



Sligo County Council

Noise Action Plan for Sligo County and City Dec 2018

TABLE OF CONTENTS

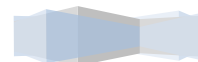
1	EXECUTIVE SUMMARY	5
1.1	General	5
1.2	Summary of Actions	6
1.3	Round 3 Action Planning Timelines	7
2	INTRODUCTION	11
2.1	Purpose of the Environmental Noise Directive (END)	11
2.2	Scope of the END	12
2.3	Purpose and Scope of the Regulations	12
2.4	Roles and Responsibilities of Designated Bodies	12
2.5	Key Phases	14
2.6	Noise Indicators	16
3	EXISTING NOISE MANAGEMENT: LEGISLATION AND GUIDANCE	17
3.1	National Legislation and Guidance	17
3.2	Noise Assessment for Action Planning	20
4	DESCRIPTION OF THE ACTION PLANNING AREA	21
4.1	Coverage Area	21
4.2	General Population Exposed to Traffic Noise	21
4.3	Location of Noise Sensitive Buildings	22
5	RESPONSIBLE AUTHORITY FOR ACTION PLANNING	23
6	OVERVIEW OF THE PREPARATION OF THE NOISE MAP	24
6.1	General	24
6.2	Responsible Authorities	24
6.3	Noise Mapping Process	25
6.4	Review of 2012 Noise Maps	25



6.5	Calculation Methodology	26
6.6	Data Sources	26
6.7	Software and Hardware	28
6.8	Population Exposure Estimates	28
7	SUMMARY OF THE RESULTS OF THE NOISE MAPPING PROCESS	30
7.1	Presentation of Results	30
7.2	Limitations of the Maps/Results	30
7.3	Identification of Areas to be Subject to Noise Management Activities	31
7.4	Confirmation of Onset of Assessment Thresholds	31
7.5	Protection Thresholds for Quiet Areas	32
7.6	Quiet Areas in Open Country	33
7.7	Application of the criteria	33
7.8	Results of the analysis	34
8	MITIGATION AND PROTECTION MEASURES	36
8.1	General Principle of Action Plan	36
8.2	Processing areas above onset of assessment criteria	36
8.3	Overview of possible mitigation measures	37
8.4	Assessment of Options	38
8.5	Preservation of areas below protection threshold	39
8.6	Management of Areas between the Thresholds	39
8.7	Planning for Noise Management	39
9	PUBLIC PARTICIPATION	41
9.1	Public Consultation	41
10	IMPLEMENTATION PLAN	42
10.1	General	42
10.2	Roles and Responsibilities	42



10.3	Objectives	42
10.4	Programme of Works	42
10.5	Evaluation, Review and Corrective Action Programmes	43
11	SUMMARY AND CONCLUSIONS	44
11.1	Summary of Actions	44
12	APPENDIX A: DECISION/SELECTION MATRIX	12-48
13	APPENDIX B: STRATEGIC NOISE MAPPING	13-51



Tables

TABLE 6-1: HARDWARE SPECIFICATIONS	28
TABLE 6-2: SOFTWARE SPECIFICATIONS	28
TABLE 6-3: CALCULATION SETTINGS	28
TABLE 7-1: SLIGO POPULATION EXPOSURE (L_{DEN} AND L_{NIGHT})	30
TABLE 7-2: DECISION SUPPORT MATRIX (2018)	35
TABLE 12-1: EXAMPLE DECISION SUPPORT MATRIX	12-48
TABLE 12-2: EXAMPLE OF USE OF DECISION SUPPORT MATRIX	12-49



1 Executive Summary

1.1 General

The Environmental Noise Regulations (S.I. No. 140 Of 2006) came into effect in April 2006 and designated the Environmental Protection Agency as the National Competent Authority for the purposes of the Regulations. The Agency's role includes supervisory, advisory and co-ordination functions in relation to both noise mapping and action planning, as well as reporting requirements for the purpose of Directive 2002/49/EC relating to the assessment and management of environmental noise.

While the Environmental Protection Agency is the national competent authority, the Regulations include significant functions for Local Authorities in relation to the preparation of strategic noise-maps and as action planning authorities.

A two-stage approach to the assessment and management of environmental noise is provided for in the Regulations. Firstly, the preparation of strategic noise maps for areas and infrastructure falling within defined criteria, e.g. large agglomerations, major roads, railways and airports. Secondly, based on the results of the mapping process, the Regulations require the preparation of noise action plans for each area concerned. The fundamental objective of action plans is the prevention and reduction of environmental noise.

This Noise Action Plan represents an update to a plan previously prepared in 2013 (2013-2018) and has been prepared by Sligo County Council in accordance with the requirements of the Environmental Noise Regulations 2006, Statutory Instrument No. 140 of 2006. These Regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

The aim of the document is to provide an overview of the requirements of the Regulations, to review the results of the strategic noise mapping within County Sligo and to set out an approach to the strategic management and control of environmental noise over the next five years.

The objectives of the Sligo County Council Noise Action Plan is to avoid, prevent and reduce, where necessary, on a prioritised basis, the harmful effects, including annoyance, due to long term exposure to environmental noise. This will be achieved by taking a strategic approach to managing environmental noise. This approach promotes action on environmental noise through three avenues, these being noise reduction at source, land use planning adapted to noise goals and procedures to reduce noise impact.

This Noise Action Plan primarily considers the long term environmental noise impact from road traffic noise sources, and sets out an approach to review noise impact levels near to the major sources assessed during the strategic noise mapping in 2017 with a view to identifying locations where noise reduction is deemed necessary in the first instance. The process then goes on to undertake an assessment of potential noise mitigation measures which are then subject to a cost benefit analysis in order to result in recommendations for viable, cost effective, noise mitigation action.

The strategic noise mapping was undertaken in 2017, by Transport Infrastructure Ireland (TII) for major roads within County Sligo. The results of this assessment have been presented as maps and summary tables of statistics showing the estimated area, number of dwellings and people exposed to long term road traffic noise within the area covered by the noise maps.

The noise action plan proposes noise levels for the onset of this assessment of 70 dB L_{den} , and 57 dB L_{night} . An initial assessment indicates that there is exposure of up to 249 (a reduction of 182 from the 2013 NAP) people above the L_{den} threshold, and there is an exposure of up to an estimated 1045 (a reduction of 296 from the 2013 NAP) people above the L_{night} threshold.

In the interests of equality and promotion of best practice, the action plan also sets out a number of proposals for the prevention and avoidance of increasing levels of environmental noise considered detrimental to human health, to be implemented through the planning process, which are to be applicable throughout County Sligo.

1.2 Summary of Actions

Increased levels of environmental noise will be prevented and avoided, where possible, within the requirements of the Development Plan, Local Area Plans and sustainable development, through the whole of Sligo County, by integration of noise management into the planning process for the development of new noise sensitive premises, or sources of long term environmental noise, such as road, railways and industrial sites. The following actions will be carried out:

- Review existing noise control policies contained within current Development Plans and other planning guidance documents;
- On completion of review, prepare and publish county planning guidance on noise assessment and control to be incorporated into future development plans;
- Monitor and assess the implementation of the planning guidance on reducing adverse impacts associated with noise.

Noise reduction of existing sources of long term environmental noise, where necessary, will be considered within the area covered by the strategic noise mapping undertaken by TII in 2017. The approach to the assessment of relevant actions will use the following approach:

- Review strategic noise maps and results of 2018 Decision Support Matrix to identify priorities;
- Confirm the extent of the noise impact through refined noise modelling and/or long term noise monitoring;
- Draw up list of areas for noise mitigation review;
- Assess all identified sites:
 - In context of proposed development & maintenance;
 - Feasibility study for possible mitigation measures;
 - Cost benefit analysis for feasible measures;
 - Draw up list of cost effective interventions.
- Undertake cost effective actions for which funding is available;

The preservation of relatively quiet areas in the vicinity of major noise sources, and quiet areas in the open countryside, will be considered and reviewed as part of the implementation of the noise action plan. Any possible designations which may be recommended by such a process would go to public consultation prior to submission to the Minister for adoption.

Prepare relevant information for 2022 strategic noise mapping

- Estimate extent of sources under 2022 strategic noise mapping

- Set out data requirements for 2022 strategic noise mapping
- Collate, capture and consolidate data required for 2022 strategic noise mapping

Undertake an annual review of progress on implementation of the noise action plan.

Any actions arising from this process will be subject to Strategic Environmental Assessment and Appropriate Assessment screening prior to progression.

1.3 Round 3 Action Planning Timelines

The relevant Round 3 dates for the noise action planning tasks were as follows:

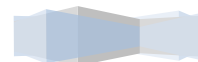
- April 2018: Draft Noise Action Plans to be submitted to the EPA for review;
- April to July 2018: Public consultation (6 – 8 weeks) on Draft Noise Action Plan;
- July 2018: Draft Action Plans (including comments) were to be "drawn up" prior to this date;
- September 2018: Draft Action Plans to be submitted to the EPA for final review – including the short Summary Noise Action Plan;
- 18 January 2019: Details of noise control programs and measures to be reported to the EC by the EPA for 3rd round – ENDRM DF9; and
- 18 January 2019: Summary Noise Action Plans to be reported to the EC by the EPA for 3rd round – ENDRM DF10.



Glossary of Acoustic Terms

<i>Agglomeration</i>	<i>Major Continuous Urban Area as set out within the Regulations</i>
<i>Attribute Data</i>	<i>A trait, quality, or property describing a geographical feature, e.g. vehicle flow or building height</i>
<i>Attributing (Data)</i>	<i>The linking of attribute data to spatial geometric data</i>
<i>CRTN</i>	<i>The Calculation of Road Traffic Noise 1988. The road traffic prediction methodology published by the UK Department of Transport</i>
<i>Data</i>	<i>Data comprises information required to generate the outputs specified, and the results specified</i>
<i>dB</i>	<i>Decibel</i>
<i>END</i>	<i>Environmental Noise Directive (2002/49/EC)</i>
<i>ESRI</i>	<i>Environmental Systems Research Institute</i>
<i>GIS</i>	<i>Geographic Information System</i>
<i>INM</i>	<i>Integrated Noise Model</i>
<i>Irish National Grid (ING)</i>	<i>The official spatial referencing system of Ireland</i>
<i>ISO</i>	<i>International Standards Organisation</i>
<i>Metadata</i>	<i>Descriptive information summarising data</i>
<i>Noise Bands</i>	<i>Areas lying between contours of the particular noise levels (dB)</i>
<i>Noise Levels</i>	<i>Free-field values of L_{den}, L_{day}, $L_{evening}$, L_{night}, and $L_{A10,18h}$ at a height of 4m above local ground level</i>
<i>Noise Mapping(Input) Data</i>	<i>Two broad categories: (1) Spatial (e.g. road centre lines, building outlines). (2) Attribute (e.g. vehicle flow, building height – assigned to specific spatial data)</i>
<i>Noise Mapping Software</i>	<i>Computer program that calculates required noise levels based on relevant input data</i>
<i>Noise Model</i>	<i>All the input data collated and held within a computer program to enable noise levels to be calculated</i>
<i>Noise Model File</i>	<i>The (proprietary software specific) project file(s) comprising the noise model</i>

<i>Output Data</i>	<i>The noise outputs generated by the noise model</i>
<i>OSI</i>	<i>Ordnance Survey for Ireland</i>
<i>Spatial (Input) Data</i>	<i>Information about the location, shape, and relationships among geographic features, for example road centre lines and buildings</i>
<i>WG – AEN</i>	<i>Working Group – Assessment of Exposure to Noise</i>



2 Introduction

2.1 Purpose of the Environmental Noise Directive (END)

2.1.1 Introduction

In 2002 the European Union issued a Directive (2002/49/EC) to establish a method for dealing with environmental noise pollution. Also known as the Environmental Noise Directive, hereafter referred to as the END, the Directive's main aim is to put in place a European-wide system for identifying sources of environmental noise pollution, informing the public about relevant noise data and then taking the necessary steps to avoid, prevent or reduce noise exposure on a prioritised basis. The basic principles and requirements of the END can be summarized as follows:

2.1.2 Noise Assessment

The Directive aims to monitor environmental noise problems by requiring competent authorities in Member States to generate strategic noise maps for major roads, railways, airports and agglomerations, using harmonised noise indicators L_{den} (day-evening- night average sound level) and L_{night} (night time average sound level). These maps are to be used to as a means of presenting environmental noise data, as a source of information for the public and as an aid in the preparation of Noise Action Plans.

All member states are required to develop strategic noise maps describing the environmental noise situation within their territories.

Strategic noise maps present noise level data in terms of a relevant noise indicator. Their purpose is to allow authorities to identify areas where noise limit values have been exceeded, estimate the number of people exposed to environmental noise and evaluate the contribution of various noise sources to the overall noise situation.

2.1.3 Development of Action Plans

The Directive aims to address local environmental noise issues by requiring competent authorities to draw up Action Plans to reduce environmental noise where necessary and maintain the environmental acoustic quality where it is good. The Directive does not set any limit value, nor does it prescribe the measures to be used in the Action Plan's, which remain at the discretion of the competent authorities.

Action Plans outline the measures which competent authorities intend to take to assess any environmental noise issues identified during the mapping process. This includes the prioritisation of retrofit action to reduce these noise levels when deemed to be too high and the preservation of the noise situation in locations which have been designated as quiet areas.

2.1.4 Disseminating Data to the Public

One of the underlying themes throughout the Directive is the dissemination of noise data to the general public using channels and media that are both suitable and effective. The Directive

instructs that the public be made aware of any noise assessment data, be consulted during the formulation of Action Plans and informed of any decisions taken.

The overall goal of these actions is to develop a long-term EU strategy, which includes objectives to reduce the number of people affected by noise and provide a framework for developing existing community policy on noise reduction from major sources.

2.2 Scope of the END

The Directive is aimed at establishing harmonised EU measures to reduce noise emitted by the major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and also at providing a basis for developing and complementing the existing set of community measures concerning environmental noise. The Directive applies to environmental noise to which humans are exposed, in particular in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself\herself, noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas. Noise maps are strategic tools and should not be used for the assessment of local noise nuisances.

2.3 Purpose and Scope of the Regulations

Statutory Instrument No. 140 of 2006, also known as The Environmental Noise Regulations, was brought into effect by The Minister for the Environment, Heritage and Local Government, for the purpose of giving effect to European Council Directive 2002/49/EC relating to the assessment and management of environmental noise. The Regulations were brought into force in accordance with the powers conferred on The Minister by sections 6, 53 and 106 of the Environmental Protection Agency Act 1992 (No. 7 of 1992), as amended by Part 2 of the Protection of the Environment Act 2003 (No. 27 of 2003).

The Environmental Noise Regulations provide for the implementation in Ireland of a common approach within the European Community intended to avoid, prevent or reduce, on a prioritised basis, the harmful effects, including annoyance, due to exposure to environmental noise.

The Regulations apply to environmental noise to which people are exposed, in line with the definition given above in section 2.2. As with the Directive itself, the Regulations do not apply to nuisance noise which can be dealt with under the Environmental Protection Agency Act 1992.

2.4 Roles and Responsibilities of Designated Bodies

The Regulations designate the Environmental Protection Agency (EPA) as the national authority responsible for overseeing the implementation of the Regulations. The EPA is required to provide advice and guidance to the relevant noise mapping bodies and action planning authorities. The EPA is responsible for reporting to the European Commission the information relating to strategic noise mapping and action planning in accordance with Article 10(2) of the Directive.

2.4.1 Noise Mapping Bodies

Under the Environmental Noise Regulations the following organisations have been designated as noise-mapping bodies:

- For the agglomeration of Cork, Cork City Council and Cork County Council
- For the agglomeration of Dublin, Dublin City Council and the County Councils of Dun Laoghaire/Rathdown, Fingal, and South Dublin
- For major railways, Iarnród Éireann or Transport Infrastructure Ireland (formerly Railway Procurement Authority), as appropriate, on behalf of the action planning authority or authorities concerned
- For major roads,
 1. where such roads are classified as national roads in accordance with Section 10 of the Roads Act 1993 (No. 14 of 1993), the Transport Infrastructure Ireland (formerly National Roads Authority), on behalf of the action planning authority or authorities concerned, and
 2. other than those provided for in part (i), the relevant road authority or authorities, as appropriate
- For major airports, the relevant airport authority, on behalf of the action planning authority or authorities concerned

Responsibilities

The relevant noise-mapping bodies were required to produce strategic noise maps for:

- An agglomeration with more than 100,000 inhabitants
- A major road
- A major railway
- Any major airport

A major road is defined as any motorway, regional or national road with more than 3 million vehicle passages per year, while a major railway is any railway with more than 30,000 passages per year.

The Regulations also state that the designated noise-mapping bodies are required to make and maintain a strategic Noise Map, or Revised Map as appropriate over the life time of the Plan.

2.4.2 Action Planning Authorities

Under the Environmental Noise Regulations the following organisations have been designated as action planning authorities:

- For the agglomeration of Cork, Cork City Council and Cork County Council;
- For the agglomeration of Dublin, Dublin City Council and the County Councils of Dun Laoghaire/Rathdown, Fingal, and South Dublin;

- For major railways, the local authority or local authorities within whose functional area or areas the railway is located
- For major roads, the relevant local authority or local authorities within whose functional area or areas the road is located
- For major airports, the local authority or local authorities within whose functional area the airport is located.

Accordingly, Sligo County Council is designated as the action planning authority for all sections of major roads within the functional areas of the Council, which experience a volume of traffic greater than 3 million vehicle passages per year.

There are no major railways, airports or agglomerations within the functional area of the Council. The railway in County Sligo is not considered to be major as it does not have more than 30,000 passages per year.

Responsibilities

Action planning authorities are responsible for the making and approval of action plans, in consultation with the Agency and the noise-mapping body for the noise maps involved. Action plans must satisfy the minimum requirements set out in the Fourth Schedule of the Regulations.

Action planning authorities are required to ensure that:

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

2.5 Key Phases

The key phases involved in meeting the requirements of the Regulations are laid out below. The responsibility is shared between the noise-mapping bodies and action planning authorities.

2.5.1 Identification of Areas for Noise Mapping

Strategic noise maps were developed for all roadways meeting the criteria set out in Article 10(1) of the Regulations, specifically any motorway, regional or national road with more than 3 million vehicle passages per year. Road traffic volumes were obtained using Transport Infrastructure Ireland (TII) traffic counting system and the Council's own traffic count data. Traffic count figures were used to identify roadways which were eligible for mapping.



2.5.2 Preparation of Strategic Noise Maps

2.5.2.1 Purpose and Scope

According to the END a strategic noise map is “A map designed for the global assessment of noise exposure in a given area or for overall predictions for such an area.” Essentially a noise map is a representation of the noise situation in a given area, presented in terms of a chosen noise indicator.

Noise maps may take several forms such as tabulated data or data in electronic form, but the most common format is a graphical representation of the noise levels in an area. Colour coded contour plots link areas of equal noise exposure.

Noise mapping techniques employ software that estimates the noise level in an area from a particular source, given several governing factors e.g. speed of the traffic flow, number of light and heavy vehicles, building topology, road surface and gradient.

The maps are intended to provide a representation of the noise levels perceived within the assessment area and to identify locations where action may be needed to reduce high noise levels and protect the acoustic environment where favourably low noise levels are present.

2.5.2.2 Extent/Range

The noise maps generated by TII are plotted in graphical form in terms of L_{den} and L_{night} . They are presented in 5dB contour bands beginning at 50-54dB and ranging up to 70-74dB. The maps also provide an indication of noise levels which are greater than 75dB. The noise levels indicated are predictions attributed only to a specific source of noise i.e. road traffic.

2.5.2.3 Noise Mapping Bodies Responsible

Under article 6(d) of the Regulations, TII is designated as the noise-mapping body responsible for the mapping of all major national roads within Ireland, whilst the County Council are responsible for mapping all major non-national roads within their area of control. During the noise mapping carried out in 2017, TII undertook the assessment of noise from non-national roads on behalf of the counties based upon information supplied to TII by the relevant Local Authorities.

2.5.3 Development of the Noise Action Plans

2.5.3.1 Purpose and scope

Noise Action Plans are aimed at defining a common approach intended to avoid, prevent and reduce exposure to environmental noise and also to protect quiet areas. They will form the basis of a long term environmental noise strategy and are not tools for dealing with nuisance noise complaints.

2.5.3.2 Extent/Range

Action Plans are based on the results of the noise mapping process. The noise mitigation measures contained within Action Plans deal with potential issues identified during noise

mapping, with a view to reducing the number of people exposed to unacceptably high noise levels and protecting areas of perceived tranquillity.

2.5.3.3 Public Participation and the Role of the Public

Public participation and dissemination of data to the public are integral parts of the END and the Environmental Noise Regulations. The public should be consulted at all stages of policy development and implementation. The role of the public is to review and guide the formulation of strategic noise policy with a view to avoiding, preventing and reducing, where necessary, exposure to environmental noise. Their role is not to highlight individual instances of noise annoyance, but to contribute to an overall best approach to widespread environmental noise reduction.

2.5.3.4 Implementation of the Plans

Noise Action Plans span a 5 year time scale. They detail planned activities in each year and include a program review before the end of the Action Plan time frame.

2.6 Noise Indicators

In order to standardise noise measurements and assessment methods a common noise indicator is required. Various statistical indicators exist to define noise levels depending on the manner and duration of the noise in question.

The END specifies two noise indicators to be used when preparing environmental noise maps. These are the L_{den} indicator and the L_{night} which is used to assess sleep disturbance. The L_{den} is the day, evening and night time rating level, with weightings applied to noise pollution for the different periods.

L_{day} is the A-weighted long-term average sound level measured between 07.00 and 19.00

$L_{evening}$ is the A-weighted long term-average sound level measured between 19.00 and 23.00

L_{night} is the A-weighted long-term average sound level measured between 23.00 and 07.00

The average day, evening and night values are determined over all the respective periods of a year, making the L_{den} a yearly average. A 5dB weighting is added to the evening noise value and a 10dB weighting added to the night time level. This is to account for the fact that the same noise level may be more annoying at different times of the day. Consider road works in a residential area at four in the afternoon or four in the morning. The same noise level will be far more annoying during the night time period.

A-weighting of noise levels accounts for the fact that the human ear is more responsive to certain types of sound than others. The A-weighting process applies weightings to different types of noise to better approximate the perception of sounds. A-weighted sound pressure levels are measured in decibels, dB(A).



3 Existing Noise Management: Legislation and Guidance

3.1 National Legislation and Guidance

3.1.1 Environmental Protection Agency Act 1992

The EPA Act identifies noise as a form of environmental pollution and contains provisions for dealing with noise *“which is a nuisance, or would endanger human health or damage property or harm the environment.”* The sections of the Act relevant to noise pollution are:

Section 106 – Regulations for Control of Noise

This section gives the Minister the power to make regulations for the purpose of preventing or limiting noise. This may include imposing noise limits, either exceedance values or emission values, controlling sources of noise and the imposition of charges for noise pollution.

Section 107 – Power of Local Authority or Agency to Prevent or Limit Noise

This section gives powers to Local Authorities or the Environmental Protection Agency to control and limit noise from any premises, process or work.

Section 108 – Noise as a Nuisance

This section gives provision for Local Authorities, the EPA or any individual to complain to the District Court regarding noise nuisance causing unreasonable annoyance. The Court may order the offending person or body to take specific measures to limit or prevent noise pollution.

The EPA Act provides a method for dealing with nuisance noise in the community. It does not however, address noise pollution in the long term. The END, enacted through the Environmental Noise Regulations, is the beginning of a framework to develop long term strategic policies to combat noise pollution and protect the public from potentially harmful effects of environmental noise exposure.

3.1.2 The Roads Act 1993 (as amended)

There are currently no Irish statutory or mandatory limits or standards for governing road traffic noise, or its assessment on either new or existing roads.

Also of relevance in terms of the Roads Acts, a 2015 amendment established Transport Infrastructure Ireland through a merger of the National Roads Authority and the Railway Procurement Agency.

3.1.3 Transport Infrastructure Ireland Guidelines

In light of the lack of standardised methods for the assessment of road traffic noise TII published the *‘Guidelines for the Treatment of Noise and Vibration in National Road Schemes.’* These guidelines propose design goals for noise related to both the construction and traffic flow on new road schemes.

For new roads in Ireland, it is standard practice to adopt the traffic noise design goal contained within TII guidance document. This document specifies that the Authority (i.e. TII) considers it appropriate to set the design goal for Ireland as follows:

- day-evening-night 60dB L_{den} (free field residential façade criterion)

Noise mitigation measures are deemed necessary whenever all of the following three conditions are satisfied:

- (a) the combined expected maximum traffic noise level, i.e. the relevant noise level, from the proposed road scheme together with other traffic in the vicinity is greater than the design goal, and;
- (b) the relevant noise level is at least 1dB more than the expected traffic noise level without the proposed road scheme in place; and
- (c) the contribution to the increase in the relevant noise level from the proposed road scheme is at least 1dB.

These conditions will ensure that mitigation measures arising out of this process are based upon the degree of impact of the scheme under consideration. This Design Goal is applicable to new road schemes only.

Essentially what this means, is that for any new road scheme, the Environmental Impact Assessment Report must take this target into account, with regard to any existing sensitive residential property likely to be affected by the road scheme. The guidelines present an approach to mitigating the adverse effects of road construction in so far as possible through the use of measures such as alignment changes, barrier construction e.g. earth mounds, and the use of low noise road surfaces. The responsibility for considering noise mitigation policy relating to any proposed new sensitive properties in the vicinity of the road scheme lies with the relevant Planning Authority.

TII also published additional guidelines in 2014, titled '*TII Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes*'. The purpose of this guidance was to evaluate the effectiveness of the earlier guidelines, including the effectiveness of noise mitigation measures, in achieving the NRA's noise design goal as set out in the guidelines. A further aim of the review was to identify good practice and potential deficiencies in current practice, and to provide advice on the practice to be adopted in the planning of national road development proposals.

3.1.4 IPPC Licensing

The EPA's Integrated Pollution Prevention Control Licensing terms require that certain bodies must limit environmental pollution caused by industrial activities in order to obtain a license to operate. The criteria relating to noise pollution are outlined in the EPA publication "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*."

This document recommends a "*Best Available Technique*" approach to the assessment and mitigation of noise pollution. BAT is defined in Section 7 of the *Protection of the Environment Act* as follows:

'...the most effective and advanced stage in the development of an activity and its methods of operation which indicate the practical suitability of particular techniques for providing, in principle, the basis for emission limit values designed

to prevent or eliminate or, where that is not practicable, generally to reduce an emission and its impact on the environment as a whole’.

In this context ‘best’ means ‘the most effective in achieving a high general level of protection of the environment as a whole’.

As stated in the document the concept of BAT requires a degree of balance between the attainment of environmental benefits and the likely cost implications for the licensee. In the identification of BAT, regard should be had to a wide range of factors; however, emphasis should be given to ‘practical suitability’ and the need ‘to reduce an emission and its impact on the environment as a whole’.

3.1.5 Building Regulations 2014

Part E of the Building Regulations (Part E Amendment) Regulations 2014 relates to the mitigation of sound transfer between dwellings and rooms within a building. The regulations simply state that:

*Each wall and floor separating a dwelling from—
(a) another dwelling or dwellings,
(b) other parts of the same building,
(c) adjoining buildings,
shall be designed and constructed in such a way so as to provide reasonable resistance to sound.*

No consideration is given to the nature or location of the building or potential noise sources. More comprehensive regulations should include façade noise insulation guidelines and appropriate standards to be met before habitation.

3.1.6 Regional and Local Legislation and Guidance

3.1.6.1 Sligo County Development Plan, 2017-2023

The Sligo County Development Plan 2017-2023 sets out the following Noise control objective in Section 10.3:

It is the policy of Sligo County Council to:

P-NC-1 *When assessing proposals for activities that are likely to generate significant levels of noise, seek to protect the amenity of dwellings, community facilities and other noise-sensitive developments by ensuring that all new (and where possible existing) developments incorporate appropriate measures to minimise noise nuisance.*

P-NC-2 *Developments that operate at night – e.g. restaurants, takeaways, pubs, hotels, night clubs – should not be located close to dwellings, where possible.*

3.1.6.2 Sligo Local Area Plan, 2018-2024

The Sligo City Local Area Plan is currently being drafted and will have reference to this Noise Action Plan.



3.1.7 National Planning Framework, 2040

In 2018, the Government issued the National Planning Framework 2040¹, which includes - Policy Objective 65 to:

Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans.

The top level national spatial plans in Ireland will essentially guide where population increase and economic growth is to be focused.

3.2 Noise Assessment for Action Planning

At present there is no existing legislation that limits noise levels to a particular value. Several difficulties arise when attempting to choose a reasonable value for noise level limits, mainly due to the subjective nature of noise exposure and annoyance. The effects of noise exposure are highly dependent on the perception of the exposed person and the effectiveness of noise reduction can often be dependent as much on relative changes as on absolute levels. Attempting to apply the same limit value to a city centre park and rural country side may be inappropriate, despite the fact that both can be perceived as tranquil areas relative to the surroundings.

To address the lack of legislative measures and unify the approach taken by Action Planning Authorities the EPA have issued guidelines for the assessment of noise exposure and prioritising areas for noise mitigation measures. The proposed onset of assessment levels relating to road traffic noise are given below.

Onset levels for noise mitigation measures:

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

Onset levels for measures to preserve the existing noise situation:

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

These levels reflect an annual average 24 hour period.

These values were decided upon after a review of guidance values issued in other countries e.g. the UK, and TII guidelines for treatment of noise.

¹ National Planning Framework 2040: <http://www.gov.ie/en/project-ireland-2040/>

4 Description of the Action Planning Area

4.1 Coverage Area

Sligo County Council is responsible for Noise Action Planning relating only to the major roads passing through the functional area of the Council. There are no agglomerations subject to noise mapping or action planning within the jurisdiction of the Council.

This Action Plan is concerned with noise in the vicinity of major roads, the levels of which are indicated by strategic noise maps. In Sligo the following sections of road qualified for noise mapping:

4.1.1 National Primary routes:

N4 from its Junction with the N15/N16 in Sligo City to the County Boundary with Roscommon

Total Length 34.345 km

N17 from its Junction with the N4 in County Sligo to the County Boundary with Mayo

Total Length 34.129 km

N15 from its Junction with the N4/N16 in Sligo City to the County Boundary with Leitrim

Total Length 27.078 km

4.1.2 National Secondary Route:

N59 from Ballisodare village to the townland of Beltra

4.1.3 Regional Roads:

R287 from its Junction with Carrowroe Roundabout to the Borough Boundary and along Pearse Road from the Borough Boundary to its Junction with Mail Coach Road.

R870 from its junction with the Mail Coach Road to its Junction with Abbey St./Castle Street.

R286 from its junction with Stephen St/ The Mall to its Junction with Abbey Street/ Castle street.

Accordingly it is necessary to define a boundary area, within the range of the strategic noise map results, which can be designated as being 'near' a major road. It was proposed to use the 55dB L_{den} contour supplied by TII to define the boundary of the coverage area for potential noise mitigation.

4.2 General Population Exposed to Traffic Noise

The main population centre within County Sligo, which is exposed to environmental noise from major roads is as follows:

- The **N4** Inner Relief Road between the Summerhill Roundabout and its Junction with the **N16**;
- The **N15** from its Junction with the N4 and N16 to its junction with Mount Shannon Road;
- The **R287/R870** from its Junction with Carrowroe Roundabout to its Junction with Castle Street;
- The **R286** from Bridge Street to Thomas Street in Sligo Town.

4.3 Location of Noise Sensitive Buildings

Certain locations and building types are considered to be more sensitive to noise pollution than others. The main priority of the END is to reduce noise exposure in residential areas. It is also recommended that competent authorities designate buildings such as educational and health care facilities as being noise sensitive.

In accordance with this guidance and in line with the Action Plan coverage area definitions given above, Sligo County Council have designated the following as being noise sensitive locations in Sligo:

- Summerhill College
- St Joseph's Hospital
- Gilhooley Hall
- Nazareth House Nursing Home
- Markievicz House
- Mercy College
- Rathcormack National School

It should be noted that these locations were chosen because of their proximity to the major road. The buildings have at least one façade directly exposed to the roadway or have minimal insulation. While other noise sensitive areas exist within the towns such as additional schools, places of worship etc. they are not located in the immediate vicinity of the major road and should therefore be exposed to lower levels of traffic noise pollution.

Accordingly, these additional locations will not be assessed for priority mitigation activity, but will be considered in the overall strategy for the long term management of noise pollution.



5 Responsible Authority for Action Planning

Sligo County Council is responsible for the production and implementation of the Noise Action Plan for County Sligo.

Name and Contact Details:

Sligo County Council

County Buildings,

Riverside,

Sligo (F91 Y763)

For enquiries please contact Ms. Louise Gallagher, Senior Staff Officer at 071-91 11982 or email noise@sligococo.ie



6 Overview of the preparation of the noise map

6.1 General

This section outlines the process involved in the development of the noise map, including the data sources, calculation methodology and authorities responsible.

6.2 Responsible Authorities

The Environmental Noise Regulations require TII 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 2017, a centralised approach to the noise mapping of major roads outside agglomerations was adopted. Through this centralised approach, one central body, TII, developed strategic noise maps for all major roads outside agglomerations, encompassing both national and non-national roads. Non-national roads were mapped by TII 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.

Figure 6-1: **CASE 1:** Non-national roads are deemed to be a major road when carrying in excess of 3 million vehicles per year

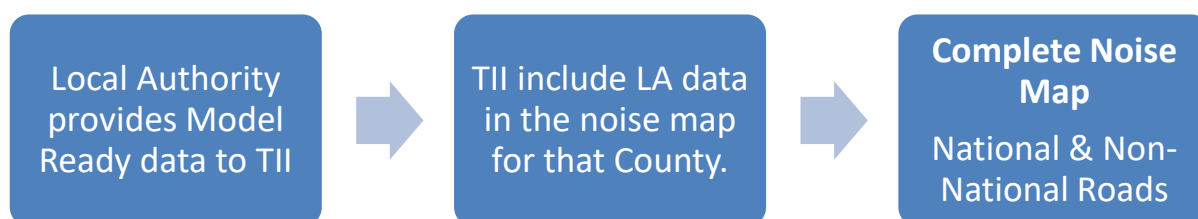
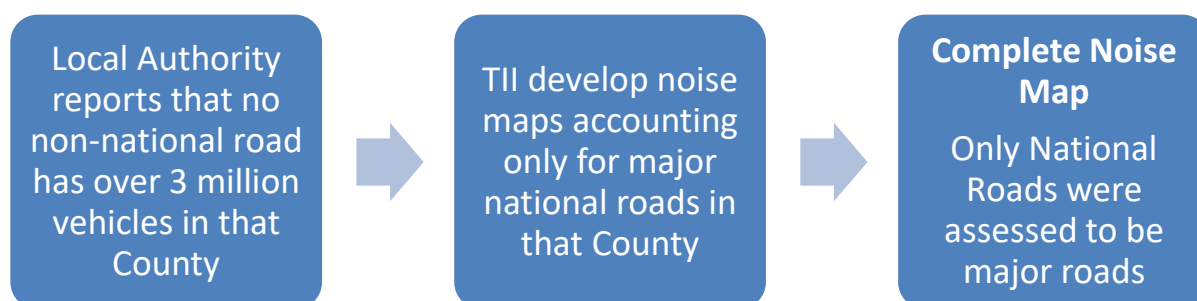


Figure 6-2: **CASE 2:** No non-national road deemed to be a major road



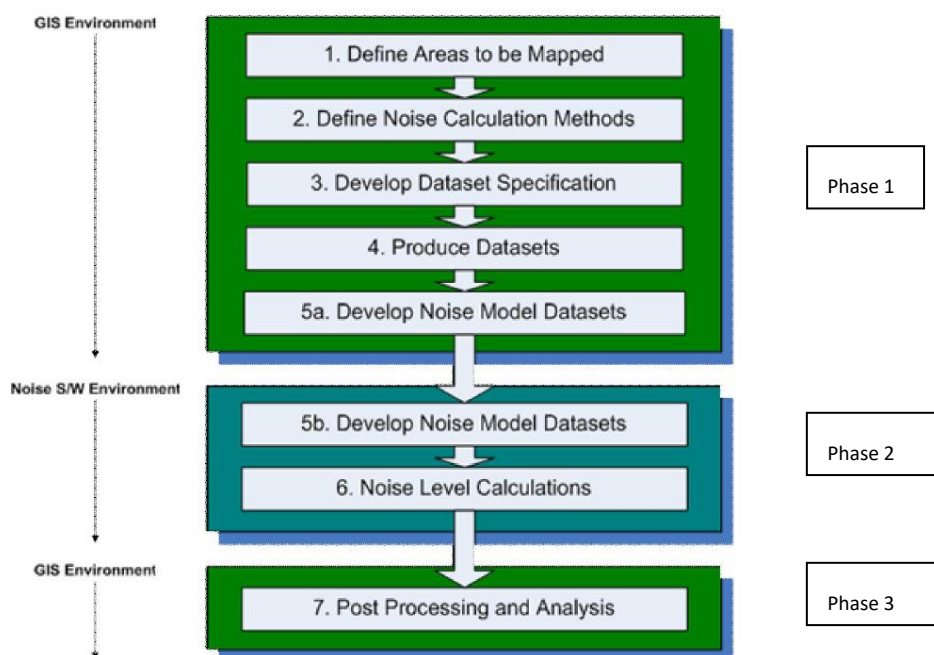
6.3 Noise Mapping Process

Figure 6-3 displays the overview of the noise mapping process as presented in the EPA's Guidance Note for Strategic Noise mapping². There are three main phases to the process:

- 1) Preparation of datasets in the GIS Environment;
- 2) Noise calculations; and
- 3) Post Processing and Analysis.

Phase 1 was conducted separately for national and non-national roads while Phase 2 and Phase 3 merged datasets from national and non-national roads to form one complete model.

Figure 6-3: Overview of the noise mapping process



Population exposure assessments were then performed on a County by County basis.

6.4 Review of 2012 Noise Maps

The EPA Guidance Note for Strategic Noise Mapping notes:

The Regulations introduce a continuing obligation on noise mapping bodies to review and, where necessary, revise each strategic noise map every 5 years, or sooner, as requested by the EPA, or when a material change in environmental noise in the area concerned triggers a revision of the relevant noise action plan.

² EPA Guidance Note for Strategic Noise Mapping (Version 3)

The EPA “Guidance Note for Noise Action Planning”, suggests that a noise action plan should be revised due to a material change if “it is known, or thought likely, that greater than 10% of the exposed population within the area of an action plan have experienced a change in the prevailing noise situation of greater than 3dB L_{den} or L_{night} ”.

In 2016, TII and the other Noise Mapping Bodies undertook a review of the Phase II strategic noise maps prepared in 2012.

6.5 Calculation Methodology

The second schedule of the Regulations sets out the recommended interim computation methods which may be used for the assessment of noise. The methods are referred to as interim methods as they are to be used until such time as a common method of noise assessment is adopted across Europe. The recommended interim methods of assessment set out in the second schedule of the Regulations contain the four EC Recommended Interim Methods set out in Annex II of the Directive. The Directive also provides for Member States to use either the EC Recommended Interim Methods or methods based upon those laid down in their own legislation. As it is common practice for environmental impact assessments to be undertaken in Ireland for roads and railways using the UK national calculation methods, the second schedule of the Regulations also sets out the UK methods CRTN and CRN.

The UK national computation method ‘Calculation of Road Traffic Noise’ (CRTN) adapted for use under the Regulations is described within the following documents:

- Department of Transport publication, ‘Calculation of Road Traffic Noise’, HMSO, 1988
- Converting the UK Traffic Noise Index $L_{10,18h}$ to EU Noise Indices for Noise Mapping, TRL Project report PR/SE/451/02, 2002; and
- Defra, Method for Converting the UK Road Traffic Noise Index $LA_{10,18h}$ to the EU Noise Indices for Road Noise Mapping, st/05/91/AGG04442, 24th January 2006.

In their Guidance Note for Strategic Noise Mapping the EPA recommended that the UK CRTN methodology be used for the assessment of road traffic noise levels for the second round of strategic noise mapping. It notes that the method should be used with particular reference to the following:

- The NANR 93 project report;
- DMRB Volume 11 Section 3 Part 7 HD 213/11 Annex 4,
- Additional advice to CRTN procedures;
- TRL Project report PR/SE/451/02, Converting the UK Traffic Noise Index $L_{10,18h}$ to EU Noise Indices for Noise Mapping, 2002; using traffic count information, particularly for the night period, wherever practicable.

Thus CRTN, taking cognisance of the supplemental reports identified above, was used for all noise mapping calculations

6.6 Data Sources

In order to develop strategic noise maps the following data sources were utilised.

Aerial LiDAR

In 2009, the NRA published a notice for tender for an aerial LiDAR survey of approximately 3,019km of the Irish national road network. The survey corridor was 1,200m in width. The survey was completed in early 2011 and outputs included 1 metre contours for the entire survey area, building height information for buildings within the survey corridor and a digital terrain model Figure 6-4.

Figure 6-4: Sample Point Cloud from Aerial LiDAR Survey



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 GeoDirectory dataset provides the definitive address database for the country and is an essential component in calculating the population exposed to the various noise bands, information that is required to be submitted to the EU as part of this work.

Corine Database

The European Environment Agency's (EEA) CORINE Land Cover 2012 dataset is a European-wide vector land parcel product derived from satellite imagery R2V processing. The CORINE dataset was developed in the framework of the CORINE programme to establish a computerised inventory on land cover. The dataset was used for making environmental policy as well as for others such as regional development and agriculture policies. For noise calculation, the dataset can be used to provide information on the land cover distribution.

Ordnance Survey of Ireland (OSI)

The Round 3 noise modelling was based on the OSI Prime2 database.



Central Statistics Office (CSO)

The CSO publish statistical information on population based upon Census returns. 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 and Small Areas.

6.7 Software and Hardware

All datasets were prepared and collated in a GIS Environment prior to importing them to the noise mapping programme. All attributes were consistent through the datasets thus ensuring an efficient export.

Details of the noise mapping system are presented in the following tables.

Table 6-1: Hardware Specifications

Modeling Hardware
Microsoft Windows 10
Standard x64 Edition
Intel (R) Core (TM) i5-4590 @ 3.30GHz with 19.9GB of RAM

Table 6-2: Software Specifications

Modeling Software
Predictor V11.21
Predictor Calculation Client V8.10
Predictor Analyst V3.40

Table 6-3: Calculation Settings

Calculation Settings
Fetching Radius 1,500m
Standard Tile Size 10km x 10km
Standard Tile Buffer 2,000m

6.8 Population Exposure Estimates

Annex VI of the END requires that the estimated number of people living in dwellings exposed to various noise levels on the most exposed façade.

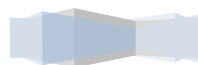
The population exposure assessment was completed following guidance received by the EPA on 26th September 2017 in the document entitled 'R3 Exposure Methodology – V2'.

The four datasets used to derive population exposure were:

- i. Small Area Population Statistics (SAPS) data from the CSO;
- ii. address data from GeoDirectory;
- iii. façade points, output by the noise model; and
- iv. building polygons, used by the noise model, from OSi Prime2 model.

The population data used was obtained from Census 2016. The address data used was obtained from the GeoDirectory from Quarter 1 2016 (Q1 2016). Façade points were the outputs of noise modelling.

These estimates were collated to derive an overall exposure level for the County. Full details of this process are presented in Section 10 of the EPA's Guidance Note for Strategic Noise Mapping, Revised Section 10: Mapping Methodology for Exposure Assessment - Post Processing and Analysis (October 2017).



7 Summary of the Results of the Noise Mapping Process

7.1 Presentation of Results

7.1.1 Noise Maps

Noise maps for major roads within the County of Sligo are presented in Appendix B. These maps are plotted in terms of L_{den} and L_{night} and are displayed in 5dB contour bands.

7.1.2 Summary Exposure Statistics for Action Planning Area

The total number of people in each 5dB band of traffic noise pollution was estimated using the methods outlined in the foregoing section. The following table indicates the estimated number of people exposed in each 5dB contour band, within County Sligo.

Table 7-1: Sligo Population Exposure (L_{den} and L_{night})

SLIGO POPULATION EXPOSURE		SLIGO POPULATION EXPOSURE	
L_{den}	Approximate Number of People	L_{night}	Approximate Number of People
55 - 59	1,663	50 - 54	1,265
60 - 64	1,108	55 - 59	1,045
65 - 69	977	60 - 64	322
70 - 74	249	65 - 69	2
> 75	0	> 70	0
L_{den}	Approximate Area (km ²)	L_{night}	Approximate Area (km ²)
> 55	34	> 50	18
> 65	7	> 60	3
> 75	0	> 70	0
L_{den}	Approximate Number of Dwellings	L_{night}	Approximate Number of Dwellings
> 55	2,010	> 50	1,342
> 65	655	> 60	184
> 75	0	> 70	0
L_{den}	Approximate Number of People	L_{night}	Approximate Number of People
> 55	3,997	> 50	2,634
> 65	1,226	> 60	324
> 75	0	> 70	0

7.2 Limitations of the Maps/Results

The strategic noise maps are based on averaged data sets that best describe the defining parameters of the noise model. While these calculation models are extremely complex, they only provide estimates of the likely noise levels resulting from these conditions. It is possible

that, in some cases, factors outside the scope of the calculation model could influence the levels of environmental noise.

The results of the noise mapping process display noise levels attributed only to a single source i.e. traffic noise. While this is by far the most predominant source of environmental noise, the maps may not always be fully representative of the noise situation.

In relation to the assessment of quiet areas in open country the maps become inapplicable. By definition these areas are undisturbed by noise from traffic, industry or recreational activity. As such, they will not be located in the vicinity of major roadways and will lie outside even the lowest contour bands of the noise maps.

In addition, the identification of quiet areas within a built up environment becomes difficult when the mapping results for the area are attributed to a single major road passing through the development. Areas identified by the noise maps as being 'quiet' may be subject to traffic noise from smaller roads within the built up area that do not qualify as major roads.

These areas may in fact experience levels of environmental noise that are higher than indicated due to traffic flows that are outside the scope of the mapping process. Nonetheless, the mitigation of noise levels from the major source will still be of benefit to these areas and will at least provide relatively perceived benefits regardless of absolute levels.

7.3 Identification of Areas to be Subject to Noise Management Activities

Strategic noise maps provide an indication of which locations are subject to undesirably high levels of environmental noise. However, not all of these noise "hotspots" require priority action. Various factors must be taken into account when deciding if noise management is necessary, such as, the type of buildings and land use in the area, the source of the noise and of course the level of noise itself. For the purpose of identifying problem areas for action planning, the EPA has proposed the use of a decision support matrix. A decision support matrix is a chart which enables identification, analysis and rating of the strength of relationships between various sets of information. It enables a number of different factors to be examined and facilitates the assessment of the relative importance of each. An example of this decision support matrix is given in Appendix A.

A total score of approximately 17 or above in this matrix indicates that the location in question should be included in a shortlist for further assessment. When combined with the guideline values for the onset of noise assessment presented in Section 3.2 the support matrix allows for a more comprehensive evaluation of the impact of noise pollution at a given location.

7.4 Confirmation of Onset of Assessment Thresholds

The guideline values presented in Section 3.2 were used as a preliminary indicator of the need for noise assessment and possible mitigation activity. The estimated population exposure figures indicate that there may be up to 249 people exposed to noise levels above the assessment threshold of 70dB L_{den} . The night time noise figures indicate that there may be up to 1045 people subject to noise levels above the guideline threshold value of 57dB L_{night} .

The predicted exposure levels at these residences give rise to the need for further detailed noise assessment.

7.5 Protection Thresholds for Quiet Areas

Under the Regulations it is required to delimit quiet areas within agglomerations. As there is no qualifying agglomeration within Sligo County, there is no statutory requirement to identify quiet areas within Sligo city and county.

Within the coverage of the strategic noise mapping there may be public open space or recreational areas where it may be deemed desirable to have relatively quiet noise levels. As the identification and delimiting of quiet areas is a means of ensuring that noise levels are preserved where they are good, it is considered appropriate to consider using the concept of quiet areas within the Action Plan.

To this end, initially it is considered appropriate to propose onset noise levels for the assessment of noise level preservation where they are good, at:

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

During the implementation of the Action Plan it is proposed to identify locations in the vicinity of the major road which have noise levels below these criteria and review their use. If appropriate or necessary locations could be identified as quiet areas where the existing noise levels are to be preserved or reduced if possible.

The types of public open spaces which it could be considered appropriate to include within the assessment include areas such as:

- Recreation areas
- Playing fields
- Playgrounds
- Public parks and gardens
- Cemeteries
- River banks

And possibly extend to locations such as:

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

It is also relevant to consider that some public open spaces may currently have low levels of environmental noise as indicated by the strategic noise mapping, yet have much higher existing noise levels due to other noise sources not considered within the scope of the mapping, such as recreation, entertainment, neighbourhood noise, smaller roads, railways or

industry. Similarly there may be other areas which it may be desirable to identify and designate, due to usage and utility, despite having a reasonably high level of environmental noise as indicated by the strategic noise mapping.

7.6 Quiet Areas in Open Country

Under the Regulations it is required to delimit quiet areas in the open country as defined by *“an area, delimited by an action planning authority following consultation with the Agency and approval by the Minister, that is undisturbed by noise from traffic, industry or recreational activities.”*

By definition the areas covered by the strategic noise mapping will not include any areas which may be considered undisturbed by noise, and it would be more appropriate to consider research work undertaken on tranquillity which addresses the interaction between noise and other factors such as visual amenity, cultural, historic, ecological, landscape and presence of natural sounds.

In support of this aspect of the regulations the EPA commissioned research work undertaken by Waugh and Durcan to evaluate baseline noise levels in areas of rural Ireland.

The complex interrelationships between the various factors which build up an impression of tranquillity means that the classification of quiet areas in open countryside may not be defined on acoustic measurement alone, but should incorporate criteria which balance the various associated aspects.

It is proposed that during the implementation of the Action Plan a review will be undertaken of the research in this area, and the findings referenced across to Sligo County Council policies set out in the Development Plans on landscape character areas, protected views and scenic routes and heritage conservation; which will need to be balanced with the projected demands for rural development, tourism and the extractive industries. As appropriate, quiet areas in open countryside would then be identified and consultation undertaken prior to any recommendation for approval by the Minister.

7.7 Application of the criteria

With the thresholds for onset of assessment and onset of preservation defined the decision support matrix could be developed to help provide a rating scheme which would initially help to identify locations beyond the assessment thresholds, but also assist in the process of ranking the locations to help develop an initial prioritisation for further investigation.

This decision matrix is then used to draw up a short list of potential areas for action, both above the onset values, and below the level for preservation to help identify Quiet Areas. The shortlists are then mapped within a GIS system to look for any clusters which could be considered “hot spots”. As necessary a second shortlist would then be drawn up to take into account the presence of any “hot spots”.

The decision support matrix is designed such that a score of approximately 17 or above indicates that the location in question should be included in a shortlist for further assessment.

The decision support matrix has been used to assess all noise sensitive locations within the strategic noise mapping area during the first phase of the implementation of the Action Plan.

7.8 Results of the analysis

An analysis has been undertaken in 2018 using the Decision Support Matrix in order to establish areas which should be subjected to further analysis and assessment. The results of this assessment is outlined in Table 7-2. Those areas which are recommended for further assessment will be appraised in 2019.

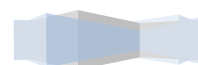
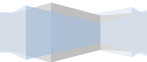


Table 7-2: Decision Support Matrix (2018)

Location	Decision Support Matrix Score	Comments and Actions
Sensitive Buildings as Defined in Section 4.3		
Summerhill College	18	Score above 17 - Proceed for Further Assessment
St. Josephs Hospital	18	Score above 17 - Proceed for Further Assessment
Gilhooley Hall	19	Score above 17 - Low night value - However High Index Value Overall - Proceed for Further Assessment
Nazareth House Nursing Home	20	Score above 17 - Low night value - However High Index Value Overall - Proceed for Further Assessment
Markievicz House	20	Score above 17 - Low night value - However High Index Value Overall - Proceed for Further Assessment
Mercy College	18	Score above 17 - Low night value - However High Index Value Overall - Proceed for Further Assessment
Rathcormac National School	19	Score above 17 - Low night value - However High Index Value Overall - Proceed for Further Assessment
Other Properties adjoining the Road Network		
N4 @ Collooney Roundabout junction	16	Score is less than 17 - No Further Assessment
N4 Summerhill Roundabout to junction of John Street	17	Score is 17 - Identify Properties and Proceed for Further Assessment
N4 Urban (City Centre)	14	Score is less than 17 - No Further Assessment
N4/N15 Hughes Bridge to Rahabeerna	17	Score is 17 - Identify Properties and Proceed for Further Assessment
R287 Carrowroe Roundabout to Pearse Road	16	Score is less than 17 - No Further Assessment
R287 Pearse Road to junction with MCR (Residential)	19	Score is above 17 - Identify Properties and Proceed for Further Assessment
R870/R286 (City Centre)	14	Score is less than 17 - No Further Assessment



8 Mitigation and protection measures

8.1 General Principle of Action Plan

Sligo County Council's Noise Action Plan aims to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise.

Sligo County Council will adopt a strategic approach to managing environmental noise by following a balanced approach which promotes:

- Noise reduction at source
- Land use planning adapted to noise targets
- Procedures to reduce noise impact.

Sligo County Council's Noise Action Plan will have regard to the principles of sustainable development and integrate with other strategic policy objectives of Sligo County Council.

8.2 Processing areas above onset of assessment criteria

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

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

This would most likely be undertaken in two ways, firstly by undertaking a review of the strategic noise models and then refining if appropriate. The second approach would be to undertake field survey work to measure noise levels prior to the commencement of any works. In a best practice situation it is Sligo County Council's aim to undertake both approaches, with measurements repeated after any actions are carried out in order to confirm the delivered results.

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

Once the extent of the existing noise impact has been confirmed for the locations under review, the potential noise mitigation measures would then be investigated, and a cost benefit

analysis undertaken for each, with the aim of developing a selection matrix which leads towards a recommendation for action.

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

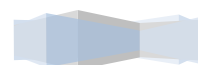
8.3 Overview of possible mitigation measures

Where the decision support matrix analysis identifies locations for which noise mitigation measures may be considered appropriate a review of available measures will then be undertaken.

As discussed previously it is the view of Sligo County Council that a balanced approach needs to be taken to help sustainably manage the interests of the residents, the aims of the noise Action Plan and the development plan.

There are a wide range of potential noise mitigation measures, some of which may act at a national or regional level, others which may be purely localised. Likewise there are a number of levels of authority which may be capable of taking action. Some examples of measures which may be considered include:

- Vehicle noise emissions and tyre noise regulations would be set at EU level
- National planning guidance or noise regulations would be set at national level
- Transport policy objectives may be set at regional level
 - improved public transport
 - getting people out of cars
 - increasing bus, train, bicycle journeys.
- Local authorities could undertake the following:
 - Replacement of diesel vehicles with compressed natural gas / electric
 - Truck routes
 - Night time delivery restrictions or limits
 - Planning permissions
 - Enforcement of speed limits
 - Road closures / traffic routing
 - New road construction (bypass)
 - Road re-surfacing
 - Smoothing broken surfaces
 - Use of low noise road surfaces on higher speed routes
 - Planning zones



- Locating noise sources and population with consideration to potential for noise impact
- Façade insulation requirements
 - Secondary or triple glazing as a mitigation measure
 - Building construction detailing for new developments exposed to environmental noise
- Noise barriers
- Public liaison groups
- Long term targets
- Provision of Park and Ride facilities where feasible

From the above list it is apparent that the Councils only have powers to act within a number of the possible mitigation scenarios. Research has been undertaken within EC funded projects looking into the design of noise mitigation measures, and estimates of the extent of costs and benefits. The conclusion is often that there is no single solution which provides the optimal solution, rather a range of measures, each of which may provide an incremental improvement in the situation.

These actions against noise will be considered during the assessment of possible noise mitigation for sites identified through the decision support matrix, but through the Noise Action Plan they should be encouraged to be considered within local and regional development plans, road maintenance proposals and the planning process.

8.4 Assessment of Options

For the locations under review a list of potential noise mitigation actions will be drawn up. In order to undertake an assessment of feasibility and develop a prioritised list of actions, a cost-benefit analysis will be undertaken in order to maximise value for money and deliver benefit from investment.

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

The benefit of noise reduction may be viewed in terms of decibels / people / time, may be considered using an assessment of changes in estimated levels of annoyance or sleep disturbance, or could be monetised to fully process the analysis. Monetisation of noise is becoming increasingly common. The monetary assessments of noise levels tends to take two differing approaches, (i) impact upon property market value and (ii) willingness to pay by residents exposed to noise to produce a reduction. As may be expected these tend to lead to somewhat differing suggested levels of financial benefit. The appropriate metrics and

valuations will be reviewed at the time of the analysis, using the best available research data which will include reference to the CEDR, *“Technical Report 2017-03, State of the art in managing road traffic noise: cost-benefit analysis and cost effectiveness analysis”* and the EC working group position paper from 2003 *“Working Group on Health and Socio-Economic Valuation of Noise”*.

8.5 Preservation of areas below protection threshold

Where areas are identified as being below the onset of preservation threshold, they will be considered for review in the context of the review for quiet areas. In addition to this, if the locations identified have cultural or amenity value then the planning process will be used to help preserve the nature and level of the existing sound environment. More details on the proposed use of planning are set out below.

8.6 Management of Areas between the Thresholds

For sustainable development to be delivered over the long term, careful consideration of environmental noise pollution when planning for new developments will be a key factor in the management of the noise environment. Setting out clear planning policy relating to noise, and incorporating environmental noise strategies into the development, planning and zoning processes will help to ensure that the existing noise climate is preserved where appropriate.

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

8.7 Planning for Noise Management

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

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

- Bringing people to noise
 - New housing, hospital, school, nursing home etc. developments near to existing road, rail, industrial or airport noise;
 - Noise levels outside the façade, in gardens, in public open spaces;
 - Noise levels inside the building.
- Bringing noise to people

- New or altered roads, railways, industrial sites, airports or commercial developments which would alter the noise environment in the vicinity of noise sensitive locations.

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

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

In the scenario where new residential properties, or other noise sensitive premises, are introduced into an existing climate of environmental noise, there is currently no clear guidance. Until specific planning guidance on noise is forthcoming from DEHLG, Sligo County Council propose to develop and publish its own set of guidance on noise assessment and control which would be applicable throughout the County.

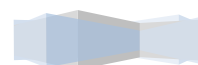
In the scenario where new, or altered, sources of noise are introduced to existing residential properties, or other noise sensitive locations, there are currently a number of guidance documents which cover some of the situations which may arise, as discussed above. Where existing guidance does not cover the situation under consideration, Sligo County Council will determine the format of assessment that it would consider appropriate.

It is currently envisaged that the guidance is likely to formalise the approaches to noise impact assessment which already appear commonly within Ireland. These are frequently based upon assessment methods within the UK, the Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system.

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

In the scenario where new noise sensitive premises are introduced to locations already exposed to levels of long term environmental noise likely to be above the thresholds of interest within the Regulations, i.e. 55 dB L_{den} and 45 dB L_{night} , it is considered appropriate to consider aiming to achieve target internal noise levels within noise sensitive rooms, such as living rooms and bedrooms.

In the case of new development, or conversions, these targets could be introduced through the use of appropriate planning conditions, and possibly some form of pre-completion testing as used in a number of other EU countries. The choice of targets for internal noise levels could be informed by the WHO Guidelines from 2000, including WHO night time guidelines for Europe or BS 8233, whilst the assessment of façade noise insulation capabilities could be undertaken using the methods set out within BS 8233 or BS EN 12354-3.



9 Public Participation

9.1 Public Consultation

The Noise Action Plan has been developed by Sligo County Council with regard to the Regulations and the EPA document *"Guidance Note for Strategic Noise Action Planning for the Environmental Noise Regulations 2006"*, Version 3, March 2018.

The Action Plan aims to meet the requirements set out within the Regulations and presents a strategic approach to the management of environmental noise within Sligo City and County. An approach to the assessment and reduction of existing noise levels, where necessary, near to major roads is presented in Section 7 based upon the results of the strategic noise mapping. The Action Plan also sets out in Section 8 an approach which aims to prevent and avoid the harmful effects, including annoyance, of the long term effects of exposure to environmental noise through the appropriate control of future development within the context of sustainability.

As an important stage in the development of the Noise Action Plan, Sligo County Council made the Draft Noise Action Plan available as a document for consultation and sought responses and feedback from stakeholders and the public alike.

Within the public consultation period, Sligo County Council made copies of this Noise Action Plan available to access by the public at the following locations within County Sligo, and by placing an electronic version on the Authorities' website (www.sligococo.ie).

In addition, a number of statutory bodies and stakeholder organisations were approached directly and asked to provide review and feedback on the proposals set out within the Draft Noise Action Plan.

A copy of the Draft Noise Action Plan was made available for inspection at the offices outlined below from 9:00am to 5:00pm from Thursday, 31st May 2018 to Thursday, 19th July 2018.

Sligo County Council, County Hall, Riverside, Sligo, F91 Y763;

Sligo County Council, National Roads Design Office, Business Centre, Market Yard, Sligo, County Sligo, F91 KR91;

Submissions were invited in respect of the Draft Noise Action Plan for the County and City of Sligo and could be made ***in writing*** to Director of Services (Infrastructure), Sligo County Council, County Hall, Riverside, Sligo, F91 Y763, or email noise@sligococo.ie.

One submission was received from Transport Infrastructure Ireland prior to the deadline date of **5:00pm on Thursday, 19th July 2018.**

10 Implementation Plan

10.1 General

This Noise Action Plan sets out below a proposed approach to implementation of any requirement for the mitigation of existing levels of environmental noise due to major roads within the County.

10.2 Roles and Responsibilities

Sligo County Council is the designated Action Planning Authority as set out within the Environmental Noise Regulations 2006. The Council is responsible for developing the action plan, and ensuring that the implementation timetable set out below is progressed and reviewed.

TII is the key external stakeholder to the Council during the implementation of the action plan, as they developed the strategic noise mapping, and they are the body responsible for the national roads network.

10.3 Objectives

It is the Council's goal to adopt a strategic approach to the management of environmental noise with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health. The Council will aim to promote a high level of protection and environmental health.

This goal is to be considered within the context of sustainable development and relates to the strategic objectives of the Council Development Plan.

The objective of the Councils is to promote an efficient, integrated, accessible and sustainable transport system for the county.

It is the objective of Sligo County Council to bring National Roads up to appropriate standards and to continue improvements on non-national roads so as to develop a safe and comprehensive road system for the county.

10.4 Programme of Works

The Noise Action Plan is to be implemented through a staged process over 5 years, such that the works undertaken within the Action Plan will feed into the next round of strategic noise mapping in 2021. The implementation of the action plan will be reviewed and reported within the third round of noise action plan due to be completed in 2021.

Year 1 – 2018

- Public consultation for Noise Action Plan
- Review strategic noise maps and results of 'Decision Support Matrix' to identify priorities



Year 2 - 2019

- Confirmation of extent of impact
- Draw up list of areas for noise mitigation review
- Noise mitigation review
- Assess all identified sites
 - In context of proposed development & maintenance
 - Feasibility study for possible mitigation measures
 - Cost benefit analysis for feasible measures
 - Draw up list of cost effective interventions
- Review County Planning development and planning guidance regarding noise control
- Publish County planning guidance on noise assessment and control

Year 3 to 5 – 2020 to 2022

- Commence implementation of the relevant actions
- Collate, capture and consolidate data required for **2021** strategic noise mapping
- Assess implementation and use of guidance on planning and noise

Year 4 – 2021

- Produce new strategic noise maps for 2018 assessment year

Year 5 - 2022

- Review impact of Action Plan and amend where appropriate
- Public consultation and finalisation of 2023 to 2027 Action Plan

Ongoing requirements

- Annual review of progress against milestones

10.5 Evaluation, Review and Corrective Action Programmes

The Council will review the effectiveness of noise action planning activities on an ongoing basis. This will be done by performing an annual review of the progress made in relation to planned activities. The effectiveness of these measures at combating local environmental noise exposure will also be considered. If necessary, adjustments may be made to the schedule and nature of planned activities in order to better meet the goals of the action plan.

In 2020 and 2022 the Council will carry out a review of the program of works implemented under this action plan. Progress and results will be evaluated using information gathered through local assessment of environmental noise exposure. This will include “before and after” evaluations of any noise mitigation measures. A review of new noise maps will also be carried out, giving an indication of the change in environmental noise levels and the numbers of people exposed.

11 Summary and Conclusions

This Noise Action Plan has been prepared as required by the Environmental Noise Regulations 2006, Statutory Instrument No. 140 of 2006. These Regulations give effect to EU Directive 2002/49/EC relating to the assessment and management of environmental noise.

It aims to provide an overview of the requirements of the Regulations, a review of the results of the strategic noise mapping within Sligo City and County, and set out an approach to the strategic management and control of environmental noise over the next four to five years.

The objectives of Sligo County Councils Noise Action Plan is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise. This will be achieved by taking a strategic approach to managing environmental noise and following a balanced approach which promotes the objectives in the context of sustainable development. This approach promotes action on environmental noise through three avenues, these being noise reduction at source, land use planning adapted to noise goals and procedures to reduce noise impact.

This Noise Action Plan primarily considers the long term environmental noise impact from road traffic noise sources, and sets out an approach to review noise impact levels near to the major sources assessed during the strategic noise mapping in 2017. In the interests of equality and promotion of best practice the action plan also sets out a number of proposals for the prevention and avoidance of environmental noise levels detrimental to human health to be implemented through the planning process, these being applicable throughout County Sligo.

11.1 Summary of Actions

Increased levels of environmental noise will be prevented and avoided, where possible, within the requirements of the Development Plan, Local Area Plans and sustainable development, through the whole of Sligo County, by integration of noise management into the planning process for the development of new noise sensitive premises, or sources of long term environmental noise, such as road, railways and industrial sites. The following actions will be carried out:

- Review existing noise control policies contained within current Development Plans and other planning guidance documents;
- On completion of review, prepare and publish county planning guidance on noise assessment and control to be incorporated into future development plans;
- Monitor and assess the implementation of the planning guidance on reducing adverse impacts associated with noise.

Noise reduction of existing sources of long term environmental noise, where necessary, will be considered within the area covered by the strategic noise mapping undertaken by TII in 2017. The approach to the assessment of relevant actions will use the following approach:

- Review strategic noise maps and results of 2018 Decision Support Matrix to identify priorities;



- Confirm the extent of the noise impact through refined noise modelling and/or long term noise monitoring;
- Draw up list of areas for noise mitigation review;
- Assess all identified sites:
 - In context of proposed development & maintenance;
 - Feasibility study for possible mitigation measures;
 - Cost benefit analysis for feasible measures;
 - Draw up list of cost effective interventions.
- Undertake cost effective actions for which funding is available;

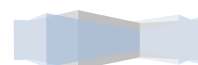
The preservation of relatively quiet areas in the vicinity of major noise sources, and quiet areas in the open countryside, will be considered and reviewed as part of the implementation of the noise action plan. Any possible designations which may be recommended by such a process would go to public consultation prior to submission to the Minister for adoption.

Prepare relevant information for 2022 strategic noise mapping

- Estimate extent of sources under 2022 strategic noise mapping
- Set out data requirements for 2022 strategic noise mapping
- Collate, capture and consolidate data required for 2022 strategic noise mapping

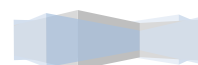
Undertake an annual review of progress on implementation of the noise action plan.

Any actions arising from this process will be subject to Strategic Environmental Assessment and Appropriate Assessment screening prior to progression.





i. APPENDIX A: DECISION/SELECTION MATRIX



12 Appendix A: Decision/Selection Matrix

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

The following table presents the prioritisation decision support matrix to be used to support the action planning decision making process.

Table 12-1: Example decision support matrix

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

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



Each noise sensitive premises is allocated to one of the “Type of Location” categories, and the noise level at the most exposed façade scored as per the “Noise Band” and the source scored as per the “Type of Noise Source”.

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

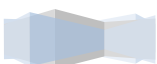
Table 12-2: Example of use of decision support matrix

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

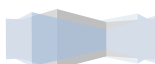
A score of approximately 17 or above indicates that the threshold levels have been exceeded and the location should be included in the shortlist for further assessment.

Similarly a location with low noise levels may also score above 17, which then indicates that it should be short listed for consideration as a location where environmental noise levels are currently considered good.

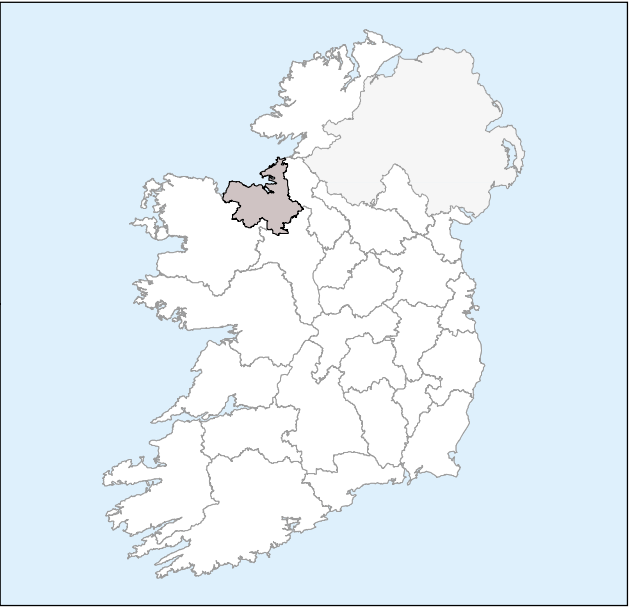
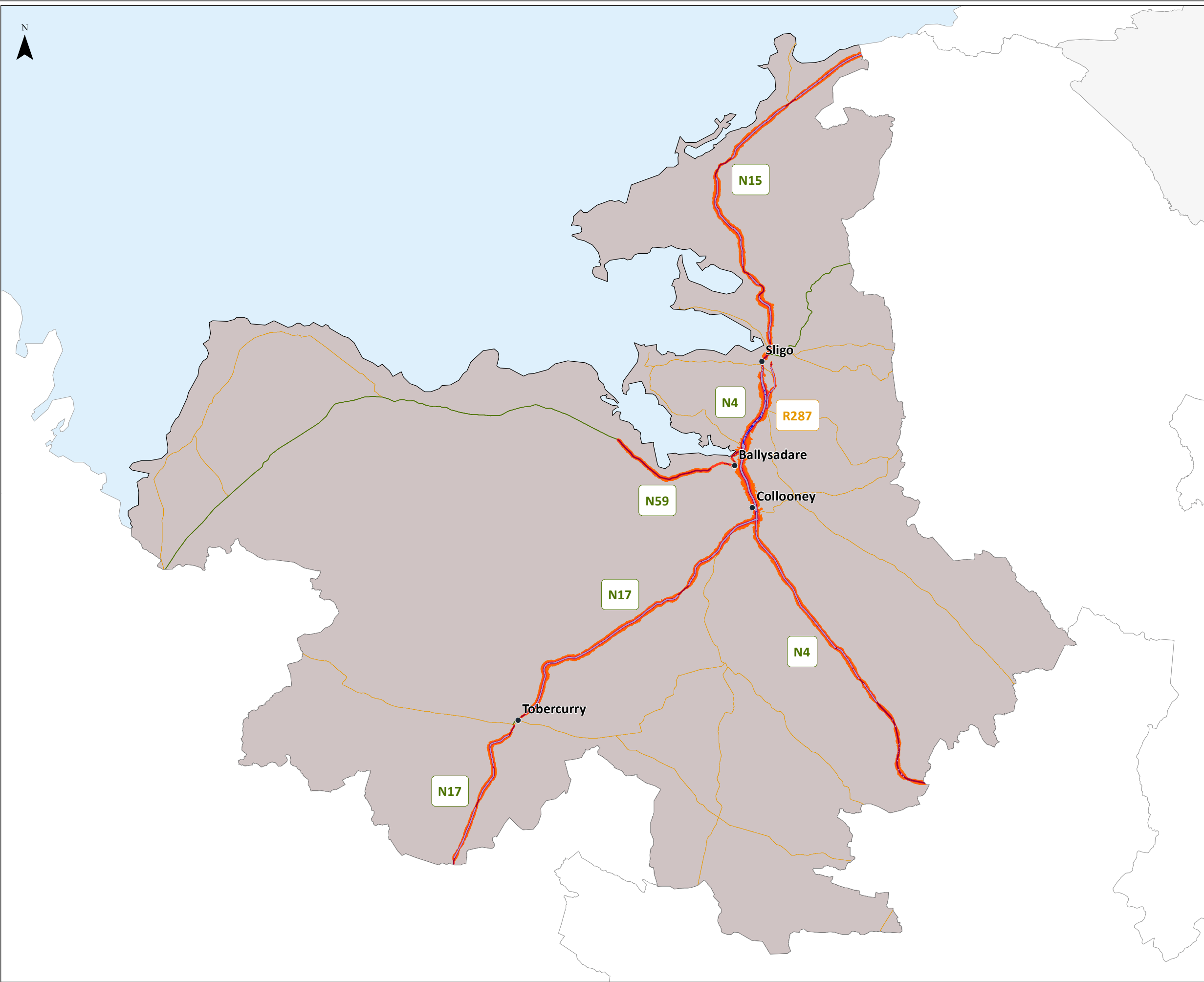




13 Appendix B: Strategic Noise Mapping







SLIGO POPULATION EXPOSURE	
L _{den}	Approximate Number of People
55 - 59	1,663
60 - 64	1,108
65 - 69	977
70 - 74	249
> 75	0
L _{den}	Approximate Area (km ²)
> 55	34
> 65	7
> 75	0
L _{den}	Approximate Number of Dwellings
> 55	2,010
> 65	655
> 75	0
L _{den}	Approximate Number of People
> 55	3,997
> 65	1,226
> 75	0

Noise Zone

Lden (dB)

55 to 59 (dB)

60 to 64 (dB)

65 to 69 (dB)

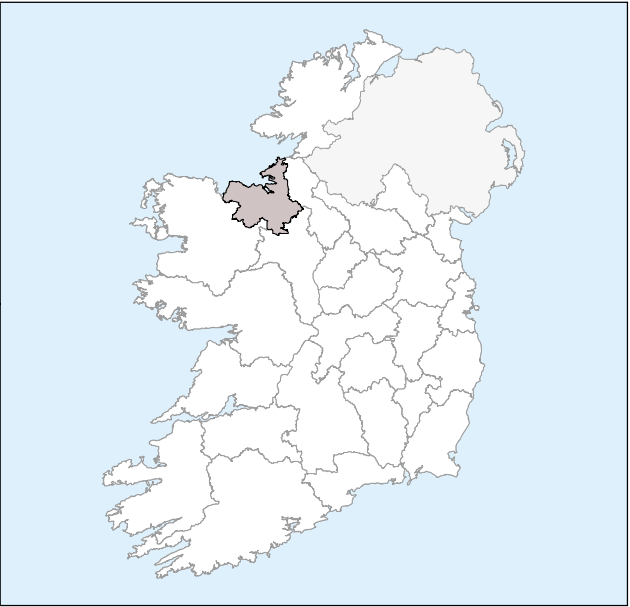
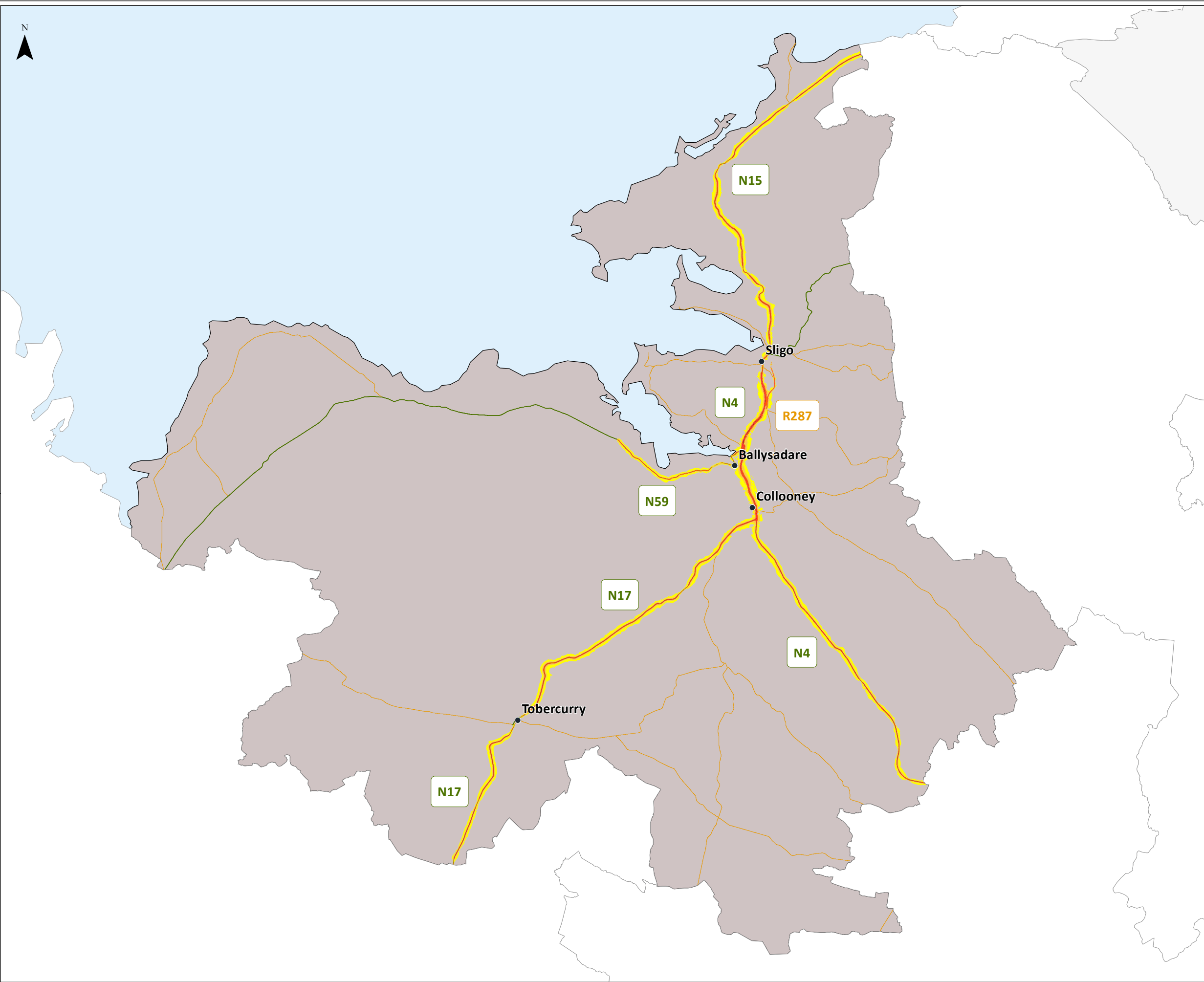
70 to 74 (dB)

≥ 75 (dB)

Road Type

National Road

Regional Road



SLIGO POPULATION EXPOSURE	
L _{night}	Approximate Number of People
50 - 54	1,265
55 - 59	1,045
60 - 64	322
65 - 69	2
> 70	0
L _{night}	Approximate Area (km ²)
> 50	18
> 60	3
> 70	0
L _{night}	Approximate Number of Dwellings
> 50	1,342
> 60	184
> 70	0
L _{night}	Approximate Number of People
> 50	2,634
> 60	324
> 70	0

Noise Zones

L_{night} (dB)

- 45 to 49 (dB)
- 50 to 54 (dB)
- 55 to 59 (dB)
- 60 to 64 (dB)
- 65 to 69 (dB)
- ≥ 70 (dB)

Road Type

- National Road
- Regional Road