes to “resist new provision for residential development and other noise sensitive uses” above a noise level of 63 dB $L_{Aeq,16hr}$ and require noise insulation where appropriate above a noise level of 57 dB $L_{Aeq,16hr}$.

Having due regard to the issues raised above, the proposed onset levels for assessment of noise mitigation measures are:

- 63 dB, $L_{Aeq,16hr}$ ⁵⁷; and
- 57 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} .

These levels reflect an annual average 24 hour period.

3.5.1.3 Industry

Under the Regulations, the assessment of noise impact from industry is only required within agglomerations. The industrial process sites considered within the strategic

⁵⁶ *The Future of Air Transport*, Department for Transport, December 2003

⁵⁷ This is $L_{Aeq,16hr}$ derived from the L_{day} and $L_{evening}$ results assessed under the Regulations, not the $L_{Aeq,16hr}$ assessment undertaken for an average summers day.

noise mapping were those subject to IPPC licensing. The provisions of an IPPC license include for noise emissions from sites, where necessary.

As discussed in Section 1.7.2 above, guidance is set out in the EPA publication “*Guidance Note for Noise in Relation to Scheduled Activities*”. This document contains suggested noise limits of 55 dB(A) $L_{Ar,T}$ for daytime (08:00 – 22:00 hrs) and 45dB(A) $L_{Aeq,T}$ for night-time (22:00 – 08:00 hrs); with said limits to be applied to “*sensitive locations*”.

Having due regard to the existing licensing of industrial noise under IPPC the proposed onset levels, for assessment of noise mitigation measures, are:

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

These levels reflect an annual average 24 hour period.

3.5.1.4 Railways

The assessment of noise due to railway noise sources under the Regulations is required for all railway sources inside agglomerations, and for major sources outside agglomerations above the flow threshold. Under the regulations the definition of railways is to include traditional heavy rail systems, plus more recent light rail systems, such as Luas.

The English planning guidance document PPG24 suggests that planning for new housing should not normally be granted for levels above 66 dB $L_{Aeq,16hr}$ and 59 dB L_{night} . The Noise Insulation Regulations⁵⁸ indicate that a residential property is eligible for façade noise insulation above railway noise levels of 68 dB $L_{Aeq,18hr}$ or 63 dB $L_{Aeq,6hr}$. The Luas line EIS on noise and vibration proposes a criterion where mitigation measures should be considered at 68 dB $L_{Aeq,18hr}$ or 63 dB $L_{Aeq,6hr}$.

Having due regard to the existing licensing of industrial noise under IPPC the proposed onset levels, for assessment of noise mitigation measures, 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} .

⁵⁸ Noise Insulation (Railways and Other Guided Transport Systems) Regulations (1993)

These levels reflect an annual average 24 hour period.

3.5.1.5 Roads

Under the regulations, the noise due to road traffic sources is required for all roads within agglomerations, and more major roads outside agglomerations above a traffic flow level threshold. As the definition of a major road only considers the volume of traffic flow, the roads included within the assessment may be motorways, National Roads or Regional Roads, and will not necessarily be all examples of any one class.

The NRA Guidelines for the design of new national roads indicates that mitigation measures should be considered above a level of 60 dB L_{den} free-field, with an initial draft including a 50 dB L_{night} free-field criterion. The UK PPG24 suggests that planning for new housing should not normally be granted for levels above 63 dB $L_{Aeq,16hr}$ and 57 dB $L_{Aeq,8hr}$. The UK Noise Insulation Regulations⁵⁹ set out a level of 68 dB $L_{A10,18hr}$ above which a noise insulation package must be offered to property owners.

Having due regard to the discussion above the proposed onset levels, for assessment of noise mitigation measures, are:

- 70 dB, L_{den} ; and
- 57 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} .

These levels reflect an annual average 24 hour period.

3.5.2 Review strategic noise maps to identify priorities

The results of the strategic noise mapping provide information on the assessed noise levels at properties within the assessment area, along with an estimate of the number of inhabitants. These resultant datasets may then be used in combination with the recommended onset of assessment noise levels to develop a noise scoring decision matrix. This decision matrix is used to draw up a short list of potential areas for action, both above the onset values, and below the level for preservation to help identify Quiet Areas.

Appendix D provides an example prioritisation decision support matrix, based upon work carried out by Dublin City Council.

Once a shortlist of locations has been drawn up, these could be mapped within a GIS system to look for any clusters which could be considered “hot spots”. It may be relevant to then draw up a second shortlist which takes into account the presence of any “hot spots”.

⁵⁹ The Noise Insulation Regulations (1975), and The Noise Insulation (Amendment) Regulations 1988

3.5.3 Confirmation of extent of impact

Following the prioritisation exercise based upon the results of the strategic noise mapping, an ordered shortlist of areas may be drawn up which will proceed to the next stage in the process. The aim of this stage is to confirm that the noise levels assessed by the strategic noise mapping are experienced by the properties and population within the areas being addressed.

3.5.3.1 Do the noise maps indicate that this exposure has been exceeded?

The approach set out within the Directive is to first undertake strategic noise mapping within cities, and for major sources outside cities, and then assess the numbers of people exposed to noise within 5 dB bands. The strategic noise mapping process is a predominantly technical process requiring an array of different input datasets across large geographical areas. These datasets are combined to form 3D models, through which an assessment of noise propagation is undertaken using specialist computer software systems.

The noise level is assessed on a regular grid pattern across the model, and these results are used with an estimated population distribution model to assess the numbers of people exposed. The nature and extent of the various datasets required, coupled with the fact that 2007 was the first time this had been attempted on such a large scale, inevitably means that the results provide a best estimate, rather than a complete and wholly accurate account.

Within the context of the Directive and its requirement for the strategic noise maps to “provide a representation of the noise levels perceived within that area” (Para 10), and the development of strategic policy it is important to understand the scale of the uncertainties inherent within the results at this stage, rather than strive for an unachievable goal of total accuracy. Knowledge of the strategic noise mapping process and uncertainties will be beneficial during the development and execution of noise action plans.

The results of the strategic noise mapping process help to gain an understanding of:

- Where environmental noise is located;
- The approximate magnitude of noise levels within the assessment area; and
- Approximately how many people are exposed to differing levels of environmental noise.

3.5.3.2 Is the population exposed to these indicated noise levels?

The results of the strategic noise mapping provide information on the estimated population distribution. This may be used to determine an estimate of the number of people exposed above the onset of assessment criteria. If a number of clustered “hot spots” have been identified, the exposed population within these locations may be totalled to assess the extent to which the population may benefit from any noise mitigation measures.

Prior to the review of potential noise mitigation measures, and any subsequent commitment of budget to undertake any necessary actions, it is considered advisable to confirm that the noise levels indicated by the strategic noise maps are being experienced by the population within the study area.

This could be undertaken by reviewing and refining the noise models, if appropriate, or by undertaking field survey work to measure noise levels prior to the commencement of any works. In a best practice situation it is recommended that both are undertaken, with measurements repeated after any actions are carried out in order to confirm the delivered results.

Any field survey work could also ascertain as to whether the properties being assessed had noise sensitive rooms on the most exposed facades, or whether noise mitigation measures were already present which may not be indicated within the calculation model.

3.5.4 Review possible mitigation measures

Once the extent of the existing noise impact has been confirmed for the locations under review, the potential noise mitigations measures may be investigated, and a cost benefit analysis undertaken for each, with the aim of developing a selection matrix which leads towards a recommendation for action.

3.5.4.1 Scenario analysis

At this stage a review of potential noise mitigation schemes should be undertaken and a cost benefit analysis carried out.

There are a wide range of potential noise mitigation measures, some of which may act at a national or regional level, others which may be purely localised. Likewise there are a number of levels of authority which may be capable of making actions. A non-exhaustive list of example may include:

- Vehicle noise emissions and tyre noise regulations would be set at EU level.
- National planning guidance or noise regulations would be set at national level.
- Transport policy objectives may be set at regional level;
 - improved public transport;
 - getting people out of cars; and
 - increasing bus, train, bicycle journeys.
- At local authority level there are powers to act:
 - Replace diesel vehicles with Compressed natural gas / electric;
 - Truck routes;
 - Night time delivery restrictions or limits;
 - Planning permissions;
 - Enforcement of speed limits;
 - Road closures / traffic routing;
 - Road re-surfacing;
 - Planning zones;
 - Façade insulation requirements;
 - Noise barriers;
 - Public liaison groups; and
 - Long term targets.
- Airport operators may act in the following way:
 - Noise surcharge;
 - Fines for off track aircraft;
 - Aircraft restrictions;
 - Noise level limits;
 - Operating restrictions;

- Defined periods of respite;
- Purchase of most affected properties;
- Land use planning process; and
- Noise insulation packages.
- Roads authorities could undertake the following:
 - Traffic management – routes and HGVs;
 - New road construction (bypass);
 - Re-surface roads;
 - Vehicle speed management;
 - Noise screening measures; and
 - Façade insulation measures.
- Railway operators may take the following actions:
 - Railhead grinding;
 - Fleet renewal;
 - Electrification of lines;
 - Replacement of tread brakes with disk brakes;
 - Vehicle speed management;
 - Noise screening measures; and
 - Façade insulation measures.

There are various examples of possible noise mitigation measures within the EC funded projects EffNoise⁶⁰, Silence⁶¹ and QCity⁶². Where the APA identifies a potentially beneficial action for which it is not the managing authority or organisation, they are encouraged to liaise with the relevant authority to discuss the viability of actions, or support any move by other authorities to undertake the desired actions.

3.5.4.2 Cost benefit analysis

For the locations under review a list of potential noise mitigation actions is now drawn up. In order to develop a prioritised list of actions to be undertaken it is relevant to carry out a cost-benefit analysis on the potential actions being considered in order to maximise value for money and deliver benefit from investment.

The cost-benefit analysis should address lifetime construction and maintenance cost against noise reduction benefit.

The extent of noise reduction may be a reasonably simple assessment if global source related measures are being considered, or may be more detailed and complex if specific local measures are being reviewed. Assessment of noise benefit may even involve the use of the strategic noise models to undertake scenario testing to determine estimates of the noise reduction from identified design options. However there are a number of potential noise reduction measures which can be difficult to assess within the current calculation models, such as enhanced barrier design, quiet pavement surfaces and rail grinding for example.

The benefit of noise reduction may be viewed in terms of decibels / people / time or could be monetised to fully process the analysis. Monetisation of noise is becoming

⁶⁰ Effectiveness of Noise Mitigation Measures, EffNoise, <http://www.calm-network.com/bluebook/content/projects/p023.htm> [accessed May 2008]

⁶¹ Quieter Surface Transport in Urban Areas, Silence, <http://www.silence-ip.org/> [accessed May 2008]

⁶² Quiet City Transport, QCity, <http://www.qcity.org/> [accessed May 2008]

increasingly more common, and various approaches and valuations may be found within the HEATCO⁶³ project, WG-HSEA reports, WebTAG⁶⁴ and STAG⁶⁵ for example. It is important to note that the studies which form the basis of these monetary assessments of noise levels tend to take two differing approaches, (i) impact upon property market value and (ii) willingness to pay by residents exposed to noise to produce a reduction. As may be expected these tend to lead to somewhat differing suggested levels of financial benefit.

APAs undertaking a cost-benefit analysis of the mitigation options may also wish to consider the guidance within the CSF Evaluation Units report from 1999⁶⁶.

3.5.5 *A recommendation for action*

Following the cost-benefit analysis the locations under review may be prioritised to form a list of beneficial, achievable actions for noise mitigation.

With the cost and timescale implications of each action understood from the analysis, the mitigation measures may then be put forward to the relevant departments and fund holders to be incorporated within their future work plans.

3.6 Wider Considerations

Any new noise management measure in the Action Plan must reflect the wider context of local and national sustainable development plans, policies and strategies, including but not necessarily limited to, the following:

- Local Area Plans;
- Transport 21;
- Sustainable transport and sustainable urban mobility strategies;
- Strategic environmental assessment regulations;
- Environmental impact assessment regulations;
- Air quality regulations and Action Plans;
- Renewable Energy Action Plan;
- Local Authority Open Spaces policies;
- Planning policy statements and design guides;
- Airport master plans;
- Emerging climate change initiatives;
- Spatial data strategy;
- Urban regeneration strategies; and
- Noise abatement policy.

Where possible the synergies and conflicts presented should be reviewed and discussed.

⁶³ HEATCO, Developing Harmonised European Approaches for Transport Costing and Project Assessment, Final Technical Report, December 2006.

⁶⁴ Department for Transport, Transport Analysis Guidance, Noise, TAG Unit 3.3.2, November 2006.

⁶⁵ Transport Scotland, Scottish Transport Appraisal Guidance, 6.11 Noise and Vibration, September 2006.

⁶⁶ Community Support Framework (CSF) Evaluation Unit, *Proposed Working Rules for Cost-Benefit Analysis*, June 1999.

4 Process including Public Consultation and Publication

4.1 Process

The action planning authorities will have acquired information in accordance with Section 3 and reached a view on whether or not the current noise impact is considered acceptable, and whether or not current noise control measures are considered adequate. In coming to this view the APA will have considered the noise maps, the contents of this guidance, any subsequent relevant statements of government or regional policy, and, if applicable, the APA's own strategic development plan.

The APA should assemble this information, and any initial proposals for a way forward, into a Draft Noise Action Plan for wider consultation. This document must include prominently displayed wording identifying it as a draft subject to public consultation by the action planning authority.

4.1.1 Consulting the public

The Regulations require the Action Planning Authorities to consult the public when drawing up and revising Action Plans⁶⁷:

Box 3
Action Plans – Public Participation

In preparing and revising Action Plans Action Planning 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.

Once the Draft Noise Action Plan has been prepared, a formal public consultation exercise should be undertaken. The Draft Noise Action Plan and accompanying summary needs to be issued for Public Consultation to all relevant stakeholders and the public no later than 18 July 2008. These documents must include prominently displayed wording identifying them as a draft subject to the outcome of the Public Consultation process.

It is recommended that, where possible, the consultation process is planned and undertaken with regard to the Department of the Taoiseach publication "*Reaching Out – Guidelines on Consultation for Public Sector Bodies*", 2005⁶⁸. It is also recommended that in parallel to the wider public consultation, the APAs proactively seek consultation from relevant groups such as:

⁶⁷ Article 11 (6)

⁶⁸ Available at : <http://www.betterregulation.ie/index.asp?docID=73> [accessed May 2008]

- Department of the Environment;
- Environmental Protection Agency;
- APAs for adjacent areas, and neighbouring Member States⁶⁹;
- Local and regional authorities;
- Local and national pressure groups
- NGOs and professional bodies; and
- Local citizen groups.

Action Planning Authorities should allow a minimum of 6 weeks for consultation, and a further 2 weeks for submissions, for the general public to have adequate time to participate in this process.

If the noise source is located in or near to an agglomeration, and if the noise maps show that the agglomeration will be affected (see Section 2.1 above) by noise then, as part of the consultation exercise, the APA must submit the Draft Noise Action Plan to the other APAs developing Action Plans for each agglomeration so affected. Action planning authorities should be aware that there are a number of APAs having a statutory duty to draw up a Noise Action Plan within the agglomeration, and all bodies should use all reasonable endeavours to co-operate and agree the best way forward.

During the period of public consultation, the APA may deem it relevant, or necessary, to undertake a strategic environmental impact assessment on the Draft Noise Action Plan to review any impacts or influences on, or from, other strategic policies. The assessment should follow the approach set out within the Planning and Development (Strategic Environmental Assessment) Regulations 2004, S.I. No. 436 of 2004.

The APAs should examine and reflect upon the comments received, and complete the Noise Action Plan including a description of the comments received during the consultation process, and a reasoned justification for the response to the issues raised.

The Noise Action Plan, and accompanying summary, needs to be submitted to the Department no later than 31 October 2008.

4.1.2 Publishing

The action planning authority should then undertake a process to publish the noise action plan as a strategic policy document of the authority as a public document in an electronic format, within 28 days of being finalised.⁷⁰

The public consultation process, and the dissemination process following the finalisation of the Action Plan, should follow the requirements of the European Communities (Access to Information on the Environment) Regulations 2007, and the related guidance notes issued by the DEHLG.

⁶⁹ Article 11 (8)

⁷⁰ Article 11 (9)

4.1.3 Revision

The Regulations introduce a continuing obligation on action planning authorities to review (and revise, if necessary) the Noise Action Plan every 5 years, or sooner where a material change in environmental noise in the area occurs.⁷¹ Should the APAs feel that such a review is necessary, then the process described above regarding consultation shall be followed and the Noise Action Plan re-submitted to the EPA.

⁷¹ Article 11 (7)

5 Reporting Requirements

5.1 Reporting Mechanism

The Member States within the EC need to submit the results of the strategic noise mapping and action planning to the Commission. As the designated national authority it is the responsibility of the EPA to report the results of the strategic noise mapping and action planning to the Commission⁷².

To this end the EC have published the recommended Electronic Noise Data Reporting Mechanism (ENDRM)⁷³ for reporting under the END, which sets out 11 Data Flow templates covering the Member State (MS) reporting obligations set out in the Directive. The Data Flows cover the first and second round implementations of the END with deadlines ranging from 2005 to 2014.

Information on noise control programmes that have been carried out in the past, and noise-measures in place before adoption of action plans are to be submitted to the Commission by 18th January 2009 using Data Flow 6 (DF6). The information to be reported under DF6 covers the following:

- Per agglomeration \geq 250,000 inhabitants, including:
 - Agglomeration Roads
 - Agglomeration Rail
 - Agglomeration Airports
 - Agglomeration Industry
- Per major airport \geq 50,000 movements/y
- For overall major roads \geq 6 million vehicles/y
- For overall major railways \geq 60,000 trains/y

Any information pertinent to this report is to be included by APAs and clearly identified within the noise action plan.

The summaries of noise action plans are to be submitted to the Commission by 18th January 2009 using Data Flow 7 (DF7). The information to be reported under DF7 covers the following:

- DF7 by 18 January 2009
Action plans related data as listed in annex VI for major roads, major railways, major airports and agglomerations concerned by 1st round, and any criteria used in drawing up action plans
- Per agglomeration \geq 250,000 inhabitants, including:
 - Agglomeration Roads

⁷² Article 5 (4)

⁷³ Available at:

http://circa.europa.eu/Public/irc/env/d_2002_49/library?l=/reporting_mechanism/reporting_mechanism&vm=detailed&sb=Title [accessed May 2008]

- Agglomeration Rail
 - Agglomeration Airports
 - Agglomeration Industry
- Per major airport ≥ 50,000 movements/y
 - For overall major roads ≥ 6 millions vehicles/y
 - For overall major railways ≥ 60,000 trains/y

Appendix F includes extracts from the ENDRM which sets out the reporting requirements under DF7 for major roads, whilst Appendix G includes extracts of DF7 for agglomerations.

Appendix H contains an extract from the ENDRM which describes the supplementary summary reports required under DF6 and DF7.

Appendix I contains a copy of the ENDRM plan-sum template.

5.2 Information to be sent to the EPA

Action Planning Authorities are to submit Draft Noise Action Plans to the EPA by 18 July 2008. Following the consultation process, and any subsequent revisions necessary, the Action Plans are to be submitted to the EPA by 31 October 2008. Summaries of Action Plans, not exceeding 10 pages in length⁷⁴, are to be submitted to the EPA by 30th November 2008⁷⁵. See section 1.6 above.

The designated action planning authorities for the agglomeration of Dublin are to liaise and submit a single consolidated Action Plan for the agglomeration. They will also need to submit four Summaries of the Action Plan, each not exceeding 10 pages in length, to the EPA covering the whole agglomeration:

- Summary of Agglomeration Action Plan, including:
 - Agglomeration Roads
 - Agglomeration Rail
 - Agglomeration Airports
 - Agglomeration Industry
- Summary of Action Plan for Major Airports in the agglomeration
- Summary of Action Plan for Major Railways in the agglomeration
- Summary of Action Plan for Major Roads in the agglomeration

The Summaries of Noise Action Plans must meet the minimum requirements as set out in Annex V of the Directive.

5.3 Information to the Public

Within the context of the Regulations, and the Directive, the action plans are to serve as a public statement delivering the central tenet of the Directive to communicate to the public the effects of environmental noise, the extent to which environmental noise

⁷⁴ Fifth Schedule 2.8

⁷⁵ Article 11 (9)

currently affects the area covered by the action plan, the proposed approach to managing noise issues and noise reduction where necessary.

To this end information for the public on noise action plans, and their summaries, should be clear and comprehensible, and include a summary setting out the most important points⁷⁶.

Dissemination to the public should be via any appropriate means, including through the use of available information technologies⁷⁷, and should be in accordance with relevant Regulations, see Note 5. Noise action plans should be made available to the public within one month of the date they are finalised⁷⁸.

Note 5: On dissemination, the Directive states that it should be in “accordance with relevant Community legislation, in particular Council Directive 90/313/EEC of 7 June 1990 on the freedom of access to information on the environment”, which has subsequently been repealed and replaced by Directive 2003/4/EC of 28 January 2003 on public access to environmental information.

The Regulations quote the European Communities Act 1972 (Access to Information on the Environment) Regulations 1998 (S.I. No. 125 of 1998), which have subsequently been revoked and replaced by European Communities (Access to Information on the Environment) Regulations 2007, S.I. No. 133 of 2007, which transpose Directive 2003/4/EC, and which have an accompanying guidance document from the DEHLG⁷⁹.

It is recommended that the 2007 Regulations are followed, using the DEHLG guidance note as a point of reference.

⁷⁶ Article (2)

⁷⁷ Article 12 (1)

⁷⁸ Article 12 (3)

⁷⁹ Available from: <http://www.environ.ie/en/Legislation/Environment/Miscellaneous/> [accessed May 2008]

Appendix A: Glossary of Acoustic and Technical Terms

Term	Definition
Agglomeration	Major Continuous Urban Area as set out within the Regulations
Attribute 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
CRN	The Calculation of Railway Noise 1995. The railway prediction methodology published by the UK Department of Transport.
CRTN	The Calculation of Road Traffic Noise 1988. The road traffic prediction methodology published by the UK Department of Transport.
Data	Data comprises information required to generate the outputs specified, and the results specified
dB	Decibel
DEM	Digital Elevation Model
DSM	Digital Surface Model
DTM	Digital Terrain Model
DVD	Digital Versatile Disk
EC	European Commission
END	Environmental Noise Directive (2002/49/EC)
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
INM	Integrated Noise Model
Irish National Grid (ING)	The official spatial referencing system of Ireland
ISO	International Standards Organisation
Metadata	Descriptive information summarising data
NA	Not Applicable
Noise Bands	Areas lying between contours of the following levels (dB): L_{den} <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥75 L_d <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥75 L_e <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥75 L_n <45, 45-49, 50 – 54, 55 – 59, 60 – 64, 65 – 69, ≥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 Levels	Free-field values of L_{den} , L_d , L_e , L_n , and $L_{A10,18h}$ at a height of 4m above local ground level
Noise Level - L_d -	L_d (or L_{day}) = $L_{Aeq,12h}$ (07:00 to 19:00)

Term	Definition
Daytime	
Noise Level - L_e - Evening	L_e (or L_{evening}) = $L_{\text{Aeq},4h}$ (19:00 to 23:00)
Noise Level - L_n - Night	L_n (or L_{night}) = $L_{\text{Aeq},8h}$ (23:00 to 07:00)
Noise Level - L_{den} - Day/Evening/Night	A combination of L_d , L_e and L_n as follows: $L_{\text{den}} = 10 * \log \frac{1}{24} \{12 * 10^{((L_{\text{day}})/10)} + 4 * 10^{((L_{\text{evening}}+5)/10)} + 8 * 10^{((L_{\text{night}}+10)/10)}\}$
Noise Level - $L_{A10,18h}$	$L_{A10,18h} = L_{A10,18h}$ (06:00 to 24:00)
Noise Mapping (Input) Data	Two broad categories: (1) Spatial (e.g. road centre lines, building outlines). (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
OSI	Ordnance Survey for Ireland
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)
QA	Quality Assurance
RMR	The railway noise calculation method published in the Netherlands in 'Reken- en Meetvoorschrift Railverkeerslawaaai '96, Ministerie Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, 20 November 1996'.
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
XPS	The French road traffic noise calculation method published in 'NMPB-Routes-96 (SETRA-CERTULCPC-CSTB)', referred to in 'Arrêté du 5 mai 1995 relatif au bruit des infrastructures routières, Journal Officiel du 10 mai 1995, Article 6' and in the French standard 'XPS 31-133'.

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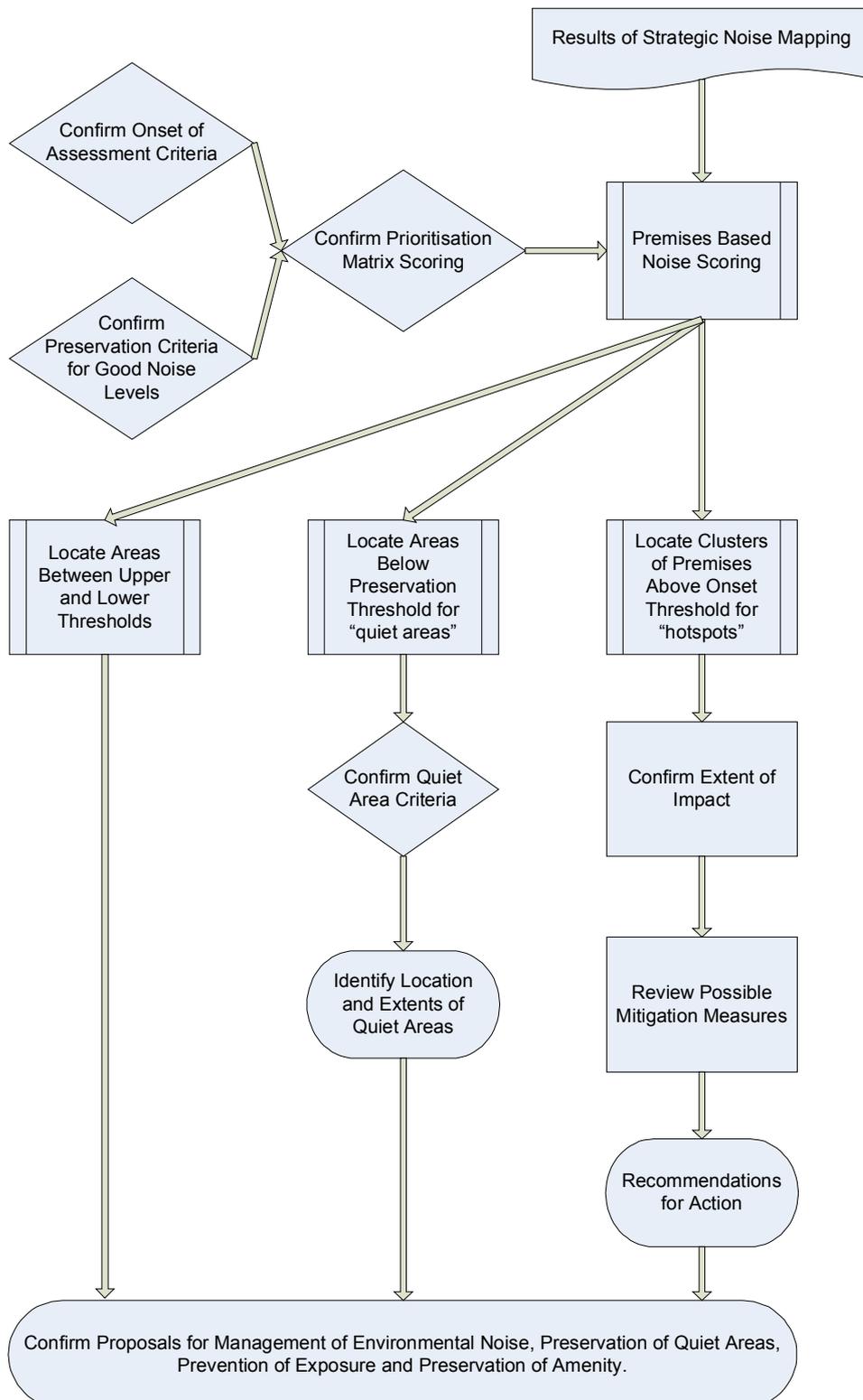
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Appendix C: Overview of Recommended Approach to Determine Actions to Be Undertaken



Appendix D: Example Prioritisation Decision Support Matrix

A decision support matrix is a chart which enables identification, analysis and rating of the strength of relationships between various sets of information. It enables a number of different factors to be examined and facilitates the assessment of the relative importance of each.

Table 1 provides an example prioritisation decision support matrix, based upon work carried out by Dublin City Council.

Table 1: Example decision support matrix

		Priority Matrix		
		Location:		
Decision Selection Criteria		Score Range Lden	Score Range Lnight	SubTotal
Noise Band(dB(A))	<45	5	6	
	45 - 49	4	5	
	50 - 54	3	4	
	55 - 59	2	2	
	60-64	1	3	
	65-69	2	4	
	70-74	3	5	
	75 - 79	4	6	
	>=80	5	7	
Type of Location	City Centre	1	1	
	Commercial	1	2	
	Residential	2	3	
	Noise Sensitive Location	3	3	
	Quiet Area	3	3	
	Recreational open space	2	2	
Type of Noise Source	Air	3	4	
	Industry	2	3	
	Rail	2	3	
	Road	3	4	
Total Score				0

Note: for Air noise the L_{DEN} column is used with the $L_{Aeq,16hr}$ results.

The use of the table may be automated using a spreadsheet or database application, with each noise sensitive premises allocated to one of the “types of Location” categories, and the noise level at the most exposed façade scored as per the “noise Band” and the source scored as per the “Type of Noise Source”.

The scoring matrix could be applied to all locations within the results dataset from the strategic noise mapping, or could be pre-filtered to only include locations below the chosen “preservation” levels, and above the onset of assessment levels.

The process of scoring is undertaken separately for each of the relevant noise sources, to produce a short list per noise source.

An example of the use of the matrix for a residential property exposed to road traffic noise levels of 71 dB L_{DEN} and 63 dB L_{night} is shown in Table 2.

Table 2: Example of use of decision support matrix

		Priority Matrix		
		Location:		
Decision Selection Criteria		Score Range Lden	Score Range Lnight	SubTotal
Noise Band(dB(A))	<45	5	6	
	45 - 49	4	5	
	50 - 54	3	4	
	55 - 59	2	2	
	60-64	1	3	3
	65-69	2	4	
	70-74	3	5	3
	75 - 79	4	6	
>=80	5	7		
Type of Location	City Centre	1	1	
	Commercial	1	2	
	Residential	2	3	5
	Noise Sensitive Location	3	3	
	Quiet Area	3	3	
Recreational open space	2	2		
Type of Noise Source	Air	3	4	
	Industry	2	3	
	Rail	2	3	
	Road	3	4	7
Total Score				18

A score of approximately 17 or above indicates that the threshold levels have been exceeded and the location should be included in the shortlist for further assessment.

Optionally, the APAs may wish to add an additional weighting factor to include the number of residents.

Appendix E: Guidelines on the 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 (see Box 2 and Section 2 of this guidance), and set out an approach to protect 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. In addition, the APA shall prepare a summary of the Draft Noise Action Plan (not exceeding 10 pages in length).

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 are still to be included.

Executive Summary

Table of Contents

1. Background/Introduction

- 1.1 Purpose and Scope of the END Directive
- 1.2 Purpose and Scope of the Regulations
- 1.4 Roles and Responsibilities of designated bodies
- 1.5 Key Phases
 - Identification of areas required to be mapped.
 - Preparation of strategic noise maps
 - Purpose and scope
 - Extent/range
 - Noise Mapping bodies responsible
 - Development of the noise action plans.
 - Purpose and scope
 - 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:
 - EPA Act
 - NRA guidance,
 - IPPC,
 - National Planning guidance,
 - Building Regulations etc

- include description of any statutory limit values in place or in preparation, including NRA, IPPC etc

2.2 Regional or local legislation or guidance, including:

- Planning policy
- Regional roads
- Local guidelines of use of EPA act
- Any currently in preparation

3. Description of the Action Planning Area

- 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 Responsible Authority for Action Planning

- 4.1 Name and contact details for the Responsible 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
 - See Appendix I of EPA Guidance for recommended colour scheme for display of noise level bands
 - 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
- Confirmation of approach to determining Quiet Areas in open country

6.2 Application of the criteria/matrix.

6.3 Results of the analyses, if available. If not available 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 mitigation 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

10.1 Roles and Responsibilities.

10.2 Targets and Objectives.

- Long term aims / objectives / strategy of APA regarding management of noise

- Over next 5 years, and beyond to subsequent rounds

10.3 Programme of Works

- broken down per year

10.4 Evaluation, Review and Corrective Action Programmes

- Ongoing review:

- This should state how often reviews of progress against the original programme of works will be undertaken,

- An evaluation of the outputs of the measures taken and any corrective actions/changes to the original programme to be undertaken as a result of the evaluation

- And who the responsible bodies are for this

- 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 and technical terms

Appendix B:

Bibliography and references

Appendix C:

Strategic noise map(s) – See Appendix I of EPA Guidance for recommended colour scheme for display of noise level bands.

Appendix D:

Overview / flow diagram of process for action planning decision making

Appendix E:

Final / completed Decision/Selection Matrix

Appendix F:

Public Consultation: Provide details of the public consultations organised in accordance with Article 11(6) of the Regulations. This should include the following:

- Description of the consultations undertaken with the public on the proposed action plans including dates and duration of consultations and methods of consultation used e.g., newsletters, news paper articles, public meetings, website etc.

- The results of the public participation and how these were taken into account in the finalisation of the action plans.
- Description as to how the public were informed of the decisions taken in relation to the action plans.

Note that the Regulations require that reasonable time frames be adopted to allow sufficient time for each stage of the public participation process.

Appendix F: Extract from ENDRM section 5.2 Reporting Major Road Information

5.2.7 Data Flow 7 (and 10) – Action Plans (page 53 of RM2007 HandBook.doc)

Name	Data Flow 7 (and 10), Action Plan Summary - Major Roads
Reporting Naming Convention	<CountryCode>_<Reporting Entity Unique Code>_DF7_Summary_MRoad (or <CountryCode>_<Reporting Entity Unique Code>_DF10_Summary_MRoad for the second implementation and thereafter)
Short Description	Data Flow 7 (and 10), Action Plan summary, allows Member States to report the document detailing the action plan summary.
Methodology for obtaining data	<p>European Parliament and Council Directive 2002/49/EC, relating to the assessment and management of environmental noise requires data and reports from Member States to be supplied to the European Commission.</p> <p>In Data Flow 7 (and 10), Member States must report action plan related data. Data Flow 7 (and 10) detailed in this data specification is related to the Action Plans summary document. This data specification details the table structure for Member States to supply this information. The table in this specification must contain the name of the associated written summary report, which must be supplied electronically with the submission. A Microsoft template is provided separately to cover this (see 6.1.4).</p> <p>The table must be supplied with supporting xml metadata compliant with the current European Environment Agency, Dublin Core Metadata Element Set (http://cr.eionet.europa.eu/dcmes.jsp).</p>

Columns in table:

Field Name	Field Definition	Methodology	Data Specification
Reporting Entity Unique Code	A single character Unique code assigned by the Member State to each Reporting Entity.	The same code as defined in DF0_MRoad	Datatype: string Minimum size: 1 Maximum size: 1 Minimum value: a Maximum value: z
Name of Action Plan Summary report	The full name of the action plan, the author/publisher of the summary report and date of production of the summary report.	Name formatted as 'fullname_author(publisher)_DD_MM_YYYY' An electronic copy of the summary report must be supplied separately with the submission to the European Commission	Datatype: string Minimum size: 1 Maximum size: 255
Cost of Action Plan	The total implementation cost of the noise action plan	Cost in EUROS	Datatype: integer

Date of adoption	The date of adoption of the action plan	Date formatted as 'DD_MM_YYYY'	Datatype: string Minimum size: 10 Maximum size: 10
Date of Completion	The date of completion of the action plan	Date formatted as 'DD_MM_YYYY'	Datatype: string Minimum size: 10 Maximum size: 10
Number of people experiencing an improvement in environmental noise	The number of people experiencing an improvement in their environmental noise situation	Number of people living in the dwellings which have actually benefited from noise reductions	Datatype: integer

Appendix G: Extract from ENDRM section 5.2 Reporting Agglomeration Information

5.5.14. Data Flow 7 (and 10) – Action Plans (page 170 of RM2007 HandBook.doc)

Name	Data Flow 7 (and 10), Action Plan Summary - Agglomerations
Reporting Naming Convention	<CountryCode>_<Reporting Entity Unique Code>_DF7_Agg (or <CountryCode>_<Reporting Entity Unique Code>_DF10_Agg for the second implementation and thereafter)
Short Description	Data Flow 7 (and 10), Action Plan summary, allows Member States to report the document detailing the Agglomeration action plan summary.
Methodology for obtaining data	<p>European Parliament and Council Directive 2002/49/EC, relating to the assessment and management of environmental noise requires data and reports from Member States to be supplied to the European Commission.</p> <p>In Data Flow 7 (and 10), Member States must report action plan related data. Data Flow 7 (and 10) detailed in this data specification is related to the Action Plans summary document. This data specification details the table structure for Member States to supply this information. The table in this specification must contain the unique name of the written summary report of action plans, which must be supplied electronically with the submission. A Microsoft Word template is provided separately to cover this (see 6.1.4).</p> <p>The table must be supplied with supporting xml metadata compliant with the current European Environment Agency, Dublin Core Metadata Element Set (http://cr.eionet.europa.eu/dcmes.jsp).</p>

Columns in table:

Field Name	Field Definition	Methodology	Data Specification
Unique Agglomeration ID	Unique Agglomeration ID assigned by the reporting entity to each agglomeration.	The same code as defined in DF1_Agg (or DF5_Agg)	Datatype: string Minimum size: 6 Maximum size: 14
Name of Action Plan summary report	The full name of the action plan, the author/publisher of the summary report and date of production of the summary report.	Name formatted as 'fullname_author(publisher)_DD_MM_YYYY' An electronic copy of the summary report must be supplied separately with the submission to the European Commission	Datatype: string Minimum size: 1 Maximum size: 255
Cost of Action Plan	The total implementation cost of the noise action plan	Cost in EUROS	Datatype: integer

Date of adoption	The date of adoption of the action plan	Date formatted as 'DD_MM_YYYY'	Datatype: string Minimum size: 10 Maximum size: 10
Date of Completion	The date of completion of the action plan	Date formatted as 'DD_MM_YYYY'	Datatype: string Minimum size: 10 Maximum size: 10
Number of people experiencing an improvement in environmental noise	The number of people experiencing an improvement in their environmental noise situation	Number of people living in the dwellings which have actually benefited from noise reductions	Datatype: integer

Appendix H: Extract from ENDRM section 6 Reporting of Supplementary Information

6.1.3. Data Flow 6 (and 9) Noise Control programmes - Supplementary Summary Report (page 173 of RM2007 HandBook.doc)

Within a given Reporting Area, the Supplementary Summary Report associated with Data Flow 6 (and 9) should summarize noise control programmes carried out in the past (before adoption of Action Plans required under article 8 of the END) for the geographical area in question. A Microsoft Word Document template is provided separately to cover this summary report. It is the same template as the one proposed for the summary report of action plans (see 6.1.4).

6.1.4. Data Flow 7 (and 10) Action Plan Summary - Supplementary Summary Report (page 174 of RM2007 HandBook.doc)

For Major Roads, Major Railways, Major Airports and Agglomerations a summary of the action plan covering all the important aspects referred to in Annex V of the Directive should be provided. A separate Supplementary Summary Report should be submitted for the Major Road and Major Rail networks and for each of the Major Airports and Agglomerations. A Microsoft Word template covering this report is provided separately. Its headlines takeover most of the items listed in Annex V of the END.

Note: The Microsoft Word Document template referred to in both of the above paragraphs is reproduced in Appendix I.

Appendix I: Extract from ENDRM plan-sum template

Reproduced contents of “RM2007 plan-sum template.doc”, being the Microsoft word template document referenced in paragraphs 6.1.3 and 6.1.4 of the RM2007 HandBook.doc.

Reporting Mechanism⁸⁰ proposed by the Environment DG of the European Commission

October 2007

*Word Template proposed for reporting
summary of Noise Control Programme/Action Plan
(not more than 10 pages length per programme/plan)*

Name of DF6 (or DF7 or DF9 or DF10) *(use naming convention presented in the Handbook)*:

Full name of the Noise Control Programme (or Action Plan) summary report *(use naming convention presented in the Handbook)*:

Limit values in place (preferably converted where relevant in Lden, Lday, Levening, Lnight as defined by Annex I of the Directive 2002/49/EC):

Summary of the results of noise mapping (problems, situations that need to be improved):

Summary of the results of public consultations organized in relation to this noise control programme (or action plan):

Summary of noise management actions (and related budget and targets) taken/envisaged:

Summary of provisions envisaged for evaluating the implementation and results of the noise control programme (or action plan):

Web links to the full Noise Control Programme (or Action Plan):

⁸⁰ An overview presentation of the reporting mechanism and a handbook on data specifications can be found at: http://circa.europa.eu/Public/irc/env/d_2002_49/library

Appendix J: Recommended colour scheme for presentation of noise level bands

The colour bands below are recommended for use in the production of noise level contour maps. The colour bands are based upon those set out within ISO 1996-2 (1987). Furthermore, it is recommended that the colour bands are made semi-transparent such that the base mapping below remains partly visible such that orientation and location remains possible.

Table J-1: Recommended noise Level Bands for Maps of Lden

Noise zone dB	Colour	Code	Red	Green	Blue
< 55	Transparent				
55 to 59	Orange 	# FF 66 00	255	102	0
60 to 64	Cinnabar 	# FF 33 33	255	51	51
65 to 69	Carmine 	# 99 00 33	153	0	51
70 to 74	Lilac red 	# AD 9A D6	173	154	214
≥75	Blue 	# 00 00 FF	0	0	255

Table J-2: Recommended Noise Level Bands for Maps of Lnight

Noise zone dB	Colour	Code	Red	Green	Blue
<45	Transparent				
45 to 49	Yellow 	# FF FF 00	255	255	0
50 to 54	Ochre 	# FF C7 4A	255	199	74
55 to 59	Orange 	# FF 66 00	255	102	0
60 to 64	Cinnabar 	# FF 33 33	255	51	51
65 to 69	Carmine 	# 99 00 33	153	0	51
≥70	Lilac red 	# AD 9A D6	173	154	214

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 mapping of Lnight values in the 45 to 49 dB(A) band is optional under the Regulations; if results are not available, or are chosen not to be mapped, below 50 dB(A) Lnight, the maps should show levels <50 dB(A) as transparent.