

Dublin Agglomeration

Environmental Noise Action Plan

December 2013 – November 2018



July 2013



Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council



Comhairle Contae County Council



Comhairle Contae Fhine Gall
Fingal County Council



Comhairle Contae
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Dublin Agglomeration Environmental Noise Action Plan December 2013 – November 2018

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Executive Summary

Introduction

This Dublin Agglomeration Noise Action Plan 2013-2018 has been prepared jointly by the four Local Authorities in the Dublin Agglomeration. The key objective is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise from road traffic, rail and aircraft. This will be achieved by taking a strategic approach to managing environmental noise and undertaking a balanced approach in the context of sustainable development.

Legal Context

The Noise Action Plan has been prepared in accordance with the requirements of the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These Regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise. This Directive sets out a process for managing environmental noise in a consistent manner across the EU and the Noise Regulations set out the approach to meeting the requirements of the Directive in Ireland.

Description of the Agglomeration

The Dublin Agglomeration covers Dublin City Council, Dún Laoghaire-Rathdown County Council, Fingal County Council and South Dublin County Council. The character of the use of land\property within the four Local Authorities varies substantially throughout the Agglomeration from a busy urban capital city to rural landscapes, to busy local towns and developing suburban residential developments.

Noise Mapping

The Regulations set out a requirement for the assessment of noise impact through the use of strategic noise maps. As part of the Noise Action Plan 2013-2018, about 3800Km of road was inputted into the noise model. Noise mapping was also prepared for approximately 150km of rail and for Dublin Airport

Noise Limit Values

In line with the previous noise action plan, the following are the proposed thresholds for desirable low and undesirable high sound levels in the Noise Action Plan 2013-2018

Desirable Low Sound levels

- < 50 dB(A) Lnight
- < 55 dB(A) Lday

Undesirable High Sound levels

- > 55 dB(A) Lnight
- > 70 dB(A) Lday

Also, it is proposed to use the following absolute values as one criterion for defining a Quiet Area.

- < 45 dB(A) Lnight
- < 55 dB(A) Lday
- < 55 dB(A) Lden

During the implementation of the noise action plan, it is proposed to identify locations that have noise levels below these criteria and review their use. If appropriate or necessary, locations could be identified as quiet areas where the existing noise levels are to be preserved or reduced if possible.

Summary of Actions

The key actions that will be implemented under the new Noise Action Plan 2013-2018 are listed under the following headings:

- Traffic Noise reduction and prevention measures
- Rail reduction and prevention measures
- Planning Process
- Protecting 'Quiet Areas'

Long term strategy

The Noise Action Plan 2013-2018 will be implemented through a staged process over 5 years, with each Local Authority within the Dublin Agglomeration endeavouring to follow the time frame set out in implementation of the Action Plan as follows, subject to resources being made available

First year of Plan (2014):

- To continue the implementation of the actions in the Environmental Noise Action Plan 2008-2013.
- To make available to the public the data from the ambient sound monitoring networks.
- To identify from noise maps where priority action is required at a local level.

Second and Third Year of Plan (2015)

- To identify Quiet Areas and preparation of submissions for approval by the Minister
- To commence implementation of the actions outlined in Chapter 8 on a prioritised basis, where the resources in each Local Authority permit.
- To review planning guidance regarding noise assessment and control and develop a programme of action to meet any shortfalls.

Fourth Year of Plan (2017).

- To commence capture of data for the new noise plans.
- To produce new noise maps for the Dublin Agglomeration in accordance with EPA guidance.

Fifth Year of Action Plan (2018)

- To review the impact of the Noise Action Plan 2013-2018 and amend where appropriate to prepare the Noise Plan for 2018 in accordance with EPA guidance.

In 2017, the Council will carry out a review of the actions implemented under this action plan. Progress and results will be evaluated using information gathered through local assessment of environmental noise exposure. A review of new noise maps will also be carried out, giving an indication of the change in environmental noise levels and the numbers of people exposed

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1. Introduction

1.1 Background

This Environmental Noise Action Plan has been developed jointly by the four Local Authorities in the Dublin Agglomeration - Dublin City Council, Dún Laoghaire - Rathdown County Council, Fingal County Council and South Dublin County Council in their role as designated Action Planning Authorities under Article 7 of the Environmental Noise Regulations 2006, Statutory Instrument Number 140 of 2006 (the Regulations).

The Action Plan is aimed at managing Environmental Noise and excludes noise from domestic activities, noise created by neighbours, noise at work places or construction noise as these can be dealt with under existing legislation such as the Environmental Protection Agency Act 1992 and Health & Safety legislation.

The aim of the document is to provide an overview of the regulations, to review the results of the latest strategic noise maps for the Dublin Agglomeration and to set out an approach to the strategic management and control of environmental noise over the next five years. It also provides the basis for feedback and input from the statutory authorities and the public to help inform the Noise Action Plan for the Dublin Agglomeration.

1.2 Sound and Effects of Noise

Noise can be characterised as “unwanted sound” or “sound that is loud, unpleasant or unexpected” (Future Noise Policy - European Commission Green Paper 1996) and that can eventually cause disturbance, impairment or damage to health. Sound levels are expressed in decibels (dB) on a logarithmic scale, where 0 dB is nominally the “threshold of hearing” and 120 dB is nominally the “threshold of pain”. One effect of using the decibel scale is that a doubling of the sound energy results in a 3 dB increase in the sound level.

Figure 1.1 provides an overview of common sound levels on the dB (A) scale as outlined in the NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004. From this, we can see that the sound in a bedroom is about 35 dB(A) and the sound in a busy office is about 60 dB(A).

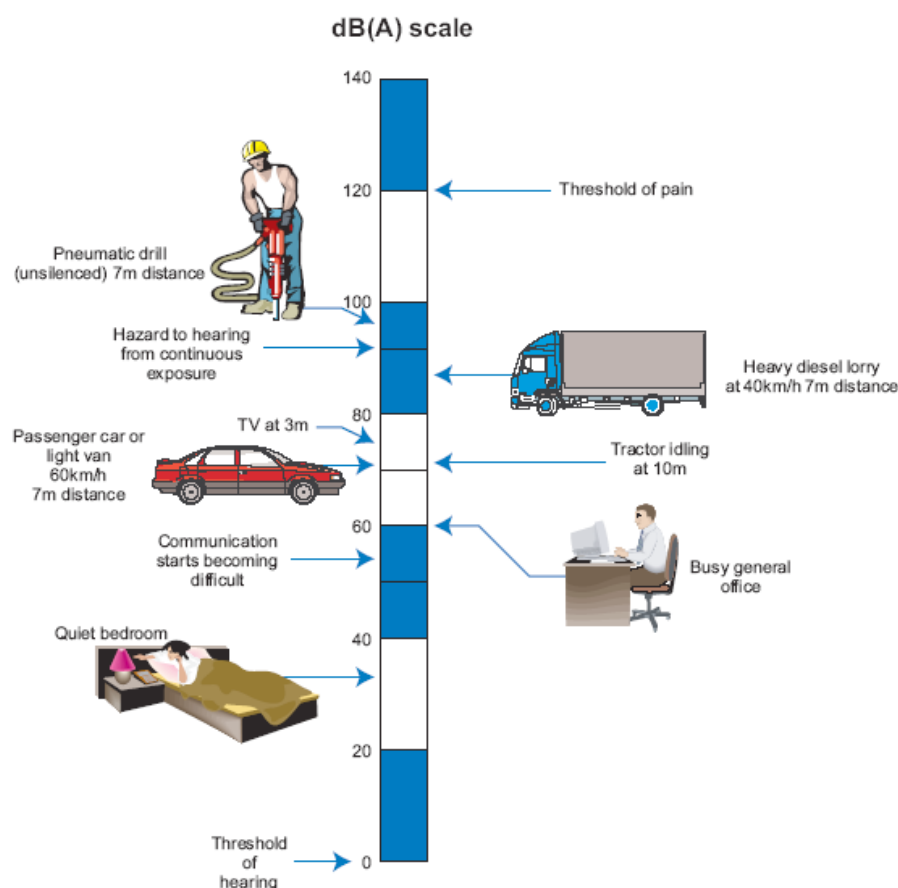


Figure 1.1 Levels of Typical Common Sounds on the dB(A) Scale (NRA, 2004)

Environmental noise, commonly called noise pollution, is among the most frequent sources of complaint regarding environmental issues in Europe, especially in densely populated urban areas and residential areas near highways, railways and airports, (WHO, European office). People are exposed to different sources of noise, including:

Transport (road traffic, rail traffic, air traffic);

- Construction and industry;
- Community sources (neighbours, radio, TV, bars, restaurants);
- Social and leisure sources (portable music players, fireworks, etc.);
- Indoor noise sources (ventilation systems, office machines, home appliances and neighbours).

Noise contributes greatly to diminishing people's quality of life. Unwanted sound (noise) of sufficient intensity and duration can cause temporary and/or permanent hearing loss. It can also interfere with speech communication, the transmission of other auditory signals, can disturb sleep and act as a general source of annoyance or disturbance and interfere with the performance of complicated tasks and the opportunity for privacy. In particular, exposure of people to day time noise levels above 65 dB(A) can cause severe health problems. In general, sound levels in cities can range between 60-70 dB(A), with suburban levels between 50-60 dB(A). The World Health Organisation has set guideline levels for annoyance at 55 dB(A) representing daytime levels below which a majority of the adult population will be protected from a moderate or serious annoyance.

In 2009, WHO European Regional Office published the 'Night Noise Guidelines for Europe'. It presented new evidence on the health damage of night time sound exposure and recommended threshold values that, if breached at night, would threaten health. An annual average night exposure not exceeding 40 dB(A) outdoors is recommended in the guidelines. It is recommended that this level should be the target for night noise guidelines to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. A night time level of 55 dB(A) is recommended as an interim target for countries that cannot meet these night noise guidelines in the short term and where policy-makers choose to adopt a stepwise approach.

In 2011 the European Regional Office of the World Health Organisation published a document entitled 'Burden of Disease from Environmental Noise'. It suggests that there is overwhelming evidence that exposure to environmental noise has adverse effects on the health of the population. The publication provides an evidence base for the future development of suitable guidelines on noise by the World Health Organisation (WHO). It supports the recommendations as set out in the 'Night Noise Guidelines for Europe' publication and supports this view based on a review of evidence based assessments of the impact of noise on health.

Noise from transport is by far the most widespread source of noise exposure, causing the most annoyance, sleep disturbance and public health concerns. **Road traffic noise** is the most significant contributor to environmental noise, with the CE Delft report (Traffic Noise Reduction in Europe, August 2007) estimating that approximately 210 million EU citizens are regularly exposed to 55 decibels (dB) or more from road noise.

The major contributors to road traffic noise are passenger cars, lorries and buses, with minor contributions from motorcycles.

Railway noise is the second most dominant source of environmental noise in Europe, with approximately 9 million people exposed to levels beyond 50 dB at night. Railway noise arises from engine noise, rolling noise and aerodynamic noise.

In Europe, **aircraft noise** affects a much smaller proportion of the population compared to road and traffic noise. However, aircraft noise is regarded as being more annoying than both road traffic and railway noise. (WHO Guidelines for Community Noise, 1999)

1.3 Purpose and Scope of the Environmental Noise Directive

In 2004 the European Community adopted Directive 2002/49/EC, which relates to the assessment and management of environmental noise. This directive is commonly referred to as the Environmental Noise Directive.

The aim of the Environmental Noise Directive is to identify a European Union common approach aimed at avoiding, preventing or reducing the negative and harmful effects due to exposure to environmental noise. In the Directive's provisions, environmental noise is defined as 'unwanted or harmful outdoor sound created by human activity, such

as noise emitted by means of transport, road traffic, rail traffic, air traffic and industrial activity'. The Directive indicates a number of actions that need to be progressively implemented by Member States in order to achieve the objectives of the Directive. These actions relate to four main principles:

- **Monitoring of environmental noise** – Member States must develop strategic noise maps, using a common methodology, in order to determine the exposure to environmental noise in priority areas in their territories;
- **Managing environmental noise issues** – On the basis of the developed strategic noise maps, Member States have to adopt noise action plans containing measures designed to address noise issues, including noise prevention / reduction and preserving environmental noise quality where it is good;
- **Public information and consultation** – Strategic noise maps, noise action plans and relevant information about noise exposure, its effects and measures to be considered to address environmental noise issues should be made available to the public or developed in consultation with the public;
- **Development of European Union long-term strategy** – With a view to reduce noise emitted by the major sources (in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment), the EU and Member States should cooperate in order to provide a framework for EU policies addressing environmental noise issues.

The Directive applies to environmental noise to which humans are exposed, particularly in industrial or built-up areas, public parks and in other quiet areas in agglomerations and in open country, near schools, hospitals, etc. However, the Directive does not apply to noise caused by the exposed person, noise created by domestic activities or neighbours, noise at work place or inside means of transportation due to military activities. Member States are obliged to designate competent national authorities responsible for the implementation of the Directive.

The Environmental Noise Directive requires all European Union (EU) Member States to produce strategic noise maps for the main sources of environmental noise, i.e. major roads, major railways, major airports and all sources within 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.

One of the objectives of the Directive is to establish a common approach to assess the exposure to environmental noise throughout the European Union. Article 6.2 empowers the European Commission to establish common assessment methods for the determination of the noise indicators *L_{den}* (day-evening-night equivalent level) and *L_{night}* (night equivalent level). Article 6.2 of the Directive foresees the development of a harmonised methodological framework for noise assessment and, in 2009, the Commission decided to develop CNOSSOS_EU (Common Noise aSSessment MethOdS) for noise mapping of road traffic, railway traffic, aircraft and industrial noise. The ultimate objective is to have the common noise assessment methodology implemented and operational for the third round of strategic noise mapping in 2017.

1.4 Purpose and Scope of the Noise Regulations

The purpose and scope of the regulations are set out in the statutory instrument S.I No. 140 of 2006, which transposes EU Directive 2002/49/EC relating to the assessment and management of environmental noise. It states that for the purposes of these Regulations, environmental noise means 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.

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. This is to be done through a two-stage process. Firstly, noise must be assessed through the preparation of strategic noise maps for areas and infrastructure falling within defined criteria, e.g. large agglomerations, major roads, railways and airports. Secondly, based on the results of the mapping process, the Regulations require the preparation of noise action plans for each area concerned. The fundamental objective of noise action plans is the prevention and reduction of environmental noise.

The Regulations provide for strategic noise maps and noise action plans to be made available to the general public. They also provide for public consultation to take place on the proposed action plans and for the results of public consultation to be taken into account in finalising action plans or in the review of action plans.

1.5 Role and Responsibilities of Designated Bodies

The Regulations designate the Environmental Protection Agency as the national authority for the purposes of the Regulations. The role of the Agency includes supervisory, advisory and coordination functions in relation to both noise mapping and action planning, as well as reporting requirements for the purpose of the Directive.

The Regulations designate noise-mapping bodies and action planning authorities for the making of strategic noise maps and action plans. Primary responsibility for both noise mapping and action planning is assigned to Local Authorities. While a number of other bodies also have noise mapping functions, these bodies will carry out their functions on behalf of the Local Authorities concerned.

1.5.1 Noise Mapping Bodies

A strategic noise map is defined within the Environmental Noise Directive as a map designed for the global assessment of noise exposure in a given area due to different noise sources for overall predictions for such an area (EU, 2002).

The roles of the Irish noise mapping bodies are set out in the Environmental Noise Regulations 2006. Table 1.1 outlines the organisations that have been designated as noise-mapping bodies under the regulations:

Table 1.1 Designated Noise Mapping Bodies	
For the agglomeration of Dublin	Dublin City Council and the County Councils of Dún Laoghaire/Rathdown, Fingal and South Dublin
For the agglomeration of Cork	Cork City Council and Cork County Council
For major railways -	Iarnród Éireann (Irish Rail) or the Railway Procurement Agency, as appropriate;
For major roads	The National Roads Authority, for national roads classified in accordance with Section 10 of the Roads Act 1993 (No.14 of 1993), and the relevant road authority, or authorities, for major roads not classified as national roads
For major airports	The relevant airport authority.

Following the first round of noise mapping in 2007, each designated noise mapping body was required to make a strategic noise map no later than 30 June 2012, for each of the following areas in respect of data from 2011:

- An agglomeration with more than 100,000 inhabitants;
- Any major road with more than 3 million vehicle passages per year (approximately 8,220 per day);
- Any major railway with more than 30,000 train passages per year (approximately 82 per day); and
- Any major airport with more than 50,000 aircraft take-off or landing movements per year (approximately 137 per day).

Dublin City Council, on behalf of the Dublin Agglomeration Local Authorities, submitted the required Noise Mapping Report to the EPA in June 2012 (See Chapter 4).

A key element in the production of maps is that they are sufficiently accurate and detailed to satisfy any public appraisals as public engagement is a central objective of the Environmental Noise Directive.

1.5.2 Noise Action Planning Bodies

Action planning authorities are responsible for the making and approving of Noise Action Plans, in consultation with the EPA and the noise mapping body for the relevant noise map. Under the Regulations, the organisations listed in Table 1.2 have been designated as action planning bodies:

Table 1.2 Designated Noise Action Planning Bodies

For the agglomeration of Dublin	Dublin City Council and the County Councils of Dún Laoghaire/Rathdown, Fingal and South Dublin
For the agglomeration of Cork	Cork City Council and Cork County Council
For major railways	The Local Authority or Local Authorities within whose functional area or areas the railway is located;
For major roads	The relevant Local Authority or Local Authorities within whose functional area or areas the road is located; and
For major airports	The Local Authority or Local Authorities within whose functional area the airport is located;

Accordingly, Local Authorities are designated as the Action Planning Authorities for all sections of major roads within their functional area which experience a volume of traffic greater than 3 million vehicle passages per year. Action Planning Authorities are required to ensure the following:

- The public are consulted on proposals for noise action plans;
- The public are given early and effective opportunities to participate in the preparation and review of action plans;
- The results of public participation are taken into account in finalising action plans or reviews of action plans;
- The public are informed of the decisions taken in relation to action plans;
- Reasonable time-frames are adopted to allow sufficient time for each stage of public participation.

1.6 Key Phases

The Environmental Noise Directive sets out a process for managing environmental noise in a consistent manner across the EU and the Regulations set out the approach to meeting the requirements of the Directive in Ireland. Responsibility for undertaking the phases of work required under the Regulations is shared between the noise mapping bodies and the action planning authorities.

Noise Action Plans are required to be reviewed and revised every five years. The second mapping for those agglomerations and major sources affected by the Regulations was completed in June 2012. The following timetable applies with regard to Noise Action Plan for the second round:

- March 2013 – Action Planning Authorities to submit their Draft Noise Action Plans to the EPA for review;
- April to June 2013 – Action Planning Authorities to issue their Draft Action Plans to all relevant stakeholders including the EPA and the public for a Consultation period of a minimum of 6 weeks for consultation,
- July 18, 2013 – Action Planning Authorities to submit their Final Noise Action Plans to the EPA
- January 18, 2014 – Details of Noise control programs and measures (ENDRM DF9) and Summary Noise Action Plans (ENDRM DF10) to be reported to the European Commission (EC) by the EPA for the second round

Section 2 of this Noise Action Plan provides an overview of noise management legislation and guidance. Section 3 provides a description of the extent of the Action Planning Area and outlines details of the length of road and rail that was included in the model as part of the 2nd round of mapping. Section 4 provides a summary of actions carried out in each Local Authority during the period of the previous Noise Action Plan 2008-2013. Sections 5 and 6 outline the process involved in the Noise Map preparation and the method for calculating sound. Section 7 outlines the key principles used to determine the actions to be included in the plan. Section 8 provides an overview of the public consultation process and the key issues that arose. Section 9 outlines the key actions that will be implemented under the new plan for the period December 2013 to November 2018 with a summary of the Noise Action Plan provided in Section 10.

2. Existing Noise Management Legislation and Guidance

2.1 National and Local Legislation, Regulations and Guidance

In addition to EC regulations, there is national legislation and guidance and local policy that relate to the management and control of environmental noise. The following provides an overview of the relevant literature.

2.2 Environmental Protection Agency Act 1992

The existing statutory provisions have primarily come about from the Environmental Protection Agency Act of 1992. The Act identifies noise as a form of environmental pollution and contains provisions for dealing with noise ‘which is a nuisance, or would endanger human health or damage property or harm the environment’. Sections 106 to 108 of the Act are of direct relevance to noise, and can be summarised as follows:

- Section 106 gives the relevant Minister certain powers to regulate noise that may give rise to a nuisance or be harmful to health or property.
- Section 107 gives powers to Local Authorities and the EPA to serve notice to take steps to control noise from any premises, process or work;
- Section 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.

The powers set out within the EPA Act 1992 largely relate to the control of noise nuisance, and therefore may be applicable to neighbourhood noise, music, industry or other such activities. Arising from the Act, all Local Authorities in the Dublin Agglomeration have developed policy statements dealing with issues arising from the provisions with the 1992 Act that can be found on the website of each Local Authority, with the web links shown in Appendix E.

2.3 Irish Roads Act 1993

The Roads Act 1993 grants powers to the Minister, under Section 77, to make regulations requiring relevant road authorities to take measures to mitigate the effects of road traffic noise. The Act also empowers the Minister to specify limits for road traffic noise which would lead to a requirement for mitigating measures by roads authorities, if exceeded. At present there are no limit values or standards for controlling road traffic noise, or its assessment on either new or existing roads.

In the absence of a regulatory assessment method or limit values the National Road Authority (NRA) published the document ‘*Guidelines for the Treatment of Noise and Vibration in National Road Schemes*’ in 2004. The Guidelines reviewed common practice in Ireland at the time, as well as the relevant approach within the UK, and set out the procedure to be followed in respect of the planning and design of national road schemes. The Guidelines indicate that, for new roads, mitigation measures should be considered for noise levels above a level of 60 dB Lden free-field when the three conditions within the Guidelines are satisfied. Although this is not a statutory limit value, it is considered to be a target for best practice design where mitigation is feasible. The NRA is currently working on a Good Practice Guide to complement the Noise Guidelines.

2.4 Irish Planning Guidance

Local Authorities can set conditions relating to noise as part of a planning permission. However, there is currently no national policy or guidance that addresses the issue of noise during planning leading to inconsistencies in relation to both the assessment and conditioning of planning applications.

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

- Our Sustainable Future, A Framework for Sustainable Development in Ireland, June 2012;

- Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities), September 2007;
- Sustainable Residential Development in Urban Areas: Guidelines for Planning Authorities, May 2009;
- 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*’. However, there is no guidance setting appropriate design goals, or the assessment methodology to be employed, other than reference to Part E of the Building Regulations.

The 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, it is appropriate to consider environmental noise and noise transfer between dwellings 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.

2.5 IPPC Licensing

Certain activities that are required to be licensed may be subject to controls relating to sound emissions. The relevant guidance is set out in the EPA document, ‘*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*’ dated April 2012. This document contains typical Limit Values for Noise from Licensed Sites as follows:

- Daytime (07:00 to 19:00hrs) – 55dB L_{Ar,T};
- Evening (19:00 to 23:00hrs) – 50dB L_{Ar,T};
- Night time (23:00 to 07:00hrs) – 45dB L_{Aeq,T}.

This document supersedes the EPA publications, ‘*Guidance Note for Noise In Relation To Scheduled Activities*’, 2006 and ‘*Environmental Noise Survey Guidance Document*’, 2003. It provides background information and clear guidance on the theory of environmental noise and on the principle of Best Available Techniques (BAT). As part of the preparation of the Noise Plan 2008-2013, an assessment of sound emissions from plants in heavily population areas did not highlight any issues with noise levels.

2.6 Wind Energy Planning Guidelines

With specific regard to wind energy developments, Department of the Environment, Heritage and Local Government guidance suggests a ‘*lower fixed limit of 45 dB(A) or a maximum increase of 5 dB(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 43 dB(A) at night-time is deemed appropriate by DoEHLG as there is no requirement to protect external amenity. A review is currently underway on the Wind Energy Guidelines.

2.7 Quarries and Ancillary Activities

EPA Guidance on Quarries and Ancillary Activities contain 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 it suggests that more onerous values may be considered appropriate in areas with low levels of pre-existing background noise. EPA guidance also states that *blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125 dB(Lin) maximum peak with a 95% confidence limit*.

2.8 Building Regulations 1997 - 2012

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 criteria, reference is often made to the guidance values put forward in the ‘Similar Construction’ method described in Technical Guidance Document E. The Regulations apply to the transmission of sound between adjoining residential dwellings, such as within apartment blocks, or semi-detached properties, they do not relate to the transmission of sound from the outside environment into the living accommodation.

2.9 Regional or Local Legislation or Guidance

This document is a Noise Action Plan for Environmental Noise generated mainly by road traffic in the Dublin Area. Currently there is no regional or local legislation relating to noise. However, there are a number of guidance documents that are relevant in the context of noise action planning:

2.9.1 Regional Planning Guidelines

The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). In this, it is stated that, ‘Planning policies need to consider the added health burden from the effects of air and noise pollution, road traffic accidents, sedentary lifestyles, lack of safe community space or spaces with poor access...’ Reference is also made to noise mitigation in the design of Green infrastructure in the guidelines.

2.9.2 Development Plans and Local Area Plans

Transportation, environment and development control policies and objectives that aim to reduce the negative and harmful effects due to exposure to environmental noise are contained in the Development Plans and Local Area Plans of each of four Dublin Local Authorities, with details of policies shown on the respective websites.

2.9.3 Transportation Policy for the Greater Dublin Area

There are ongoing sustainability policies being implemented at a regional or local level that aim to increase the mode share of sustainable travel modes in the Dublin region with a resultant reduction in noise and air pollution levels arising from less car traffic on the roads: These are as follows:

- **Draft transport strategy for the Greater Dublin Area, 2011 to 2030.** The Strategy vision for the Greater Dublin Area in 2030 is for “a competitive, sustainable city-region with a good quality of life for all”. This would be achieved through a range of economic, social and environmental objectives relating to transportation and the promotion of sustainable alternatives to car travel and planning for sustainable living. As part of the Strategy, under High level objective 4, ‘Respect and sustain the natural environment’, there is a sub objective to minimise the impact of noise and vibration.
- **Smarter Travel – A Sustainable Transport Future 2009-2020** - This sets out a broad vision for the future and establishes objectives and targets for transportation. It also supports greater integration between spatial planning and transport policy and sets a target to reduce car based commuting from 65% to 45% by 2020.
- **National Cycle Policy Framework 2009-2020** - This sets out actions to deliver a new culture of cycling in Ireland by 2020, with 10% of all trips to work being made by bicycle by 2020.

3. Description of the Action Planning Area

3.1 Introduction

Under the Environmental Noise Regulations 2006, the four Local Authorities within the 'Agglomeration of Dublin' are designated as the noise-mapping and action planning bodies for the purpose of making and approving strategic noise maps and action plans. They have been designated as the action planning authorities for the following categories within their areas:

- All Roads and Major Roads,
- All Rail and Major Rail,
- Major Industrial Processes,
- All Airports and Major Airport.

Before producing and implementing the Noise Action Plan, the Local Authorities must consult with the Environmental Protection Agency and the noise-mapping body for the noise-map involved, i.e. the National Roads Authority, Iarnród Éireann, Railway Procurement Agency and Dublin Airport Authority. Local Authorities are also responsible for consulting with members of the public and are required under the Directive to demonstrate how they have done so.

3.2 Description of Topography

The Dublin Agglomeration is geographically located near the Wicklow Mountains and plains of Kildare and Meath. It borders the Irish Sea and a number of large rivers and canals such as the River Liffey, River Dodder, Royal and Grand Canals flow through it. The character of use of land\property within the four Local Authorities varies substantially throughout the Agglomeration from a busy urban capital city to rural landscapes, to busy local towns and developing suburban residential developments.

3.3 Extent of Action Planning Area

Figure 3.1 shows a map of the four Local Authorities Dublin Agglomeration and Figure 3.2 shows a map of the key transport corridors in the Greater Dublin Area. Table 3.1 provides details of the areas, population and the number of dwellings for each of the administrative areas in the Dublin Agglomeration and also shows the percentage increases in population and in the number of residential dwellings since the 2006 COS Census.



Figure 3.1 Map of the Dublin Agglomeration



Figure 3.2 Map of the Greater Dublin Area (Source NTA GDA Draft Transport Strategy 2011- 2030)

Table 3.1 Population and areas in the Dublin Agglomeration

	Area	Population*	Residential dwellings**
County borough of Dublin (Dublin City Council)	115km ²	527,612 (+4.2%)	241,678 (10.2%)
County of Dún Laoghaire - Rathdown	127km ²	206,261 (+6.3%)	85,250 (7.7%)
County of Fingal	455km ²	273,991 (+14.2%)	95,682 (5.3%)
County of South Dublin	224km ²	265,205 (+7.4%)	95,499 (5.3%)
Dublin Total	921km²	1,273,069 (+7.2%)	518,109 (+8.2%)
* CSO 2011 Population (% population increase)			
** CSO 2011 Households - occupied and unoccupied (%vacancy rate)			

The Dublin Agglomeration covers all of the Dublin County area other than those areas excluded in the First Schedule of the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998) as follows:

1. The District Electoral Division of Tibradden,
2. That parts of the District Electoral division of Glencullen situated west of an imaginary line drawn as follows: Commencing at the junction of Slate Cabin Lane and Woodside Road, thence in a south-easterly direction and proceeding along Woodside Road and Ballyedmonduff Road to the county boundary at Glencullen Bridge.

3.3.1 Roads

Approximately 3800Km of road was inputted into the noise model with the length of road in each Local Authority, as shown in Table 3.2. This has not changed considerably from the length of road modelled in the previous plan. Approximately 10% of all roads in the Dublin Agglomeration are designated as Major Roads, i.e. carrying more than 8,219 vehicles for a 24-hour period.

Table 3.2 Road lengths in the Dublin Agglomeration noise model

Roads (km)	Total
Dublin City Council	1280
Fingal County Council	919
South Dublin County Council	846
Dún Laoghaire-Rathdown Co. Co	708
Total	3753

Table 3.3 shows number of licensed vehicles in Dublin City and County over the period 2007 to 2011, the latest data available.

Table 3.3 Number of licensed Vehicles in Dublin and Nationally

Year	Dublin City and County	Nationally
2007	610,053	2,441,564
2008	622,300	2,497,568
2009	609,116	2,467,660
2010	595,322	2,416,387
2011	595,033	2,425,156
Irish Bulletin of Vehicle and Driver statistics 2007 to 2011, DoEHLG / DTTaS		

In this, we can see that over the period 2007 to 2011, there has been a slight reduction in the number of licensed vehicles in Dublin City and County and nationally even though traffic congestion would appear to have decreased at a higher rate. It should be noted the mode share for car trips to work, college or school in the Dublin area has not changed between 2006 and 2011, with the number of trips by car driver only remaining at about 34% for 2006 and 2011. The only notable increase in mode share for all sustainable travel modes was by bicycle which showed a 1% increase for trips to work, college or school.

3.3.2 Rail

The Dublin Agglomeration contains approximately 150 Kilometres of rail, including Luas, with all being designated as Major Rail. There are two Luas light rail lines in the Dublin Agglomeration as follows:

- The Red Line is 20.8km in length and has 32 Stops and services currently run from Tallaght in South Dublin County Council to The Point in Dublin City Council and from Saggart to Connolly Station
- The Green Line is 16.5km in length and has 22 Stops running from Brides Glen through Sandyford in Dún Laoghaire-Rathdown County Council to St. Stephen's Green in Dublin City Council.

Passenger numbers on the Luas have been increasing in recent years from 22.2 million in 2005 to 29.4 million in 2012, with the majority of passengers on the Red Line.

Nationally, the number of Irish Rail passengers fell in recent years reducing from 37.4 million journeys in 2011 to 36.9 million journeys in 2012. However, in 2012, Dart passenger numbers for the second half of the year saw an increase of 6% over the same annual period in 2011.

3.3.3 Airports

Dublin Airport is the main airport located in the area and is situated in the Fingal County Council administrative area. Passenger numbers at Ireland's main international gateway increased each year since 2010 as shown in Table 3.4:

Table 3.4 Flight Statistics Dublin Airport

Dublin Airport	Passenger Number	Number routes	Number airlines
2012	19.1 million	169	55
2011	18.7 million	171	62
2010	18.4 million	177	63

Weston Executive Airport falls within the Dublin Agglomeration but is not defined as a major airport. Passenger numbers at the airport have decreased by 36% between 2007 and 2011 with approximately 80% of these movements for training purpose with commercial traffic making up the remaining 20%.

3.3.4 Location of Noise Sensitive Areas

Certain locations and building uses are considered to be more sensitive to environmental noise pollution than others. The main priority of the Directive is to manage environmental noise exposure where it is high and preserve environmental sound quality where it is within acceptable limits.

The Directive, Regulations and EPA guidance all indicate that the Action Planning Authority should take due consideration of the locations which will be considered to be noise sensitive, if any, in addition to residential dwellings. For the purposes of the assessment of potential noise mitigation measures under the Noise Action Plan, the following locations are considered noise sensitive:

- Hospitals, including nursing and convalescence homes;
- Educational institutions;
- Childcare\crèche facilities;
- Places of worship;

4. Responsible Authority for Action Planning

4.1 Name and contact details for the Responsible Authority

Dublin City Council and the County Councils of Dún Laoghaire/Rathdown, Fingal and South Dublin are the designated Action Planning Authorities under the noise regulations and are responsible for the preparation and implementation of the Noise Action Plan for the Dublin Agglomeration. This plan has been prepared by Dún Laoghaire-Rathdown County Council with support, assistance and information supplied by the other County Councils.

The address for each Local Authority in relation to strategic noise mapping and action planning in the Dublin Agglomeration is as follows:

1. Dublin City Council – The Traffic Noise & Air Quality Unit, Block 2, Floor 4, Civic Offices, Wood Quay, Dublin 8
2. Dún Laoghaire – Rathdown County Council – Environmental Health Section 8 Corrig Avenue, Dún Laoghaire, Co. Dublin.
3. Fingal County Council – Environmental Health Section, Grove Road, Blanchardstown, Dublin 15
4. South Dublin County Council – Environmental Health Section, County Hall, Tallaght, Dublin 24.

4.2 Description of existing noise reduction measures

4.2.1 Noise Limit Values

There are no specific noise limit values currently in place within each Local Authority except for those in the guidelines outlined in Chapter 2. In general, Local Authorities can only specify advisory levels.

4.3 Review of Dublin Noise Plan 2008-2013

Broad objectives were set out in the Noise Action Plan July 2008 to November 2013 with detailed sub-objectives. Measures were outlined to prevent environmental noise and reduce, avoid or relocate the various types of noise source and were mainly based on road traffic sound emissions, as the 2007 noise maps showed it to be the dominant sound source within the region. Many of the objectives in the plan were addressed through the implementation of various transportation, environmental and development control policies in each Local Authority even though the noise action plan may not have been the main driving force.

For example, many traffic related policies such as encouraging modal shift to cycling, walking and the use of public transport have a direct positive acoustical benefit by reducing the growth in traffic noise sources. Therefore it is proposed to mirror many of the aims in the first Noise Action Plan in the revised noise action plan for the period December 2013 to November 2018. The following sections provide an overview of the main actions implemented in each Local Authority within the Dublin Agglomeration as part of the Dublin Noise Plan 2008 to 2013.

4.3.1 Noise Monitoring Network

As part of the Noise Plan 2008-2013, an objective was set to review the Noise Action Plan at the end of the five year period. To support this review, a permanent ambient sound monitoring network was established in the Dublin area with units set up in each of the Local Authorities. The units are designed to operate continuously, recording sound levels and statistical information to allow analysis of trends in noise emissions. The units are equipped with a Class 2 microphone, specifically designed for long term outdoor use. Application areas include traffic noise level monitoring and rail noise level monitoring.

Dublin City Council commenced the installation of a permanent ambient sound monitoring network in 2009 and now the monitoring network consists of 12 sites. The purpose of the network is to measure outdoor ambient sound levels in the City, at sites which are representative of typical sound levels to which citizens are being exposed. It is anticipated that there will be further expansion of the network in 2013, subject to site availability.

The following are the current locations:

- Ashtown, Navan Road. D7, Private House
- Ballyfermot Road, D10, Civic Centre
- Ballymun Road, D11, Library
- Bull Island, D3, Interpretative Centre
- Chapelizod Road, D8, Dublin City Council Rowing Club
- Howth Road, D5, Raheny Library
- Blessington Basin, Blessington St, D1.
- Millmount Avenue, D9, Drumcondra Library
- Percy French Road, D12, Walkinstown Library
- Ringsend, D4, Irishtown Stadium
- Woodstock Gardens, Ranelagh, D6, Senior Citizens Residential Scheme
- Chancery Park, Public Park, Dublin

Dublin City Council produces annual reports relating to the noise monitoring units that can be accessed in www.dublincity.ie under Noise.

The noise monitoring network in **South Dublin County Council** measures outdoor ambient sound levels, at sites which are representative of typical sound levels to which citizens are being exposed. The first three noise monitoring units were installed in 2009 with an additional four locations provided in recent years. The locations are spread throughout the County and cover all 4 representative local areas, with the locations as follows:

- County Hall, Tallaght
- Tallaght Leisure Centre
- Deansrath Depot
- Esker Parks Depot
- St. Columcilles School
- Saggart Parks Depot
- Cheeverstown Centre

Further expansion of the network is planned over the duration of this action plan. A report presenting an analysis of the noise data captured from these 7 noise monitoring stations was completed for 2012.

Dún Laoghaire-Rathdown County Council installed five units in 2010 in areas considered to be sites of public amenity or potentially noisy locations. These are;

- People's Park, Dún Laoghaire
- Stillorgan Library
- Dundrum Library
- Marlay Park, Ballinteer
- Cherrywood Technology Park, Loughlinstown

Over the last 6 months the entire network has been upgraded to include GSM communications capabilities.

In the **Fingal County Council** Area, two units have been established in the County. It is anticipated that there will be further expansion of the network in 2013, subject to site availability. The current locations are as follows;

- River Road, Blanchardstown, Dublin 15.
- Old Airport Road, Santry, Dublin 11.

As part of the Dublin Noise Plan 2013-2018, it is proposed to expand this network over the next five years and to make the real time sound monitoring data from all the monitoring sites more readily available to the public.

4.3.2 Traffic Noise reduction and prevention measures

As part of the Noise Plan 2008-2013, objectives were set to reduce traffic density, to reduce traffic speeds and to reduce the volumes of goods vehicles in towns and in Dublin city centre. During the period of the previous Noise Action plan 2008-2013, all Local Authorities in Dublin area implemented a number of transportation policies and projects, in line with 'Smarter Travel, A Sustainable Travel Future', the National Transport Policy 2009 – 2020, that positively contributed to a reduction in sound levels. These included the following;

- Development of Cycle Greenways and shared pedestrian/cycle routes.
- Implementation of bus priority measures.
- Expansion of the Luas Network.
- Introduction of 30kph zones and traffic calmed areas.
- Improved Urban Road network through improved traffic signal efficiency allowing a smoothing of traffic flows on key strategic routes.
- Removal of HGV's from non strategic routes and a greater focus on the delivery of goods during certain hours and restrictions at certain times (night time delivery restrictions or limits).

The following are some specific measures carried out in Dublin City Council since 2008:

- Designation of an inner cordon within the city which has almost eliminated all heavy goods vehicle (HGV) within that area between the hours of 7am-7pm. Restrictions have been placed on new planning applications in certain areas, in relation to delivery of goods by HGV to shops before 7am in the morning.
- Dublin City Council has engaged in reducing excessive driving speeds through the provision of appropriate traffic calming measures and thus reducing sound emissions, e.g. College Green Bus Gate.
- For new roads schemes and major resurfacing projects, low noise surfaces were considered and applied where considered to be appropriate e.g. on both sides of the city quays and portions of Swords Road.
- A greater focus was placed on parking control and management in the City which in turn alleviated traffic congestion and thus noise.
- Identified 8 Quiet Areas which are being considered for delimiting by the Minister for Environment and Local Government.

The following are some specific measures carried out in DLRCC since 2008:

- Expansion of the County Cycle network which is now over 220km in length including the development of the segregated Metals Walking and Cycle route (Dún Laoghaire to Dalkey), the Slang River Greenway (Dundrum to Marlay Park), the Sandyford Greenway and cycle routes through a number of parks.
- Prepared a report on the Prioritization of Traffic Calming Schemes in Dún Laoghaire Rathdown County Council. This examined every road in the County and developed a priority list for the implementation of traffic calming schemes.
- Expansion of the bus priority network in the County, E.g. Kill Avenue QBC, Upper Church Road QBC, Sandyford Road QBC and the upgrade of bus stops throughout the County to allow for improved accessibility for mobility impaired and disabled persons.
- Expansion of the number of junctions linked to the SCATS traffic control system to allow a greater smoothing of traffic flows in the network.
- 7.5km extension of the Green Luas to Brides Glen in 2010
- Installation of a network of electric charge points around the County in conjunction with ESB.

The following are some specific measures carried out in South Dublin County Council since 2008:

- 4.2km extension to Luas from Belgard to Saggart

- Opening of Bothar Katherine Tynan (Embankment Road Extension) linking Belgard Road with Citywest, removing 'rat runs' from housing estates.
- Application of special speed limits – a speed limit review is currently underway.
- HGV bans in designated areas
- Extensive use of noise reducing road surfaces
- Provision of major bus lanes
- Developed 5km Green Route cycling track along the Grand Canal and extension of primary cycle network

The following are some specific measures carried out in Fingal County Council since 2008:

- Implementation of QBC's and bus priority measures including Swords QBC Extension, R108 Bus Priority Scheme, Blakestown Way QBC, Castleknock QBC, Huntstown Way QBC
- The Road Traffic (Special Speed Limits) (County of Fingal) Bye-Laws (No. 1) 2012 were updated with speed limit reductions introduced at over 40 locations throughout the County
- The County Cycle network was expanded and is now over 40km in length. This included the development cycle routes through a number of parks.
- For new roads schemes and a small number of major resurfacing projects low noise surfaces were considered and applied where appropriate e.g. on both sides of the Swords Road.
- The introduction of '3 ton limits' in residential areas throughout the County

4.3.3 City and County Development Plans

During the period of the Noise Plan 2008-2013, each of the Local Authorities in the Dublin Agglomeration introduced new development plans for their area as follows:

- Dublin City Council Development Plan 2011-2017
- Dún Laoghaire-Rathdown County Council Development Plan 2010-2016
- Fingal County Council Development Plan 2011-2017
- South Dublin County Council Development Plan 2010-2016

Transportation, environment and development control policies and objectives that aim to reduce the negative and harmful effects due to exposure to environmental noise are contained in each of the Development Plans. Also, it is policy in each Council to reduce the number of people exposed to noise.

4.3.4 Rail

As part of the previous Noise Action Plan 2008-2013, there was an objective for rail operators to produce a sound impact assessment and apply mitigation measures, as appropriate, for any new rail infrastructure or ancillary developments or any major intensification on any existing rail infrastructure or ancillary developments within the Dublin Agglomeration. This was carried out as part of the Environment Impact statement for the major rail projects carried out in the Dublin Area and will be included in the new noise action plan.

4.3.5 Dublin Airport

Responsibility for the reduction of aircraft noise on local communities close to Dublin Airport is shared by the Irish Aviation Authority (IAA) the Airport itself and the airlines that operate there. In recognition of its own responsibilities in this area, Dublin Airport has introduced and continues to evaluate a number of initiatives to monitor aircraft noise levels and to mitigate their impact.

A flight tracking system is now operated that allow aircraft movements to be analysed and respond to any complaints relating to aircraft noise. The primary objective of the Noise & Flight Track Department of the Dublin

Airport Authority is to gather information on aircraft approach and departure routes and resultant noise levels at a number of key locations.

In 2008, Dublin Airport Stakeholders Forum set up an Environmental Working Group that works closely with Fingal County Council. This provides an effective forum for the discussion of all matters concerning the development and operation of the airport that have an impact on users, customers of the airport and on people living and working in the surrounding communities.

The purpose of the group is:

- To understand the legislative / regulatory background for Noise and Flight Track monitoring as well as the monitoring of Air & Water Quality at Dublin Airport.
- To consider possible noise reduction measures as well as possible environmental measures to manage and control emissions.
- To consider how Noise Monitoring Data can be made available to the wider public.
- To make recommendations to Dublin Airport Stakeholders Forum on all issues in relation to Noise & Flight Track Monitoring.

The Working group has carved out a successful ongoing role in contributing to Dublin Airport Stakeholders Forum discussions and interests and has built up a consensus and strong working relationship between all parties over the years and continues to meet on a quarterly basis.

5. Summary of the results of the Noise Mapping

5.1 Introduction

Under EU Directive 2002/49/EC relating to The Assessment and Management of Environmental Noise, the four Local Authorities, within the agglomeration of Dublin, are required to review and revise, if necessary, 'Strategic Noise Maps' every 5 years. The first sets of maps were produced in June 2007. A review was carried out by the four Local Authorities within the 'Agglomeration of Dublin' and this found that overall traffic volumes had reduced since 2007. However, due to the re-designation of the 'Major Roads' from more than 6 million vehicle passages per year to more than 3 million vehicle passages per year (from approx 16,438 to 8,219 per day), a decision was made to revise the 2007 road source noise maps in order to produce noise maps for June 2012.

5.2 Noise Map Preparation

Preparation of strategic noise maps is mainly a technical process requiring an array of different input datasets across large geographical areas. The strategic noise mapping process results in grids of calculated noise levels at 20m intervals and the output from the mapping process allows the determination of the location and magnitude of noise levels within an area using 5dB(A) noise bands. This gives an indication of the number of people and households exposed to different levels of environmental noise.

Dublin City Council acted as the lead co-ordinator in relation to developing the traffic source maps for the Agglomeration of Dublin in 2007 and in 2012, with support and information from the other County Councils. It calculated the noise models on behalf of the four Dublin Local Authorities along with the population and household exposures to noise, the collation of the maps and tables of statistics. The latest maps for the Agglomeration were submitted to the EPA in a report titled 'Report on the Dublin Agglomeration Noise Mapping Project 2012' dated June 2012. Strategic noise mapping was also undertaken by the Dublin Airport Authority, the Railway Procurement Agency and Irish Rail. Indicative maps for the Dublin Agglomeration can be seen in Appendix C with links to the mapping for each Local Authority and for the relevant agency shown in Appendix E.

5.3 Sound Calculation method

5.3.1 Method of Assessment

The Environmental Noise Regulations prescribes two methods that can be used for the assessment of noise from road sources. These are CRTN (Calculation of Road Traffic Noise) and the 'Interim Method' as described in the Environmental Noise Directive.

In the interest of consistency with the Round 1 Noise mapping, it was decided to use the adapted version of the UK CRTN methodology for the assessment of road traffic sound levels. Within this assessment procedure, Method 2 was used in the Dublin City Council region, as Method 1 for conversion of L10, 18Hr to Lden and L night, (outlined in the TRL Project report PR/SE/451/02), in relation to low flow roads at night, was found to be unsuitable. Method 3 was used by the other three Local Authorities within the agglomeration, as there were incomplete datasets in relation to hourly traffic volumes on the major roads within their areas.

5.3.2 Dataset Specification

Noise mapping entails the calculation or measurement of sound levels at a number of receiver/receptor points. These values are then used to draw colour contour 'noise maps', which visually represent the levels of 'noise' throughout the area being mapped. In general, the calculation of sound levels takes place in two stages within the 'noise mapping' software:

- a) The assessment of the level of sound emitted from a source - the "source noise emission";
- b) The assessment of the attenuation of the emitted sound en-route from the point of emission to the receptor - the "propagation attenuation".

After the assessment of sound levels across the area of the strategic noise mapping is performed, it is then necessary to undertake statistical analysis to determine the area, dwelling and population exposure data required to be reported to the EC. Following this concept, the input dataset required can be classified into:

- Source input data which defines the position and characteristics of the noise sources;
- 3D model pathway input data which defines the environment within which propagation occurs;
- Population input data which defines the location of the population exposed to the long term environmental noise sources.

5.3.3 CRTN Input Data Requirements

Noise maps are developed by inputting data into 'noise mapping' software. The information required for the source emission model for the road traffic is specific to each method of assessment. The following CRTN input information is required for each road section for an assessment of road noise using the adapted UK CRTN method:

- Road centrelines and Traffic Data (Traffic volume, %HGV's, and mean vehicle speed, Direction of vehicle flow, Road width, Road surface type, Texture depth, Road gradient. Road classification).
- Ground region and Surface contours (10m spacing)
- Barriers/Screening – Heights and locations
- Buildings – Heights and locations

5.4 Noise Model Data Sources

The Noise Directive requires information on the total number of dwellings exposed to noise from all roads and major roads with the agglomeration. It also requires information on the estimated number of people living in dwellings that are exposed to noise for the various scenarios mapped:-

The type of information used for the agglomeration of Dublin was:-

- GeoDirectory 'Buildings' table; 'Address Point' Table.
- CSO census data – Population of each electoral division.
- Geo referenced DED object layer attributed with CSO data to Ordnance Survey Ireland (OSI) Electoral Divisions (ED).

The Environmental Noise Directive requires that data should not be more than three years old. All data sets used in the model were less than a year old with the most up-to-date data set being the 'Geodirectory' containing address point and building use information. The model infrastructure data sets for Buildings, Road Centre lines, Contours and Green areas were supplied by OSI under license and dated 2010. Traffic counts were based on an annual average daily traffic for 2011 and the percentage of heavy goods (HGV) vehicles was estimated for those roads that did not have manual HGV counts. The SCATS's traffic control system was used to produce annual hourly traffic volumes, where it was available.

5.5 Noise Level Calculations

The Predictor\Lima software suite, version 8.11 was used in the processing of the noise maps. The default settings for CRTN were used for computation, except for the setting of the fetching radius, which was set to 1000m. The grid spacing's were set to 20m spacing's as the modelling software could not handle more than one million grid points. The models were subdivided automatically (tiled) into 1Km² grids with 1Km² buffers to improve calculation efficiency. This resulted in each model being 9Km² in size. For the area near the boundaries of each Local Authority, a buffer region of 2Km was used. These smaller models were then recombined automatically on export into the GIS environment.

Test calculations were carried out using a model containing the same data that was used in Round One of noise mapping. For Round One, version 6.0 of the Predictor modelling software was used. In Round Two, version 8.11 was used. The outputs from the two versions using the same data inputs were not similar. It is thought the reason for

this was that version 8.11 used a different method in calculating the ‘propagation’ impacts. The computations using Version 8.11 resulted in values lower than those in the First Round.

5.6 Noise levels Indicators and exposure levels

To provide a standardised approach to the description of long term environmental noise, Article 6.2 of the Directive specifies the use of two noise level indicators when preparing environmental noise maps and action plans, the L_{den} and L_{night} . The L_{den} is a noise rating indicator, rather than a sound level, and is based upon the day, evening and night time noise levels, with weightings applied for the different periods. L_{night} is typically used to assess sleep disturbance.

- L_{day} is the A-weighted long-term average sound level between 07.00 and 19.00
- $L_{evening}$ is the A-weighted long term-average sound level between 19.00 and 23.00
- L_{night} is the A-weighted long-term average sound level between 23.00 and 07.00
- L_{den} is the 24 hour noise rating level determined by the averaging of the L_{day} with the $L_{evening}$ plus a 5 dB penalty, and the L_{night} plus a 10 dB penalty

The long term, annual average, day, evening and night values are determined and then combined to provide the indicated L_{den} yearly average, as seen in Appendix A. The penalties are applied to the evening and night time periods during the assessment of L_{den} to take into account evidence that response to noise levels is not uniform throughout the 24 hour period. For example, a given indicated level of noise during the day may be deemed acceptable by the majority of people. However that same level of noise at night may be deemed less acceptable.

There are currently no national criteria in relation to noise limit values. In 2009, the EPA issued guidance notes on the development of noise action plans. The guidance on sound values where and action should be invoked, are in terms of average night time and 24hour values. In the current noise action plan they are expressed as average day and night time values. The EPA guidance suggests a desirable night time level of 45dB (A) whereas the existing Dublin Noise Action Plan sets it at 50dB (A).

In 2009, the World Health Organisation’s European Office published guidance in relation to night time sound levels (Night Noise Guidelines for Europe). In this it stated that, ‘considering the scientific evidence on the thresholds of night noise exposure indicated by L_{night} , outside, as defined in the Environmental Noise Directive (2002/49/EC), an L_{night} , outside of 40 dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. L_{night} , outside value of 55 dB is recommended as an interim target for the countries where the Night Noise Guideline cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach’. For this reason, it is proposed to use an L_{night} desirable level of 50dB (A) and undesirable level of 55dB (A) for the new Noise Action Plan that are in line with the recommended interim target. In addition, daytime noise levels greater than 70 decibels are considered to be undesirable.

5.7 Summary of Noise exposure levels

5.7.1 Noise exposure levels – Dublin Agglomeration

Table 5.1 provides details of the population exposures to sound from traffic for all the roads in the Dublin Agglomeration and Table 5.2 provides details of the population exposures to sound from all rail in the Dublin Agglomeration.

Table 5.1 Noise exposure levels from all roads – Dublin Agglomeration 2012

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Night number people Exposed	Night % people Exposed
<50	85600	7%	152500	12%	807900	63%
50-54	475300	37%	621000	49%	182900	14%
55-59	327300	26%	214300	17%	150800	12%
60-64	150400	12%	116600	9%	94500	7%
65-69	131200	10%	121800	10%	33100	3%
70-74	90700	7%	44600	4%	3400	0%
>75	12600	1%	2200	0%	300	0%

Table 5.2 Noise exposure levels from all rail – Dublin Agglomeration 2012

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Night number people Exposed	Night % people Exposed
<50	1227000	96%	1237400	97%	1259600	99%
50-54	21600	2%	17300	1%	9200	1%
55-59	13700	1%	11400	1%	3700	0%
60-64	7700	1%	5600	0%	500	0%
65-69	2800	0%	1300	0%	100	0%
70-74	300	0%	200	0%	0	0%
>75	100	0%	0	0%	0	0%

The following can be observed from Table 5.1 and Table 5.2

- Of the of 1,273,069 people living in the Dublin Area, 56% of people are exposed to noise levels greater than 55 dB(A) Lden, reducing from 94% in 2008.
- The number of people exposed to the desirable night time noise levels less than 50 dB(A) has increased from 3% in 2008 to 63% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced from 94% in 2008 to 22% in 2012 with less than 1% currently exposed to night time sound levels above 70 dB(A), i.e. 3,700 people.
- 39% of the population are exposed to sound levels from traffic sources above the desirable day time level of 55dB (A) with 4% exposed to day time sound levels above 70 dB(A), i.e. 46,800 people.
- The numbers and percentage of the population that are exposed to sound levels from LUAS or Irish Rail sources is very low when compared to noise levels from road traffic.
- Approximately 12,600 of people are exposed to average Lden sound levels over 75 dB, reducing from 24,000 in 2008.

It should be noted that rounding up or down to the nearest '100' of population in each decibel band, causes an over or under estimation of the total true population. However this 'rounding' is a requirement of the Environmental Noise Directive and the 'error' is not considered significant.

5.7.2 Noise exposure levels – Dublin City Council

Table 5.3 sets out the population exposure to sound from traffic sources on all roads in the Dublin City Council Area.

Table 5.3 Noise exposure levels from all roads – Dublin City Council

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Night number people Exposed	Night % people Exposed
<50	17100	3%	24400	5%	364500	69%
50-54	206700	39%	255900	49%	38800	7%
55-59	141800	27%	98600	19%	69000	13%
60-64	38700	7%	48600	9%	47500	9%
65-69	72800	14%	74000	14%	7600	1%
70-74	48400	9%	25400	5%	200	0%
>75	2100	0%	700	0%	0	0%

The following can be observed from Table 5.3.

- Of the 527,612 people living in the Dublin City Council Area, 58% of people are exposed to noise levels greater than 55 dB(A) Lden, reducing from 100% in 2008.
- The number of people exposed to the desirable night time noise levels less than 50 dB(A) has increased from 1% in 2008 to 69% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced from 58% in 2008 to 24% in 2012 with approximately 0.04% currently exposed to night time sound levels above 70 dB(A), i.e. 200 people.
- 47% of the population are exposed to sound levels from traffic sources above the desirable day time level of 55 dB(A) with 5% exposed to day time sound levels above 70 dB(A), i.e. 26,100 people.

5.7.3 Noise exposure levels – Dún Laoghaire-Rathdown County Council

Table 5.4 sets out the population exposure to sound from traffic sources on all roads in the Dún Laoghaire - Rathdown County Council Area.

Table 5.4 Noise exposure levels from all roads – DLRCC

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Night number people Exposed	Night % people Exposed
<50	2800	1%	18300	9%	103500	50%
50-54	64200	31%	110900	54%	41800	20%
55-59	63000	31%	28100	14%	25100	12%
60-64	29700	14%	19100	9%	23100	11%
65-69	21800	11%	22700	11%	11200	5%
70-74	21000	10%	6500	3%	1300	1%
>75	3800	2%	600	0%	300	0%

The following can be observed from Table 5.4

- Of the 206,261 people living in the Dún Laoghaire - Rathdown County Council area, 68% of people are exposed to noise levels greater than 55 dB(A) Lden, reducing from 96% in 2008.

- The number of people exposed to the desirable night time noise levels less than 50 dB(A) has increased from 14% in 2008 to 50% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced slightly from 31% in 2008 to 30% in 2012 with 1% currently exposed to night time sound levels above 70 dB(A), i.e. 600 people.
- 37% of the population are exposed to sound levels from traffic sources above the desirable day time level of 55 dB(A) with 3% exposed to day time sound levels above 70 dB(A), i.e. 7,100 people.

5.7.4 Noise exposure levels – Fingal County Council

Table 5.5 sets out the population exposure to sound from traffic sources on all roads in the Fingal County Council Area.

Table 5.5 Noise exposure levels from all roads – FCC						
Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Ln timer number people Exposed	Ln timer % people Exposed
<50	63200	23%	97400	36%	229900	84%
50-54	139000	51%	125400	46%	25400	9%
55-59	36400	13%	27100	10%	13100	5%
60-64	23100	8%	18200	7%	3000	1%
65-69	8800	3%	5200	2%	2400	1%
70-74	3000	1%	600	0%	100	0%
>75	400	0%	0	0%	0	0%

The following can be observed from Table 5.5

- Of the 273,991 people living in the Fingal Council Area, 26% of people are exposed to noise levels greater than 55 dB(A) Lden, reducing from 96% in 2008.
- The number of people exposed to the desirable night time noise levels less than 50 dB(A) has increased from 14% in 2008 to 84% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced from 31% in 2008 to 7% in 2012 with less than 1% currently exposed to night time sound levels above 70 dB(A), i.e. 100 people.
- 19% of the population are exposed to sound levels from traffic sources above the desirable day time level of 55 dB(A) with less than 1% exposed to day time sound levels above 70 dB(A), i.e. 600 people.

5.7.5 Noise exposure levels – South Dublin County Council

Table 5.6 sets out the population exposures to sound from traffic sources on all roads in the South Dublin County Council Area.

Table 5.6 Noise exposure levels from all roads – SDCC

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Lnight number people Exposed	Lnight % people Exposed
<50	2500	1%	12400	5%	110000	41%
50-54	65400	25%	128800	49%	76900	29%
55-59	86100	32%	60500	23%	43600	16%
60-64	58900	22%	30700	12%	20900	8%
65-69	27800	10%	19900	8%	11900	4%
70-74	18300	7%	12100	5%	1800	1%
>75	6300	2%	900	0%	0	0%

The following can be observed from Table 5.4

- Of the 265,205 people living in the South Dublin County Council Area, 74% of people are exposed to noise levels greater than 55 dB(A) Lden, reducing from 93% in 2008.
- The number of people exposed to the desirable night time noise levels less than 50 dB(A) has increased from 25% in 2008 to 41% in 2012.
- The number of people exposed to the undesirable night time levels above 55 dB(A) has reduced from 43% in 2008 to 29% in 2012 with about 1% currently exposed to night time sound levels above 70 dB(A), i.e. 1,800 people.
- 47% of the population are exposed to sound levels from traffic sources above the desirable day time level of 55 dB(A) with 5% exposed to day time sound levels above 70 dB(A), i.e. 13,100 people.

5.7.6 Noise exposure levels – Luas and Irish Rail

Tables 5.7 and 5.8 provide details of the population exposures to sound from the Luas and Mainline Rail in the Dublin Agglomeration, based on a population of 1,273,000 in the Dublin Area.

Table 5.7 Noise exposure levels from Luas – Dublin Agglomeration 2012

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Lnight number people Exposed	Lnight % people Exposed
<50	1256800	99%	1259700	98%	1266200	99%
50-54	6600	1%	5700	0%	4700	0%
55-59	5200	0%	4700	0%	1800	0%
60-64	3000	0%	2200	0%	300	0%
65-69	1200	0%	600	0%	100	0%
70-74	200	0%	200	0%	0	0%
>75	100	0%	0	0%	0	0%

Table 5.8 Noise exposure levels from Irish Rail – Dublin Agglomeration 2012

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lday number people Exposed	Lday % people Exposed	Lnight number people Exposed	Lnight % people Exposed
<50	1243700	98%	1250800	98%	1266500	99%
50-54	14800	1%	11600	1%	4600	0%
55-59	8200	1%	6800	1%	1900	0%
60-64	4700	0%	3200	0%	200	0%
65-69	1600	0%	700	0%	0	0%
70-74	100	0%	0	0%	0	0%
>75	0	0%	0	0%	0	0%

In general, noise exposure levels from rail in the Dublin area are low. In Table 5.7, we can see that the number of people exposed to the undesirable night time levels above 55 dB(A) from the Luas is 2200, i.e. 0.2% of the total population. Similarly in Table 5.8, we can see that the number of people exposed to the undesirable night time levels above 55 dB(A) from the other rail is 2100, i.e. 0.16% of the total population.

5.7.7 Noise exposure levels – Airport

Within the Dublin Agglomeration, there are two airports, Dublin International Airport and Weston Airport.

5.7.7.1 Weston Airport

Weston Executive Airport falls within the Dublin Agglomeration. The first round of noise mapping in 2007 examined the need to produce noise maps for the airport. A study was conducted and the following is an extract from the TEC Ltd Environmental and Management Review Report:

“The noise impact assessment undertaken as part of the EIS produced by Bord na Móna Environmental Consultancy Service indicated that the predicted noise levels associated with ground, taxiing and on-site vehicle movement operations at the three closest noise sensitive locations to the site would not be greater than the proposed criterion of 46 dBL aeq.16hours. The study concluded that mitigation measures are therefore not necessary to comply with the proposed criterion and that the noise impact is not significant.”

This report, along with estimated sound levels at the boundary of the airfield, provided evidence that noise modelling was not required for Weston Executive Airport for the second round of noise monitoring.

5.7.7.2 Dublin Airport

Environmental corridors in Dublin Airport define the airspace in the runway approaches or departure where most aircraft are required to operate. These were agreed in 2003 and designed to minimise noise disturbance in neighbouring communities and extend in a straight line from the end of each runway out to distances ranging from five or six nautical miles depending on the runway. The environmental corridors are depicted on the Noise & Flight Track Monitoring system so that deviations are easily identifiable.

Table 5.9 provides details of the population exposures to sound arising from aircraft in Dublin airport the Dublin Agglomeration, based on a population of 1,273,000 in the Dublin Area. In this, we can see that the number of people exposed to the undesirable night time levels above 55 dB(A) from the Airport is 200 people, i.e. 0.02% of the total population.

Table 5.9 Noise exposure levels from aircraft – Dublin Agglomeration 2012

Decibels dB(A)	Lden number people Exposed	Lden % people Exposed	Lnight number people Exposed	Lnight % people Exposed
<50	1260700	99%	1271700	100%
50-54	11900	1%	1200	0%
55-59	300	0%	200	0%
60-64	200	0%	0	0%
65-69	0	0%	0	0%
70-74	0	0%	0	0%
>75	0	0%	0	0%

Full details including a map can be found on the Dublin Airport Authority web site.

5.7.8 Noise exposure levels – Conclusions

Based on comparison of the 'Noise Maps' and population exposure between the noise mapping in 2007 and the current 2012 maps, it can be seen that there has been reduction in the number of people being exposed to undesirable sound levels, especially at night time in the Dublin Agglomeration.

- The number of people being exposed to levels below the night time desirable level of 50 dB Lnight from roads has risen from 3% to 64% of the population.
- The number of people being exposed to undesirable night time level of 55 dB Lnight from roads has reduced considerably from 94% to 22% of the population.
- Less than 1% of people are currently exposed to night time sound levels from roads above 70 dB(A).
- Noise exposure from railways and airports are considerably lower than that from roads.

There are a number of factors that may have contributed towards these reductions, including a decrease in traffic volumes, housing development occurring in quieter areas, movement of population to these areas, and the use of amended calculation methods in the noise model. The number of people being exposed to undesirable night time levels due to Dublin Airport, the Luas and Irish Rail is also low.

6. Noise Management Areas Identification

6.1 Introduction

Low environmental sound levels contribute significantly to the good health and quality of life for the population in the Dublin Agglomeration. Co-ordinated and sustained effort is required to protect those areas that have low environmental sound levels and to improve areas that are deemed to have undesirable high levels. It can be more cost effective to adopt an approach of prevention through good management and planning rather than having to retrofit existing situations to try and improve the quality of life for citizens. The use and enjoyment of many natural resources, such as our green spaces and sea frontage can be further enhanced through the preservation of low sound levels or the reduction in undesirably high levels, thus providing respite from the noisy 'hustle and bustle' often experienced in the busy urban environment.

6.2 Confirmation of onset of Assessment Thresholds

The results of the strategic noise maps provide an indication of the extent of environmental noise exposure in an area. However, they do not necessarily indicate where noise mitigation measures are required or where they would be cost effective. For this reason it is necessary to set out an approach which seeks to identify locations where noise mitigation measures are necessary and cost effective. Initially, some form of noise level needs to be identified for the onset of the process for the assessment of need. The following section outlines the proposed levels for the assessment of noise mitigation measures due to noise from all road traffic in the Dublin Agglomeration.

6.2.1 Areas with desirable low and undesirable high sound levels

Following a review of existing guidance, as outlined in Chapter 2, and of the levels set the previous noise action plan, the following are the proposed thresholds for desirable low and undesirable high sound levels:

Desirable Low Sound levels

- < 50 dB(A) Lnight
- < 55 dB(A) Lday

Undesirable High Sound levels

- > 55 dB(A) Lnight
- > 70 dB(A) Lday

Areas with low and high sound levels have been identified by the Strategic Noise Maps as seen in Appendix C.

6.2.2 Protection Thresholds for Quiet Areas

The Environmental Noise Regulations defines a 'Quiet Area in an agglomeration' as an area, delimited by an action planning authority following consultation with the Agency and approval by the Minister, where particular requirements on exposure to environmental noise shall apply.

A Quiet Area could be an area with low sound levels or an area that should not be exposed to high sound levels due to the type of area or the nature of the activities that take place within it. An area may also be perceived to be quiet although the sound levels may be relatively high. However, in general natural sounds can be soothing regardless of their level. For instance sound levels on St Stephens Green East can occasionally exceed daytime levels of 70 decibels, while sound levels in the centre of the Park, range from 57 to 60 decibels. Whilst still relatively high, people use this park at lunch and other times to recreate and escape from the hustle and bustle of city life. Some quiet areas may not be noise sensitive at night as they are not in use as an amenity at this time, e.g. parks closed at night.

In this Noise Action Plan, it is proposed to use the following absolute values as one criterion for defining a Quiet Area.

- < 45 dB(A) Lnight
- < 55 dB(A) Lday

- < 55 dB(A) Lden

A second criterion to cover what are perceived as Relatively Quiet Areas is also proposed. These types of locations will be defined by their proximity to areas of high sound levels, and which provide a perceived area of tranquillity. Both quantitative and qualitative assessments will be used to identify these types of locations.

During the implementation of the noise action plan, it is proposed to identify locations that have noise levels below these criteria and review their use. If appropriate or necessary, locations could be identified as quiet areas where the existing noise levels are to be preserved or reduced if possible.

6.3 Application of the Decision/Selection Criteria matrix

Having identified locations where the threshold has been exceeded, it is necessary to develop a ranking that seeks to identify locations where noise mitigation measures are necessary, feasible and will be cost effective. To do this, a noise decision support matrix will be used, with details shown in Appendix F.

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, such as the noise exposure level, the type of noise receptor, the type of noise source and the number of people affected. It also facilitates assessing the relative importance of each. As part of the Noise Action Plan, a value of **17 or more** is suggested as the point where priority action should be considered either to reduce excessive sound levels or to preserve low sound levels where they exist. The following sections outline the results of the application of the decision support matrix analysis in the Dublin Agglomeration.

6.4 Results from the Matrix analysis - Residential

Arising from the noise mapping, it is possible to identify the number of residential properties exposed to the various bands of sound levels. Although not defined as noise sensitive locations, residential properties are ranked just one point below noise sensitive locations in the decision matrix. Therefore it is essential to know the sound exposure level at each property. The following sections outline noise exposure data for residential dwelling in each of the Local Authorities in the Dublin Agglomeration with the number of households exposed rounded up or down to the nearest 100.

6.4.1 Residential Areas - DCC Noise Exposure

Table 6.1 provides details of noise exposure levels for various bands arising from all traffic for the 244,200 residential dwellings in the Dublin City Council Area.

Table 6.1 Household Noise exposure levels – DCC

Decibels dB(A)	Lday Number households exposed	Lday % households exposed	Lnight Number households exposed	Lnight % households exposed
<55	125,200	51	183,700	75
55-59	46,900	19	32,800	13
60-64	22,900	9	23,800	10
65-69	36,000	15	3900	2
70-74	12,900	5	100	0
>75	300	0	0	0

Analysis of the noise decision support matrix for the Dublin City Council Area shows the following:

- In total, 53.4% (130,398) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. The equivalent percentage in the Noise Plan 2008 to 2013 was 6.1% (13,914).
- The 53.4% is broken down as follows

- > 52.9% (129,284) of properties are in areas with exposure to low sound levels,
- > 0.5% (1,114) of properties are exposed to high sound levels. Applying this to the population, this equates to potential annoyance from high sound levels for approximately 2130 people.

6.4.2 Residential Areas – DLR Noise Exposure

Table 6.2 provides details of noise exposure levels for various bands arising from all traffic for the 81,267 residential dwellings in the Dún Laoghaire-Rathdown County Council Area.

Table 6.2 Household Noise exposure levels – DLR

Decibels dB(A)	Lday Number households exposed	Lday % households exposed	Lnight Number households exposed	Lnight % households exposed
<55	51,200	63	57,100	70
55-59	10,500	13	9,800	12
60-64	7,400	9	9,300	11
65-69	9,300	11	4,500	6
70-74	2,700	3	500	1
>75	200	0	100	0

Analysis of the noise decision support matrix for the Dún Laoghaire-Rathdown County Council area shows the following:

- In total, 66.5% (54,045) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. The equivalent percentage in the Noise Plan 2008 to 2013 was 6.5% (5,191).
- The 66.5% is broken down as follows
 - > 64.4% (52,336) of properties are in areas with exposure to low sound levels,
 - > 2.1% (1,707) of properties are exposed to high sound levels. Applying this to the population, this equates to potential annoyance from high sound levels for approximately 4,403 people.

6.4.3 Residential Areas – FCC Noise Exposure

Table 6.3 provides details of noise exposure levels for various bands arising from all traffic for the 103,300 residential dwellings in the Fingal County Council Area;

Table 6.3 Household Noise exposure levels – FCC

Decibels dB(A)	Lday Number households exposed	Lday % households exposed	Lnight Number households exposed	Lnight % households exposed
<55	83,900	81	77,600	75
55-59	10,200	10	13,363	13
60-64	7,000	7	10,279	10
65-69	2,100	2	2,056	2
70-74	200	0	0	0
>75	0	0	0	0

Analysis of the noise decision support matrix for the Fingal County Council Area shows the following:

- In total, 63.8% (65,894) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. The equivalent percentage in the Noise Plan 2008 to 2013 was 29.5% (21,549)
- The 63.8% is broken down as follows
 - > 63.5% (65,596) of properties are in areas with exposure to low sound levels,
 - > 0.3% (310) of properties are exposed to high sound levels. Applying this to the population, this equates to potential annoyance from high sound levels for approximately 509 people.

6.4.4 Residential Areas – SDCC Noise Exposure

Table 6.4 provides details of noise exposure levels for various bands arising from all traffic for the 97,300 residential dwellings in the South Dublin County Council Area.

Table 6.4 Household Noise exposure levels – SDCC

Decibels dB(A)	Lday Number households exposed	Lday % households exposed	Lnight Number households exposed	Lnight % households exposed
<55	51,800	53	68,450	70
55-59	21,900	23	15,850	16
60-64	11,200	12	7,800	8
65-69	7,400	8	4,500	5
70-74	4,700	5	700	1
>75	300	0	0	0

Analysis of the noise decision support matrix for the South Dublin County Council area shows the following:

- In total, 51.5% (49,920) of residential properties have been identified as having a score of 17 or greater thus suggesting priority action should be considered. The equivalent percentage in the Noise Plan 2008 to 2013 was 14.1% (11,870)
- The 51.5% is broken down as follows
 - > 49.3% (47,969) of properties are in areas with exposure to low sound levels,
 - > 2.2% (2,141) of properties are exposed to high sound levels. Applying this to the population, this equates to potential annoyance from high sound levels for approximately 5,968 people.

It is worth noting that change between the 2007 and 2008 noise data may arise because the lower noise levels calculated in the mapping have resulted in a large shift in dwellings from being above to now being below the threshold for low sound levels. It should be noted that rounding up or down to the nearest '100' of population in each decibel band, causes an over or under estimation of the total true population. However this 'rounding' is a requirement of the Environmental Noise Directive and the 'error' is not considered significant.

6.5 Results from the Matrix analysis – Noise Sensitive Locations

Certain locations and building types are considered to be more sensitive to noise pollution than others. The main priority of the Environmental Noise Directive is to reduce environmental noise exposure in residential areas. It is also recommended that competent authorities designate buildings, such as educational and health care facilities, as being noise sensitive. In accordance with this guidance, each Local Authority carried out an assessment using the Noise Support matrix and designated the following to be noise sensitive locations for each of the four Local Authorities in the agglomeration:

- For **Dublin City Council** area the recreational open spaces available to the City's population can be broken down into approximately 120 large open space/ recreational areas, approximately 260 playing fields, 120 play grounds, 88 public parks, open spaces and gardens, 4 beaches, two nature reserves, one main river with associated boat clubs and river walks and two canals with associated green spaces and walks. There are 128 places of worship, 69 hospitals including nursing and convalescence homes, 216 educational institutions, and 396 childcare/crèche facilities.
 - > Using the decision making matrix all have been found to have a score of less than 17.
- For the **Dún Laoghaire-Rathdown County Council** area the recreational open spaces available to its citizens can be broken down into approximately 900 Ha large open space/ recreational areas/public parks, approximately 91 playing fields, 18 play grounds, 10 beaches, 11 rivers 4 of which have associated river walks, 6 harbours, 1 marina with associated boat/yacht clubs. There are 43 places of worship, 5 private and 4 public hospitals, 12 health centres, 120 educational institutions, 37 public & private nursing homes and 65 childcare/crèche facilities.
 - > Using the decision selection matrix it has been found that 111 of the 313 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 10 Child Care facilities, 48 Educational establishments, 3 Hospitals, 9 Nursing Homes, 19 places of Worship, and 22 Health Clinics
- For the **Fingal County Council** area the recreational open spaces available to its citizens population can be broken down into approximately 5,000 acres of large open space/ recreational areas, 33 play grounds, 11 public parks and gardens, 30 miles of coastline with 20 popular bathing spots, 10 major heritage sites, two nature reserves, 5 harbours, 13 rivers and one canal with associated green spaces and walks. There are 102 places of worship, 68 hospitals including clinics, nursing and convalescence homes, 115 educational institutions, and 151 childcare/crèche facilities.
 - > Using the decision/ selection matrix it has been found that 98 of the 427 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 42 Child Care facilities, 43 Educational establishments, 1 Nature Reserve, 10 Nursing Homes, 2 Parks & Gardens and 9 Places of Worship.
- For the **South Dublin County Council** area the recreational open spaces available to its citizens can be broken down into approximately 4000 acres of Public Open Space, including five regional parks, 50 neighbourhood parks, 10 playgrounds with public access and 120 playing fields. There are five rivers with associated parklands and walks, two of which contain proposed Natural Heritage Areas, and the Grand Canal with associated green spaces and walking routes which is also a proposed Natural Heritage Area. There is one tourist caravan park. There are 69 places of worship, 123 educational institutions, 6 hospitals, 14 nursing homes and 261 childcare/crèche facilities.
 - > Using the decision/ selection matrix it has been found that 287 of the 715 areas identified as Noise sensitive, Quiet or Recreational Open Spaces have a score of at least 17. These include 127 Parks and Gardens, 55 Child Care facilities, 68 Educational establishments, 6 Hospitals, and 41 places of Worship.

7. Noise Mitigation and Protection Measures

7.1 Principles for deciding on action

As part of this Noise Action Plan, a strategic approach will be undertaken to managing environmental noise. In line with the previous Noise Action Plan, it is proposed that the following principles will be adhered to when deciding on the appropriate actions to reduce sound levels and to maintain noise levels where they are considered satisfactory.

- As the noise maps were developed for strategic use only, it is proposed that the basis of the Action Plan should be strategic in nature also and shall not include proposals relating to noise from domestic activity, noise created by neighbours, noise caused by the exposed person themselves or noise at work.
- It is proposed to include actions to manage environmental noise only, primarily from road traffic as this is the dominant sound source.
- Mitigation measures will be prioritised using the decision support matrix. For this Action Plan it is proposed that the higher number achieved the higher the priority for action. A value of 17 or more has been proposed as the point where priority action should be considered.
- The plan shall address priorities that have been identified by the relevant noise limit value being exceeded or other relevant criteria established by the Environmental Protection Agency and shall in the first instance, address the most important areas established by the strategic mapping process. The following are the proposed limits
 - > Desirable low sound levels are defined as areas with a night time level less than 50 decibels and/or a daytime level less than 55 decibels.
 - > Undesirable high sound levels are defined areas with a night time level greater than 55 decibels and a daytime level greater than 70 decibels.
 - > Absolute value of below 55 dB(A) daytime, below 45 decibels at night time and below an Lden of 55 dB(A) will be one criterion for defining a Quiet Area.
 - > A second criterion for defining for perceived or 'Relatively Quiet' areas. will be defined by their proximity to areas of high sound levels, but which provide a perceived area of tranquillity
- A step-by-step approach will be taken and will be in accordance with the current policies and practices of the relevant Local Authorities and relevant agencies.
- There will be earlier integration of noise abatement planning into the planning process and certain transportation schemes.
- The Local Authorities within the Dublin Agglomeration will seek to be facilitators of change and will strive to be a model of best practice that in turn can influence other bodies. They will also ensure that information on environmental noise is made available to the public.

7.2 Processing areas above the onset of assessment criteria

Following the prioritisation exercise based on the results of the strategic noise mapping and the decision support matrix, an ordered shortlist of areas will 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 population and residential dwellings within the areas being addressed.

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

This will be undertaken in two ways. Firstly, by undertaking a review of the strategic noise models and refining them, if appropriate, and secondly by undertaking field survey work and using the noise monitoring network in each Council to measure noise levels prior to the commencement of any works.

The review and possible refinement of the strategic noise model may help to reduce the uncertainty in the calculated noise levels within the area under review, and will benefit any subsequent use of the model to assess the potential level of noise reduction benefit which may be delivered to the residents by potential mitigation measures. Field survey work would help with calibration of the strategic noise map, as well as provide information on whether the properties being assessed had noise sensitive rooms exposed on the most exposed facades, or whether noise mitigation measures were already present which may not be indicated within the calculation model.

Once the extent of the existing noise impact has been confirmed for the locations under review, the potential noise mitigation measures would then 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.

This staged approach helps to ensure that any work undertaken is cost effective, will deliver genuine benefit to the residents, and has been undertaken in a prioritised manner which is objectively based.

7.3 Preservation of areas below protection threshold

Where areas are identified as being below the onset of 'desirable' threshold, they will be considered for review in the context of the review for quiet areas. In addition to this, if the locations identified have amenity value then the planning process may then be used to help preserve the nature and level of the existing sound environment.

7.4 Management of Areas between the Thresholds

Careful consideration of environmental noise pollution when planning for new developments will be a key factor in the management of the noise environment in the interest of sustainable development. Setting out clear planning policy relating to noise, and incorporating environmental mitigation noise strategies into the development, planning and local area planning processes will help to ensure that the existing noise climate is preserved where appropriate.

With the twin focus on mitigation of noise for the most exposed residents, and preservation through designated quiet areas of the least exposed areas, there is a risk that the majority of households, which sit between these two categories, are not provided for within the action planning process. It is acknowledged that the action plan needs to provide a means of preventing and avoiding detrimental levels of long term noise exposure, and the development of planning guidance plays a key role in support of this target.

7.5 Possible Noise mitigation measures

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 measures includes the following:

- 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 as follows:
 - > Replace diesel vehicles with Compressed natural gas / electric;
 - > Truck routes;
 - > Night time delivery restrictions or limits;
 - > Planning permissions;
 - > 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 HGV's;
 - > New road construction (bypass);
 - > Re-surface roads;
 - > Vehicle speed management;
 - > Noise screening measures; and
 - > Façade insulation measures.
- Rail Authorities could undertake the following
 - > Railhead grinding;
 - > Fleet renewal;
 - > Electrification of lines;
 - > Replacement of tread brakes with disk brakes;
 - > Vehicle speed management;
 - > Noise screening measures; and
 - > Façade insulation measures.

7.6 Assessment of Options and Cost Benefit Analysis

In general, no one design intervention can provide a solution in an area and often a range of measures will be needed. In general, the best way to minimise the costs of noise prevention and noise reduction is as follows:

- In the case of existing noise sources or sensitive buildings affected by noise, noise mitigation can be coordinated with scheduled maintenance, renewal and modernisation activities insofar as the funding and lands available will allow.
- Where new noise sources are being created in the vicinity of existing sensitive buildings, or vice versa the most cost effective mitigation is to take it into account from the very beginning of the planning process.

- Where a new noise source is being created, consideration should be given as to whether it is absolutely necessary, and whether the benefits really outweigh the disadvantages. If this is the case then consideration should be given to the location of the noise source so that it causes the minimum possible disturbance.

For the locations where noise has been identified as being an issue, a list of potential noise mitigation actions will be drawn up. In order to undertake an assessment of feasibility and develop a prioritised list of actions, a cost-benefit analysis will be undertaken in order to maximise value for money and deliver benefit from investment. The cost-benefit analysis will address lifetime construction and maintenance cost against noise reduction benefit.

The benefit of noise reduction may be viewed in terms of decibels / people / time, and may be considered using an assessment of changes in estimated levels of annoyance or sleep disturbance, or could be monetised to fully process the analysis. Monetisation of noise is becoming increasingly common. The monetary assessment of noise levels tends to take two different 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.

The best information available at present comes from an European Commission working group position paper from December 2003 “Working Group on Health and Socio-Economic Valuation of Noise” which proposes a median value in noise perceived by households from road traffic of €25 per dB Lden per household, per year based upon the noise level change compared to the initial situation. The validity range of this interim value is between 50/55 Lden and 70/75 Lden, to be adjusted as new research on the value of noise becomes available.

Applying this data to the priority residential properties arising from the matrix analysis, we obtain the following analysis for each Local Authority.

- For the **Dublin City Council area**, the number of priority residential properties has been calculated at 1114. Movement from the priority action status to a lower status equates to a positive benefit, estimated between €27,850 to €139,250 per year – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between €55,700 - €278,500 over the period of the plan.
- For the **Dún Laoghaire-Rathdown County Council area**, the number of priority residential properties has been calculated at 1707. Movement from the priority action status to a lower status equates to a positive benefit, estimated between €43k to €213k per year – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between €85k – €427k over the period of the plan.
- For the **South Dublin County Council area**, the number of priority residential properties has been calculated at 2141. Movement from the priority action status to a lower status equates to a positive benefit, estimated between €54k to €267K per year – using the value of €25 per dB (Lden), per household per year. Assuming the positive influence of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between €107k – €535k over the period of the plan.
- For the **Fingal County Council area** the number of priority residential properties has been calculated at 310. Movement from the priority action status to a lower status equates to a positive benefit, estimated at between €8k to €39k per year – using the value of €25 per dB (Lden), per household, per year. Assuming the positive influence of the Action Plan will impact in the 3rd year of the plan this will result in an estimated positive benefit of between €16k – €78k over the period of the plan.”

8. Public Participation

8.1 Public Consultation

In preparing and revising Noise Action Plans, Action Planning Authorities must ensure the following:

- 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.

In accordance with the regulations, a Draft Noise Action Plan was prepared for the Dublin Agglomeration and feedback was sought from statutory bodies and the general public.

Advertisements were placed in the Irish Times and Irish Independent on May 9th seeking feedback by June 20th, 2013. Copies of the draft Noise Action Plan were placed in each of the four Council Offices and details were placed on each of the Council websites.

The following Statutory Bodies\Agencies were circulated for comment by letter and CD on May 15th, 2013

- An Bord Pleanála
- An Taisce
- Dublin Chamber of Commerce
- CODEMA
- ESB
- Department of Education and Skills
- Department of Environment, Community and Local Government
- Department of Transport, Tourism and Sport
- Dublin Airport Authority
- Dublin Bus
- Dublin City Business Association
- Environmental Protection Agency
- ESB
- Fáilte Ireland
- Health Service Executive
- Health and Safety Authority.
- Iarnród Éireann
- Irish Aviation Authority
- National Roads Authority
- National Transport Authority
- National Economic and Social Council
- Office of Public works
- Railway Procurement Agency

A number of newspaper articles were published relating to the Draft Noise Action Plan as follows

- Sunday Times May 19th, 2013 – Headline ‘Half of Dubliners blighted by Noise’
- Irish Times May 25th, 2013 – Headline ‘Noise level in Dublin Lower than in 2008’

8.2 Responses to the Public Consultation

Appendix G provides details of all submissions made regarding the draft Noise Action Plan and provides a response to each submission.

8.3 Next steps

Following the Public Consultation process the plan was amended and sent to the City and County Manager of each Local Authority for approval. The final Noise Action Plan and mapping will be placed on the website of each Local Authority.

9. Noise Implementation Plan

9.1 Objective of the Noise Action Plan

The key objective of the Dublin Agglomeration Noise Action Plan is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise. This will be achieved by taking a strategic approach to managing environmental noise and undertaking a balanced approach in the context of sustainable development.

It is proposed that the Noise Action Plan will be implemented through a staged process over five years with each Local Authority within the Dublin Agglomeration endeavouring to follow the time frame set out below in relation to the programme of works and to the implementation of the Noise Action Plan.

9.2 Proposed Action Plan measures

A number of measures are proposed as part of this plan to prevent noise and reduce, avoid or relocate the various types of noise source. As per the previous plan, these measures focus mainly on road traffic sound emissions, as the noise maps have shown it to be the major sound source in the Dublin Agglomeration. However, particular actions in relation to Dublin Airport and Fingal County Council are also included. These will be the primary measures considered when deciding on action to prevent, reduce avoid or relocate sources of high sound levels.

9.2.1 Traffic noise reduction and prevention measures

As part of the plan, the following will be introduced in the coming years:

- a) Sustainable travel infrastructure projects and traffic management schemes that promote access by all sustainable travel modes.
- b) Continued promotion and development of sustainable travel modes in conjunction with transport providers and local communities.
- c) Introduction of Local Transport Plans, where appropriate, in line with the draft Transport Strategy for Greater Dublin Area.
- d) Facilitate the introduction of Electric charge points in conjunction with the relevant government departments and through the Planning Process.
- e) Facilitate the introduction of car share clubs.
- f) Adopting best practice / guideline documents and policy in Transportation Planning, e.g. Design Manual for Urban Roads and Streets 2013, Cycle Design Manual 2012 etc
- g) Reducing excessive driving speeds through the provision of appropriate traffic calming measures and changing of speed limits through bye-laws in line with Government guidelines. Noise levels shall be taken into account in the prioritisation / assessment of future Traffic Calming Schemes.
- h) Promote the use of low-noise road surfaces where appropriate. For new roads schemes, low noise surfaces will be considered as part of the overall design and in keeping with current design guidelines.
- i) Use Roadside Noise Barriers for new road construction projects and schemes in the context of the NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes. Noise barriers may not be appropriate on roads where there are high numbers of pedestrians crossing.
- j) In conjunction with the National Road Authority, review key national roads where noise issues have been identified arising from the noise mapping.

9.2.2 Rail noise reduction and prevention measures

Section 5 provided details of band of noise exposure levels for Luas and Irish rail. This showed that the number of people exposed to undesirable noise levels in the Dublin Agglomeration area is low.

Since the last Noise Action Plan, a number of Luas lines were extended. As part of the previous Dublin Noise Action Plan 2008 to 2013, Iarnród Éireann and the Railway Procurement Agency were required to do the following in relation to noise:

- To produce a sound impact assessment and apply mitigation measures when\where appropriate, for any new rail infrastructure or ancillary developments or any major intensification on any existing rail infrastructure or ancillary developments within the Dublin Agglomeration. This assessment should not alone include railway sound emissions but also a sound impact assessment, for example, of traffic, where the new infrastructure or intensification is likely to increase, disrupt or displace traffic flows within the Dublin Agglomeration.

This objective will be maintained for the new plan for all new rail projects in the Dublin Agglomeration.

9.2.3 Noise in the Planning Process

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

Scope exists within planning and development management process to manage increased levels of noise arising from new development where exposure levels can be harmful to health. As part of the new plan, the Local Authorities within the Dublin Agglomeration will aim to implement the following actions relating to planning and development:

- a) To integrate Noise Action Plans into the City and County Development Plans.
- b) To review existing guidelines and policy relating to Noise in the planning process.
- c) To require developers to produce a sound impact assessment and mitigation plans, where necessary, for any new development where the Planning Authority considers that any new development will impact negatively on pre-existing environmental sound levels within their Council area.
- d) To ensure that future developments are designed and constructed in accordance with best Irish practice to minimise noise disturbances and take into account the multi-function uses of street (e.g. movement, recreation), e.g. Urban Design Manual and the Design Manual for Urban Roads and Streets 2013.

9.2.4 Airport noise reduction measures

Fingal County Council will continue to promote appropriate land use patterns in the vicinity of the flight paths and will strive to restrict housing development in order to minimise the exposure of residents of such developments to undesirable noise levels. This will further reduce the potential for future conflict between airport operations and residents. The continued restriction of inappropriate development in the Outer Noise Zone and the restriction of noise sensitive uses in the Inner Noise Zone will continue to be pursued by the planning authority. The Development Plan 2011-2017 takes a precautionary view of the implications for development that could lead environmental impact and conflict. It defines an “Inner” and an “Outer” Noise Zone, shown on the Development Plan Maps, with the following explicit requirements:

- Outer Noise Zone: to strictly control inappropriate development and to require noise insulation where appropriate
- Inner Noise Zone: to resist new provision for residential development and other noise-sensitive uses.

All aircraft arriving and departing Dublin Airport come under the direction of the Irish Aviation Authority which provides air traffic control services in Ireland and it is they who are responsible for the routing of aircraft. The day to day tracking and monitoring of aircraft activity at Dublin Airport will continue to be undertaken directly by the Dublin Airport Authority (DAA). Information and reports on all aircraft track and noise issues will continue to be presented at the Dublin Airport Stakeholders Forum (DASF) and its sub Environmental Group (DASF EWG). Members of these groups include the Local Authority, local community representatives and management from both the IAA and DAA. With the creation of the DASF, and its’ associated environmental working group all noise issues can be raised and discussed with the IAA and DAA. This approach to noise and track management is working and potential conflict between existing residence and the airport is being managed.

European Commission Proposal Documents were circulated by the Aviation Services and Security Division, Department of Transport Tourism and Sport by way of a consultation process in March 2012. The Proposal has been endorsed by the International Civil Aviation Organisation and relates to the establishment of Rules and Procedures governing noise-related operating restrictions at EU airports. The so-called 'Balanced Approach' as defined by the 'Airports Package' proposes to mitigate aviation noise through a combination of four measures under the headings of:

- a. Reducing noise at source (e.g. quieter aircraft)
- b. Making best use of land (ie planning and managing the lands surrounding the airport)
- c. Introducing operational noise abatement procedures (ie use of specific runways, taxiways, etc.)
- d. Imposing noise related operating restrictions (such as night-time ban on flights).

It is hoped that this proposal while representing a major development in aviation policy will improve the environmental performance of air transport operations into the future.

The recent installation of a Noise and Flight Track Monitoring system at Dublin Airport gathers information on aircraft approach and departure routes and resultant noise levels. The system consists of seven off-site noise monitoring terminals and the data assists in producing regular Noise & Flight track monitoring reports.

9.2.5 Protecting 'Quiet Areas'

Quiet areas offer many opportunities for public recreation. They are thus not only of value to their residents, but can also improve the quality of life of people living in adjacent but noisy roads, by affording opportunities for peaceful recreation from time to time. Hence, it is very important that existing quiet areas be preserved, and that new ones be created where possible. While one aim of the action plan is to reduce human exposure to high sound levels, another important goal is to preserve areas, which are still 'tranquil' or quiet. As part of the plan, there will be an ongoing process of identifying Quiet Areas and forwarding them to the Minister for the Environment, Community and Local Government for delimiting as Quiet Areas.

9.2.6 Noise Complaint Investigation and Control procedures

Although the noise maps and the Environmental Noise Regulations are aimed at developing strategic policy, it is acknowledged that when most people complain about noise, it relates more to local issues such as neighbour, entertainment and construction noises. However, it is envisaged that the noise action plan should solely concentrate on strategic issues identified by the noise mapping as systems are already in place to deal with noise nuisances, including neighbour, entertainment and construction noises. Local noise issues will be dealt with by each Local Authority as required by the Environmental Protection Agency Act 1992 (EPA Act 1992) with details of each Local Authority approach being outlined on the web links in Appendix E.

9.3 Programme of works/Implementation Plan

It should be noted that the implementation of the actions in the plan is dependent on resources (e.g. funding, people etc) being made available in each of the Local Authorities.

First year of the Noise Action Plan (2014):

- To continue the implementation of the actions in the Environmental Noise Action Plan 2008-2013.
- To make available to the public the data from the ambient sound monitoring networks.
- To identify from noise maps where priority action is required at a local level.

Second and Third Year of Noise Action Plan (2015)

- To identify Quiet Areas and preparation of submissions for approval by the Minister.
- To commence implementation of the actions outlined in Chapter 8 on a prioritised basis, where the resources in each Local Authority permit.

- To review planning guidance regarding noise assessment and control and develop a programme of action to meet any shortfalls.

Fourth Year of the Noise Action Plan (2017).

- To commence capture of data for the new noise plans.
- To produce new noise maps for the Dublin Agglomeration in accordance with EPA guidance.

Fifty Year of the Noise Action Plan (2018)

- To review the impact of the Noise Action Plan and amend where appropriate to prepare the Noise Plan for 2018 in accordance with EPA guidance.

9.4 Evaluation, Review and Corrective Action Programmes

Each Council will review the effectiveness of noise action planning activities on an ongoing basis by regularly reviewing progress made in relation to planned activities. The effectiveness of these measures at combating local environmental noise exposure will also be considered with adjustments made to the schedule if required.

In 2017, the Council will carry out a review of the actions implemented under this action plan. Progress and results will be evaluated using information gathered through local assessment of environmental noise exposure. This will include “before and after” evaluations of any noise mitigation measures. A review of new noise maps will also be carried out, giving an indication of the change in environmental noise levels and the numbers of people exposed.

10. Summary and Conclusions

This Noise Action Plan has been prepared as required by the Environmental Noise Regulations 2006, Statutory Instrument 140 of 2006. These Regulations give effect to EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

The objective of the Dublin Agglomeration Local Authorities Noise Action Plan is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise. This will be achieved by taking a strategic approach to managing environmental noise and following a balanced approach in the context of sustainable development.

This Noise Action Plan primarily considers the long term environmental noise impact from road traffic noise sources, and sets out an approach to review noise impact levels near to the major sources assessed during the strategic noise mapping in 2012. In the interests of equality and promotion of best practice the action plan also sets out a number of proposals for the prevention and avoidance of environmental noise levels detrimental to human health to be implemented through the planning process, these being applicable throughout Dublin.

Appendix A Glossary of Acoustic and Technical Terms

Agglomeration: ‘Agglomeration’ shall mean part of a territory, delimited by the Member State, having a population in excess of 100,000 persons and a population density such that the Member State considers it to be an urbanised area.

Agglomeration of Dublin: ‘Agglomeration of Dublin’ means the county borough of Dublin, the administrative county of Dún Laoghaire/Rathdown other than those areas excluded in the First Schedule to the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998), and the administrative counties of Fingal and South Dublin;

Environmental Noise: Shall mean 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 such as integrated pollution prevention and control licensed industries. Noise is sometimes defined as unwanted sound.

Decibel dB(A): A unit of measurement of sound.

Lden: (day-evening-night noise indicator) shall mean the noise indicator for overall annoyance. This comprises of adding the average value for the 12 hour day time period with the average value of the 4 hour evening period plus a 5 decibel weighting or penalty, and the average value for the 8 hour night time period with a 10 decibel weighting or penalty. Lden is calculated as follows:

$$L_{den} = 10 \cdot \log \frac{1}{24} \{ 12 \cdot 10^{(L_{day})/10} + 4 \cdot 10^{((L_{evening}+5)/10)} + 8 \cdot 10^{((L_{night}+10)/10)} \}$$

Daytime: Between the hours of 7am and 7pm

Lday: (day-noise indicator) shall mean the noise indicator for annoyance during the day period. This is the average value in decibels for the daytime period

Evening time: Between the hours of 7pm and 11pm

Levening: (evening-noise indicator) shall mean the noise indicator for annoyance during the evening period. This is the average value in decibels for the evening time period.

Night time: Between the hours of 11pm and 7am

Lnight: (night-time noise indicator) shall mean the noise indicator for sleep disturbance. This is the average value in decibels for the night-time period

‘Major intensification’: An Action(s) that is likely to lead to a breach of any statutory sound limit, or national guide value or standard, or an action(s) that leads to and increase in sound levels above the undesirable sound levels’ or likely to increase the pre-existing annual Lden by more than 5dB

Noise Indicator: Method used to measure or quantify sound, in decibels, in order to equate it with what might be perceived as noise.

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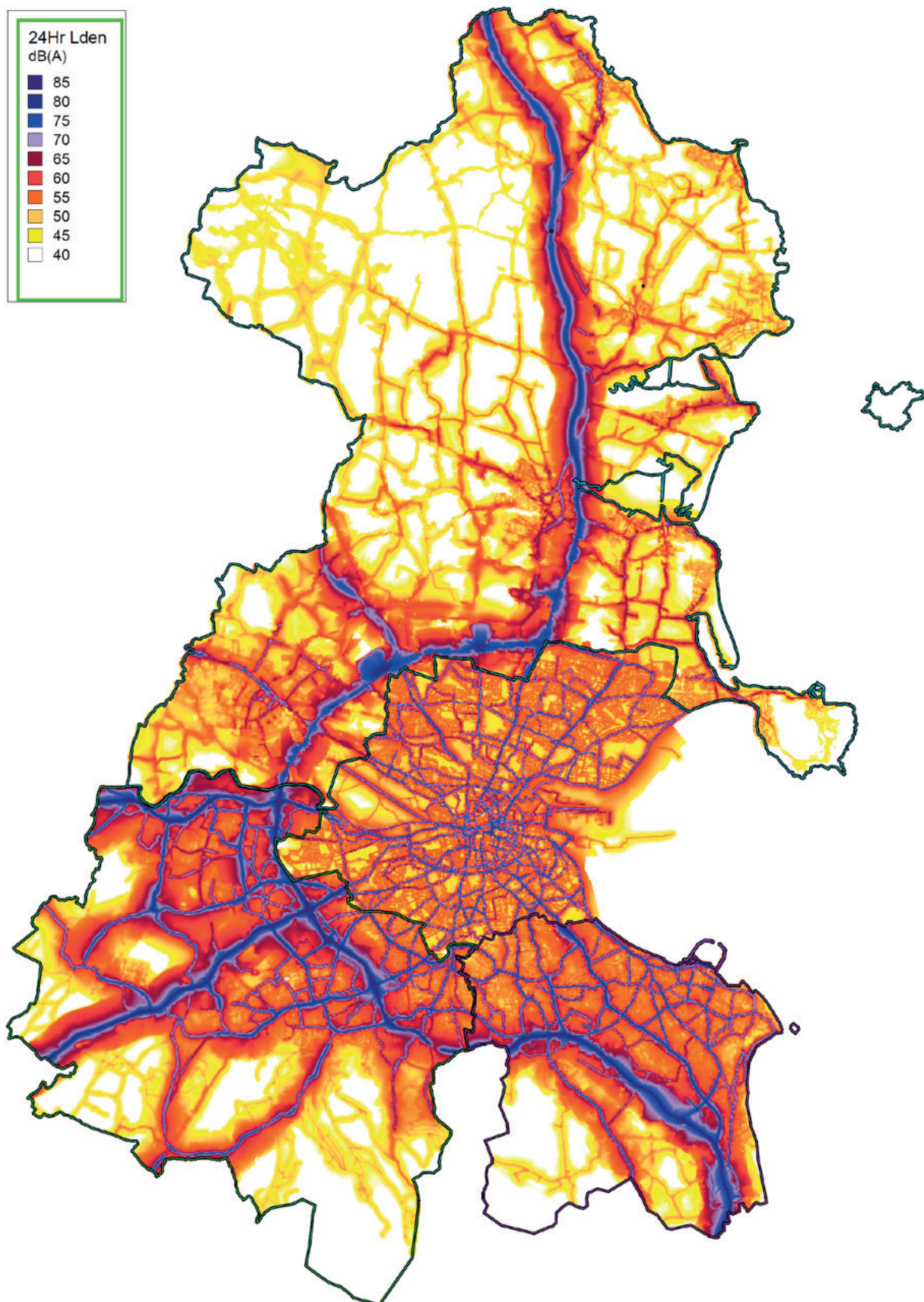
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Appendix C

Dublin Agglomeration Noise Exposure Tables and Maps

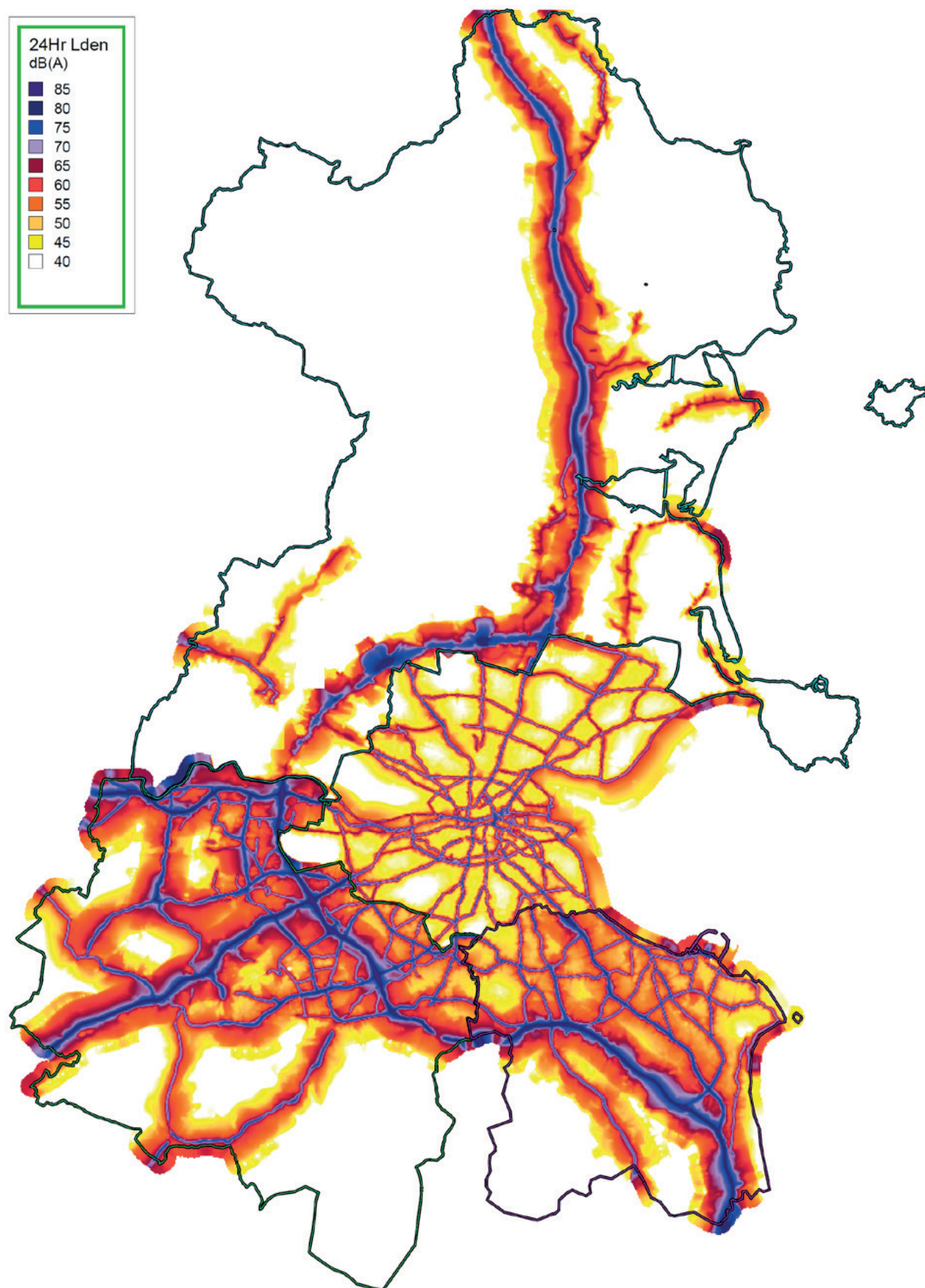
		Total Sound Emissions from All Road Sources							
All Roads	LDEN	LDAY	LEVE	LNIGHT	No. Of QF	No Of People with QF(Lden)	No Of People with QF (Ln)	Area Exposed (Lden)Km2	No. of Dwellings Exposed
dB(A)									
0-44	18000	26100	73200	517000	0	100	5400	282.0172	6700
45-49	67600	126400	291500	290900	600	2500	1800		26500
50-54	475300	621000	452100	182900	800	4500	6000		192000
55-59	327300	214300	201200	150800	600	2700	32400		137900
60-64	150400	116600	119800	94500	1000	6500	37500		59900
65-69	131200	121800	108600	33100	6900	31600	10800		57200
70-74	90700	44600	25600	3400	6600	43000	700		41000
>55	710800	498700	455100	281700	15900	88400	81800		300200
>65	234200	168500	134900	36700	14000	79200	11800	94.7904	103300
>=70	103300	46700	26500	3800	7200	47700	1000		46100
>=75	12600	2200	800	300	600	4700	300	17.4708	5200
Total	1273100	1273000	1272800	1272900	17100	95600	94900		526400
			Total Sound Emissions from Major Road Sources						
Major Roads	LDEN	LDAY	LEVE	LNIGHT	No. Of QF	No Of People with QF(Lden)	No Of People with QF (Ln)	Area Exposed (Lden)Km2	No. of Dwellings Exposed
dB(A)									
0-44	433400	604200	618100	768000	0	100	5300	186.9192	173900
45-49	219100	231000	217000	167500	300	2400	2600		95300
50-54	201600	156600	159100	132900	300	3900	4900		83400
55-59	149800	92600	99900	102000	300	2800	11800		60100
60-64	99100	66100	73700	70900	1000	5500	15700		39100
65-69	86200	84800	81300	28400	3200	14800	7700		37100
70-74	72500	35600	23000	3100	4400	22600	500		32600
>55	418700	280800	278600	204400	9500	49500	36000		173400
>65	170000	122200	105000	31700	8200	41300	8600	70.3008	74300
>=70	84000	37800	23700	3300	4900	26600	800		37200
>=75	11500	1900	700	300	600	3900	300	13.5205	4700
Total	1273200	1272800	1272800	1273100	10100	56000	48800		526200

Table C.1 Population Exposure for Road traffic in the Dublin Agglomeration



Agglomeration of Dublin 2012 Sound From All Traffic Sources

Figure C.1 24-hour Lden Sound pressure Values - Dublin Agglomeration



Agglomeration of Dublin 2012 Sound From Major Traffic Sources

Figure C.2 Night Time (L_{night}) Traffic Sound levels - Dublin Agglomeration

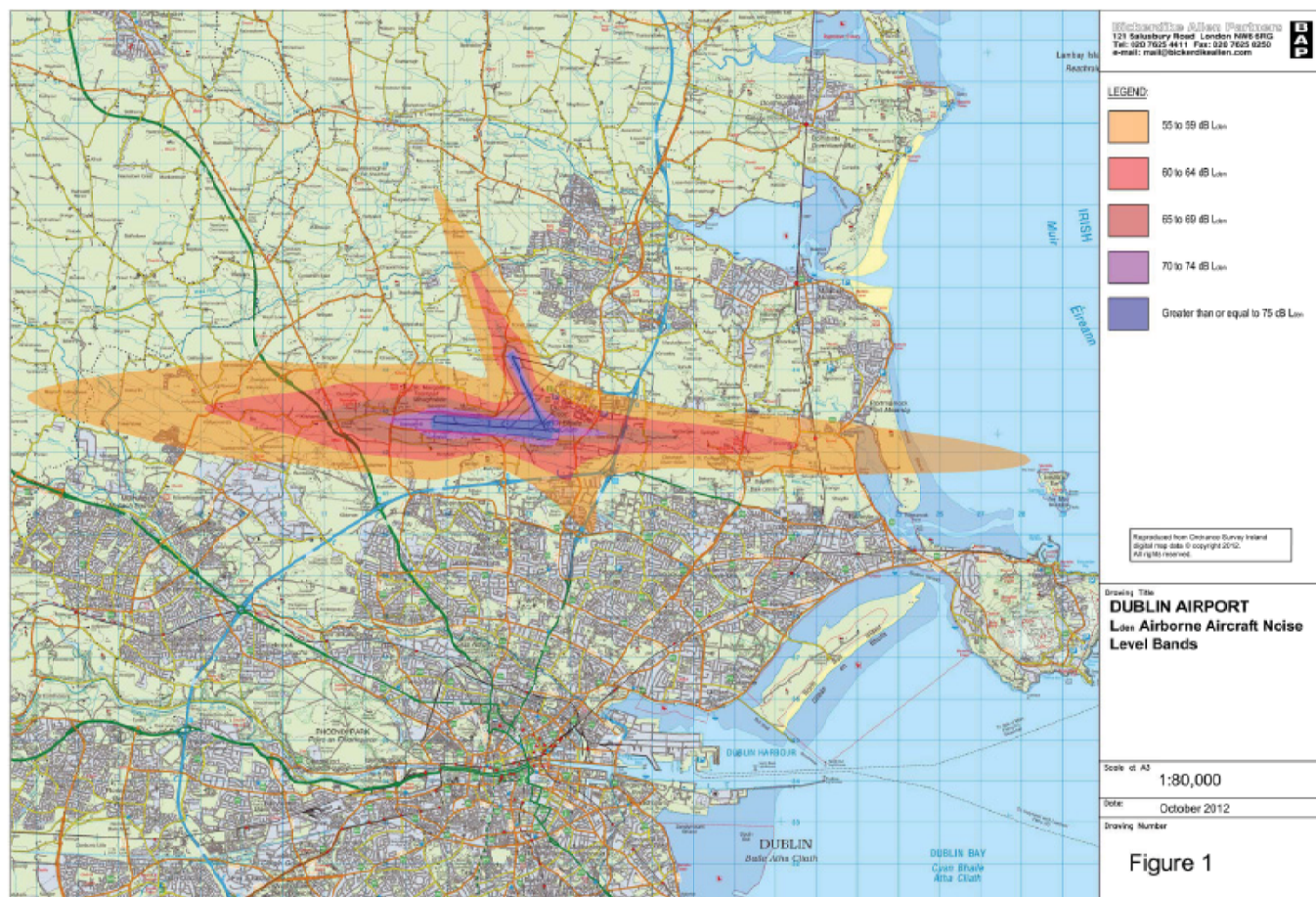


Figure C.3 24-hour Lden Aircraft Airborne Noise - Dublin Airport

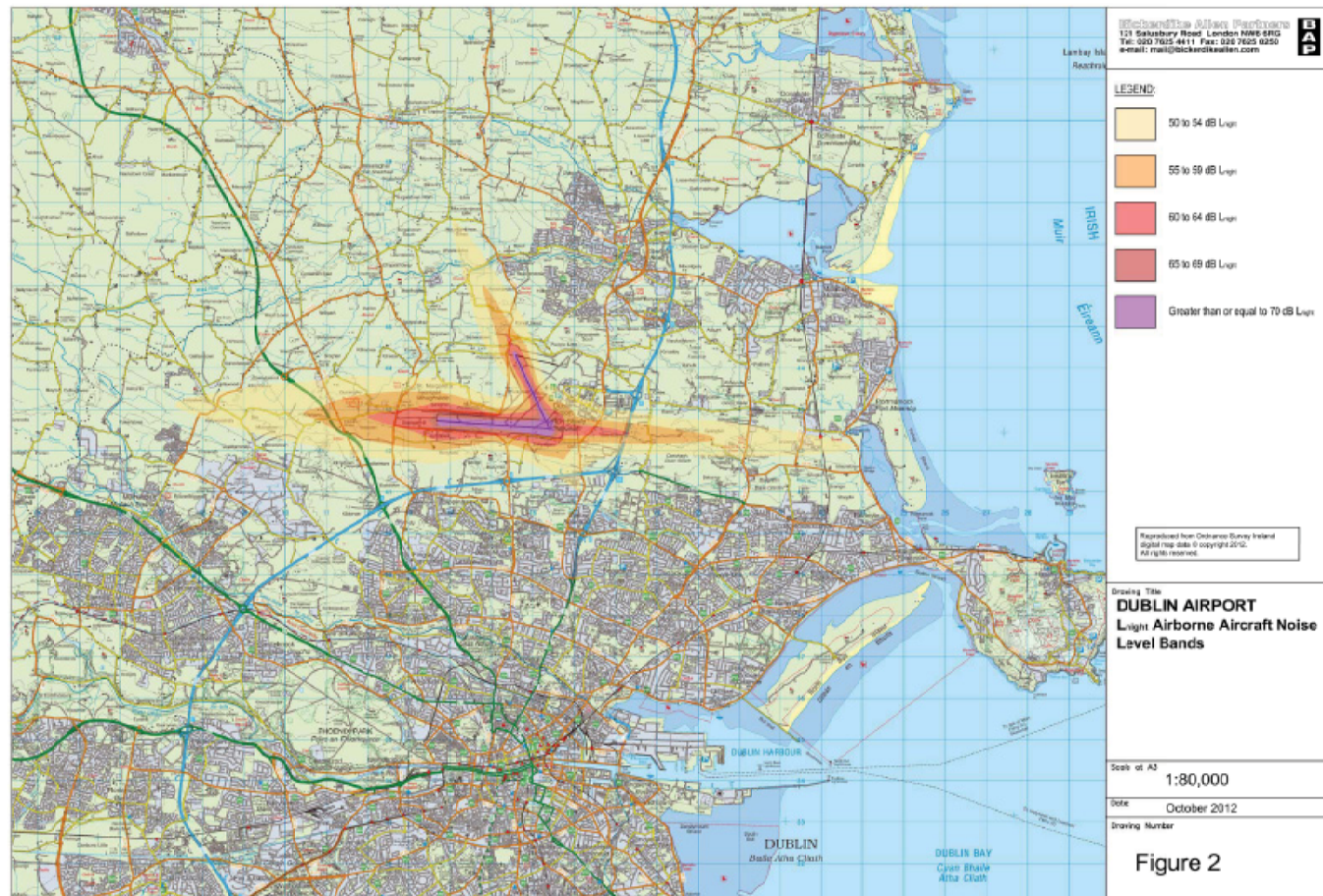
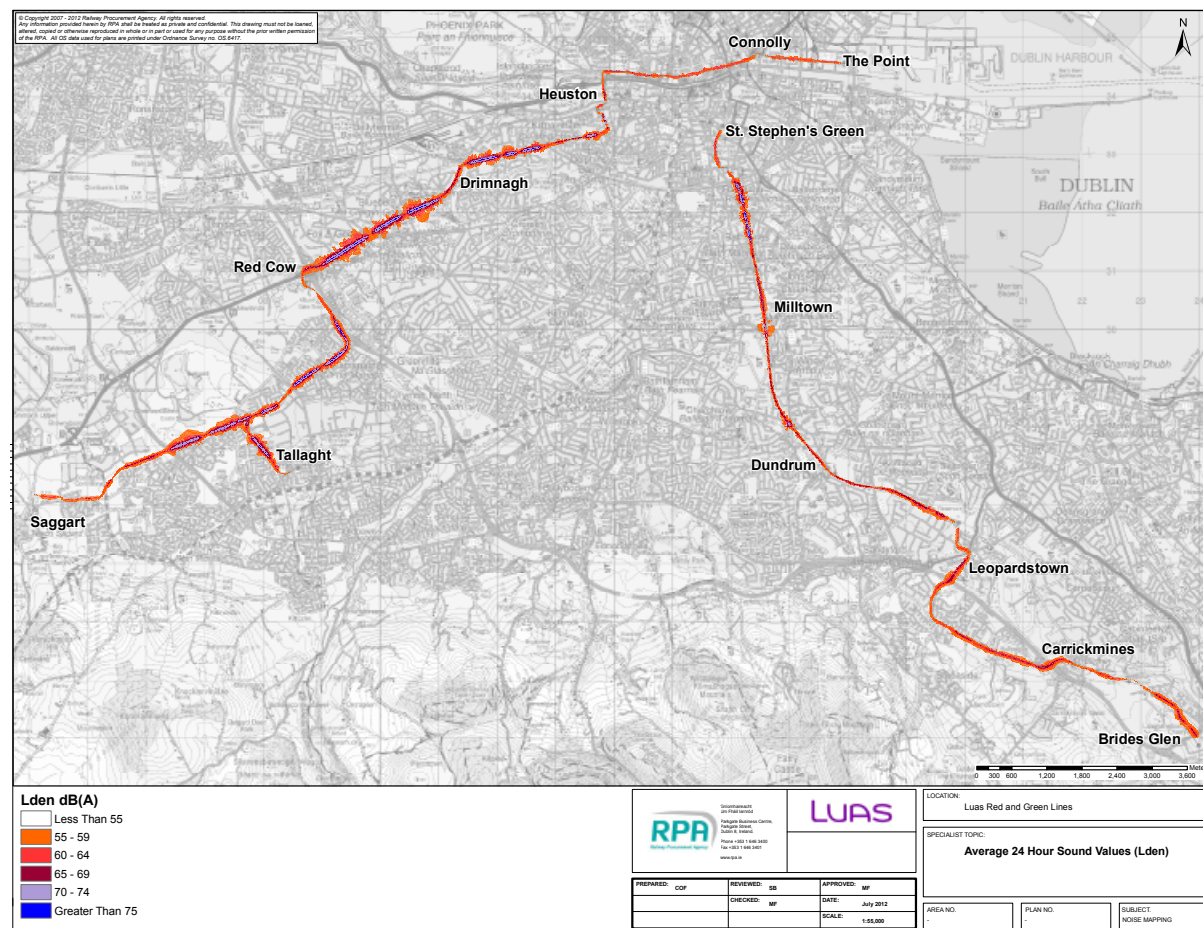


Figure C.4 24-hour Lnight Aircraft Airborne Noise - Dublin Airport



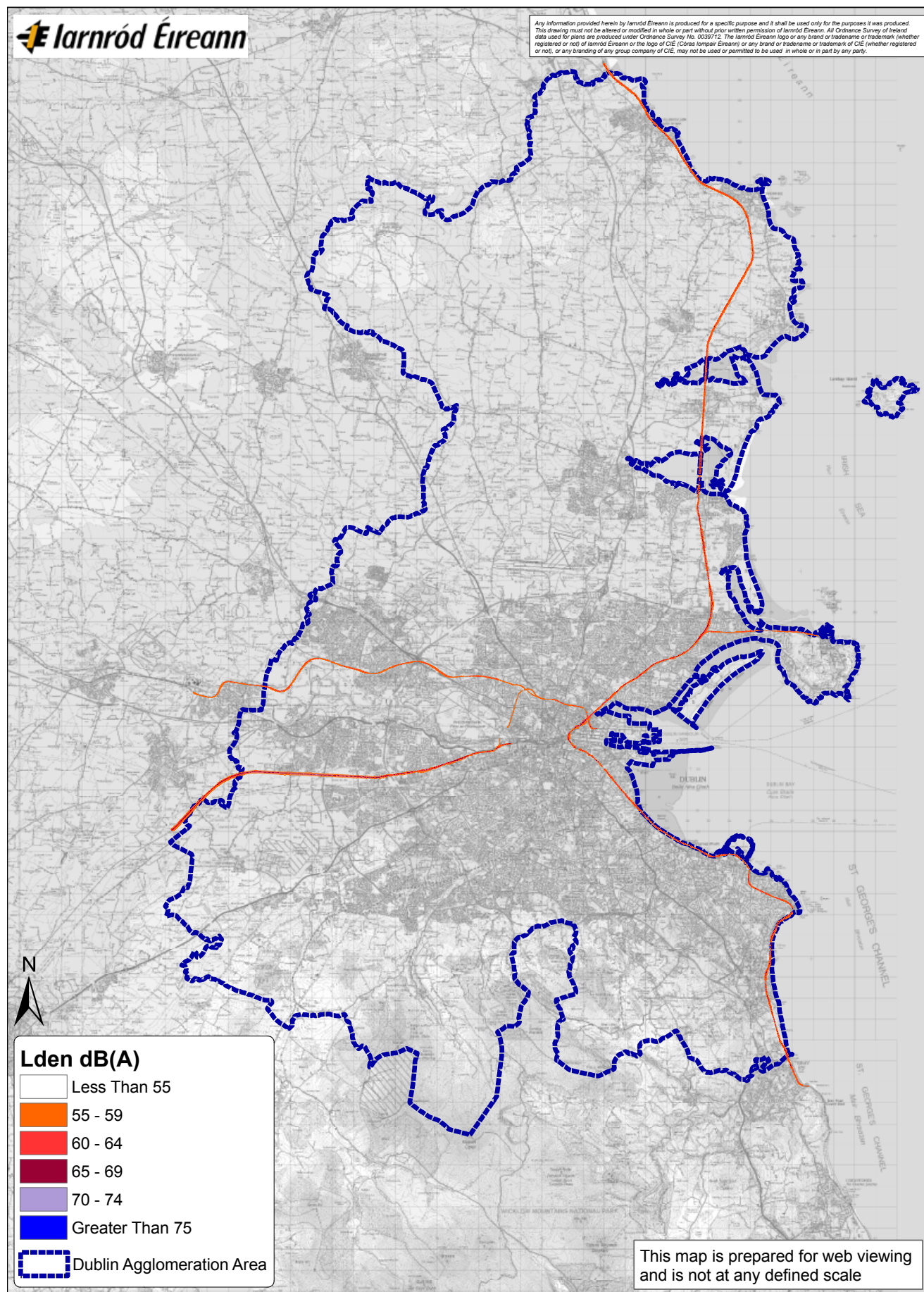


Figure C.7 24-hour Lden Sound Values – Irish Rail

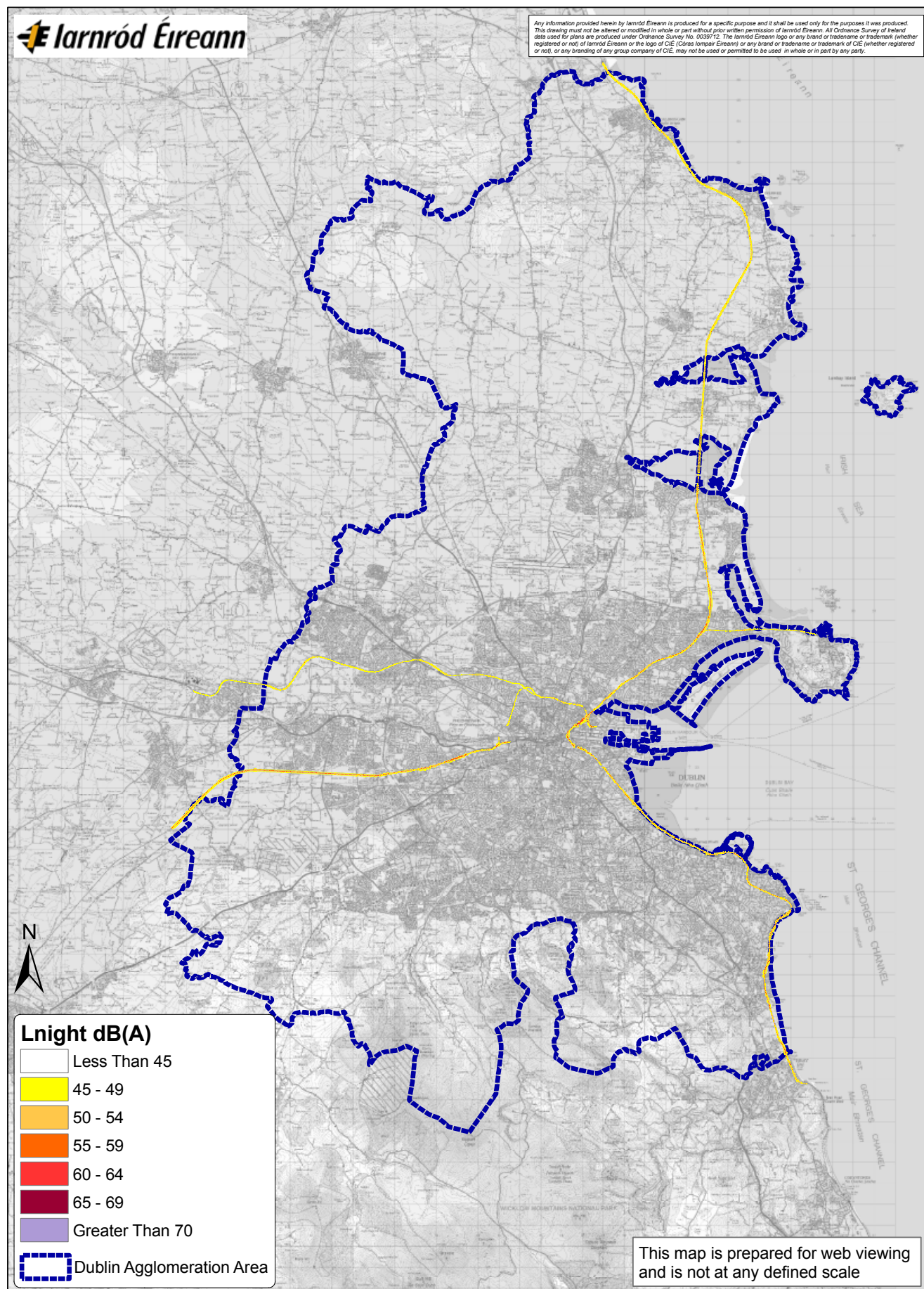


Figure C.8 24-hour Lnight Sound Values – Irish Rail

Appendix D Noise Level Bands Colour scheme

The EPA Guidance Note for Noise Action Planning recommends the colour bands outlined below 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 semitransparent 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

Appendix E Council Noise Policy and Noise Maps web links

Dublin City Council

1. Noise Maps and Action Plans

<http://www.dublincity.ie/WaterWasteEnvironment/NoiseMapsandActionPlans/Pages/default.aspx>

2. Noise Pollution

<http://www.dublincity.ie/WaterWasteEnvironment/AirQualityMonitoringandNoiseControl/NoisePollution/Pages/TypesofNoise.aspx>

Dún Laoghaire-Rathdown County council

1. Environmental Noise Action plan

<http://www.dlrccoco.ie/aboutus/councildepartments/transportation/downloadit/environmentalnoiseactionplan>

2. Noise Pollution

<http://www.dlrccoco.ie/aboutus/councildepartments/wasteservices/reportit/noisepollution/>

South Dublin County Council

1. Noise Maps and Action Plans

<http://www.sdcc.ie/services/environmental-health/air-noise-pollution>

2. Noise Pollution

<http://www.sdcc.ie/services/environmental-health/air-noise-pollution>

Fingal County Council

1. Noise Maps and Action Plans

<http://www.fingalcoco.ie/Environment/AirandNoisePollution/NoiseMapsandAreaPlans/>

2. Noise Pollution

<http://www.fingalcoco.ie/Environment/AirandNoisePollution/>

Irish Rail

1. Strategic Noise Maps

<http://www.irishrail.ie/index.jsp?p=126&n=280>

Railway Procurement Agency

1. Strategic Noise Maps

<http://www.rpa.ie/en/rpa/environment/Pages/2012StrategicNoiseMaps.aspx>

Dublin Airport Authority

1. Noise Contour maps

http://live.dublinairport.com/gns/about-us/community-affairs/aircraft-noise/Contour_Maps.aspx

Appendix F Decision Matrix

For this Noise Action Plan it is proposed that the higher the number achieved in the decision matrix process, the higher the priority for action. A value of 17 or more is suggested as the point where priority action should be considered either to reduce excessive sound levels or to preserve low sound levels where they exist. For example an address, which falls within the Sound level 65-69dB in the day (2) and 60-64dB at night (3), in a noise sensitive area for day and night (3+3) and exposed to sound from traffic day and night, (2+3) will give an overall total of 16 as can be seen in Table F.1.

Table F.1 Noise Decision Support Matrix				
Decision Selection Criteria		Score Range day	Score Range Night	Subtotal
Noise Band dB(A)	<55	3	4	
	55-59	2	2	
	60-64	1	3	3
	65-69	2	4	2
	70-74	3	5	
	>=75	4	6	
Type of location	City Centre	1	1	
	Commercial	1	2	
	Residential	2	3	
	Noise Sensitive Location	3	3	6
	Quiet Area	3	3	
	Recreational open space	2	2	
Type of Noise	Road	2	3	5
	Rail	1	2	
	Airport	3	4	
			Total	16

Appendix G Public Consultation

Statutory Bodies/ Agencies	
1	<p>Submission by the Railway Procurement Agency – key issues</p> <p>Suggested rewording of Section 3.3.2 relating to length of Luas lines and passenger numbers. Response: agreed</p> <p>Data for sound emissions from Major Rail in Section 5.7.6 to be amended as per RPA website data. Response: Agreed</p> <p>Comments that Railway Orders must be accompanied by EIS which includes a noise impact assessment. Response: Noted</p> <p>Text for the 'Rail Procurement Agency' to be replaced with 'Railway Procurement Agency'. Response: Agreed</p>
2	<p>Submission by Dublin Airport Authority – key issues</p> <p>Suggested rewording of Sections 4.3.8 and paragraph 2 of Section 8.2.4 to clarify further. Response: agreed</p> <p>Suggested removal of last lines of Sections 1.2 and 8.2.4. Response: Reference to be provided for Section 1.2 and last line of 8.2.4 to be amended</p> <p>Suggests adding text to indicate that noise maps can be found on the DDA website. Response: Agreed</p>
3	<p>Submission by Iarnród Éireann</p> <p>Noise maps can be found on www.irishrail.ie/noisemaps. Response: noted.</p> <p>Observation made that the onset noise threshold levels for undesirable sound levels are higher than recommended in the EPA Guidance. Response: noted. No change recommended to the proposed thresholds that are in line with the previous plan</p> <p>Welcomes possible early integration of noise abatement planning in the planning process with greater onus on developers to meet the requirements in the Dublin Noise Action Plan. Response: This is adequately covered in Section 8.2.3 and no amendment is proposed</p>
4	<p>Submission by DLR Planning Department</p> <p>Propose that elements of the a Noise Impact Assessment carried out for the Cherrywood SDZ be included as part of any Noise guidelines prepared for the Development Management process. Response: This is adequately covered in Section 8.2.3 and no amendment is proposed</p>
5	Acknowledgement of receipt of the Draft Noise Action Plan by the Office of the Minister, Department of Transport, Tourism and Sport
6.	Acknowledgement of receipt of the Draft Noise Action Plan by the Office of the Minister for Education and Skills
General Submissions	
1	<p>Submission by Moy Glas Resident's Association & Ken Maycock, Resident</p> <p>Noise levels high since the opening of the outer ring road, well in excess of the noise requirements in An Bord Pleanála permission</p> <p>Boundary treatments are required between Moy Glas and the Outer Ring Road in particular at locations where the noise levels are highest.</p> <p>Response: In general, due to budgetary constraints, noise abatement works that require expensive structural work are only carried out as part of the upgrading of existing roads or the building of new roads. The cost of such mitigation measures may then be included in the overall budget of these projects. This matter will be examined further in line with the steps in the Noise Action Plan</p>

2	<p>Submission by Strawberry Beds, Residents' Association</p> <p>Noise Pollution has increased due to additional traffic on the M50 bridge. Planning Permission was given on the basis that noise would be barely perceptible and not anticipated to be significant. Photographs were submitted of noise meter showing daytime and night time decibel levels and the Residents' Association calls on the National Roads Authority to address this issue. Response: In general, due to budgetary constraints, noise abatement works that require expensive structural work are only carried out as part of the upgrading of existing roads or the building of new roads. The cost of such mitigation measures may then be included in the overall budget of these projects. This matter will be examined further in line with the steps in the Noise Action Plan.</p>
3	<p>St Margaret's Concerned Residents Group</p> <p>Conditions not enacted as part of planning permission for the second runaway granted in August 2007. Response: Enactment of the planning permission has not yet commenced</p>
4	<p>All Hallows Area Residents Association</p> <p>Submission is sceptical of the results of Dublin City Councils Noise Mapping results with a report submitted to support their opinion. They also query the prioritising of properties that are based on the noise mapping.</p> <p>They wish Dublin City Council to give due recognition and attention to the serious environmental concerns of residents of Upper Drumcondra Road, including their request to resurface the road with a quiet road surface and to promote an Eastern Bypass route\Ring road.</p> <p>Response: In general, due to budgetary constraints, noise abatement works that require expensive structural work are only carried out as part of the upgrading of existing roads or the building of new roads. The cost of such mitigation measures may then be included in the overall budget of these projects. This matter will be examined further in line with the steps in the Noise Action Plan.</p> <p>The provision of an Eastern Bypass route\ring road is a policy and funding matter for the National Roads Authority</p> <p>It is considered that the information in the report included in the submission does not support the contention that the Dublin City Council Noise Maps are not robust and fit for the purpose for which they have been used.</p>
5	<p>Submission by John and Beverly Power, Resident</p> <p>Concerned with noise levels on Adamstown Road and the high level of Good vehicles on the R120. Response: In general, due to budgetary constraints, noise abatement works that require expensive structural work are only carried out as part of the upgrading of existing roads or the building of new roads. The cost of such mitigation measures may then be included in the overall budget of these projects. This matter will be examined further in line with the steps in the Noise Action Plan</p>
6	<p>Submission by Steven Kavanagh, Resident</p> <p>Concerned with increasing noise levels on Convent lane arising from nighttimes deliveries to Bloomfield Shopping Centre. Response: The Dublin Noise Action Plan is strategic plan mainly dealing with noise from Road Traffic. The matter of localised noise will be brought to the attention of the relevant Council Department</p>
7	<p>Submission by Pauline Duffy, Resident</p> <p>Concerned with increasing noise levels on Rochestown Park arising from new housing development and increased air traffic. Response: Noise levels to be monitored. Night time aircraft noise may vary in some areas of Dublin as maintenance planes are occasionally diverted due to adverse weather conditions.</p>
8	<p>Submission by Stephen O'Neill, Resident</p> <p>Concerned with noise levels from a pedestrian crossing audio signal on Rochestown Avenue. Response: The Dublin Noise Action Plan is strategic plan mainly dealing with noise from Road Traffic. The matter of localised noise will be brought to the attention of the Traffic Department</p>
9	<p>Submission by Dylan McCauley</p> <p>Concerned with noise levels on the M50 near his and nearby properties. Response: In general, due to budgetary constraints, noise abatement works that require expensive structural work are only carried out as part of the upgrading of existing roads or the building of new roads. The cost of such mitigation measures may then be included in the overall budget of these projects. This matter will be examined further in line with the steps in the Noise Action Plan</p>

