

ÚDARÁIS ÁITIÚLA CHONTAE

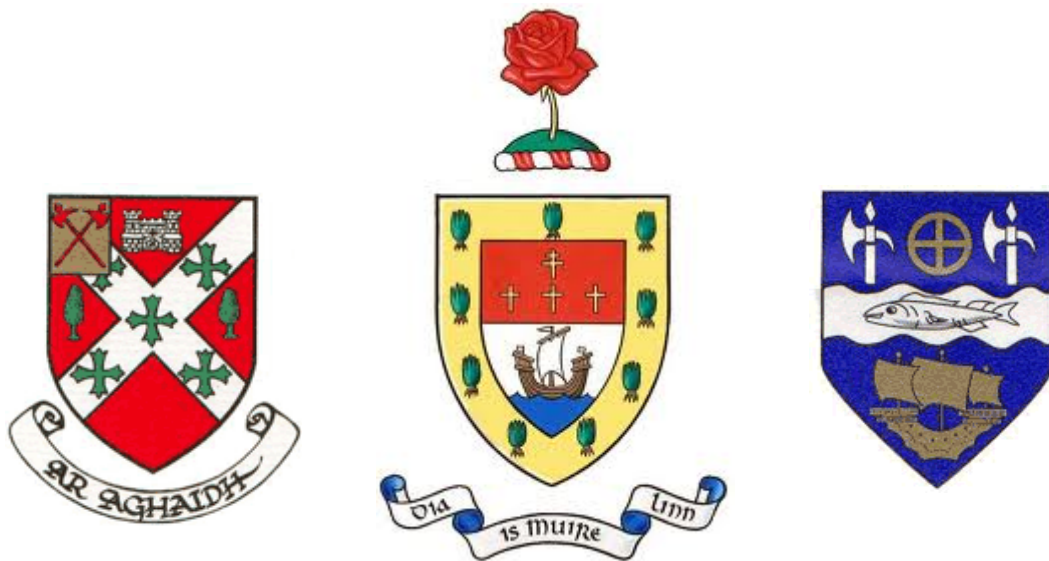
MHAIGH EO

COUNTY MAYO

LOCAL AUTHORITIES

DRAFT NOISE ACTION PLAN

2013-2018



June 2013

EXECUTIVE SUMMARY

This Draft Noise Action Plan 2013 has been prepared by Mayo Local Authorities to address environmental noise from sections of major roads in the county with more than three million vehicles per annum. The action planning areas identified in County Mayo are the N5 from Westport to east of Swinford, the N26 from Foxford to Ballina, the N17 from Claremorris south to the Galway County boundary and the N60 from Castlebar to southeast of Balla.

The plan has been prepared in accordance with the requirements of EU Directive 2002/49/EC (known as the Environmental Noise Directive, or "END"), which was transposed into Irish Law by the Environmental Noise Regulations 2006, SI No. 140 of 2006.

The aim of the Directive and the Regulations is to provide for the implementation of a European Commission common approach to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.

Environmental noise is unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic and noise in agglomerations over a specified size. Types of noise **not** included in the Regulations are noise that is caused by the exposed person, noise from domestic activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas.

Noise Mapping Bodies and Action Planning Authorities were assigned responsibility under the regulations to draw up noise maps and prepare action plans for noise from the following noise sources:

- Sections of Rail Route above a flow threshold of **30,000** train passages per year (No sections in Mayo);
- Major airports with more than **50,000** movements per year – a movement being a take off or landing. (not applicable to Mayo at present).
- Sections of major roads with a flow threshold of **3 million** vehicles per annum; and
- Agglomerations with more than **100,000** inhabitants (not applicable to Mayo).

The National Roads Authority (NRA), as the noise mapping body for major national roads, has prepared noise maps for the sections of the N5, N17, N26 and N60 in Mayo that have been confirmed by verified vehicle count data to have more than 3 million vehicles per annum. The National Roads Authority (NRA) has estimated from noise mapping and from geodirectory data, that the approximate number of individuals located within the action planning areas in County Mayo where the noise levels exceed the L_{den} value of 55dB and L_{night} value 50dB are 3,852 and 2,733 respectively.

The purpose of this Action Plan is to endeavour to manage the existing noise environment and protect the future noise environment within the action planning area. Management of the existing

County Mayo Local Authorities Draft Noise Action Plan 2013-2018

noise environment may be achieved by prioritising areas for which further assessment and possible noise mitigation may be required. Protection of the future noise environment may be achieved by acoustical planning, which further incorporates noise into the planning process via measures such as land-use planning, development planning, sound insulation measures, traffic planning and control of environmental noise sources.

The present action planning area is limited to three sections of the National Primary road network (N5, N17 and N26) and one section of the National Secondary road network (N60) in Mayo.

ACTION PLAN POLICY STATEMENT

Mayo Local Authorities will seek to address environmental noise from major roads in the County, will endeavour to maintain satisfactory noise environments where they exist and will have regard to acoustical planning in the planning process (within the confines of the 2000 Planning and Development Act) to endeavour to ensure that future developments include provisions to protect the population from the effects of environmental noise in the interests of residential amenity and public health.

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1.0 BACKGROUND/INTRODUCTION

1.1 Purpose and Scope of the Environmental Noise Directive.

The EU Directive 2002/49/EC (known as the Environmental Noise Directive or “END”) deals with the assessment and management of environmental noise.

The aim of the directive is to:

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

The Directive requires that Member States:

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

The Directive defines noise mapping, strategic noise maps and action plans as:

Noise Mapping – shall mean the presentation of data on an existing or predicted noise situation in terms of a noise indicator, indicating breaches of any relevant limit value in force, the number of people affected in a certain area or the number of dwellings exposed to certain values of a noise indicator in a certain area.

Strategic Noise Map – shall mean a map designed for the global assessment of noise exposure in a given area due to different noise sources or for overall predictions for such an area.

Action Plans – shall mean plans designed to manage noise issues and effects, including noise reduction if necessary.

1.2 Purpose and Scope of the Environmental Noise Regulations.

END was transposed into Irish Law by the Environmental Noise Regulations 2006, SI No. 140 of 2006. The regulations provide for the implementation 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.

For the purposes of the Directive and Regulations, environmental noise is unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic and noise in agglomerations over a specified size. Types of noise not included in the regulations are noise that is caused by the exposed person, noise from domestic

activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas.

The Regulations specify the process to be followed in addressing environmental noise from transport sources.

Round One:

Noise mapping bodies made strategic noise maps before the 30th June 2007 for the following:

- Major roads with >6 million vehicles per annum.
- Major railways with >60,000 trains per annum.
- Major airports with >50,000 movements per annum.
- Agglomerations with >250,000 inhabitants.

Phase 1 Final Noise Action Plan was submitted by Mayo Local Authorities to the EPA in March 2009 on foot of a public consultation process.

The fundamental objective of the action plans is the prevention and reduction of environmental noise.

Round Two:

Phase two provides for noise mapping bodies to make strategic noise maps for the following:

- Major roads (defined in the regulations as roads with > 3 million vehicles per annum).
- Major railways (defined as > 30,000 trains per annum).
- Major airports with > 50,000 movements per annum.
- Agglomerations with > 100,000 inhabitants.

Timetable:

A draft Noise Action Plan was submitted to the EPA on the 21st June 2013.

The draft plan will go to public consultation in July 2013 and then the plan will be finalised.

The EPA will submit a summary of the Noise Action Plan to the European Commission by the 18th January 2014.

1.3 Roles and Responsibilities of Designated Bodies.

The Environmental Noise Regulations designate noise mapping bodies and action planning authorities for the making of strategic noise maps and noise action plans as follows:

1.3.1 Noise Mapping Bodies:

- For major national roads, the National Roads Authority (NRA) is the noise mapping authority, on behalf of the action planning authority concerned;

- For major non-national roads, each local road authority is the noise mapping authority concerned, therefore Mayo Local Authorities is designated for County Mayo.
- For major airports, the relevant airport authority is the noise mapping body, on behalf of the action planning authority concerned;
- For major railways, Iarnród Éireann or the Railway Procurement Authority, as appropriate, is the noise mapping body on behalf of the action planning authority concerned;
- For the agglomeration of Dublin, Dublin City and Dun Laoghaire/ Rathdown County Council, Fingal County Council and South Dublin County Council.
- For the agglomeration of Cork, Cork City and County Councils.

1.3.2 Action Planning Authorities:

The Action Planning Authorities are the Local Authorities within whose functional areas the major road/railway/airport/agglomeration are located.

- Each Local Authority is the action planning authority for major roads in the local authority area, therefore Mayo Local Authorities is the action planning authority for major national roads in County Mayo.

1.4 Key Phases.

1.4.1 Identification of areas to be mapped.

In Mayo, strategic noise maps and associated action plans must be prepared for major roads only. The requirements for major railways, major airports or agglomerations of greater than 100,000 do not apply as the relevant thresholds are not met.

The definition of a major road for this second noise mapping/action planning phase of the Regulations is a road with more than 3 million vehicles per annum. Sections of the National Primary routes (N5), (N17) and (N26) and a section of the National Secondary route (N60) were identified by the NRA as roads in Mayo with this level of vehicle movement based on traffic count data.

The roads identified as major roads in the County of Mayo are:

- **N5 National Primary Road from Westport to Castlebar.**
- **N5 National Primary Road from Castlebar to Swinford.**
- **N17 National Primary Road from Claremorris to the Galway County Boundary.**
- **N17 National Primary Road from Charlestown to the Sligo County Boundary.**
- **N26 National Primary Road from Foxford to Ballina.**
- **N60 National Secondary Road from Castlebar to Balla.**

1.4.2 Strategic Noise Maps

1.4.2.1 Purpose

The purpose of the strategic noise maps is to identify the areas affected by different levels of environmental noise from major roads, railways, airports and agglomerations as described under 1.2 above. The maps are a visual representation of estimated noise contour bands within the action plan area from 55dB_{L_{den}} to greater than 75dB_{L_{den}}, in 5dB bands, and from 50dB _{L_{night}} to greater than 70dB _{L_{night}}, in 5dB bands. The maps have been linked to population data to estimate the number of people located in each environmental noise band. This information is then used to produce noise action plans, which will endeavour to manage existing environmental noise from the major sources and protect the future noise environment.

1.4.2.2 Preparation

In January 2012, a centralised approach to the noise mapping of major roads outside agglomerations was adopted. Through this centralised approach, one central body, the NRA, developed strategic noise maps for all major roads outside agglomerations, encompassing both national and non-national roads. All Local Authorities with major roads within their jurisdiction participated in this centralised approach.

The NRA ran computerised noise modelling programmes for the relevant roads with volumes above 3 million vehicles per year and generated GIS grids of noise levels as an output of the noise modelling process.

GIS polygon contour layers were generated from these grids for the following decibel bands for L_{den} and L_{night}:

L_{den}	L_{night}
55-59	45-49
60-64	50-54
65-69	55-59
70-74	60-64
≥75	65-69
	≥70

See Appendix 1 Glossary of acoustic and technical terms.

The resultant noise maps are a visual representation of the estimated noise level bands within each action plan area.

An overview of the preparation of the noise maps is given in Section 5.2 of this plan.

1.4.3 Development of Noise Action Plans.

1.4.3.1 Purpose.

The purpose of the action plans is to manage environmental noise from the major sources, to improve noise levels where necessary on a prioritised basis, to preserve satisfactory noise environments where they exist and to protect the future noise environment.

1.4.3.2 Scope

The local authority areas covered by the noise action plans are those areas identified by noise mapping as being affected by environmental noise from the major noise sources. The action plans refer to places near the major noise sources i.e. major roads, major railways and major airports and within any relevant agglomeration. The noise from these sources is regarded as affecting an Action Plan Area if it causes either an L_{den} value of 55dB(A) or greater or an L_{night} value of 45dB(A) or greater anywhere within an area.

1.4.3.3 Public participation

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

Article 11(6) of the END imposes the following duty on member states in relation to public consultation:

- *Member States shall ensure that the public is consulted about proposals for action plans, given early and effective opportunities to participate in the preparation and review of the action plans, that the results of that participation are taken into account and that the public is informed on the decisions taken. Reasonable time frames shall be provided allowing sufficient time for each stage of public participation. If the obligation to carry out a public participation procedure arises simultaneously from this Directive and any other Community legislation, Member States may provide for joint procedures in order to avoid duplication.*

Regulation 12(2) of SI 140 of 2006 provides that:

- *Information for the public on noise maps and action plans shall be clear, comprehensive and accessible and "shall include a summary of the most important points.*

It is the policy of Mayo Local Authorities to engage in public consultation with our citizens in regards to policies and plans developed by Mayo Local Authorities for Mayo, in accordance with national guidelines and best practice.

1.4.4 Implementation of the Action Plan

Mitigation and protection measures detailed in Section 7 of this Action Plan will be implemented if required, on a prioritised, phased basis over the five-year life of the Plan subject to funding. Monitoring measures may be undertaken where noise-mapping data must be verified by measurement prior to the implementation of any corrective action. Relevant noise prevention measures which fall into the planning arena will be proposed for inclusion in the next County Development Plan 2014-2020.

2.0 EXISTING NOISE MANAGEMENT LEGISLATION AND GUIDANCE:

2.1 National Legislation and Guidance

The Environmental Noise Regulations 2006 are concerned with community or environmental noise, which is classified in the draft International Institute of Noise Control Engineering (I-INCE) publication "A Global Approach to Noise Control Policy" as follows:

Community/Environmental Noise

Unwanted sound in a non-occupational setting, indoors or outdoors, caused by sources over which an individual has little or no control, including sounds produced by neighbours.

Many different noise sources contribute to community/environmental noise, including:

- Roads, railways, airports, industry or recreational activities adjacent to residential properties or noise sensitive premises such as schools or hospitals, or recreational spaces.
- Noisy neighbours, barking dogs.
- Gardening machinery, construction activities, ice cream vans, street cleaning, delivery vehicles.
- Air-conditioning equipment.
- Public house, nightclubs, restaurants or other recreational activities.
- Industrial operations, workshops and factories.

Location of new residential properties or noise sensitive premises such as schools or hospitals, adjacent to existing roads, railways, airports, industry or recreational activities can result in significant noise management issues as can the development of mixed residential/commercial use buildings, and multi-part residential buildings.

Noise sensitive locations such as schools, hospitals, churches, funeral homes, have particular requirements for low level noise environments in order to be able to function effectively. Noise levels in these noise sensitive locations must be managed to address external noise break-in, as well as room-to-room transmission. A high standard of insulation can be applied to improve noise attenuation in these buildings but this measure is rendered relatively ineffective when windows are opened. It also does not protect the external environment around the noise sensitive location from community/environmental noise.

2.2 Current Community Noise Management Situation

The Regulations address certain aspects of the wider definition of community noise, and there are currently a number of other measures in place which address other aspects of community or neighbourhood noise. The **following sections (2.2.1 to 2.2.7)** provide a brief overview of these other measures:

2.2.1 Environmental Protection Agency Act, 1992

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

- **S.106:** gives the relevant Minister certain powers to regulate noise that may give rise to a nuisance or be harmful to health or property;
- **S.107:** gives powers to local authorities and the EPA to serve notice to take steps to control noise;
- **S.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. S.108 enables private individuals to take a case to the courts at very low financial cost. This procedure is recommended for use by the public, particularly where the problem is caused by noisy neighbours in privately owned or rented accommodation.

In relation to general neighbourhood noise problems, Mayo Local Authorities encourage complainants to exert their rights under The Environmental Protection Agency Act 1992 (Noise) Regulations, 1994 (S.I. No. 179 of 1994), which provides straightforward access to the Courts by individual or groups concerned about excessive noise.

2.2.2 IPPC and Waste Licensing

Noise conditions are routinely imposed as part of an IPPC licence. The relevant guidance is set out in the EPA publication "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*" published by EPA 2012. This document contains suggested noise limits of 55 dB(A) $L_{A_{r,T}}$ for daytime, 50 dB(A) $L_{A_{r,T}}$ for evening-time and 45dB(A) $L_{A_{eq,T}}$ for night-time; with said limits to be applied to "*sensitive locations*". Whilst these limits have a very specific application, they have appeared in many different contexts and often form the basis for conditions in planning permissions. Similar noise conditions are also imposed on waste-licensed facilities.

2.2.3 Waste Permitting

Mayo Local Authorities impose noise conditions on waste permitted facilities where noise is considered to be a potential issue. These conditions are similar to the EPA waste licence conditions referred to above.

2.2.4 Wind Energy Planning Guidelines

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

2.2.5 Quarries and Ancillary Activities

Section 261 of the Planning and Development Act, 2000, introduced a new system of one-off registration for all quarries. Only those quarries for which planning permission was obtained in the 5-year period before S261 became operational were excluded. The Department of the Environment published guidelines for Planning Authorities for quarries and ancillary activities in April 2004, including recommended noise conditions for inclusion as part of registration or where a full planning permission was required. Depending on the complexity of the quarrying operation, noise conditions were included as part of the registration process and as part of the planning process for quarry extension applications. For larger quarry operations, environmental noise conditions along the following lines have been imposed by the planning authority: Noise emissions from the facility shall not exceed 55dB(A)_{L_{Aeq} 30 mins} during the daytime and 45dB(A)_{L_{Aeq} 15 min} during the night time at the façade of the nearest noise sensitive locations, subject to adjustment in the event of a change in the accepted limits for industrial noise.

Noise and vibration conditions have also been imposed for quarries in which blasting is carried out. These conditions generally state: Vibration levels from blasting shall not exceed a peak particle velocity of 12mm/second, measured in any three mutually orthogonal directions at any sensitive location. *Blasting shall not give rise to air overpressure values at the nearest occupied dwelling in excess of 125 d(B)(Lin)_{max peak} with a 95% confidence limit*. *No individual air overpressure value should exceed the limit value by more than 5 db (Lin)*. Mayo County Council has now completed the process of quarry registration in accordance with Section 261 of the Planning and Development Act 2000 and at present there are a total of 103 registered quarries in the county. Depending on the complexity of the quarrying operation, noise conditions were included as part of the registration process and as part of the planning process for quarry extension applications.

2.2.6 Building Regulations

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

2.2.7 Planning.

Aside from the guidelines for quarries, there is currently no national policy or guidance to address noise issues as part of the planning process, Mayo Planning Authorities will set conditions relating to noise as part of a planning permission where the planning authorities consider that excessive noise may result from the development.

The National Roads Authority has published the document “*Guidelines for the Treatment of Noise and Vibration in National Road Schemes*”, which sets out the procedure to be followed in respect of the planning and design of national road schemes.

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

- Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities), September 2007;
- Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns, Villages) May 2009.
- Urban Design Manual: A best practice guide (A companion document to the Guidelines for Planning Authorities on Sustainable Residential Developments in Urban Areas), May 2009.
- The document dealing with Design Standards for New Apartments calls for “*attention at the design and construction stages to prevent undue noise transmission between units*”. There is no mention of appropriate design goals or the methodology to be employed, other than reference to Part E of the Building Regulations (see below).

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

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

2.3 Local Planning Policy

2.3.1 Mayo County Development Plan 2008-2014

The Mayo County Development Plan 2008-2014 recognises the significance of addressing noise issues in a planning context. Section 3.1.5: Development Policies and Objectives for Environment, Heritage and Conservation, under Air Quality and Noise Pollution (P/EH-AN3) states:

"It is the policy of the Council to ensure that noise levels from new and existing developments do not exceed normally accepted standards, as set down in the DoEHLG Noise Regulations 2006, and that the requirements of S.I No 140 of 2006 (Environmental Noise Regulations 2006) are complied with, with regard to existing and future development in proximity to National Roads."

The County Development Plan also recognises the importance of setback distances for proposed developments from public roads. Section 4.2.4, Table 4.7, of the Mayo County Development Plan 2008-2014 details the building line setback requirements as follows;

Building Line Requirements:

<i>Road Classification:</i>	<i>Requirement:</i>
<i>National Roads</i>	<i>The building line shall be not less than 30 metres from the fence of a re-aligned road or from the designed fence line on an unimproved route.</i>
<i>Regional Routes</i>	<i>The building line shall be not less than 20 metres from the fence of a re-aligned road or from the designed fence line on an unimproved route.</i>
<i>Adjacent to any other public roadway or roadway of public importance</i>	<i>The building line shall be not less than 10 metres from the fence of a re-aligned carriageway or from the designed fence line on an unimproved road or right of way.</i>
<i>Town Streets</i>	<i>Existing frontage or existing building line</i>
<i>Housing Developments</i>	<i>The building line shall be not less than 6 metres from the front boundary of the house site.</i>

It promotes the use of cycling and walking as modes of transport thus reducing car usage.

Noise impacts are required to be addressed in Traffic Impact Assessments for large developments.

3.0 DESCRIPTION OF THE ACTION PLANNING AREA

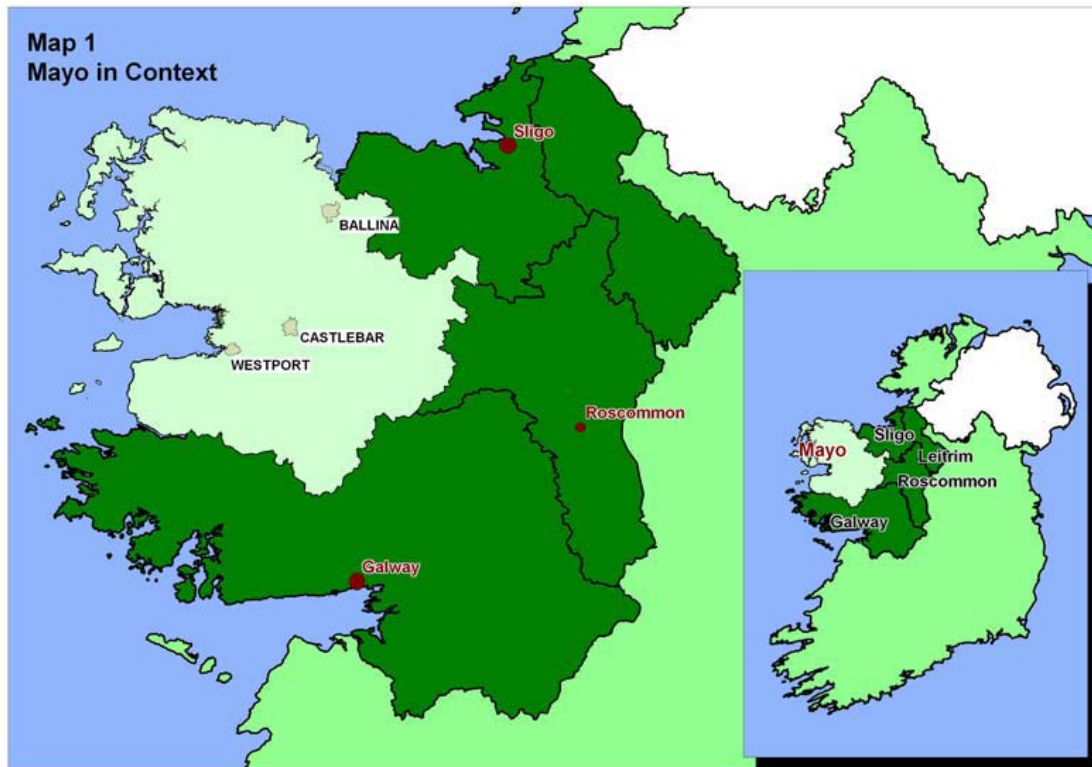
3.1 County Mayo

County Mayo is located in the West of Ireland (Map 1). A predominantly coastal county, it also has borders with Sligo to the East, Roscommon to the East and South East, and Galway to the South. It is the third largest county in the state with an area of 5592 square kilometres, which represents roughly 10% of the state's land mass.

A predominantly coastal county, Mayo is bounded by the Atlantic from Killala Bay in the North to Killary Harbour in the South West. The landscape of the County varies greatly. Dominating the landscape are the peaks of the mountains Nephin (806m, 2,644ft), Croagh Patrick (765m, 2,510ft) and Mweelrea (819m, 2,687ft), which is the highest mountain in Connaught. In contrast to this, vast areas of bogland stretch east and north from Carrowmore Lough covering an area of over 518 square kilometres. Because of the unique topography of the landscape of North West Mayo a National Park was established, comprising of 10,000 hectares of State owned land in the Owenduff / Nephin Beg area. Other distinct features of Mayo include the abundance of inland lakes, including the world famous Loughs of Conn, Cullin & Mask. In addition, there are many offshore islands both large and small. Achill Island is the largest island in the country and is connected by bridge to the mainland. Other inhabited islands include Clare Island, Inishturk, and Inishbiggle.

The principal rivers in Mayo are the River Moy, which flows into Killala Bay and which is a world famous salmon angling river, and the River Erriff, which flows into the mouth of Killary Harbour.

The three largest towns, each with its own Town Council are the County town of Castlebar, located inland in the centre-West of the County, Ballina located in the North of the County and Westport situated beside the sea at the mouth of Clew Bay (Map 1, Mayo in Context). The towns of Castlebar and Ballina were identified as a "Linked Hub" under the National Spatial Strategy.



3.2 Population Data:

In the period 2002–2006, Mayo experienced its most significant population increase since 1926. A population of 123,839 was recorded in 2006, compared with 117,446 in 2002, representing an increase of 5.4% in four years. The average annual rate of population increase in this four-year period was 1.35 per cent, which was higher than the rate of increase experienced during the 1996–2002 period (0.8%). The population of Mayo is unevenly distributed throughout the county, reflecting both the influence of its varied landscape and the existence of traditional service centres. Analysis of the Census Report indicates declining populations in the urban cores of the three main towns, with the population in the rural EDs adjacent showing significant increases. This suggests that some of the population increase in the environs of the towns may be at the expense of population growth in the town centres. It is reasonable to assume that similar trends (*ie.* declining town centre population, coupled with growth in the environs) are mirrored in the smaller towns throughout the County.

Table 1: Census Data for Mayo County

<i>Year</i>	<i>Total Population</i>	<i>Percentage change in population since previous census</i>
2002	117,446	+5.3% (1996-2002)
2006	123,839	+5.4% (2002-2006)
2011	130,638	+5.5% (2006-2011)

3.3 Transport Infrastructure in County Mayo

3.3.1 Road Network

There are approximately 6,518km of roads in County Mayo. There are three National Primary Routes; the N5 (Westport to Longford), the N17 (Charlestown to Galway) and the N26 (Ballina to Swinford). All three National Primary Routes comprise approximately 132km in length. There are five National Secondary Routes in the County (N58, N59, N60, N83 and N84) comprising approximately 264km. The majority of the road length is made up of Regional (625km) and Local Roads (5,497km), a reflection of the predominantly rural nature of the county. Traffic count data indicated that traffic flows along all of the National Secondary Roads, apart from the section of the N60 identified in this report, and all of the Regional and Local routes were below the 3 million vehicles per annum threshold for noise mapping/action planning specified for the second phase of implementation of the Regulations.

3.3.2 Rail Network

At present, the only rail network in Mayo is the service between Westport/Ballina and Dublin. An average of three passenger trains run daily and two to three freight trains serve Mayo on a daily basis. Rail noise mapping/action planning is therefore not required for implementation of the regulations.

3.3.3 Air Transport

County Mayo is served by Ireland West Airport Knock, which is situated in the East of the County. In the last five years Ireland West Airport Knock's position has been further strengthened as Ireland's fourth international airport with a major increase in the number of passengers using the facility. Ireland West Airport Knock is the main international air access gateway for the West, North West and Midland regions of Ireland. The Airport has also experienced rapid developments and now serves more than 20 scheduled and charter destinations across Ireland, the UK, Europe and beyond. Flights include commercial scheduled, commercial charter and training flights.

A major airport is defined in the legislation as a civil airport that has more than 50,000 movements per year (a movement being a take-off or a landing), excluding those purely for training purposes

on light aircraft. The number of movements per year at Ireland West Airport Knock at present is significantly lower than the threshold required for Action Planning. `

3.4 Extent of Action Planning Area

The County Mayo action planning area is defined from the legislation, for this phase of the plan, as the area affected by noise from a major road carrying greater than 3 million vehicles per annum. Vehicle count data was obtained from Mayo County Council's road surveys and NRA surveys. The roads identified as major roads in the County of Mayo from NRA and Mayo County Council traffic counts are:

- **N5 National Primary Road from Westport to Castlebar.**
- **N5 National Primary Road from Castlebar to Swinford.**
- **N17 National Primary Road from Claremorris to the Galway County Boundary.**
- **N17 National Primary Road from Charlestown to the Sligo County Boundary.**
- **N26 National Primary Road from Foxford to Ballina.**
- **N60 National Secondary Road from Castlebar to Balla.**

The exact action planning area is a clearly defined stretch of these roads including lands on both sides of the road. The boundary of the lands is not defined by distance from the road noise source but rather it is the land area defined by computer modelling to be affected by noise levels of greater than 45dB(A) L_{night} and/or 55dB(A) L_{den} . The NRA Traffic Count Data indicates that traffic flow on further sections of the N5, N17, N26 and N60 are currently below the annual 3 million threshold.

4.0 RESPONSIBLE AUTHORITY FOR ACTION PLANNING

4.1 Name and Contact Details:

Mayo County Council,
Roads Section,
Áras an Chontae,
The Mall,
Castlebar,
County Mayo.
Telephone number: (094) 9024444
Fax number: (094) 9024447
E-Mail: roads@mayococo.ie

4.2 Description of other bodies of relevance.

The EPA is an independent public body established under the Environmental Protection Agency Act, 1992. The EPA is the national authority for the purposes of the Environmental Noise Regulations 2006.

The National Roads Authority (NRA) was formally established as an independent statutory body under the Roads Act, 1993 with effect from 1 January, 1994. The Authority's primary function, under the Roads Act 1993, is 'to secure the provision of a safe and efficient network of national roads'. For this purpose, it has overall responsibility for planning and supervision of construction and maintenance works on these roads. For major national roads, the NRA is the noise mapping authority on behalf of the action planning authority concerned.

The Department of Transport, Tourism and Sport's role is to ensure the provision, development and regulation of competitive, safe and secure integrated sustainable transport services and transport infrastructure for the road, rail, air and maritime transport modes in Ireland.

The Local Roads Authority ie Mayo Local Authorities is responsible for the maintenance and upkeep of non-national routes in the county. The primary goal of the Roads Authority is to keep the roads safe. The Roads section in consultation with the NRA undertakes traffic calming measures where warranted by high vehicle speed and numbers passing through settlement areas and accident statistics

4.4 Future Schemes Proposed

4.4.1 National Primary Routes:

It is an objective of the Mayo County Development Plan 2008-2014 to encourage the completion of a series of National Primary Road Improvements which include the following that may have an influence on the Noise Action Plan areas:

Objective	Route	Proposal
<ul style="list-style-type: none">NP4	N5	Commence design and land acquisition for Castlebar by-pass.
<ul style="list-style-type: none">NP6	N26	Commence design and land acquisition for Ballina Orbital Route.

4.4.2 National Secondary Routes:

It is an objective of the Council to completely upgrade the N60 from Castlebar to the N17 Claremorris by-pass.

Objective	Route	Proposal
NS2	N60	Complete design, commence land acquisition and construction of Castlebar-Claremorris section including Balla by-pass.

5.0 Summary of Noise Mapping Results.

5.1 Overview of the preparation of the noise map

The roads identified as falling above the 3 million threshold have been listed in Section 1.4.1. The Environmental Noise Regulations require the NRA to develop noise mapping for National Roads and Mayo Local Authorities are required to develop noise mapping for regional roads.

Specific sections of national primary and national secondary routes as described earlier, have been identified as the only sections of major road in County Mayo for the purpose of implementation of this phase of the Directive and the Regulations. This was established from the NRA's traffic count data. A strategic noise map was prepared for these sections of road.

The strategic noise maps were prepared by the NRA using the recommended interim method of noise assessment set out in the second schedule of the regulations. The model used was the UK national computation method "calculation of road traffic noise (CRTN), Department of Transport-Welsh Office, HMSO, London, 1998", adapted as set out in paragraph 2.1 of Annex II to the Directive. The model took account of information such as traffic flow data, vehicle type data, traffic speed, road width, road incline, road barriers and features which affect the spread of noise such as buildings and the shape of the ground (e.g. earth mounds), and whether the ground is acoustically absorbent (e.g. fields) or reflective (e.g. concrete or water).

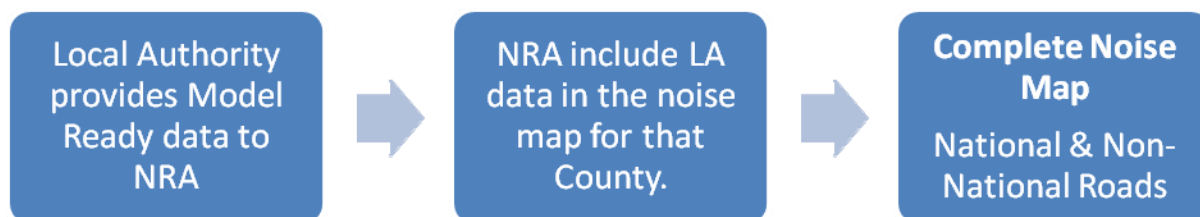
The NRA generated GIS grids of noise levels as an output of the noise modelling process. Compass Informatics then generated GIS polygons from the grids. The polygons are maps showing the noise contour bands in 5dB contours from 55dB to >75dB for Lden and from 45dB to >70dB for Lnight.

5.1.1. Responsible Authorities

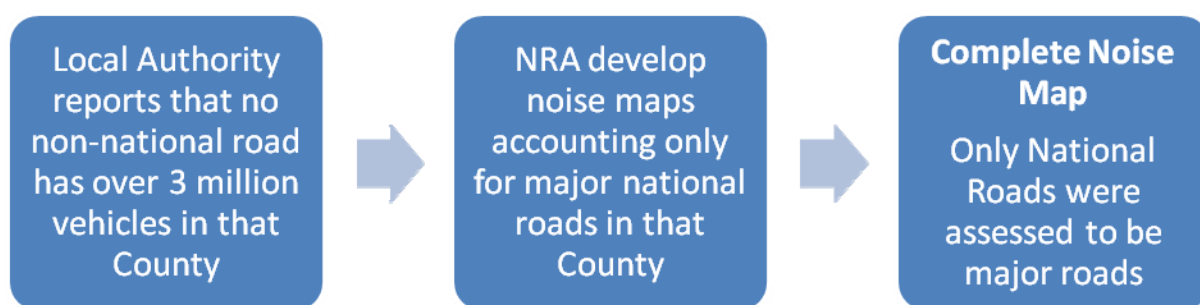
The Environmental Noise Regulations require the NRA to develop noise maps for every major road classified as a national road while the responsibility of mapping non-national roads rests with the relevant Local Authority within whose functional area the road lies.

In January 2012, a centralised approach to the noise mapping of major roads outside agglomerations was adopted. Through this centralised approach, one central body, the NRA, developed strategic noise maps for all major roads outside agglomerations, encompassing both national and non-national roads. Non-national roads were mapped by the NRA on the behalf of the relevant Local Authority *provided* that authority participated in the centralised approach and provided 'model-ready' data to the central body for calculations.

All Local Authorities with major roads within their jurisdiction participated in this centralised approach.



CASE 1: Non-national roads are deemed to be a major road when carrying in excess of 3 million vehicles per year



CASE 2: No non-national road deemed to be a major road.

5.2 Presentation of Results.

5.2.1 Noise Contour Maps

The strategic noise maps for the N5, N17, N26 and the N60 are attached in Appendix D. Each map shows colour-coded contours of different noise bands, identifying areas that are relatively louder or quieter. The noise indicator contours shown on the noise maps are L_{den} and L_{night} . These are defined as follows (more detailed definitions can be found in Appendix A):

- L_{day} : The A weighted average sound level over the twelve hour day period of 0700-1900 h;
- $L_{evening}$: The A weighted average sound level over the 4 hour evening period of 1900-2300 h;
- L_{night} : The A-weighted average sound level over the 8 hour night period of 2300-0700 h;
- L_{den} : The day, evening, night rating level. L_{den} is a logarithmic composite of the L_{day} , $L_{evening}$, and L_{night} levels but with a 5dB(A) weighting added to the $L_{evening}$ value and a 10dB(A) weighting added to the L_{night} value.

The noise levels reflect an annual average 24-hour period. The L_{den} contours shown on the maps range from 55dB to >75dB in 5 contour bands. The L_{night} contours range from 45dB to >70dB in 5 contour bands. Areas with noise levels of less than 55dB L_{den} and less than 45dB L_{night} are not mapped because these levels are below the threshold for inclusion under the legislation.

5.2.2 Summary Exposure Statistics

The population exposure methodology was prepared by the EPA during the noise mapping process. The method is described in "Post Processing and Analysis of Noise Level Results" in Appendix B. In summary, population exposure in each noise contour band was generated by cross referencing geodirectory locations with population data to create a set of population figures for each stretch of major road in the country. A summary report was provided to each local authority to assist in preparation of the action plans. The estimated population exposure results for County Mayo are shown in Tables 6 and 7 below.

Tables 2(a) and (b): Population Exposure Data, (L_{den})

<i>Decibel Level Contour</i>	<i>Approximate Number of People</i>	<i>Decibel Level Contour</i>	<i>Approximate Number of Dwellings</i>
< 55	12,351	> 55	1,834
55 - 59	1,428	> 65	574
60 - 64	1,285	> 75	0
65 - 69	1,053		
70 - 74	86		
> 75	0		

Tables 3(a) and (b): Population Exposure Data, (L_{night})

<i>Decibel Level Contour</i>	<i>Approximate Number of People</i>	<i>Decibel Level Contour</i>	<i>Approximate Number of Dwellings</i>
< 50	13,469	> 50	1,317
50 - 54	1,342	> 60	68
55 - 59	1,278	> 70	0
60 - 64	113		
65 - 69	0		
> 70	0		

Tables 4 and 5: Total Action Plan Area, (L_{den}) and (L_{night})

<i>Decibel Level Contour (L_{den})</i>	<i>Approximate Area (km^2)</i>	<i>Decibel Level Contour (L_{night})</i>	<i>Approximate Area (km^2)</i>
> 55	26	> 50	14
> 65	5	> 60	2
> 75	0.05	> 70	0

5.3 Limitations of the Noise Mapping Process.

5.3.1 Limitations of the computer modelling method

The data used to generate the noise maps was obtained from computer modeling rather than from actual noise measurement. This approach is in accordance with the Noise Regulations. There are technical and practical reasons for using computer modelling in preference to noise measurement to produce noise maps: (re: noisemapping.defra.gov.uk). Noise levels at each monitoring location will generally result from a combination of different sources and physical measurement would not allow for the specific contribution from road noise to be determined. Furthermore, to produce a map based on measurements would require a large number of measurements to be made at each location over extended monitoring periods, at prohibitive expense.

The use of computer modelling to prepare noise maps is not a limitation of the noise mapping process because it is the method imposed under the Regulations. However, this noise mapping method does make it difficult to quantify the reduction in noise levels achieved by specific mitigation measures implemented at a local level. Without “before” and “after” noise monitoring results, improvements cannot be quantified. To address this limitation Mayo Local Authorities proposes that where specific situations are identified for which mitigation measures may be required, a limited amount of noise monitoring will be conducted to confirm that noise levels are unsatisfactory. Where mitigation measures are implemented, further monitoring will be carried out to quantify the effectiveness of the measures.

Data obtained from computer modelling is somewhat limited in that it provides a single annual average noise level and does not identify changing noise profiles over time.

5.3.2 The vehicle count data

The noise maps produced by the NRA for the N5, N17, N26 and N60 were based on the latest NRA traffic count data and projected to the design year using the “NRA Future Traffic Forecasts 2002-2040”. These traffic figures may be validated when compared to traffic counts carried out on the appropriate sections of the N5, N17, N26 and N60 by Mayo County Council’s National Road Design Office.

6.0 IDENTIFICATION OF AREAS TO BE SUBJECTED TO NOISE MANAGEMENT ACTIVITIES

6.1 Assessing and prioritising actions.

The delivery of the key strategic projects is a priority of Mayo County Council and it is proposed to incorporate mitigation measures in accordance with current best practice on the major roads in the action planning area for the first round of the implementation of the regulations.

There are no statutory limits in place in relation to environmental noise exposures at EU or national level. The EPA recommends (ref EPA Guidance document) that the proposed onset levels for assessment of noise mitigation measures for noise due to road traffic should be as follows:

- 70dB, L_{den} and
- 57dB, L_{night}

The proposed onset levels for assessment of noise level preservation for quiet areas, where the existing noise level is considered good are as follows:

- 55dB, L_{den} and
- 45dB, L_{night}

The second round of implementation of the regulations will require mapping of more extensive stretches of road and in order to focus resources on areas in most need of improvement, a decision matrix will be applied, based on work carried out by Dublin Agglomeration⁵. The final matrix score is determined based on three variables:

- 1. The calculated environmental noise level (from the noise mapping data).**
- 2. The type of location (e.g. town centre, commercial, residential).**
- 3. The noise source (i.e. road, rail, airport, agglomeration).**

1. Calculated environmental noise level:

The score under this variable is assigned based on the calculated L_{den} and L_{night} levels for the location.

2. Type of location:

This score is assigned based on the type of land use in the area and on the receptor. A higher score is assigned to open countryside on the basis of the expectation that residences in open countryside will have lower ambient noise levels than commercial areas and town centres. A higher score is also assigned to noise sensitive locations because of the requirement for low noise levels for them to function effectively (e.g. schools, churches, funeral homes, hospitals, nursing homes).

3. Noise Source:

In County Mayo, the noise source is the same for all assessments (i.e. noise from major roads). It has been suggested in EPA Noise Guidance Document (ref) that each Action Planning Authority may impose an additional weighting factor to the matrix to include the number of residents at each address. However Mayo Local Authorities does not propose to impose this additional weighting for the following reasons:

- The number of residents at a particular location may change with change of ownership.
- While there may be only one or two residents at a particular address, their lifestyle habits may be such that they spend considerably more hours around the home than for example a large family where the adults are at work all day and children are at school.

Data obtained from the matrix tool will enable Mayo Local Authorities to prioritise actions. A matrix assessment score of **17 or greater** will be taken to indicate that the threshold levels may

have been exceeded and that the location should be included in the shortlist for further assessment.

Table 6. Matrix A: Decision Support Matrix to Identify and Prioritise Noisy Areas

Priority Matrix Based on Maximum Exposure Levels in the Assessment Area				
Location				
Decision Selection Criteria		Score Range Lden	Score Range Lnight	Sub Total
Noise Band	45-49	4	5	
	50-54	3	4	
	55-59	2	2	
	60-64	1	3	
	65-69	2	4	
	70-74	3	5	
	75-79	4	6	
	>/=80	5	7	
Type of Location	Town centre	1	1	
	Commercial	1	2	
	Residential	2	3	
	Noise Sensitive	3	3	
	Open countryside	3	3	
	Recreational open space	2	2	
Type of noise source	Air	3	4	
	Industry	2	3	
	Rail	2	3	
	Road	3	4	
		Total Score		

6.2 Preservation of Noise Levels in Quiet Areas and Noise Sensitive Locations

A quiet area in open country is defined as an area delimited by the action planning authority following consultation with the agency and approval by the minister, that is undisturbed by noise from traffic, industry or recreational activities. At present, there are no such areas identified along the stretches of the N5, N17, N26 and N60 for which noise mapping has been carried out therefore quiet areas are not relevant to this action plan.

Noise Sensitive locations are locations for which a quieter noise environment is preferable for effectively carrying out the functions of the particular location. They include schools, libraries, hospitals, nursing homes, funeral homes, churches and other places of worship.

Decision support Matrix 'B' can be applied (Table 7) to identify noise sensitive locations, recreational open spaces or quiet areas for which mitigating measures may be required to preserve a good quality noise environment.

Table 7. Matrix B: Decision Support Matrix to Preserve Quiet Areas:

Priority Matrix				
Location				
Decision Selection Criteria		Score Range Lden	Score Range Lnight	Sub Total
Noise Band	<45	0	0	
	45-49	1	2	
	50-54	2	3	
	55-59	3	4	
Type of Location	Noise Sensitive	3	3	
	Quiet area	3	3	
	Recreational open space	2	2	
Type of noise source	Air	3	4	
	Industry	2	3	
	Rail	2	3	
	Road	3	4	
		Total score		

The noise maps will be examined to identify any noise sensitive locations situated within the action planning area (i.e. alongside the sections N5, N17, N26 and N60). Any noise sensitive locations identified will be tested against Matrix 'A' (Table 6) above - to establish whether mitigation measures need to be carried out to improve the existing noise situation. They will also be tested against Matrix 'B' to identify whether protective measures need to be taken to preserve the quiet environment at these locations.

7.0 MITIGATION AND PROTECTION MEASURES:

7.1 The Source of Road Noise.

The level of environmental noise generated by a particular road is dependent on a range of factors including the number and type of vehicles, the speed of the vehicles, the road surface and the incline. The extent to which the noise travels from the road is affected mainly by the following parameters: distance, weather, the presence of acoustic barriers, buildings, road width, road incline, nature of the topography and whether the ground is acoustically absorbent or reflective. The most significant factor in terms of noise generation is the noise produced by the vehicle. Vehicle noise arises from three sources:

- Propulsion noise (engine, powertrain, exhaust and intake systems).
- Tyre/road contact noise.
- Aerodynamic noise.

Engine noise is the dominant source at lower speeds (under 30kph for passenger cars/under 50kph for lorries), tyre/road noise dominates above that and aerodynamic noise becomes louder as a function of the vehicle speed (ref European Federation for Transport and Environment).

Vehicle noise limits are set in EU legislation and address propulsion noise for new vehicles. Current limits are shown in Appendix F. Noise emissions are determined by means of a vehicle drive-by test, which measures the noise emitted as the vehicle drives by at 50kph and accelerates in front of the microphone position. The current drive by test does not include provision for evaluating noise performance in typical urban stop-start traffic situations at lower speeds, where engine noise is the dominant source. Another failing is that the test parameters are set in such a way that vehicles can be designed to pass the test but are considerably louder when driven on the road. A new type of vehicle test has recently been introduced which corrects for these limitations.

The EU noise limits are a valuable tool for ensuring that noise emissions are minimized for new vehicles. However they only apply to new vehicles. As vehicles age, the level of noise produced by the engine increases with wear and tear on the parts but there is presently no requirement in Ireland to assess noise emissions from older vehicles. Another practical limitation to the noise emission limits is that while a newly purchased vehicle may comply with its emission limit, modifications to or removal of the vehicle silencer will result in an excessively noisy vehicle. Installation of a sports exhaust on a vehicle is not illegal at present and is a major contributor to nuisance noise from road vehicles.

Tyre rolling noise emissions have increased over time, predominantly due to the trend towards wider and heavier tyres. Tyre/road contact begins to dominate the noise emission above 30km/h for passenger cars and above 50km/h for lorries. For this reason, it was deemed necessary to regulate tyre/road noise separately at EU level.

The rolling noise emissions of tyres are regulated under the following EU regulations.

Tyre-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefore – Regulation No 661/2009.

Under the framework of Directive 2007/46/EC this regulation establishes new maximum permissible rolling noise limits for tyres available on the market across Europe. This Noise limits replace the previous limits set out within Directive 2001/43/EC. The new Regulation requires tyres to comply with more stringent limits on rolling noise emissions. Compliance with these new noise limits is mandated from 1st November 2012 for new types of tyre, from 1st November 2013 for new types of vehicle and from 1st November 2016 for all new tyres and vehicles. The new rolling noise limits are between 3 and 4 db(A) lower than the previous limits.

Labelling of tyres with respect to fuel efficiency and other essential parameters – Regulation 1222/2009.

In support of Regulation No 661/2009 this Regulation establishes a framework for the provision of harmonised information on tyre parameters through labelling, allowing end users to make informed choice when purchasing tyres.

As from 1st November 2012 the EU Energy labels for tyres must be available at point of sale and show information on fuel consumption, wet grip and rolling noise levels, as shown in Figure 7.1.

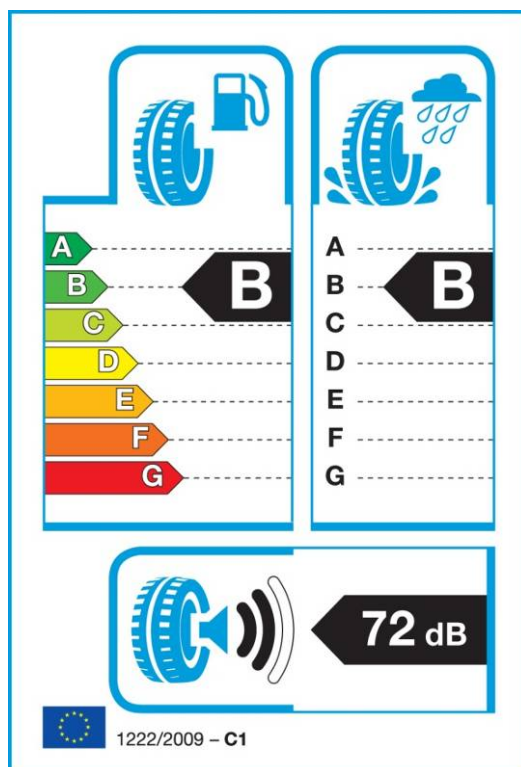


Figure 7.1: Example of EU Energy label for tyres

7.2 Measures To Reduce Noise From Major Roads.

7.2.1 Existing Developments.

There are a limited number of approaches that can be taken to reduce noise from major roads for *existing* dwellings:

Relocating the road away from high-density settlements by the construction of a By-pass is obviously the most effective method of minimising the numbers of dwellings likely to be affected by the road noise. Where areas are identified by further assessment as requiring possible mitigation, it may be possible to install noise barriers on major roads away from residential areas (where pedestrian access is not an issue).

Traffic calming measures can be employed where the major road passes through a built-up area.

Changes to the road surface to use porous asphalt may be appropriate in some instances; the road surface must be regularly cleaned to keep the pores free of sediment otherwise the sound absorbing properties of the surface are reduced. Porous surfaces are more effective at higher vehicle speeds and are not as effective within 50kph speed restriction zones.

Improved insulation will reduce noise levels within dwellings but this is only effective when windows are kept closed.

7.2.2 Future Developments.

The measures available for the protection of future developments from exposure to noise from major roads include acoustical planning measures in land use zoning and development layout, design and specifications, such as: locating residential developments away from major roads; using the lands around major roads feeding into towns for commercial/industrial development; incorporating noise issues into the design of housing developments by locating the access roads and green areas on the major road side of the development, thus increasing the separation distance between the houses and the roads; through the implementation of "Building Line Setback" distances specified in NRA guidelines and the Mayo County Development Plan 2008-2014 (Re: Section 2.3.1 above); using a higher standard of insulation for new dwellings adjacent to major roads and also using higher standards of insulation for the exposed façades of new dwellings. These are acoustical planning measures although not all are within the control of the planning authority.

Mayo Local Authorities will endeavour to protect the future noise climate by the early incorporation of noise action planning into the planning and operational stages of future developments.

7.3. Proposed Measures for Mayo Action Planning Area

7.3.1 Mitigation Measures:

Residences located within the action planning area will be tested using the decision matrix (Matrix A) to prioritise areas for which further assessment may be required.

Reducing traffic density is the most effective way to reduce road noise emissions. Mayo Local Authorities will also strive to reduce traffic density as much as possible on a countywide basis by:

Promoting Public Transport:

The Mayo County Development Plan 2008-2014 includes the following aims:

- To develop a high quality, sustainable and integrated transportation system embracing the road, rail and air transport sectors, with an increased emphasis on the use of public transport to achieve a more balanced and sustainable transport system.
- To promote the integration of transport and land use by encouraging and consolidating the development of the County's extensive network of towns and villages.
- To support and promote the development of the transportation assets of the County, including Ireland West Airport Knock and the strategic road and rail corridors as critical elements of the intra/inter regional linkages.

➤ Smarter Travel and Active Travel Towns

The aim of Smarter Travel is to get people to consider the impact our travel decisions have on ourselves and others.

The Smarter Travel Programme provides funding and facilities for cyclists, walkers & public transport users. The Council actively promotes Smarter Travel through its proactive role in promoting sustainable mobility by delivering a programme of events to mark 'Bike Week' each year, such as Family Fun Cycles, Pedal a Smoothie and Cycle to Work Scheme.

The Council further encourages the shift from car to walking and cycling by providing safer routes for people to travel by bicycle or on foot.

Traffic Calming Measures, Footpaths & Pedestrian Crossings have been provided to improve walking and cycling routes in some towns.

Future development of parking facilities:

It is a policy of the Mayo County Development Plan 2008-2014 to support and facilitate the provision of parking facilities at appropriate locations, including the provision of bus parking facilities within and on the edge of towns and villages, and at viewing areas at important tourist destinations and routes.

Improved traffic management and smoothing traffic flows:

The preparation of Town Traffic Management Plans is a stated objective of the Mayo County Development Plan 2008-2014:

- **O/ TI-R 6** It is an objective of the Council to carry out Traffic and Transportation Studies in the larger towns and other locations as required.

The plans will examine improved traffic management measures such as:

- *Pedestrianisation;*
- *Designation of cycle routes;*
- *Use of one-way systems; and*
- *Modifications to junction types.*

Where appropriate, new traffic calming areas may be designated and existing traffic calming measures will be optimised.

Mayo Local Authorities will consider improvement or changes to road surfaces during routine road maintenance, where necessary, by:

- *Improving the quality of road surfaces by ongoing road maintenance programmes.*
- *Using low-noise road surfaces where appropriate.*

Where relevant, Mayo Local Authorities will investigate the feasibility of extending speed limit zones. For major national roads, this would be done in consultation with the NRA.

Mayo Local Authorities will ensure that council-owned fleet vehicles are maintained to an adequate level to minimise unnecessary noise generation. Consideration will be given to using quieter vehicles such as electric rather than diesel.

7.3.2 Protection measures for future improvement:

Mayo Local Authorities will endeavour to utilise the planning process as necessary:

- To incorporate the aims of the present and future noise action plans into the county development plan and into relevant local area plans, protecting larger areas from road noise. Special consideration should be given to zoning objectives, speed limits and established settlements within the area.

- Developers are encouraged (or required at the discretion of the Planning Authority) to produce a sound impact assessment and implement mitigation measures as follows:
 - *For new developments proposed within the current action planning area or*
 - *For developments proposed near major roads (i.e. traffic volumes in excess of 3 million vehicles per annum or otherwise on a case by case basis).*
- Where developments are planned adjacent to major roads, to incorporate acoustical planning into the development design e.g. designing the development so that the access road is adjacent to the major road noise source. It may also involve the use of buffer zones and/or noise barriers and traffic calming measures.
- To ensure that all future developments are designed and constructed so as to minimise noise disturbance.

The above measures may be restricted under the existing provisions of the current Planning, Building and Fire Acts.

Mayo Local Authorities will consider providing for a higher standard of façade and window insulation on the most exposed façades in new local authority housing developments located beside major roads, potentially with a pre-completion sound insulation test carried out prior to habitation.

Mayo Local Authorities will consider requiring a higher standard of façade and window insulation for all new multiple residential developments located beside major roads, potentially with a pre-completion sound insulation test required prior to habitation. Mayo Local Authorities will consider requiring a higher standard of façade and window insulation for single one-off housing applications beside major roads.

The powers of the Planning Authority to impose the above measures are restricted by the provisions of the existing Planning Acts.

Protection measures for future improvement may also include extending speed limit restrictions around built-up areas.

7.3.3 Monitoring Measures:

Data presented in the noise maps shown in Appendix IV is obtained from computer modelling and is reported as a mean annual noise level, L_{den} and L_{night} . The model may overestimate the environmental noise levels resulting from major road traffic at a particular location. Where the decision matrix process identifies locations for further assessment, noise monitoring may be carried out to confirm that levels of environmental noise are unsatisfactory and that mitigation measures may be required. The possibility of other noise sources contributing to the measured noise level must be taken into account in this assessment. Where mitigation measures can be implemented, further noise monitoring will be carried out after implementation in order to quantify the improvement achieved.

Mayo Local Authorities will endeavour to ensure that sufficient traffic count data is collected on a continuous basis.

7.3.4 Consultative Measures

In areas where Mayo Local Authorities do not have a regulatory role, but where improvements in regulatory controls will effect a reduction in environmental noise from major roads, Mayo Local Authorities will consult and liaise with the relevant authorities.

These areas may include:

- i. Liaising with the NRA to extend speed restriction zones for national roads passing through built-up areas. Of relevance to the present and future action planning areas.
- ii. Liaising with the NRA to impose set back distances for developments alongside national roads.
- iii. Consulting with the Department of Environment, Community and Local Government regarding present restrictions on Planning Authorities in relation to the imposition of planning measures to address noise in the assessment of applications.
- iv. Recommending to the Planning Authority that measures proposed in this action plan be included in any review of the Mayo County Development Plan and in relevant Local Area Plans.
- v. Recommending to the Department of Transport, Tourism and Sport that noise monitoring be incorporated as part of the NCT and DOE commercial vehicle tests. Wear and tear on a vehicle will increase noise emissions and should be addressed in vehicle testing. A vehicle with a missing or defective silencer will not pass the NCT test. However a vehicle with a modified exhaust (approved sports exhaust) will pass the test unless the air emission limits are exceeded.
- vi. Recommending to the Department of Transport, Tourism and Sport that modified sports exhausts be made illegal for normal road use. This recommendation will obviously have resource implications for the Gardai in terms of enforcement.
- vii. Possibly recommending to the Department of Justice that An Garda Síochána be provided with noise testing instrumentation for roadside checks (of limited effectiveness without supporting legislation and emission limits – recommendation (vi) above would be easier to enforce and also more effective).
- viii. Liaising with the EPA to establish limit values for community noise.
- ix. Recommending to the Department of Transport that tighter tyre rolling noise limits should be implemented at EU and national level.

8.0 Public Participation.

Submissions and observations are invited from the general public in the preparation of this Noise Action Plan.

The main objective of the Plan is to identify the population exposed to excessive road noise within the action planning area and, where appropriate, to recommend mitigating measures to improve noise levels. The Plan also has as an objective the requirement to maintain low-level noise environments where they exist (again in relation to road noise).

Mayo Local Authorities is interested in receiving your comments on this action plan, on whether you consider that the plan addresses all the relevant issues in relation to road noise in County Mayo.

Mayo Local Authorities will comply with data protection requirements and will use information that you provide to compile a report on your observations/comments. We will not include your name, address or other contact information in the report, unless you specifically request that we do so.

The purpose of the Public Consultation is to allow for public participation in preparation and review of the Mayo Noise Action Plan. The Draft Mayo Noise Action Plan 2013 will be advertised. The draft plan will be made available for inspection in the Roads and Transportation Department, Mayo County Council, Aras an Chontae, Castlebar, Co. Mayo and in Town Councils in Castlebar, Westport and Ballina. It will also be published on the Mayo County Council website: www.mayococo.ie. A newspaper notice will be placed in the Connaught Telegraph inviting submissions from the general public.

Please submit any observations or comments to this document by post or email before 4.00pm on the 19th September 2013 to the following:

By email to: roads@mayococo.ie

By post to: Mr Paddy Mahon,
Director of Services for Roads and Transportation,
Mayo County Council,
Aras an Chontae,
Castlebar,
Co. Mayo.

Please use the heading "Submission – Draft Noise Action Plan".

In addition to the general public, the following stakeholders will also be asked to comment on this draft noise action plan:

- Department of Transport, Tourism and Sport.
- Department of Environment, Community and Local Government.
- National Roads Authority.
- Environmental Protection Agency.
- Irish Aviation Authority.
- Galway County Council.
- Roscommon County Council.
- Sligo County Council.
- Roads and Transportation Strategic Policy Committee
- Planning and Economic Development Strategic Policy Committee

Further details of the public consultation process and the submissions will be provided in Appendix E of the final Plan.

9.0 IMPLEMENTATION PROGRAMME

9.1 Roles and Responsibilities

Under the Environmental Noise Regulations, 2006, the National Roads Authority (NRA) is the noise mapping body for major national roads in County Mayo. Mayo Local Authorities are the noise mapping body for major non-national roads in the county. Mayo Local Authorities are the Action Planning Authority for major roads in County Mayo. The volumes of rail and air traffic in the county are below the threshold for noise mapping and so the Regulations do not apply to these areas at present.

Mayo Local Authorities are responsible for the preparation of this noise action plan and for meeting the stated objectives of the plan, including implementing measures to improve existing noise levels at a local level (if appropriate) and identifying and implementing measures for the protection of the future environment from road noise. Mayo Local Authorities are also responsible for identifying major non-national roads that fall under the second round of implementation of the regulations (i.e. more than 3 million vehicles per annum) and ensuring that noise mapping is carried out for these roads.

The NRA is the noise mapping body for major national roads under the second round of implementation of the regulations on behalf of Mayo Local Authorities.

9.2 Targets and Objectives:

It is the aim of this action plan to manage environmental noise from major roads, to protect good satisfactory noise environments where they exist and to protect the quality of the future noise environment by acoustical planning.

9.3 Programme of Works

Year one to two (2013 to 2014):

Progress the delivery of the key strategic projects.

Apply the matrix assessment method described in section 6.1 to identify from noise maps specific areas for which further assessment may be warranted (i.e. monitoring).

Year Two (2014):

Undertake consultative measures outlined in 7.3.4 above.

Progress the delivery of the key strategic projects.

Initiate monitoring in specific area if required to determine existing noise levels in dB(A).

Identify appropriate mitigating measures for specific locations for which corrective measures are required.

Ensure that adequate traffic flow data is collected for all roads in the county and that a sufficient number of locations are monitored to establish the full extent of major roads in the county with an excess of three million vehicles per annum.

Year three to four (2015 to 2016):

Progress the delivery of the key strategic projects.

Commence implementation of the relevant actions as outlined in section 7, where necessary.

Year Five (2017):

Progress the delivery of the key strategic projects.

Produce new noise maps for areas around major roads carrying 3 million vehicles per annum.

Ensure that noise maps are produced for the Westport/Ballina to Dublin railway line and Ireland West Airport Knock, if relevant. Commence preparation of revised Noise Action Plan.

The above measures are subject to the availability of both staff and financial resources.

9.4 Evaluation, Review and Corrective Action Programmes

9.4.1 Ongoing Review

Progress will be reviewed against the programme of works on an annual basis. An annual interim summary report will be prepared. This report will highlight progress in implementation of action plan measures and will also identify areas where corrective action is required or where the proposed measures must be modified for presently unforeseen reasons.

9.4.2 End of programme review

An end-of-programme review of the action plan will be prepared by December 2016. This review will summarise progress in implementing measures, identify the extended noise mapping/action planning area, highlight aspects of the original action plan which were modified, giving reasons for the modification and recommend measures for future improvement.

10.0 FINANCIAL PROVISIONS

10.1 Budgetary Provisions.

Financial provisions have not been made available at national level to fund any noise assessment measures, mitigation measures or additional noise mapping requirements resulting from implementation of this action plan. Staff resources have not been increased to assist in implementation of the plan. Because of the lack of these resources, any mitigation measures must be strictly prioritised. It is hoped that where mitigation measures are identified, their implementation will also be found to be of benefit to other local authority sections e.g. Environment, Planning & Development, Roads & Transportation and Housing.

10.2 Cost Benefit Analysis.

Evaluation of the impact of noise nuisance is complicated because noise nuisance is subjective; it is largely related to the type of noise, the source of the noise and whether it is welcome or unwelcome, and background noise levels in the environment. Responses to noise from the different transport sources can vary considerably (ref HEATCO). The impact of mitigating measures to address noise nuisance is further complicated because noise is measured on a logarithmic scale and human perception of loudness does not directly coincide with increased sound pressure levels (e.g. a 3dB increase in noise, which represents a doubling in sound pressure level, is the smallest statistically significant increase in loudness detectable by the human ear). To reduce the subjective "loudness" of a noise source by 50% would require a 10dB drop in noise level and may be very difficult to achieve without major investment in noise mitigation. Assigning a monetary cost to the noise nuisance can enable cost benefit analysis to be used as a decision support tool in determining what (if any) noise mitigation measure is to be implemented.

The position of the EC working group on health and socio-economic valuation of noise (ref paper + DCC action plan) recommends the following in relation to road noise:

- *For road transport, the (interim) use of the median value change in noise perceived by households of €25 per dB (Lden), per household per year. The validity range of this interim value is between 50/55 Lden and 70/75 Lden and it should be adjusted as new research on the value of noise becomes available.*
- *The estimate of the change should apply at all initial noise levels, and regardless of the size of any change brought about;*

As a preliminary step in carrying out cost benefit analysis on possible noise mitigation measures, Mayo Local Authorities propose to assign the monetary benefit to noise mitigation measures as recommended above (i.e. €25 per dB (L_{den}) per household per year). The number of households in the immediate area that would potentially benefit from a particular mitigation measure will also be factored into the analysis.

11.0 SUMMARY AND CONCLUSIONS

The Mayo Local Authorities Action Plan addresses road noise from action planning areas identified in County Mayo:

The roads identified as major roads in the County of Mayo are:

- **N5 National Primary Road from Westport to Castlebar.**
- **N5 National Primary Road from Castlebar to Swinford.**
- **N17 National Primary Road from Claremorris to the Galway County Boundary.**
- **N17 National Primary Road from Charlestown to the Sligo County Boundary.**
- **N26 National Primary Road from Foxford to Ballina.**
- **N60 National Secondary Road from Castlebar to Balla.**

Lands adjacent to these sections of the N5, N17, N26 and N60 are located within the action plan area if noise mapping has indicated that the environmental noise levels may be $55\text{dB}_{L_{\text{den}}}$ or $50\text{dB}_{L_{\text{night}}}$.

The aim of the action plan is to manage existing road noise within the plan area and to protect the future environmental noise environment within the plan area.

While no limits exist for environmental noise in Ireland, the EPA recommends that proposed onset levels for assessment of noise mitigation measures for noise due to road traffic are as follows:

- 70dB, L_{den} and
- 57dB, L_{night}

Noise maps were prepared for major roads in Mayo based on a road noise computation model run by the NRA. These maps present calculated environmental noise levels from major roads in coloured noise contour bands from $55\text{dB } L_{\text{den}}$ and $45\text{dB } L_{\text{night}}$, to greater than $75\text{dB } L_{\text{den}}$ and greater than $70\text{dB } L_{\text{night}}$, in 5 dB bands.

The noise maps for County Mayo were prepared based on the roads network in place in the county in 2012.

In terms of the management of existing road noise, the first action proposed under the current plan is to use a decision matrix to identify areas for possible further assessment.

The effective management of future road noise within the action planning area can be addressed to some extent through the planning process (acoustical planning). It is recommended that developers address the impact of road noise in the assessment of new developments and design developments to minimise noise nuisance. For acoustical planning to be a useful tool, it can only be incorporated as a series of objectives into the Mayo County and Local Area Development Plans.

Changes to supporting legislation will be required in order to effectively implement acoustical planning into the planning process.

Future Road Schemes currently at Planning and Design Stage in the vicinity of the sections of the N5, N17, N26 and N60 subject to the Noise Action Plan will further aid in the reduction of noise levels on these sections.

The construction of the proposed road schemes in accordance with NRA noise guidelines and standards combined with advancements in noise reduction road surfacing materials will further aid in achieving lower noise levels on and in the vicinity of Mayo's National Roads.

Appendix A

Glossary of Acoustic and Technical Terms

Glossary

Acoustical Planning: Controlling future noise by planned measures such as land-use planning, systems engineering for traffic, traffic planning, abatement by sound-insulation measures and control of noise sources.

Agglomeration: a dense urbanised area having a population of greater than 100,000 persons.

Decibel (dB): A unit of measurement of sound. When measuring environmental noise, an "A" weighting network is used (called dB(A)) which filters the frequency of the sound to mimic human hearing, which is most sensitive to frequencies between 500Hz and 5,000Hz. The decibel scale is logarithmic. If two noise sources emit the same sound level (eg 80dB(A)), the combined sound level from the two sources is 83dB(A) and not 160dB(A).

The human perception of "loudness" is that a 10dB increase in sound level is perceived as being twice as loud. A 3dB increase, which is a doubling of the sound level, is perceived as a barely perceptible change in loudness.

A decibel level of zero represents absolute silence. A level of 140dB(A) would cause ear pain.

The table below gives examples of the relationship between the subjective valuation of noise and the actual objective levels (taken from the END Briefing note of the 07/02/08):

Noise Level dB (A)	Description
120	Threshold of Pain
95	Pneumatic drill (at 7m distance)
83	Heavy diesel lorry (40km/h at 7m distance)
81	Modern twin-engine jet (at take-off at 152m distance)
70	Passenger car (60km/h at 7m distance)
60	Office environment
50	Ordinary conversation
40	Library
35	Quiet bedroom
0	Threshold of hearing

Daytime: Between the hours of 7am and 7pm

DB(Lin)_{max peak}: Instantaneous Maximum Peak sound pressure measured in decibels on a sound level meter, without the use of a frequency weighting system - Used to measure air overpressure levels from blasting.

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

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.

Hertz: Unit of frequency of sound.

IPPC Licence: Integrated Pollution Prevention and Control Licence (obtained from EPA).

L_{den}: (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.

L_{day}: (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

L_{evening}: (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.

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

Major road: A national or regional road with more than 3 million vehicles per annum.

Major railway: A railway line, which has more than 30,000 train passages per year.

Major Airport: A civil airport, which has more than 50,000 movements per year, excluding those movements purely for training purposes on light aircraft; in this context, a movement means a single take-off or landing of an aircraft.

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

Noise annoyance: Noise annoyance is defined by the World Health Organisation (WHO) as 'a feeling of displeasure evoked by noise'. Ref UK DOT, Transport analysis guidance, Noise, TAG unit 3.3.2, November 2006.

Peak Particle Velocity (ppv): Peak particle velocity is a measure of vibration magnitude, which is the maximum rate of change of ground displacement with time, usually measured in mm/sec.

Appendix B

Summary of Method used to generate County-specific Statistics of Population Exposed to Noise from Roads (From ISONIQ Report)

Summary Information on method used to generate County-specific statistics of population exposed to noise from roads.

1. Generation of contours

During 2007, the National Roads Authority generated GIS grids of noise levels as an output of the noise modelling process. In December 2007, the EPA commissioned Compass Informatics to generate GIS polygons contour layers from these grids. These were made available to the relevant Local Authorities as ESRI shapefiles.

The contours contain the following decibel level bands:

55 – 59
60 – 64
65 – 69
70 – 74
> 75

A < 55 band may also be included, but is not relevant to the Environmental Noise Directive (END) reporting requirements.

2. Generation of population data

During 2007, the EPA commissioned ISONIQ to create GIS population data that could be used to provide an indication of the population living in each noise contour.

ISONIQ used the 2006 Census Small Area Population Statistics from the Central Statistics Office and the Quarter2 2007 Geodirectory to create a layer of Electoral Districts (ED) that have an average population per household (Residential points in the Geodirectory) figure for each ED polygon.

3. Extraction of population per county

Population exposure in each noise contour band was generated by cross referencing the geodirectory (residential) locations in each noise contour band with population data to create a set of population figures in each stretch of road. The EPA reported the total population in each band to the European Commission on a national basis on 19th December 2007.

To assist Local Authorities in the generation of Noise Action Plans, the statistics have now been broken down on a county basis.

The first step in this process was to clip each stretch of road using the county boundaries to create county-specific contours.

Residences were selected from the Geodirectory (Quarter 1 2008 release) and buffered by 10m to approximate a building shape. Polygons in this buffered file were selected against the noise contours to identify buildings within each noise contour polygon.

The buildings were spatially joined to the noise contours to give them a decibel level score. They were then joined to the Electoral District population layer, which gave each point an average population per household figure.

Each set of buildings with its noise and average population score were queried to remove the vacant and derelict buildings.

A set of results giving the location and/or road number, number of residences in each decibel band and estimated population was created for each county.

The population statistics in these sheets are only considered estimates, based on Q1 2008 Geodirectory and CSO 2006 figures. The purpose of these estimates is for guidance in the creation of noise action plans. Where there is any doubt over the accuracy or currency of the data, these should be verified by the Local Authorities own data or by checks in the field.

B. Post Processing and Analysis of Noise Level Results

After the completion of the noise calculations the noise level results are available as derived datasets from the noise modelling process.

The noise results generated can now be mapped, presented graphically, and used as the basis for supplementary analysis in order to derive the required information for reporting to the Commission.

B.1. Reporting Requirements

As mentioned within the EPA Guidance the precise content of the reports to be submitted to the EC and EEA are not yet finalised. The EPA is awaiting publication of the Handbook for the revised EEA Reportnet Reporting Mechanism which is expected in May 2012, prior to finalising the reporting requirements for the noise mapping bodies.

B.2. Requirements of the Directive

Annex VI of the END requires that “the estimated number of **people** living in dwellings” exposed to various noise levels “4 m above the ground on the **most exposed façade**” is provided for various scenarios.

For this reason it is necessary to more clearly define the terms “people”, “dwellings”, and “most exposed façade”.

For the purposes of the statistics required by Annex VI, persons (or people) can be defined as “human” beings, thus being consistent with the scope of the END defined in Article 2, paragraph 1. They are members of “the public” as defined in Article 3 (v) as “one or more natural or legal persons and, in accordance with national legislation or practice, their associations, organisations or groups”.

The term “population” is not referred to in the END, and is only a convenient means of referring to the exposure assessment, which as noted above is for “the estimated number of people living in dwellings”. It should be noted that the estimation of the number of people living in dwellings does not directly assess the exposure of people, as individuals move around; rather the exposure assessment is carried out upon the building/dwelling in which people normally reside. In the assessment there is no attempt to reflect the temporal dimension of the movement of population in this exposure assessment.

The CSO defines dwellings as “any building or structure, permanent or temporary created or used for private or communal human habitation or part of such a structure (e.g an apartment)”. CSO divides dwellings into “Private Dwellings” which can include houses, bungalows, flats, apartments, bedsits, houseboats, mobile homes and caravans; and “Non-private Dwellings” which can include

educational establishments, prisons, hotels, boarding houses, hospice, campsite, hostel and civilian ships.

Importantly, the use of “dwellings” within the END indicates that vacant or unoccupied dwellings should be included within the assessment of exposure of dwellings, but not within the assessment of exposure of people if the dwellings are known to be vacant, as this is contra to the phrasing used, e.g. “how many persons in the above categories live in dwellings that have” and “The estimated total number of people (in hundreds) living in dwellings”. For this reason the revised approach set out below will provide two approaches to identifying dwellings, one including vacant dwellings, to be used in the dwelling exposure assessment, and the other which excludes them, for use in the assessment of numbers of people living in dwellings.

The term “building” as used by CSO is not referred to directly in the context of the exposure assessments required by Annex VI. A building may contain zero, one or more individual dwellings. Residential buildings can therefore be considered to be those buildings containing one or more individual “Private dwellings”. Noise-sensitive buildings may be considered those buildings which contain “Non-private dwellings”, or which have uses which the competent authority deems to be noise sensitive, such as libraries etc.

The façades of a dwelling shall consist of all externally facing walls. Annex I, 1 defines the L_{den} using the stated formula, and in which: “the incident sound is considered, which means that no account is taken of the sound that is reflected at **the façade of the dwelling under consideration**”. This indicates that the subsequent references to façade indicate **the façade of the dwelling under consideration**. Which would be consistent with Annex III regarding dose-response relationships: “dwellings with a quiet façade as defined in Annex VI”.

Regarding the most exposed façade Annex I, 1 states: “the most exposed façade; for this purpose, the most exposed façade will be the external wall facing onto and nearest to the specific noise source; for other purposes other choices may be made”. Subsequent practical experience has demonstrated that selection of the most exposed façade based upon distance may lead to contradictory situations. For this reason a revised definition is proposed: “the most exposed façade will be the external wall of the dwelling exposed to the highest value of L_{den}/L_{night} from the specific noise source under consideration (e.g. road traffic).” The proposed definition is also more consistent with the existing definition of quiet façade.

Regarding quiet façade, Annex VI, 1.5 states: “a quiet façade, meaning the façade of a dwelling at which the value of L_{den} four metres above the ground and two metres in front of the façade, for the noise emitted from a specific source, is more than 20 dB lower than at the façade having the highest value of L_{den} .” This makes determination of the presence of a quiet façade more complex as it necessary to determine the noise exposure at a different distance from the façade of the dwelling than for the most exposed façade. As the reporting of quiet facades is optional, it is not currently proposed to determine the presence of quiet facades.

B.3. Relevant Input Datasets

Given the above definitions the input datasets required to undertake the required assessments may be identified.

Central Statistics Office

CSO publish statistical information on population based upon Census returns. The most recent Census was held on 10 April 2011, and the preliminary information is currently available, with the final information currently expected to be available at the end of March 2012. The information available on population is issued according to various political boundaries, namely Province or County, Province County or City, Regional Authority, Constituency or Electoral Division. Data is not made available at Census Output Area level; rather these are merged up to the Electoral Division (ED) level which provides for the highest level of resolution available to the location of the population. There are approximately 3750 ED covering Ireland.

In order to provide an accurate spatial location for the population within each ED it is necessary to have an up to date map of ED areas which matches the ED codes within the population exposure statistics report. At present the readily available ED boundary dataset does not match the population statistics spreadsheet, which will introduce errors into the geocoding of the population statistics. CSO have provided the EPA with an ED dataset which has the population data already assigned with the PERSONS_2011 attribute containing the total number of people per ED.

Proposal: When the 2011 Census data is finalised by CSO, the EPA will request a finalised dataset for ED areas with the population data already assigned by CSO. This will provide the most detailed population distribution data direct from source, assigned to a consistent ED dataset and provide a reference for the exposure assessment.

With the number of people per ED area provided by CSO, it is now necessary to establish which buildings contain dwellings, and the total number of people living within those dwellings.

GeoDirectory

The GeoDirectory data products are developed by OSi and An Post to provide a single point location object for each building in Ireland. The complete dataset is available with the "GeoAddress Locator" product, and each point location has a number of attributes which may be useful in identifying both vacant and occupied dwellings, for both CSO style private and non-private use categories.

GeoDirectory is updated quarterly. The most recent updates were published as:

- Q4 2010 on 27th Jan 2011;
- Q1 2011 on 8th April 2011;
- Q2 2011 on 25th July 2011;
- Q3 2011 on 24th October 2011;

- Q4 2011 during January 2012; and
- Q1 2012 is expected during April 2012.

Ideally, all the source datasets used as the basis of the assessment would be related to the same date in time, with all data correct and relevant as of that date, in order to minimize temporal mismatches between the datasets.

Proposal: Discussions with GeoDirectory have led to the conclusion that the dataset released from Q2 2011 release from 25th July 2011 provides the closest match to the Census date of 10th April 2011, it is therefore proposed to use this version of the dataset for the assessment of exposure.

As GeoDirectory provides a location point for each building, it is necessary to undertake a filter procedure in order to identify the two location datasets required for the assessment, namely:

- Point locations for buildings containing dwellings, and
- Point locations for buildings containing occupied dwellings.

The highest level of resolution within GeoDirectory is within the ADDRESS_POINTS table, which has a many-to-one link to the BUILDINGS table i.e. there can be many address points within one building, and one building may contain one or many address delivery points.

The number of linked address points is provided by the RESIDENTIAL_DELIVERY_POINTS and COMMERCIAL_DELIVERY_POINTS attributes within the BUILDINGS table. The RESIDENTIAL_DELIVERY_POINTS have a blank entry in the ORGANISATION attribute within the ADDRESS_POINTS table, whereas the COMMERCIAL_DELIVERY_POINTS have an entry in the ORGANISATION attribute within the ADDRESS_POINTS table. The ADDRESS_POINTS table also has a VACANT attribute for each of the entries, whether they are commercial or residential. As the noise level assessment is undertaken at the façade of the building object, it is appropriate to work from the BUILDINGS table as it provides the information relevant for the assessment, i.e. the number of residential delivery points within the building, and has the advantage that there should only be one single BUILDINGS_ID per building in OSi Large Scale.

In order to produce a location dataset of "RESIDENTIAL_BUILDINGS", the following filters should be applied to the GeoDirectory BUILDINGS table:

- BUILDING_USE – filter out all C (commercial) and U (unknown);
- DERELICT – filter out all Y (yes);
- INVALID – filter out all Y (yes);
- UNDER_CONSTRUCTION – filter out all Y (yes) entries; and
- RESIDENTIAL_DELIVERY_POINTS – filter out all 0 (zero) entries, as they do not have any residential delivery points.

The resultant dataset contains the location points for all residential buildings, whilst the RESIDENTIAL_DELIVERY_POINTS attribute provides the total number of residential dwellings within each building.

In order to create a location dataset of "OCCUPIED_RESIDENTIAL_BUILDINGS" a two step process needs to be undertaken. First it is necessary to determine the number of occupied residential delivery points within each building. For each BUILDING_ID within the "RESIDENTIAL_BUILDINGS" dataset, the ADDRESS_POINTS table should be queried, and the entries with blank ORGANISATION attributes and N in the VACANT attribute summed per building and the total value per BUILDING_ID assigned to the new OCCUPIED_RESIDENTIAL_DELIVERY_POINTS attribute within the "RESIDENTIAL_BUILDINGS" dataset.

The "OCCUPIED_RESIDENTIAL_BUILDINGS" dataset should then be created by running the following filter on the "RESIDENTIAL_BUILDINGS" dataset:

- OCCUPIED_RESIDENTIAL_DELIVERY_POINTS > 0 (zero)

The resultant dataset contains the location points for all occupied residential buildings, whilst the OCCUPIED_RESIDENTIAL_DELIVERY_POINTS attribute provides the total number of occupied residential dwellings within each building.

Proposal: GeoDirectory BUILDINGS and ADDRESS_POINTS tables are to be processed as described to produce two location datasets of "RESIDENTIAL_BUILDINGS" and OCCUPIED_RESIDENTIAL_BUILDINGS".

OSi Large Scale

The GeoDirectory data product is stated as being sourced initially from the OSi Large Scale Map Database, with geocoding validated against OSi Large Scale maps by An Post staff.

OSi Large Scale is made up of three data products which have different scales and update cycles, but the same object layers. OSi Large Scale is produced in three different scales:

- 1:1,000 scale in urban areas;
- 1:2,500 scale in suburban and periurban areas; and
- 1:5,000 scale in rural areas.

Licensees are delivered updates on a rolling cycle:

- 1:1,000 scale is updated annually for each licensee
- 1:2,500 scale is updated every 3 years for each licensee
- 1:5,000 scale is updated every 5 yearly for each licensee

In addition to these aspects, the process of polygonising the Large Scale vector datasets is currently incomplete. In some areas Large Scale is made up of polygon objects, in other areas the vector product continues to be a CAD-style line dataset.

Within the areas of noise mapping it is necessary to have building polygon objects in order to successfully undertake the noise calculations. Detached, semi-detached and terrace properties should have each unit described as a separate polygon i.e. a semi-detached building is two adjoining polygon objects, a row of terrace properties is a series of adjoining polygon objects. The areas of noise mapping may encompass urban, suburban, periurban and rural locations, therefore it may be necessary to use a collection of different Large Scale data products at 1:1000, 1:2500 and 1:5000 to cover the entire mapping area.

Ideally all the building footprints would be available as individual building polygons, and spatial GIS processing tools could then connect the GeoDirectory building points to the Large Scale building footprints. At present it is thought that to achieve a building footprint dataset of this type of national coverage would require significant processing and data preparation along with an appropriate quality assurance procedure.

Within Large Scale the building footprints are thought to be described within the following layers:

- INN_WALLS – Inner walls of buildings
- SOLID – Outline of solid buildings
- PECK – Outline of pecked buildings
- DW_HOUSE – Outline of dwellings
- BLD_ANTIQ
- BLD_COASTL
- BUILDINGS
- MBARRACKS
- MBUILDINGS

For consistency with Census and GeoDirectory it is recommended that the most recent OSi Large Scale datasets should be used:

- 1:1,000 data should be less than 12 months old as of 31st March 2012;
- 1:2,500 data should be less than 3 years old as of 31st March 2012; and
- 1:5,000 data should be less than 5 years old as of 31st March 2012.

Note: the 31st March was chosen to relate to the expected publication data of 2011 Census data.

From the source datasets the above layers should be extracted from Large Scale and merged into a LARGE_SCALE_BUILDINGS dataset. This dataset may then be clipped to the mapping extents, and should be checked and processed to ensure that all building objects are polygons.

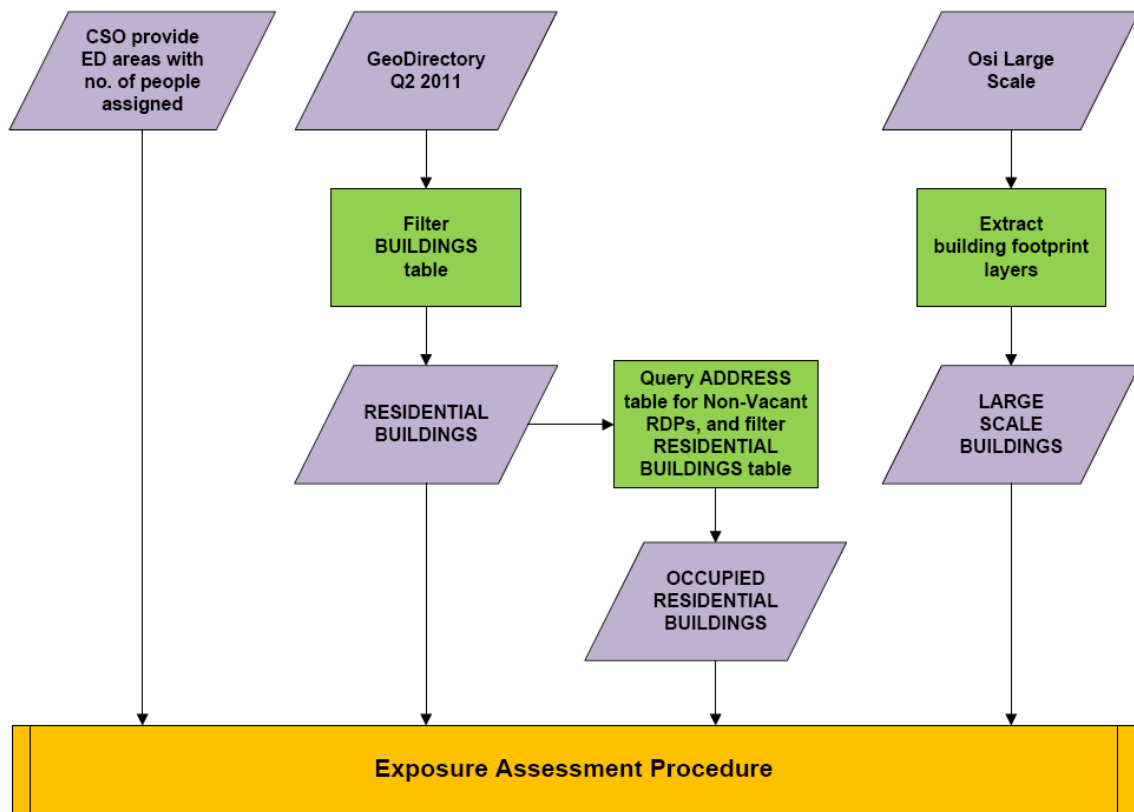


Figure B.1: Summary of input dataset processing

B.4. Noise Grid Processing

The grids of noise assessment results delivered from the noise mapping software may have a number of aspects which require attention prior to the processing of the various stages of statistical analysis.

Noise results grids may contain:

- Empty grid points or default data values for grid points located inside buildings where an assessment of noise level is not considered appropriate;
- Default data values for grid points located outside the boundary of the area to be mapped; and
- Result values to more than two decimal places.

To prepare the grids of noise results, it is recommended that the results files are verified, and relevant pre-processing undertaken:

- Interpolation of grid values to assign indicated noise levels to points with blank or default values to produce a “seamless” results grid;
- Rounding of the results to two decimal places; and
- Masking of the seamless results grids to the extent of the area to be mapped.

These processed noise results grid files may then be used for the following:

- Production of 5dB noise contour bands for graphical mapping of results; and
- Production of reclassified grids into a set of 5dB categories.
 - The reclassified grids are produced by assigning each point to a classification based upon the 5dB band in which the noise level resides.

The 5dB bands are:

- L_{den} <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥ 75
- L_{night} <50, 50 – 54, 55 – 59, 60 – 64, 65 – 69, ≥ 70

Note: all class boundaries are .00, i.e. 55-59 is actually 55.00 to 59.99. This is in line with the approach of a number of the commercial noise mapping software packages. This may require the use of a database program such as MS Access, MS SQL or MySQL where class boundaries can be programmed. The default behaviour in MS Excel should not be used for this analysis as it rounds at .49 and .50, however the ROUNDDOWN function may be used to apply the class boundaries.

B.5. Area Analysis

The EC recommended reporting mechanism, ENDRM 2012 DF8, requires information on the total area, inside and outside agglomerations, (in km²) exposed to L_{den} higher than 55, 65 and 75dB for major roads, major railways and major airports.

The reclassified grid files may be used to calculate these areas as each 10m interval grid point is at the centre of an area 10m by 10m, therefore each grid point represents 100 m². This approach avoids the secondary processing required to produce equal noise level contours based upon an interpolation between the grid points, and therefore avoid introducing any further uncertainty into the results.

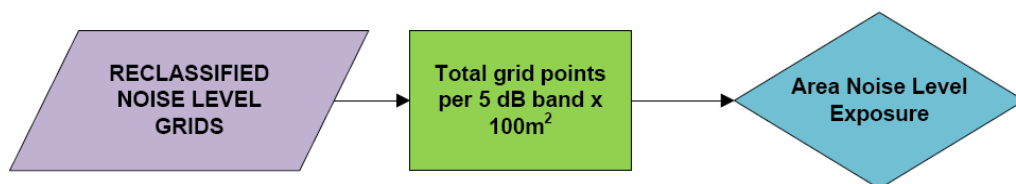


Figure B.2: Summary of area analysis

B.6. Assessment Datasets

With the relevant input datasets prepared, they can be processed together to produce the datasets required for the assessment.

1) Average number of people per residential delivery point, per ED

The CSO ED boundary polygon dataset with 2011 Census data assigned to each ED area, should be loaded in GIS with the OCCUPIED_RESIDENTIAL_BUILDINGS point data derived from GeoDirectory.

A spatial query should be run to count the total number of OCCUPIED_RESIDENTIAL_DELIVERY_POINTS assigned to building points inside each ED area polygon. This total should be assigned as an attribute to the ED area polygon.

For each ED area polygon the average number of people per residential delivery point is then calculated by dividing the total PERSONS_2011 for the ED, by the total OCCUPIED_RESIDENTIAL_DELIVERY_POINTS for the ED. This average is then assigned as a new AVERAGE_PERSONS_PER_ORDP attribute on the ED area polygon.

2) Number of people per occupied residential building

For each of the OCCUPIED_RESIDENTIAL_BUILDINGS points the total number of people per building can be calculated from the AVERAGE_PERSONS_PER_ORDP assigned to the ED area, within which the building is located, multiplied by the total number of OCCUPIED_RESIDENTIAL_DELIVERY_POINTS for the building point. This total can then be assigned as a new PERSONS_PER_BUILDING attribute to the building point.

3) Finalising “RESIDENTIAL_BUILDINGS” dataset

The OCCUPIED_RESIDENTIAL_BUILDINGS dataset now contains an attribute for the total number of persons per building. It is a subset of the RESIDENTIAL_BUILDINGS dataset.

The PERSONS_PER_BUILDING attribute should be copied across to the equivalent building point within the RESIDENTIAL_BUILDINGS dataset. All RESIDENTIAL_BUILDINGS with a blank PERSONS_PER_BUILDING attribute should have it set to 0 (zero).

The RESIDENTIAL_BUILDINGS dataset is then ready to use in the remainder of the assessment.

4) Noise exposure level per building

Façade noise level calculations

Where noise level calculations have been carried out for façade receptors around buildings, they should be used as the source dataset for noise exposure for each building.

If the façade receptor points are at a distance of 0.1m from the building façade (as recommended by WG-AEN GPG v2) then the building polygon may be buffered by 0.2m and a spatial search undertaken inside the resulting polygon to find the highest and lowest noise level figures from the calculation point. These highest and lowest noise levels may then be assigned to the building polygon as attributes.

Grid noise level calculations

Where only 10m grids of noise levels have been calculated, or where buildings were absent from the noise assessment model but are available within the OSi Large Scale data, it will be necessary to generate building façade receptor locations, and assign noise levels to these points based upon interpolation from the grid of noise levels.

The façade receptor point should be created on the external building facades in the following manner:

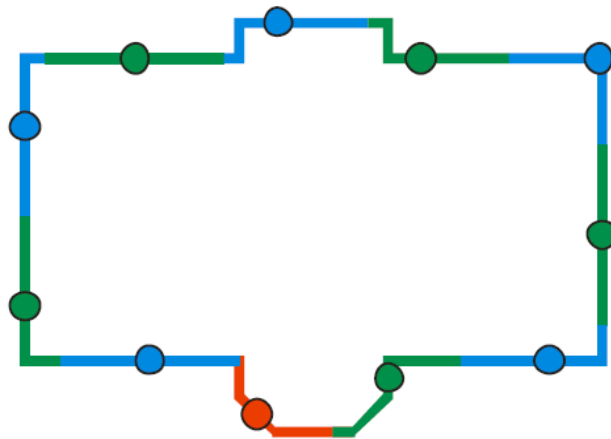


Figure B.3: Assignment of receptor points to building facades

- a) Façades are split up every 5 m from start position on with a receiver position placed at half distance (blue/green).
- b) The remaining section gets its receiver point in its middle (red).

Note: there are other means of generating façade receptor points which may be acceptable. This approach is presented one being straightforward to implement in GIS.

At each façade receptor point the noise level should be determined by interpolation from the 10m grid noise levels nearby. The highest and lowest noise levels for each building polygon may then be identified and assigned to the building polygon as attributes.

5) Linking “RESIDENTIAL_BUILDINGS” datasets to building footprints

The RESIDENTIAL_BUILDINGS datasets and the LARGE_SCALE_BUILDINGS footprints can be linked using a spatial query to identify the “RESIDENTIAL_BUILDINGS” points within each of the footprint feature of the “LARGE_SCALE_BUILDINGS” dataset. The GeoDirectory “BUILDING_ID” table can then be assigned to the footprint polygons within dataset “LARGE_SCALE_BUILDINGS”.

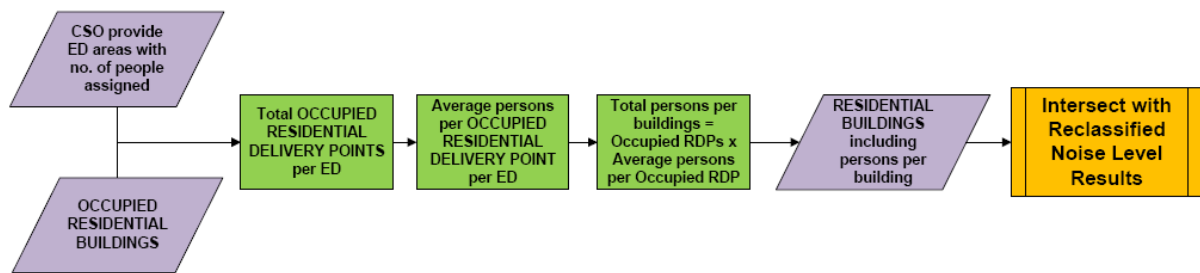


Figure B.4: Distribution of persons in dwellings

B.7. Assessment of Noise level Exposure

After joining the dataset "RESIDENTIAL_BUILDINGS" with the footprints dataset "LARGE_SCALE_BUILDINGS", the highest and lowest noise levels assigned to each of the Large Scale footprint polygons may be copied across an attribute tables onto the dataset "RESIDENTIAL_BUILDINGS_POINTS".

The total number of features within dataset "RESIDENTIAL_DELIVERY_POINTS" per noise level band then be calculated using the highest noise level per building to determine the total number of dwellings within each noise level band.

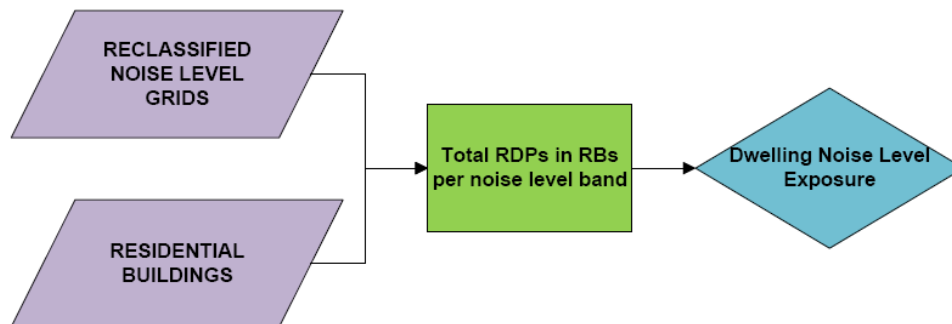


Figure B.5: Summary of dwelling analysis

The PERSONS_PER_BUILDING = 0 (zero) buildings can then be filtered out of the dataset, and the total number of persons per building summed per noise level band, using the highest noise level per building, to determine the total number of people exposed within each noise level band.

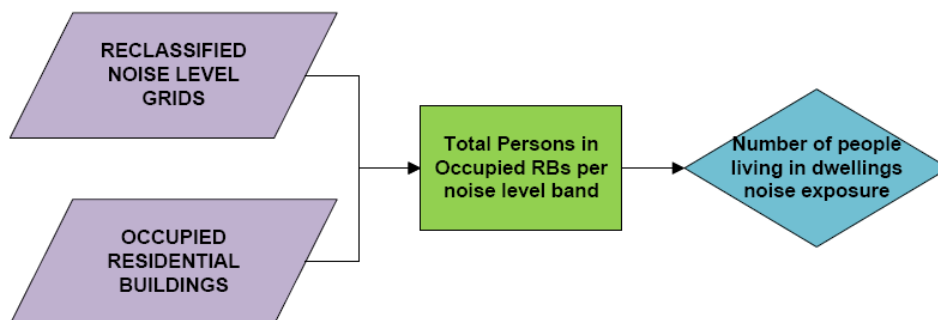


Figure B.6: Summary of persons in dwellings analysis

The 5dB bands to be used are:

- Lden <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >=75
- Lnight <50, 50 – 54, 55 – 59, 60 – 64, 65 – 69, >=70

Note: all class boundaries are .00, i.e. 55-59 is actually 55.00 to 59.99. This is in line with the approach of a number of the commercial noise mapping software packages. This may require the use of a database program such as MS Access, MS SQL or MySQL where class boundaries can be programmed. The default behaviour in MS Excel should not be used for this analysis as it rounds at .49 and .50, however the ROUNDDOWN function may be used to apply the class boundaries.

Appendix C

Bibliography and References

Bibliography and References

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9. Mayo County Development Plan 2008-2014.
10. END Briefing document 07/02/08.
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12. Valuation of Noise: Position Paper of the Working Group on Health and Socio Economic Aspects.
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14. UK DOT, Transport analysis guidance, Noise, TAG unit 3.3.2, November 2006.
15. RT.201 Expansion Factors for Short Period Traffic Counts (1978)

Appendix D

Strategic Noise Maps

See book of A3 drawings for all Strategic Noise Maps

The strategic noise map presents a graphical representation of weighted predicted annual average (Lden) and annual average night time (Lnight) road traffic noise levels in Co. Mayo.

The map has been developed in accordance with SI No 140/2006 (the Environmental Noise Regulations) and is a representation of the average environmental noise levels over one complete year. The map forms part of a national noise mapping strategy which can be primarily used as a strategic tool for large scale planning or policy matters and is not suitable for local noise assessments.

National and regional roads deemed to be carrying in excess of 3 million vehicle passages per year were assessed in the national study.

Appendix E

Details of Public Consultation (to follow)

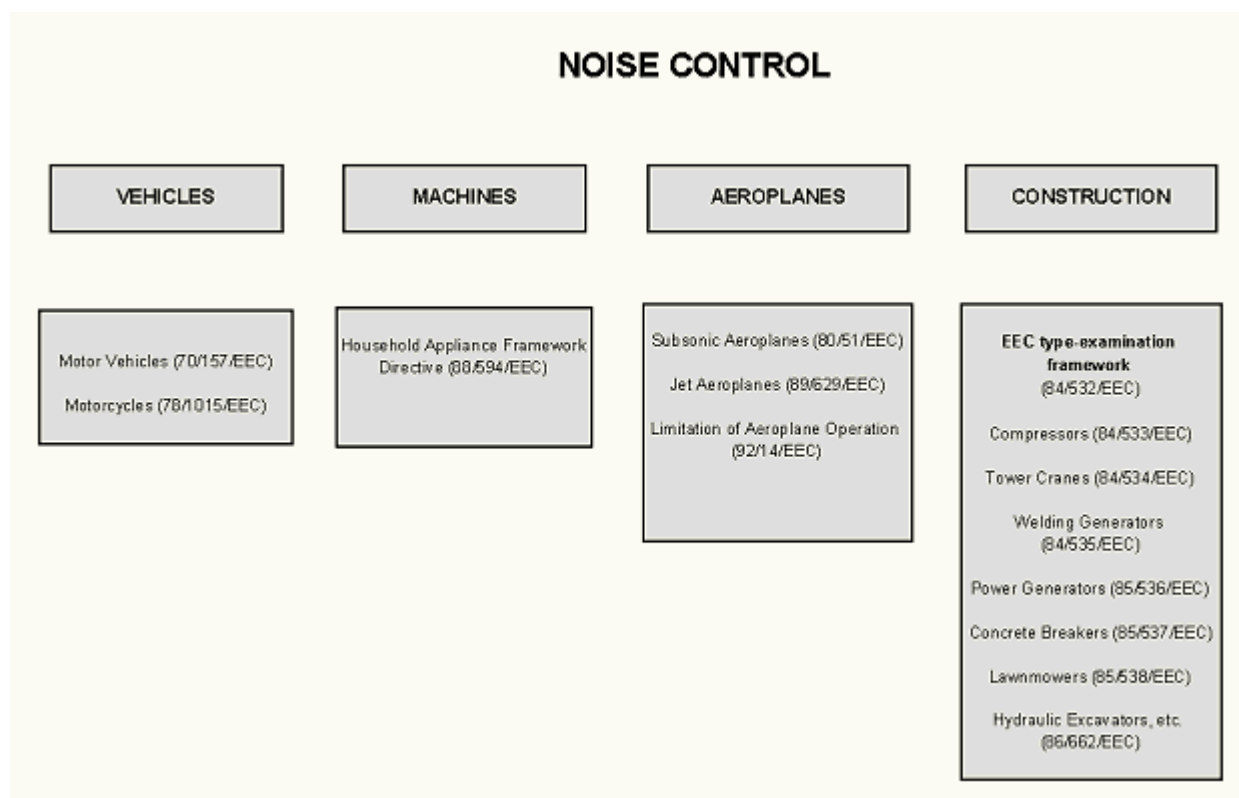
Appendix F

EU Noise Emission Limits for New Road Vehicles

Overview of EU environmental legislation

H. Noise From Vehicles and Machinery

Existing noise control legislation can be divided into four categories. The noise emissions from **motor vehicles** are covered by two directives introducing sound level limits. Three directives limit noise emissions from **aeroplanes** by reference to the Convention on international Civil Aviation. Noise emission from **household appliances** has been the object of a framework directive on household appliances. The last sector, **construction equipment**, is based in the EEC conformity assessment procedure framework directive which led to the adoption of seven daughter directives on particular types of equipment.



H.1 Motor Vehicles, Motorcycles

Motor Vehicles

Directive 70/157/EEC introduces limits on the sound levels of noise for road vehicle and gives requirements for measuring sound levels and exhaust systems and silencers. Several amendments, the latest by Directive 96/20/EC, have reduced these permissible sound levels. Limit values for eight types of passenger and goods vehicles range from 74 dB(A) to 80 dB(A). It applies a system of optional harmonisation to the approval of motor vehicles and exhaust system. The Member States may not refuse to grant EEC or national type-approval to vehicles which meet the requirements of the directive.

Motorcycles

Directive 78/1015/EEC on motorcycles establishes limits for the permissible sound level of motorcycles and requirements for exhaust or intake silencer. It introduces a harmonised testing procedure before issuance of the sound level measurement certificate. A system of optional harmonisation is applied to the checks carried out by the Member States which may not refuse to grant EEC or national type-approvals, although they are not required to adopt these standards for domestic producers. Limit values are given for three categories of motorcycles and range from 75 dB(A) to 80 dB(A). Members are required to respect the validity of each other's certificates.