

Wicklow County Council

Noise Action Plan 2018 to 2023



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Transportation, Water & Emergency Services
Wicklow County Council
County Buildings
Whitegates
Wicklow Town
Co. Wicklow
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0.0 Document Control

The “*Wicklow County Council Noise Action Plan 2018 to 2023*” defines the methodology by which Wicklow County Council intends to fulfil its obligations under the Environmental Noise Regulations 2006 Statutory Instrument (S.I) Number 140 of 2006, with respect to the second round of Noise Action Planning.

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0.00	Draft Issue	For EPA Observations	29.03.2018
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0.1 Acknowledgements

Wicklow County Council would like to thank the EPA, TII and Irish Rail for their assistance in the preparation of this document and the relevant background data and information.



0.1 EXECUTIVE SUMMARY

This Noise Action Plan 2018 to 2023 has been prepared in accordance with the requirements of the S.I. No. 140 of 2006, also known as the Environmental Noise Regulations (END) 2006. These regulations give effect to the European Union Environmental Noise Directive 2002/49/EC relating to the assessment and management of Environmental Noise.

This Noise Action Plan 2018 to 2023 has been prepared by Wicklow County Council and has focused on the impact of major roads within County Wicklow. The actions detailed herein have been drawn up to assess noise exposure in priority areas, as indicated by strategic noise mapping located on the identified routes within County Wicklow. Methods used in the production of strategic noise maps are outlined and the summary results are presented. The results have been analysed and recommendations made to limit population exposure to environmental noise pollution.

Wicklow County Council is the responsible Action Planning Authority for County Wicklow. It will adopt a strategic approach to managing environmental noise pollution, aiming to assess and prioritise the limitation of environmental noise levels where they are potentially harmful, and protect “quiet areas”. Wicklow County Council will take cognisance of acoustical planning in the planning process to endeavour to ensure that future developments include provisions to protect the population from the harmful effects of environmental noise in the interests of residential amenity and public health.

The Noise Action Plan 2018 applies, as per the Environmental Noise Regulations 2006, to the areas adjacent to roads in County Wicklow, which experience traffic volumes in excess 3 million vehicles a year and railways in Wicklow with more than 30,000 train passages per year. Strategic Noise Maps have been prepared for all roads and railways deemed to fall within the above thresholds.

To address the lack of legislative measures and unify approaches 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 and rail traffic noise mitigation measures are 70dB L_{den} and 57dB L_{night} .

The estimated population exposed to noise levels greater than 70dB L_{den} for major roads within the Action Plan Area equates to 1169 people. This compares to a figure of 977 people in the Second Round Noise Action Plan. Since the length of major railway lines passing through County Wicklow is limited to a short section within the Dublin Agglomeration to the north of Bray, there are no comparable populace figures for those affected by noise from major railways as Irish Rail included this length of track as part of the Dublin agglomeration area assessment.

The estimated population exposed to noise levels greater than 57dB L_{night} for major roads within the Action Plan Area is estimated to be of the order of 5,825. In the Second Round Noise action plan the figure totalled 5,831 people. However there is no direct correlation for a noise level of 57 dB as it falls within the 55 to 59dB noise band. The fact that the calculations are based on a variety of factors and are logarithmically calculated means that simple iteration of the 55-59 dB noise bands is unlikely to produce an accurate figure for noise above the 57dB level. The approach taken, similar to the previous two Noise Action Plans is to simply assume that all noise in the 55 - 59dB noise band exceeds the threshold of 57dB. This approach means that the estimated figure of 5,825 should be considered a conservative estimate.

Wicklow County Council has developed a detailed Programme of Works for the duration of the Noise Action Plan (2018 to 2023) and proposes to implement this programme subject to the availability of requisite technical staff, expertise and financial resources. Any mitigation measures applied will be to either reduce excessive sound levels or to preserve low noise levels where they exist.

This Draft Noise Action Plan 2018 to 2023 will be placed on public display at Wicklow County Council offices and made available in electronic format on Wicklow County Council's website. The Draft Noise Action Plan 2018 to 2023 will also be forwarded for review and comment to relevant stakeholders. Results of the stakeholder and public participation will be taken into account when preparing the final document and the public will be informed of decisions taken.

0.0 DOCUMENT CONTROL

0.1 EXECUTIVE SUMMARY

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1 INTRODUCTION

1.1 Background

This Third Noise Action Plan has been developed by Wicklow County Council in its role as designated Action Planning Authority under the Environmental Noise Regulations 2006, Statutory Instrument (S.I.) Number 140 of 2006 (the Regulations).

The aim of this Action Plan is to provide an overview of the Regulatory requirements, to review the results of strategic noise mapping within County Wicklow and to set out an approach to the strategic management and control of environmental noise, until the implementation of the next round of strategic noise mapping and action planning in approximately five years' time.

This Third Noise Action Plan follows the same approach and format of the previous Noise Action Plans (2010 & 2013) issued to date by Wicklow County Council.

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

1.2 European Requirements for Noise Action Planning

In 2002, the European Union (EU) issued Directive (2002/49/EC) relating to the assessment and management of environmental noise. This Directive is more commonly referred to as the Environmental Noise Directive (END).

The aim of the EU Directive is

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

The objective of the Action Plans is

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

The key requirements of the END can be set out in three key objectives as follows:

- i. Undertake strategic noise mapping to determine population exposure to environmental noise.
- ii. Ensure information on environmental noise and its effects are made available to the public.
- iii. Adopt Action Plans, based upon the noise-mapping results, with the objective of preventing and reducing environmental noise where necessary and to preserve environmental noise quality where it is good.

Therefore, the action plans must reduce the existing noise climate where necessary and protect the future noise climate. The Noise Action Plan is therefore designed with the twin aims of:

- Avoiding significant adverse health impacts from noise.
- Preserving environmental noise quality where good.

1.3 National Requirement for Noise Action Planning

The EU END was transposed into National Law by the Environmental Noise Regulations 2006, SI No. 140 of 2006. The Regulations provide for the implementation of the EU END in Ireland in order to ensure that a common approach within the European Community is achieved to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.

For the purposes of both the EU Directive and Irish Regulations, environmental noise is defined as

“unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic and noise in agglomerations over a specified size.”

Types of noise not included in the regulations are noise that is caused by the exposed person, noise from domestic activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas. The regulations specify the process to be followed in addressing environmental noise from transport sources, implemented over various rounds detailed as follows:

Round One:

Noise mapping bodies were required to make strategic noise maps before the 30th June 2007 for the following:

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

Noise Action Plans were prepared by action planning authorities, based on the results of the mapping process.

Subsequent Rounds:

The Regulations provide for noise mapping bodies to make strategic noise maps before the 30th June 2012, and thereafter every 5 years (In the case of Round 3, before 30th June 2017), for the following:

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

In relation to the threshold assessment level for airports this remains unchanged for the third round. However, as the Regulations require that the noise maps are reviewed and revised every five years, any airports within the noise mapping and Action Planning areas are required to be reassessed to see if they require mapping due to a change in the number of movements at the airport.

Revised/amended action plans must be prepared on foot of the revised strategic noise maps and thereafter every 5 years.

1.4 Roles & Responsibilities of the Designated Bodies

The Regulations (S.I. No. 140 of 2006) designate roles and responsibilities to certain state Agencies and Authorities in relation to implementing the Regulations. These include the Environmental Protection Agency (EPA), Transport Infrastructure Ireland (TII), certain Local Authorities, Irish Rail and certain Airport Authorities.

1.4.1 Environmental Protection Agency (EPA)

The Environmental Noise Regulations (S.I. No. 140 of 2006) have designated the Environmental Protection Agency (EPA) as the national authority for these Regulations and has a Regulatory role to:

“exercise general supervision over the functions and actions of noise-mapping bodies and action planning authorities, and provide guidance or advice to such bodies and authorities, where necessary”.

This role includes supervisory, advisory and co-ordination functions in relation to both transport noise mapping and action planning. In preparation for the third Noise Mapping exercise in 2017 and the third round of Noise Action Plans in 2018, the EPA as the regulatory agency has engaged regularly with the relevant noise action planning and noise mapping bodies and has assisted Local Authorities in the preparation of their respective Noise Action Plans, through the hosting of workshops and the provision of guidance documentation and other pertinent information.

The mapping of major roads outside the agglomerations of Dublin and Cork was undertaken by TII. All sources within Dublin agglomeration were mapped by Dublin City Council (DCC) and Fingal County Council working in partnership with South Dublin County Council and Dun Laoghaire Rathdown County Council. All sourced within the Cork agglomeration were mapped by Cork City and County Councils. The mapping of major railways fell under the remit of Irish Rail.

For Round 3, Kildare County Council has continued to manage the centralised noise map modelling approach for non-national major roads (i.e. Regional and Local Roads), as was the case during Round 2, when it was passed from the EPA to Kildare County Council in late 2011. The relevant major non-national roads were mapped by TII following the provision of “model ready” data from the participating local authorities. The Action Planning Authority (Wicklow County Council) is also required to review and revise the noise maps if necessary, periodically and whenever a major development occurs with the potential to have an effect on the existing noise climate.

The EPA is also responsible for reporting the results of the noise mapping and action planning work to the European Commission. This reporting is to fulfil Ireland's obligations under the aforementioned Environmental Noise Directive 2002/49/EC. In December 2017 the EPA reported the results of the third round of noise mapping to the EC in accordance with the reporting timetable. In December 2017 the EPA requested action planning authorities to submit draft noise action plans for review by March 2018. Action planning authorities are required to submit completed plans to the EPA. The EPA timetable for noise action planning for the fourth and subsequent rounds then continues on a cyclical basis every five years thereafter.

1.4.2 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 (TII), as appropriate, on behalf of the action planning authority or authorities concerned;
- For major roads,
 - i) where such roads are classified as national roads in accordance with Section 10 of the Roads Act 1993 (No. 14 of 1993), Transport Infrastructure Ireland (TII), on behalf of the action planning authority or authorities concerned, and
 - ii) other than those provided for in part (i) above, the relevant road authority or authorities, as appropriate; and
- For major airports, the relevant airport authority, on behalf of the action planning authority or authorities concerned.

1.4.3 Transport Infrastructure Ireland (TII)

The relevant Local Authorities and TII are jointly responsible for strategic noise mapping of major roads as defined in the Regulations. TII was established through a merger of the National Roads Authority and the Railway Procurement Agency under the Roads Act 2015, with effect from 1st August 2015. TII's primary function is to provide an integrated approach to the future development and operation of the national roads network and light rail infrastructure throughout Ireland.

TII undertook noise mapping of national major roads and non-national major roads, on behalf of the Local Authorities, outside the Dublin & Cork agglomerations as part of the third round of Noise Mapping in 2017.

In 2016 (which was the assessment year) TII, as the designated noise mapping body for national major roads, assessed the extent of the national road network falling within the third round revised threshold levels. In 2017 TII modelled the relevant sections of the national road network falling within the requirements of the Regulations. As detailed earlier the EPA and Kildare County Council facilitated the implementation of a centralised approach for a central body to carry out the noise map modelling of the Regional and Local Major Roads as defined by the Regulations which were to be mapped and modelled by the individual noise mapping bodies (i.e. the local road authorities). Once the relevant “model ready” data was submitted TII undertook the noise map modelling on behalf of the relevant noise mapping bodies for regional and local roads. The completed second round noise maps were forwarded to the relevant roads authorities in January 2018.

1.4.4 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; and
- For major airports, the local authority or local authorities within whose functional area the airport is located.

Accordingly, Local Councils are designated as the Action Planning Authorities for all sections of major roads within the functional areas of those Councils which experience a volume of traffic greater than 3 million vehicle passages per year. While the source of environmental noise for a large number of Councils will be only from major roads, a limited number of Councils will be subject to environmental noise from other sources such as major railways and major airports, which qualify for noise mapping or inclusion in the action planning process.

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. Summaries of the Action Plans are to be submitted to the EPA. As with the strategic noise maps, the Action Plans are to be reviewed at least every 5 years after the date of their approval.

1.4.5 Wicklow County Council

Wicklow County Council is the designated body for the preparation of a Noise Action Plan for roads within County Wicklow carrying traffic in excess of 3 million vehicles per year, and railways within the county which have more than 30,000 train movements annually. Wicklow County Council is also the designated noise mapping body for non-national roads within County Wicklow which have a traffic flow above the major roads flow threshold. A map of the Action Planning Area is included in Appendix B.

1.5 Key Phases

1.5.1 Identification of Areas to be Mapped

In Wicklow, for the third round of the Environmental Noise Regulations 2006, strategic noise maps and associated action plans were prepared for:

- Major roads (defined in the regulations as roads with > 3 million vehicles per annum)
- Major railways (defined in the regulations as railways with > 30,000 trains per annum)

The requirement for noise action plans for major airports or agglomerations did not apply in County Wicklow. Under the third round of the regulations noise mapping bodies were required to make strategic noise maps before the 30th June 2017.

1.5.2 Preparation of Strategic Noise Maps

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

Major Roads

For the first phase of implementation of the Regulations, TII prepared strategic noise maps for all major roads in the country, including national and non-national roads with more than 6 million vehicles per annum.

In early 2016, TII as the national roads noise mapping body identified the extent of national roads falling within the remit of the Regulations, the details of which are included in Chapter 3 of this plan.

A total of 8 non-national major roads have currently been Identified by Wicklow County Council as falling within the remit of the revised thresholds of the Regulations, the details of which are again included in Chapter 3 of this plan.

Once the extent of the areas requiring mapping were defined, mapping was undertaken as detailed in Section 5.

Major Railways

Irish Rail confirmed that the major railway network (in excess of 30,000 passages per annum) passing through County Wicklow is limited to a short 1.6 km section of twin track, running from the county border with DLRCC to south of Bray Station (before Putland Road), with the majority of passages attributed to the DART service from Bray. The extents of the major railways subject to assessment are detailed in Chapter 3.

As the majority of the railway line affected is located within the Dublin Agglomeration to the north of Bray, Irish Rail carried out an assessment of the environmental noise impact for the railway noise on this line and prepared the necessary Noise Maps within the assessment of the Dublin Agglomeration area.

2 EXISTING NOISE MANAGEMENT LEGISLATION & GUIDANCE

In 2002, the European Union issued Directive (2002/49/EC), known as the Environmental Noise Directive (END), relating to the assessment and management of environmental noise is the main EU instrument to identify noise pollution levels and to trigger the necessary action both at Member State and at EU level. The aim of the Directive is:

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

Other international and national legislation also aims to reduce the impact of noisy activities on the receiving environment. Examples of the most relevant such legislation in Ireland are outlined below.

2.1 National Legislation or Guidance

The Wicklow Noise Action Plan has been prepared in accordance with the Environmental Noise Regulations 2006, the EPA (Environmental Protection Agency) Guidance Note on Noise Action Planning July 2009 (March 2018 – Version 3 Draft) and the EPA Guidance Note for Strategic Noise Mapping (Version 2) August 2011.

2.1.1 Environmental Protection Agency Act 1992

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

The implementation of the EPA Act as it applies to County Wicklow is discussed in greater detail in Section 2.2 which deals with Regional and Local Legislation and Guidance. The existing statutory provisions have come about on foot of the Environmental Protection Agency Act of 1992. Sections 106 to 108 of the Act are of direct relevance, and are summarised in Table 2.1.

Table 2.1 Environmental Protection Agency Act 1992 (Relevant Sections)

Section	Details
Section 106	gives the relevant Minister certain powers to regulate noise that may give rise to a nuisance or be harmful to health or property.
Section 107	gives powers to local authorities and the EPA to serve notice to take steps to control noise
Section 108	sets out a process whereby noise issues may be taken to the District Court, which may make an order requiring that the person or body responsible for the noise takes steps to eliminate or

	ameliorate the noise in question.
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2.1.2 Transport Infrastructure Ireland (TII)

TII has undertaken a review of the initial draft *“Guidelines for the Treatment of Noise and Vibration in National Road Schemes”* (October 2004). The review was based on the experiences acquired from the implementation of the original draft guidelines and on a validation study that was undertaken to assess the applicability of the specified design criteria and the functionality of the various Transport Research Laboratory (TRL) conversion methodologies for Irish road conditions. The review provides guidance on the revised design criteria and the application of validated approaches to deriving the L_{den} values as well as an overview of the baseline monitoring and model validation procedure.

The new *“Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes”* (March 2014) published by TII is based on the lessons learned from post-EIA noise evaluations studies and research undertaken on the design of noise barriers. It provides advice and information for use by acousticians and it is also relevant for traffic, motorway and pavement engineers. The advice amplifies and supplements the original noise guidelines and it should be read in conjunction with that document.

TII are also involved in the Conference of European Directors of Roads (CEDER) Noise Group which have produced a number of technical roads reports. TII is also developing a series of environmental guidelines to facilitate further the integration of various environmental issues into national road scheme planning.

2.1.3 Building Regulations

Building Regulations were initially introduced in Ireland in 1991 on a formal footing to standardise the construction of buildings within the state. The Building Regulations have since their initial introduction been substantially revised to take cognisance of developments in building technology since their initial introduction.

In 2014 there were amendments to Part E (SOUND) of the Building Regulations and the associated technical guidance, which were designed to meet the overall objective of securing appropriate standards of noise transfer in the built environment. The Regulations were amended in respect of new dwellings and also apply to extensions to dwellings which adjoin other buildings. The Regulations aims to ensure that dwellings achieve reasonable levels of sound insulation from sound transmission emanating from attached buildings or differently occupied parts of the same building and to protect dwelling occupants from noise produced reverberation in common internal areas which provide direct access to a dwelling or dwellings. The Regulations

do not relate to the transmission of sound from the outside environment into the living accommodation.

2.1.4 Integrated Pollution Prevention & Control (IPPC) and Waste Licensing

Certain activities that are required to be licensed may be subject to noise conditions. The relevant guidance is set out in the current EPA publication "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, January 2016)*". The guidance document contains suggested noise limits of 55dB LAeq for daytime and 45dB LAeq, for night time, with said limits to be applied to sensitive locations and recommends a Best Available Technique (BAT) approach to the assessment and mitigation of noise pollution.

2.1.5 Wind Energy Development Guidelines

The DoEHLG is at an advanced stage in its targeted review of its Wind Energy Development Guidelines 2006 in relation to noise, proximity and shadow flicker and is close to releasing a revised version of the document. The approach to the assessment and control of wind turbine noise recommended in these guidelines seeks to achieve a balance between the protection of residential amenity of neighbouring communities in the vicinity of wind energy developments, and facilitating the meeting of national renewable energy targets.

From this targeted review, The DoEHLG has indicated that:

"The proposed new robust noise restriction limits are consistent with World Health Organisation standards, proposing a relative rated noise limit of 5dB(A) above existing background noise within the range of 35 to 43dB(A) for both day and night, with 43dB(A) being the maximum noise limit permitted. The rated limit will take account of certain noise characteristics specific to wind turbines (e.g. tonal, low frequency and amplitude modulation) and, where identified, the noise limit permitted will be further reduced to mitigate for these noise characteristics. These limits will be conditioned as part of the planning permission process.

The new noise limits are being proposed in tandem with the introduction of a new noise monitoring regime in relation to wind farms. Local authorities will enforce the noise limits as conditioned in the planning permission, in conjunction with the EPA who will provide independent noise monitoring of wind farms."

2.1.6 Quarrying & Ancillary Activities Guidelines for Planning Authorities

This 2004 DoEHLG publication contains a discussion of the primary sources of noise associated with quarrying and offers guidance in relation to the correct approach to be followed in respect of assessment and mitigation. Suggested noise limit values are 55dB LAeq,1hr and 45dB LAeq,15min for daytime and night time respectively, although more onerous values may be appropriate in areas with low levels of pre-existing background noise. In respect of blasting, reference is made to EPA guidance to the effect that *“blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125dB (Lin) max. peak with a 95% confidence limit”*. The guidance or limits which do exist only cover a restricted number of the possible situations where community or environmental noise is an issue to be addressed. Consequently, there are many situations for which there are currently no direct guidelines or legislation. This can lead to inconsistencies in carrying out noise assessments and to existing measures being quoted out of context.

2.1.7 National Planning Guidance

In early 2018, the Government issued the National Planning Framework 2040, which is the planning framework to guide development and investment for the country over the next twenty years. Included in Chapter 9, *“Realising Our Sustainable Future”*, is the recognition by Government of the importance to proactively manage noise when promoting more compact and efficient forms of development within settlements and has set Policy Objective 65 to:

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

The current EPA guidance note for Noise Action Planning (2009) includes some sections that cover aspects of planning and also contains the following observation:

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

The EPA view is that there is still a need for national and consistent planning guidance which could outline some of the main noise elements that would need to be considered by planners such as:

- Demonstrating a good acoustic design process
- Observing internal noise level guidelines
- Undertaking an external amenity area noise assessment

The EPA considers that the May 2017 Professional Practice Guidance (ProPG) Planning and noise policy and guidance note, developed by the UK Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH), contains suitable guidance that could be equally valid in Ireland when used for detailed planning assessments or for the purposes of informing policy decisions. As the IOA is well established in Ireland, the ProPG guidance note could offer some degree of standardisation if it was to be considered by Irish planners & developers.

In the absence of national planning guidance to address the issue of noise, the EPA promotes the concept that all Local Authorities are encouraged to follow the same basic approach to help avoid significant discrepancies until such time as specific noise guidance is produced for Ireland.

2.2 Regional and Local Legislation or Guidance

Generally Wicklow County Council uses national legislation and guidance as well as locally prepared Development Plans to address noise. In a Regional context County Wicklow forms part of the Greater Dublin Area (GDA), which includes the Local Authorities included in the Dublin Regional Authority and Mid Eastern Regional Authority. There are a number of relevant policy objectives and guidance documents which are relevant within the context of noise action planning. These are briefly reviewed below.

Wicklow County Council has regard to the “*Regional Planning Guidelines for the Greater Dublin Region 2010-2022*” and the “*Transport Strategy for the Greater Dublin Area 2016-2035*”. It seeks to influence county wide the impact of noise through the Wicklow County Development Plan 2016-2022 and over a more limited area geographically through Local Area Plans and Action Area Plans.

2.2.1 Regional Guidance

The Regional Planning Guidelines (RPG) 2010-2022 have been prepared to build on and extend the policies and strategies of the 2004 to 2016 RPG's for the Greater Dublin Area. A key theme of the 2010 RPG is sustainable growth *"in relation to economic growth for the GDA, for the location of new housing land, actively working to improve the environment, water quality, and building real sustainable communities with a range of integrated services. Also new to the Greater Dublin Area RPGs is a model for a Green Infrastructure framework for the GDA to promote a new approach to biodiversity protection"*.

The RPG notes in respect of Social Infrastructure & Sustainable Communities that even though healthcare is not a social service provided directly by Local Authorities, the provision of healthcare facilities must be taken into account in planning terms with planning policy seen as affecting health in many ways with some of the biggest impacts being through *"influencing transportation, buildings and communities, homes and flood risk"*. The guidelines advise that:

"Planning policies need to consider the added health burden from the effects of air and noise pollution, road traffic accidents, sedentary lifestyles, lack of safe community space or spaces with poor access, poor or unsafe access to a range of food shops and health services, poor access to local health centres, poor land use mix failing to encourage local employment, poor housing/building design, flooding and cold and damp housing. High quality development and strong local area planning provide a key opportunity to increase the quality of life for communities through improvement of health and offering real opportunities for interaction, exercise and ease of Planning access to services by all members of the community".

Linked to The Regional Planning Guidelines 2010-2022 is the Transport Strategy for the Greater Dublin Area 2016-2035. The purpose of this strategy is to:

"contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods"

A Strategic Environmental Assessment (SEA) was carried out as part of the preparation of the Strategy with the objective to:

“provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.”

One of the overall findings of the SEA is that:

“The Strategy facilitates significant improvements in sustainable mobility and associated positive effects relating to energy usage, emissions to air (including greenhouse gas emissions and noise) and human health”

2.2.2 Wicklow County Council County Development Plan 2016-2022

The Wicklow County Council County Development Plan 2016-2022 continue to recognise the increasing relevance of noise in a planning context in County Wicklow. This is highlighted in the identified Objectives and Standards listed in Table 2.2.

Table 2.2 Relevant County Development Plan 2016-2022 Objectives

Chapter	Title	Objective
5	Economic Development	EMP19
6	Centres and Retail	RT17
9	Infrastructure	TR22, WE12, WE13, WE14 & WE15
Appendix 1	Development & Design Standards	-

➤ Chapter 5 - Economic Development

The Chapter on Economic Development, Chapter 5, under specific objectives for Employment Types seeks:

“To encourage, where appropriate, home-based economic activity including the provision of small-scale individual enterprises”

as part of Home Based Economic Activity Objective EMP19. In dealing with applications for such developments, the planning authority will have regard to the following:

“the effects on the amenities of adjoining properties particularly as regards hours of operation, noise and general disturbance”

➤ Chapter 6 – Centres & Retail

Chapter 6, Centres and Retail, sets out the strategies and objectives with regard to settlement centres, that is, the core central area of each settlement. It is stipulated in Retail-Uses Objective RT17, that, while planning has an important role to play in promoting and facilitating active and healthy living patterns for local communities consideration needs to be given during the assessment of development proposals for fast-food/takeaway outlets to:

“Location of vents and other external services and their impact on adjoining amenities in terms of noise/smell/visual impact”.

➤ Chapter 9 – Infrastructure

In relation to Infrastructure, Chapter 9, the requirement to plan for noise is highlighted by National Roads Objective TR22 which states:

“To ensure that all new developments in proximity to National Routes provide suitable protection against traffic noise in compliance with S.I No. 140 of 2006 Environmental Noise Regulations and any subsequent amendments to these regulations.”

Also as part of Chapter 9, in section 9.3, Waste and Environmental Emissions, four Noise Pollution Objectives (WE12, WE13, WE14 and WE15) have been set and include:

- **WE12** - To enforce, where applicable, the provisions of the Environmental Protection Agency (EPA) Acts 1992 and 2003, and EPA Noise Regulations 2006.
- **WE13** - To regulate and control activities likely to give rise to excessive noise (other than those activities which are regulation by the EPA).
- **WE14** - To require proposals for new developments with the potential to create excessive noise to prepare a construction and/or operation management plans to control such emissions.
- **WE15** - To require activities likely to give rise to excessive noise to install noise mitigation measures to undertake noise monitoring and to provide an annual monitoring audit.

➤ Appendix 1 – Development & Design

Development & Design Standards forms Appendix 1 of the Wicklow County Council County Development Plan 2016-2022. This document intends to set out Wicklow County Planning Authority’s requirements with respect to development and design standards and outlines the principal factors that should be considered in the design of any new

development. Noise is addressed in a number of sections of the document with guidance on noise given in the following areas:

- Business / industrial developments.
- Commercial / employment development in rural areas (including agriculture, forestry and quarries)
- Tourism and Recreation developments
- Retailing
- Community Developments and Open Space
- Roads and Transportation
- Waste and Emissions

2.2.3 Local Town and Environs Development Plans

In addition to the Wicklow County Council County Development Plan 2016-2022, a number of the large Urban areas and Environs have their own Development Plans. These Urban and Environs Development Plans are fundamentally similar to the County Development Plan in terms of objective in relation to noise in the planning context.

In the current Ashford Town Plan, Specific Local Objective SLO 1: Inchanappa House has included the following as one of the criteria in an attempt to mitigate against noise pollution and to ensure that the location is delivered as a residential and open space/public park area:

“The minimum set back of new housing development from the M11 in this SLO shall be 50m. Where housing development is proposed within 100m of the M11, the developer shall be responsible for designing, providing and maintaining suitable noise and light pollution mitigation measures”

2.2.4 Wicklow County Council Wind Energy Strategy

A supplementary document to the Wicklow County Council County Development Plan 2016-2022 is the *“Wicklow County Council Wind Energy Strategy”*, It is included in Volume 3 as Appendix 6 of the Development Plan. The Wind Energy Strategy allows the Council to support the development of windfarms, whilst protecting environmental and material assets within the county.

The Wicklow Wind Energy Strategy as set out in the 2010 County Development Plan was developed generally in accordance with the Department of Housing, Planning & Local Government (DoEHLG) *“Wind Energy Guidelines”*. In early 2014 a number of issues were raised by the elected members in regard to the provisions of the adopted Wind Strategy for the County in

2010. One of the key components of these concerns was in respect to noise with the following point noted:

“The strategy did not adequately address the issues of noise and shadow flicker associated with wind energy development”

The following objective was included under Section 3, Assessment Criteria, of the Wind Energy Strategy 2016-2022 to address these issues:

“All applications for wind turbines with a rotor diameter of 50m or less shall include a detailed assessment of noise and shadow flicker impacts on all residences within 500m from any turbine. Applications providing for a rotor diameter in excess of 50m shall include a detailed assessment of noise and shadow flicker on all residences within a minimum radius of 10 times the diameter of the rotor e.g. a wind turbine with a rotor diameter of 65m will be required to carry out an assessment of impacts on all residences within a minimum 650m radius of any turbine”

In Section 9.5.3 of Chapter 9, Infrastructure, of the Wicklow County Council County Development Plan 2016-2022, Wind Energy Objective CCE6 seeks:

“To encourage the development of wind energy in accordance with the County Wicklow Wind Energy Strategy and in particular to allow wind energy exploitation in most locations in the County”

This is subject to a number of constraints, one of which includes:

“particular cognisance and regard being taken of the impact on wind turbines on residential amenity particularly with respect to noise and shadow flicker”

In evaluating potential noise and shadow flicker impacts, The Wind Energy Strategy 2016-2022 stipulates in Section 3, Assessment Criteria, that:

“regard shall be taken of the guidance set out in the Wind Energy Guidelines (DoEHLG 2006) and any revisions thereto. Conditions may require the monitoring of noise and shadow flicker throughout the operational phase of the development. In the event that the monitoring shows that any turbine is exceeding its projected noise levels or shadow flicker impacts, and is having a detrimental impact on residential amenity, mitigating measures shall be agreed with the Local Authority”.

3 DESCRIPTION OF THE ACTION PLANNING AREA

3.1 County Wicklow

County Wicklow lies on the eastern seaboard of Ireland immediately to the south of the Dublin Agglomeration and is bounded to the east by the Irish Sea and to the west and south by the predominantly rural counties of Kildare, Carlow and Wexford.

3.2 Geography and Topography of County Wicklow

County Wicklow covers a geographical area of 2,024 square kilometres with 66 kilometres of coastline. The county contains a range of landforms and land uses, from rural lowlands to the south and west to the spine of mountains dividing the county from north to south, to the coastline on the Irish Sea to the east. The larger population centres are concentrated along the eastern coastlines with a pronounced concentration towards the north eastern corner of the county which is close to the major population centres in the Dublin Agglomeration.

3.3 Population of County Wicklow

The population of County Wicklow at the 2016 census was 142,425 which was an overall increase of 5,785 on the 2011 census population of 136,640. This equates to an overall population increase of 4.2% for the county over the period. All of the main towns in the county are located along the eastern coastline with the exception of Blessington and Baltinglass on the N81 in the west of the county.

The largest urban centre is Bray (pop. 32,600 which increased by 2.3% on the 2011 census of 31,872) located on the northern county border with Dun Laoghaire Rathdown. Other main towns include Greystones (pop. 18,140 which experienced an increase of 3.8% on the 2011 figure of 17,468), Arklow (pop. 13,163, a slight increase of 1.2% from the figure of 13,009 in 2011) and Wicklow Town (pop. 10,356 which had a modest increase of 2.2% on the 2011 figure of 10,356). Other select population centres in Wicklow which experienced significant growth in population in the period were Newtownmountkennedy (pop. 2,835 up by 17.6%), Rathnew (pop. 3,370 up by 13.7%) and Newcastle (pop. 4,369 up by 10.9%). The two towns on the N81 also experienced various levels of population growth with Blessington increasing by 10.2% to a population of 5,520 and Baltinglass rising by a modest 3.7% to 2,137. The village of Kilmacanoge is located on the N11 at Junction 8 to the south west of Bray. However as the village is located within a large rural area it has not been possible to extract the population data for the village. A map of the extents of County Wicklow showing the major centres of population is included in Appendix B.

3.4 Transport Infrastructure within County Wicklow

3.4.1 Road Network

There are approximately 2,400 kilometres of public roads within the charge of Wicklow County Council. These consist of 92 kilometres of national roads, 422 kilometres of regional roads and 1,886 kilometres of local roads. There are two national routes, M11/N11 (54 Km) and N81 (38 Km) in the county.

The N81 is classified as a National Secondary Route and is a single carriageway road along its entire length. The road runs on a north to south axis linking the population centres of Blessington and Baltinglass in west Wicklow (west of the Wicklow Mountains) with Dublin to the north and Tullow and Enniscorthy to the south. Sections of the N81 have been improved by widening over the years, however some sections without hard shoulders remain on the route.

The M11/N11 National Primary route forms part of the Trans European Route E01. The capacity of the road has been gradually upgraded since the 1960's in various stages. These initially included road widening to dual carriageway with at grade junction arrangements, followed by the by-passing of population centres by dual carriageways with grade separated junctions on new alignments. Some sections of these by-passes have been upgraded to Motorway status which now accounts for 30.5 km of the route with the last 15km section between Rathnew and Arklow added when opened to traffic during the month of July in 2015. The remaining improved dualled sections of the route account for 23.5 km.

The majority of the road length in County Wicklow (95%) is made up of regional and local roads, a reflection of the predominantly rural nature of the county.

3.4.2 Rail Network

The only railway network located in County Wicklow is the Dublin Connolly to Rosslare Europort Intercity Service which connects the county with other transport nodes located in Dublin and Dun Laoghaire to the north and Rosslare Europort to the south. The service connects with varying levels of frequency the population centres of Bray, Greystones, Kilcoole, Newcastle, Wicklow, Rathdrum and Arklow in the county.

In addition Irish Rail operates the electrified DART rail service from Greystones and Bray to the centre of Dublin city and beyond. The railway line consists of twin tracks from Dublin city to just south of Bray station (before Putland Road) where the line reverts to a single track as far as its

terminus in Rosslare Europort. The frequency of the DART service to Greystones is lower than to Bray due to the reduced capacity arising from the single track.

3.5 Extent of the Action Planning Area

The action planning area includes lands on both sides of the above referenced roads and the railway network affected. The boundary of the lands is not defined by distance from the major noise source but rather it is the land area defined by computer modelling to be affected by noise levels of greater than 50dB L_{night} and/or 55dB L_{den} .

Major Roads

The Noise Action Plan applies to the areas adjacent to roads in County Wicklow which experience traffic volumes in excess 3 million vehicles a year as defined in the Regulations. In County Wicklow the total length of identified major roads included within the strategic noise mapping was 103 km which amounts to under 5% of the total road network which is reasonable considering the proximity to a major agglomeration area. The lengths of major roads by category are detailed in Tables 3.1 & 3.2 below with Appendix C containing maps of the major road network and the associated Noise Maps.

Table 3.1 – National Major Roads identified in County Wicklow

Road	From	To	Max AADT	Length (Km) Approx
M11/N11	DLRCC County Boundary at Fassaroe	WXCC County Boundary at Cooladangan	68,521	54.0
N81	SDCC County Boundary at Moanspick	Junction with R758 (Valleymount)	11,371	11.0
Total National Major Roads				65

Note: The N81 south of the junction with the R758 (Valleymount Road) does not fall within the threshold.

Table 3.2 –Non-National Major Roads identified in County Wicklow

Road	From	To	Max AADT	Length (Km) Approx
R772	M11 Junction 20 (Arklow North)	M11 Junction 21 (Arklow South)	12,263	6.9
R772	M11 Junction 16 (Wicklow North)	Junction with R750 in Rathnew	17,987	1.1
R750	Junction with R750 (Rathnew Village)	South end of Wicklow Town 50kph zone on R750	13,461	5.7
R761	DLRCC County Boundary north of Bray at Old Connaght	South end of Kilcoole 50kph zone at Woodstock on R761	17,416	14.0
R762	Junction with R761 at Blacklion, north of Greystones	Mill Road Roundabout south of Greystones on R762	12,639	2.5
R767	N11 Junction 7 (Bray South / Greystones North)	Junction with R761 at south end of Main Street, Bray	10,701	2.6
R768	N11 Junction 7 (Bray South / Greystones North)	Junction with R761 at Windgates Roundabout, south of Bray	11,685	2.8
R774	N11 Junction 11 (Greystones South)	Junction with R761 at Prettybush Roundabout south of Greystones	12,846	2.4
Total Non-National Major Roads				38

Major Railways

In County Wicklow, Irish Rail identified one section of major rail on the Dublin to Rosslare Europort Line, which is 1.6km in length, between the boundary with Dun Laoghaire Rathdown County Council (DLRCC) and the end of twin tracks at Putland Road south of Bray Station, details of which are included in Table 3.3 below.

Table 3.3 –Major Railways identified in County Wicklow

Route	From	To	Length (Km) Approx
Dublin Connolly – Rosslare Europort	DLRCC County border	South of Bray Station (Before Putland Road)	1.6

Appendix D includes maps showing the extent of the areas of strategic noise mapping arising from major railway traffic for the Dublin Agglomeration.

4 RESPONSIBLE AUTHORITY FOR ACTION PLANNING

In County Wicklow, the noise sources to be considered by the Action Planning Authority, Wicklow County Council, relate to major roads in excess of 3 million vehicle passages per year and railways in Wicklow with more than 30,000 train passages per year, as defined in the Regulations.

4.1 Contact Details for the Responsible Action Planning Authority

The contact details for the Responsible Action Planning Authority for county Wicklow are noted below:

Wicklow County Council
County Buildings,
Whitegates,
Wicklow Town,
Co. Wicklow.
A67FW96

Phone: 0404 20100
Fax: 0404 67792
Email: plandev@wicklowcoco.ie

Wicklow County Council is the Lead Authority in developing the Noise Action Plan. Any communication in relation to the Noise Action Plan should be addressed to:

Senior Executive Officer,
Transportation, Water & Emergency Services,
Wicklow County Council,
County Buildings,
Whitegates,
Wicklow Town,
Co. Wicklow
A67FW96

Telephone: 0404 20100
Fax: 0404 67792
Email: noiseplan@wicklowcoco.ie
Website: www.wicklow.ie

4.2 Description of other bodies of relevance

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

The 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 relevant non-national major road lies.

Following consultation with Responsible Action Planning Authorities agreement was reached to centrally map all major (Non-National) roads falling outside the remit of TII. This centralised approach was facilitated through the auspices of the CCMA with Kildare County Council acting as the lead authority in order to obtain the relevant noise mapping services on behalf of the participating authorities. Wicklow County Council participated in this process in order to effectively complete the required noise mapping for non-national major roads in County Wicklow. The mapping for these roads was carried out through the agreed centralised approach by TII.

4.3 Description of noise reduction measures already in place

Comparing the relative length of railway network affected (approximately 1.6 km) with the road network affected (103 km), road generated environmental noise is the overwhelming environmental noise in County Wicklow.

The most significant major road in County Wicklow is the M11/N11 which links the major towns along the eastern coastline of the county. Enhancements to this road have been ongoing since the late 1960's when the first section of dual carriageway was constructed. In the intervening years the road has undergone continuous up-grading to the point that the last remaining 15km section of single carriageway was decommissioned during July 2015 with the Rathnew to Arklow Road Improvement Scheme. Early improvement schemes on the M11/N11 did not envisage the volumes of traffic now experienced along the route. Sections of the M11/N11 which has been completed in recent years have to varying extents as part of the Environmental Assessment considered the effects of noise for the relevant schemes and included noise mitigation measures as part of the schemes. This mitigation measures consisted mainly of noise barriers (proprietary or masonry walling), earth bunding and the use of low noise road surfacing. The schemes were designed to the relevant national road design guidelines, to minimise impact on existing residential amenity. The following is a non-exhaustive list of road schemes with some level of noise assessment and/or mitigation measures were included as part of the scheme.

Scheme Name	Year Completed	Length
<i>N11 Rathnew to Arklow</i>	<i>2015</i>	<i>15km</i>
<i>Wicklow Port Access and Town Relief Road</i>	<i>2011</i>	<i>7km</i>
<i>N11 Kilpedder Interchange (Junction 11)</i>	<i>2008</i>	<i>2km</i>
<i>R774 Greystones Southern Access Road</i>	<i>2006</i>	<i>6km</i>
<i>N11 (M11) Newtownmountkennedy to Ballynabarny (N11 Ashford and Rathnew By-Pass)</i>	<i>2006</i>	<i>13km</i>
<i>N11 Kilmacanoge to Glen of the Downs</i>	<i>2003</i>	<i>5km</i>

Reduction of speed limits in the centres of urban population on the N11, N81 and the major non-national roads along with improvement of road safety for motorists and pedestrians in high conflict locations have to some extent resulted in a reduction of traffic noise.

During the last quarter of 2017, Globalvia Sacyr Jons (GSJ), the Contractor appointed by TII to Area A of the Motorway Maintenance and Renewals Contracts (MMaRC), completed a number of road pavement improvement works along sections of the N11 between Kilmacanoge and Glen of the Downs. As part of these works, the use of low noise road surfacing such as Stone Mastic Asphalt (SMA) was incorporated into the design.

5 SUMMARY OF NOISE MAPPING RESULTS

5.1 Overview of the Preparation of the Strategic Noise Maps

The preparation of the Strategic Noise Maps required the assessment of a number of parameters in order to compile the data for entry into the modelling software. These are broken down into three distinct areas:

- Roads Data
- Buildings Data
- Contour Data

The completed datasets were mapped using MapInfo software before being converted into Shape files for running in the modelling software. The details of the data included in the various datasets are discussed in more detail in sub sections 5.1.1, 5.1.2 and 5.1.3.

5.1.1 Roads Data

The Roads data was the most varied of the datasets to compile as the data required a mixture of on site assessment as well as examining pavement conditions, paving materials, stated speed limit, etc. A number of seven-day traffic counts were undertaken in November 2016 to assess the traffic flow volumes (AADT) and percentage of Heavy Goods Vehicles (HGV's) on each individual segment assessed. These traffic counts were undertaken using AT-SR4 Radar Traffic Counter boxes which collected traffic volumes, percentage of HGV's and traffic speeds and extracted the data using Sierzega traffic counter software.

The individual road segments with the relevant background data were mapped in MapInfo before being converted into Shape files for TII to run in the modelling software. The data compiled for each road segment is defined in Table 5.1.

Table 5.1 – Major Roads Dataset Information Requirements

Parameter	Details
Road	Name of Road – i.e. Road Number used within Ireland to reference the road
Traf_AADT	Annual Average Daily Traffic Count
CRTN_18Hr	18 Hour traffic Count - Derived from AADT figure using NRA Guidelines (specific to national roads) or Directly from Traffic Counter data (i.e. between 06:00 to 24:00 hours)
VD	Speed [km/h] - Speed Limit on Road Segment
PHD	Percentage of HCVs [%] derived from Traffic Counter data
MTD	Mean Texture Depth [mm] - A standard texture depth of 1.5mm is assumed for all roads.
Surface	A standard asphalt surface type is assumed for all roads unless other wise known. 0 for Standard Asphalt;1 for Bitumen; 2 for Concrete.
LowNoiseRd	Yes or No depending on presence of a low noise road surface
Gradient	Gradient of Road [%] – in direction of digitisation
RoadClass	0 for Non-Motorway; 1 for Motorway
Width	Road Width [m]
Direction	With/Against digitisation
MapYear	Year first mapped in accordance with END (2006 or 2011)
Notes	Any additional notes relevant to road section

5.1.2 Buildings Data

The data required for buildings was more generic and was generally the building height which was taken with a default of 8 metres high. The details of the locations of buildings along the relevant road segment corridors were extracted from up-to-date OSI Vector mapping data sets and each building was given a unique identifier code which contained the prefix WW for Wicklow.

5.1.3 Contour Data

The Contour Data was also obtained from OSI mapping. Initially in this process the OSI had in excess of 30km of the relevant road corridors mapped with high quality LIDAR digital mapping. The modelling software required that contour datasets be interpolated at 1 metre intervals in order to accurately run the noise models.

5.1.4 Modelling Process

In Section 3.5 details of the approach taken by Noise Mapping Bodies to achieve economies of scale by centrally arranging noise modelling services was detailed. The process, which was facilitated through the auspices of the CCMA with Kildare County Council acting as the lead authority, resulted in the TII modelling all non-national major roads as defined by the Regulations for the participating Noise Mapping Bodies.

Once the relevant datasets were completed, they were forwarded to TII to run the models during 2017. The noise levels were assessed on a regular grid pattern across the model, and the results were used with a model of estimated population distribution to assess the numbers of people exposed. As with all modelling, the variations in the data parameters in the datasets meant that the results will provide a best assessment based on the input data, rather than a conclusive quantifiable output of data. The results do however provide pointers for future assessment of the location, magnitude and population affected by environmental noise.

5.2 Presentation of Strategic Noise Mapping Results

5.2.1 General

After completion of the Noise modelling process in 2017, TII forwarded the Strategic Noise Maps for major roads in County Wicklow to Wicklow County Council in January 2018. The Noise Maps for major railways were also available during January 2018. These maps show grids of noise level results, categorised into 5 dB wide noise level bands above 55 dB L_{den} and 50 dB L_{night} . In these noise level maps, the noise level bands are displayed as coloured areas and used as the basis for statistical analysis to estimate the extent of exposed areas, and the number of exposed dwellings and exposed people. These statistical exposure results were submitted to the EC in December 2017 by the EPA. The colour coding of the noise exposure levels are in accordance with the recommendations in the EPA Guidelines for Noise Action Planning 2009.

5.2.2 Strategic Noise Maps

The Strategic Noise Maps detailing the results of the strategic noise mapping within County Wicklow are contained in Appendices C and D as a series of coloured 5dB(A) wide noise level bands above 55dB L_{den} and 50dB L_{night} .

5.2.3 Exposure Statistics Summary - Major Roads

The details of the exposure statistics obtained for the major road network in County Wicklow has been received from TII with the Strategic Noise Maps for the Major Roads. The results are detailed as follows:

- Table 5.2 Weighted 24 Hour Road Traffic Flow (L_{den}) - Estimated Number of Affected People in dB Bands.
- Table 5.3 Weighted 24 Hour Road Traffic Flow (L_{den}) – Estimate of Area, No. of Dwellings and People in dB Bands.
- Table 5.4: Weighted 24 Hour Road Traffic Flow (L_{night}) - Estimated Number of Affected People in dB Bands.
- Table 5.5: Weighted 24 Hour Road Traffic Flow (L_{night}) – Estimate of Area, Number of Dwellings and People in dB Bands.

Table 5.2: - Weighted 24 Hour Road Traffic Flow (L_{den}) Affected Population

L_{den} Noise Band	Approx Number of People Affected
55-59 dB	7,708
60-64 dB	4,412
65-69 dB	4,070
70-74 dB	1,141
≥ 75 dB	28

Table 5.3: - Weighted 24 Hour Road Traffic Flow (L_{den}) Area, Dwellings and People.

L_{den} Noise Band	Approx Area Km^2	Approx No. of Dwellings	Approx No. of People
>55 dB	45	6,579	17,359
>65 dB	11	2,160	5,239
>75 dB	2	10	28

Table 5.4: - Weighted 24 Hour Road Traffic Flow (L_{night}) – Affected Population

L_{night} Noise Band	Approx Number of People Affected
50-54 dB	4,956
55-59 dB	4,391
60-64 dB	1,346
65-69 dB	88
>70 dB	0

Table 5.5: - Weighted 24 Hour Road Traffic Flow (L_{night}) – Area, Dwellings and People

L_{night} Noise Band	Approx Area Km ²	Approx No. of Dwellings	Approx No. of People
>50 dB	28	4,182	10,781
>60 dB	6	639	1,434
>70 dB	0.2	0	0

5.2.4 Exposure Statistics Summary – Major Rail

As the majority of the railway line affected is located within the Dublin Agglomeration to the north of Bray, Irish Rail developed the Noise Mapping for this section of railway and included the results in the noise mapping for the Dublin Agglomeration. As a consequence, it is not possible to filter out the populace affected by environmental noise from major railway lines in County Wicklow.

The Irish Rail Strategic Noise Maps for L_{den} and L_{night} for the Dublin Agglomeration are included in Appendix D for general information.

5.2.5 Exposure Statistics Summary – General Overview

The results clearly show that noise from road traffic, as opposed to rail, is the dominant source of noise affecting people in the Action Planning Area of County Wicklow.

5.3 Limitations of Strategic Noise Mapping Results

As with all assessments based on subjective datasets there are a number of limitations with the results of the Strategic Noise Mapping. These limitations which were identified in sub-section 5.1.4 mean that the results provide a best assessment based on the input data rather than a conclusive quantifiable output of data. The results do however provide pointers for future assessment of the location, magnitude and population affected by environmental noise. The limitations of the noise map results include the following.

- The noise maps are generated using a computational noise prediction model using representative traffic flow data. Topographical data and existing buildings have been input into the noise prediction models. However, the effects of any existing noise mitigation measures already in place have not necessarily been fully considered.
- The results of the noise mapping process display environmental noise levels attributed only to a single source, i.e. traffic noise. While this is by far the most predominant source of environmental noise adjacent to such busy roads, the maps may not always be fully representative of the precise noise climate at a specific location.

6 IDENTIFICATION OF AREAS TO BE SUBJECT TO NOISE MANAGEMENT ACTIVITIES

6.1 General

Strategic noise maps provide a spatial indication of locations which may be subject to undesirably high levels of environmental noise. However, not all of these noise locations require priority action. Various factors must be taken into account when deciding if environmental noise management is necessary, such as the source of the noise and the actual noise level, the type of buildings and land use in the area.

At present there is no mandatory or statutory guidance in existing legislation that limits noise levels to a particular value, mainly due to the subjective nature of noise exposure and annoyance. The effect of noise exposure is 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 countryside 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 has 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 assessment of Noise Mitigation measures:

70dB L_{den}

57dB L_{night}

Onset levels for assessment of Noise Level Preservation where they are good:

55dB L_{den}

45dB L_{night}

The value of 57dB L_{night} is considered as appropriate. However, as the noise maps are plotted in 5dB contour bands, it is difficult to identify and evaluate areas which are exposed to exactly 57dB or greater. Nonetheless, these values can be seen as indicative criteria in the decision-making process. This value could be rounded up or down depending on the situation and the location of the exposed properties. Combined with the graphical results of noise mapping, consideration of the number of people exposed and the type of property, the guidelines provide a useful framework for assessing noise impact.

The estimated population exposed to noise levels greater than 70dB L_{den} for major roads within the Action Plan Area equates to 1169 people. This compares to a figure of 977 people in the Second Round Noise Action Plan.

The estimated population exposed to noise levels greater than 57dB L_{night} for major roads within the Action Plan Area is estimated to be of the order of 5,825. In the Second Round Noise action plan 5,831 people were identified. However there is no direct correlation for a noise level of 57 dB as it falls within the 55 to 59dB noise band. The fact that the calculations are based on a variety of factors and are logarithmically calculated means that simple iteration of the 55-59 dB noise bands is unlikely to produce an accurate figure for noise above the 57dB level. The approach taken, similar to the previous two Noise Action Plans is to simply assume that all noise in the 55 - 59dB noise band exceeds the threshold of 57dB. This approach means that the estimated figure of 5,825 should be considered to be a conservative estimate.

6.2 Description of the Criteria/Decision Matrix to be used for the identification of areas qualifying for action

Implementation of the Environmental Noise regulations requires strategic mapping. Strategic noise maps provide an indication of which locations are subject to undesirably high levels of environmental noise. However, not all of these areas require priority action. Various factors must be taken into account when deciding if environmental noise management is necessary, such as the type of buildings and land use in the area, the source of the noise and the level of noise itself.

In order to focus resources on areas in most need of improvement, a decision support matrix (Prioritisation Support Tool) has been applied. This is based on work carried out by Dublin City Council for the Dublin Agglomeration Noise Action Plan. A decision support matrix is a chart that enables identification, analysis and rating of the strength of relationships between various sets of information. This enables a number of different factors to be examined and facilitates assessing the relative importance of each.

For this Action Plan it is proposed that the higher the number achieved in the decision matrix process, the higher the priority for action. A total score of 17 or above in the matrix indicates that the location in question should be included in a shortlist for further assessment. When combined with the guideline values for the noise assessment the support matrix allows for a more comprehensive evaluation of the impact of environmental noise pollution at a given location.

The decision support matrix is a support tool that will help Wicklow County Council to best determine what locations to prioritise first based not only on measured noise levels but also in terms of noise receptor sensitivity and noise type. The final matrix score is determined based on three variables such as Environmental Noise Level, Location / Land Use, and source type.

6.2.1 Environmental Noise Levels

The noise indicators L_{den} and L_{night} as set out respectively in Parts I and II of the First Schedule of the Environmental Noise Regulations, 2006, shall be used by noise-mapping bodies for the preparation or revision of strategic noise maps in accordance with Article 10. A standardised noise annoyance dose-response curve, similar to that contained in ISO 1996-1:2016 was used. The weighting factors for various noise exposure categories that will be used are shown below:

Table 6.1 – Decision Support Matrix Criteria (Environmental Noise Levels)

Noise Band	Score Range L_{den}	Score Range L_{night}
<45 dB	5	6
45 - 49 dB	4	5
50 - 54 dB	3	4
55 - 59 dB	2	2
60 - 64 dB	1	3
65 - 69 dB	2	4
70 - 74 dB	3	5
75 - 79 dB	4	6
>80 dB	5	7

6.2.2 Location / Land Use

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

Table 6.2 - Decision Support Matrix Criteria (Location/Land Use)

Location	Score Range L_{den}	Score Range L_{night}
Town Centre	1	1
Commercial	1	2
Residential	2	3
Noise Sensitive	3	3
Open Countryside	3	3
Recreational open space	2	2

6.2.3 Source Type

The type of noise source will be prioritised based on the following:

Table 6.3 - Decision Support Matrix Criteria (Source Type)

Source type	Score Range L_{den}	Score Range L_{night}
Air	3	4
Industry	2	3
Rail	2	3
Road	3	4

6.2.4 Complete Decision Matrix

The individual Decision Matrix Criteria as detailed in 6.2.1 to 6.2.3 above are combined to form a Complete Decision Matrix which allows the identification, analysis and rating of the strength of relationships between the various sets of information. It enables a number of different factors to be examined and facilitates assessing the relative importance of each.

It is proposed that the higher the number achieved in the decision matrix process, the higher the priority for action. A total score of 17 or above in the 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 the support matrix allows for a more comprehensive evaluation of the impact of environmental noise pollution at a given location. The Complete Decision Support Matrix is detailed in Table 6.4 below.

Table 6.4 - Decision Matrix Criteria (Location/Land Use)

Assessment Area		Score Range L _{den}	Score Range L _{night}	Sub total
Noise Band	<45 dB	5	6	
	45 - 49 dB	4	5	
	50 - 54 dB	3	4	
	55 - 59 dB	2	2	
	60 - 64 dB	1	3	
	65 - 69 dB	2	4	
	70 - 74 dB	3	5	
	75 - 79 dB	4	6	
	>80 dB	5	7	
Location	Town Centre	1	1	
	Commercial	1	2	
	Residential	2	3	
	Noise Sensitive	3	3	
	Open Countryside	3	3	
	Recreational open space	2	2	
Source Type	Air	3	4	
	Industry	2	3	
	Rail	2	3	
	Road	3	4	
Priority: High, Medium or Low				

Note: A worked example of the Complete Decision Matrix is included in Appendix F.

6.2.5 Approach to determine Quiet Areas in Agglomerations

The Regulations define “*Quiet Area in an Agglomeration*” as

“an area, delimited by an action planning authority following consultation with the Agency and approval by the Minister, where particular requirements on exposure to environmental noise shall apply”

There are no relevant agglomerations in County Wicklow therefore there is no statutory requirement to identify quiet areas within County Wicklow.

6.3 Approach to determine Quiet Areas in Open Country

The Regulations define “*Quiet Area in an Open Country*” as

“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 virtue of the fact that the Strategic Noise Maps identify areas subject to environmental noise it could be easily assumed that the balance of County Wicklow not covered by the Strategic Noise Maps could be classed as “*Quiet Area*”. However, such a wide sweeping assessment by its nature would disregard other local factors which could affect the environmental noise within the assumed Quiet Areas. These factors could include existing industries, centres of population, geographical location, topography, economic asset (tourism / environmental) etc. Additionally, these “*Quiet Areas*” are covered by a network of non-major roads (i.e. not covered by the requirements if the Regulations) connecting to the major roads. Traffic on these non-major roads will also have an influence on the noise levels in these areas.

Nonetheless, thought should be given to the protection of these areas as they can be seen as being “*relatively quiet*” with respect to noise emissions from the major roads. Wicklow County Council as the Action Planning Authority may during the lifetime of this Action Plan identifies quiet areas in open countryside and will undertake public consultation prior to any recommendation for approval by the Minister.

6.4 Application of the Criteria / Matrix

Wicklow County Council as the Action Planning Authority proposes to examine in detail the relevant Strategic Noise Maps to identify any noise sensitive locations situated within the action

planning area. This will be achieved by superimposing the relevant Strategic Noise Maps (L_{den} and L_{night}) over detailed OSI background mapping and the Geodirectory to identify particular “hot spot” locations. Please refer to Appendix G – *“Investigation of Noise Hotspots along Busy Traffic Routes in County Wicklow”*. Observations made by the General Public shall also be reviewed as part of this process.

Any noise sensitive locations identified will then be tested against the Complete Decision Support Matrix to establish whether mitigation measures need to be carried out to improve or preserve the existing noise situation. As detailed in Section 6.2 a total score of 17 or above in the matrix indicates that the location in question should be included in a shortlist for further assessment.

6.5 Results of Analysis of the Data

During the lifetime of this Noise Action Plan, Wicklow County Council as the relevant Action Planning Authority proposes to undertake, on a phased basis, the relevant analysis of the noise data included in the Strategic Noise Maps. The phasing of this work will primarily focus on the M11/N11 corridor, followed by the N81, and finally the relevant major non-national roads from north to south.

7 NOISE MITIGATION & PROTECTION MEASURES

7.1 General

The assessment of Noise Mitigation and Protection Measures in this section will be reviewed considering the extent of areas above, below or between the threshold levels. As part of this Noise Action Plan, a strategic approach will be undertaken to managing environmental noise. Further consideration will be given to financial considerations, including budgetary restraints and value for money.

Wicklow County Council as the Noise Mapping Body and the Action Planning Authority will support and facilitate relevant measures and programmes either locally initiated or nationally procured to improve the environmental noise environment in County Wicklow.

The general approach to be taken by Wicklow County Council to managing environmental noise in the Action Planning Area is to:

- Promote Noise reduction at source
- Encourage Land use planning to comply with noise targets
- Promote measures to reduce noise impacts
- Issue operating restrictions to reduce noise emission

7.2 Description of how areas above onset of Assessment Criteria will be processed

Areas above the threshold of assessment which have been identified by the Strategic Noise Mapping will be ranked according to the decision support matrix for further review. A programme for further assessment and implementation of potential noise mitigation measures in these areas will then be required, subject to available funding and resources. Prior to any subsequent financial commitment to undertake any necessary actions, it is considered appropriate to undertake field studies to measure and confirm that site noise levels indicated by the strategic noise maps are actually being experienced by the surrounding population. Potential mitigation measures may be required.

The subsequent order of priority will be reviewed based on these actual noise measurements. Noise monitoring may be carried out in an area that is representative of a number of areas identified for further assessment, which could reduce the number of noise monitoring locations required and consequently reduce the cost of monitoring.

Once the extent of the existing noise impact has been confirmed for those locations under review, the potential noise mitigation measures will then be investigated, and a cost benefit analysis undertaken for each, with the aim of developing a selection matrix leading towards a recommendation for action. The most appropriate and cost-effective mitigation measures will be identified in order of effectiveness and priority.

When mitigation measures have been implemented at specific locations, further noise monitoring should be carried out after implementation, subject to available funding and resources, in order to determine the effectiveness of the mitigation measures and to quantify the improvement achieved.

These studies and implementation of the mitigation measures shall be undertaken over a number of years as budget and resources allocated to the noise mitigation programme facilitate.

7.3 Description of how areas below protection Threshold will be preserved

Future projects likely to have a noise impact on areas below the protection thresholds will be required to satisfy the Planning Authority of the County Council that there will not be any residual negative noise impacts where practicable. However the complete elimination of all negative noise impacts may be neither practicable nor sustainable. Planning conditions may be imposed to limit noise emissions or to implement noise reduction measures in order to preserve the areas below the protection thresholds.

Noise mitigation measures will either be applied as planning conditions or designed into future proposals of all future developments in accordance with current Irish Legislation to ensure that the relevant noise thresholds and guidelines are not exceeded. Environmental Impact Statements including Noise Prediction Modelling to determine mitigation requirements should be prepared for each proposed development, as deemed appropriate by the appropriate planning authorities.

The aims of present and future noise action plans should be incorporated into the Wicklow County Development Plan, Town Development Plans and into relevant Local Area Plans. Special consideration should be given to zoning objectives, speed limits and established settlements within the area.

Appropriate acoustic engineering of proposed dwellings in close proximity to significant noise sources, such as major roads or railways should be requested by the appropriate planning authorities. This should involve incorporating detailed acoustic planning into the development design where developments are planned adjacent to major roads.

7.4 Description of how areas between the Thresholds will be managed

The principles outlined in Section 7.3 in relation to the preservation of areas below the threshold will clearly also apply to the management of areas between the threshold levels. This approach is necessary to avoid placing undue focus on areas at the upper and lower extremities of the environmental noise regime, whilst neglecting to consider the median position. The inclusion of present and future noise action plans into relevant local planning policy and strategies will ensure that future developments will be required to address environmental noise in a sustainable manner.

7.5 Description of how extent of Noise Impact will be confirmed

The extent of noise impact will be confirmed through implementation of the programme of further investigation of areas above the threshold of assessment, subject to available funding and resources as detailed in Section 7.2.

The outcome of the public consultation phase will also identify areas where the public are concerned about the extent of noise impacts. However, the perception of noise impact may be quite subjective as what one individual regards as a slight annoyance may be regarded as unbearable noise impact by another.

7.6 Review of possible Mitigation Measures, where necessary

Existing measures are in place to manage and mitigate noise impacts from a range of sources including road and industrial noise sources in County Wicklow. These include procedures following relevant planning conditions, Environmental Impact Assessment recommendations and designs, Wicklow County Council noise complaint handling protocols, development planning guidelines, road resurfacing and improvements, noise barrier construction as part of road development projects, etc.

There are a number of approaches that can be taken to reduce noise from major roads for existing dwellings. Noise mitigation measures can be divided into physical and non-physical measures.

7.6.1 Physical Measures

Physical measures include alterations to the topographical layout of the environment and vehicles to reduce noise, which, in the case of the environment means to buffer, block, reduce or filter the noise, and in the case of the vehicle to reduce the level of noise emitted. Some examples of potentially appropriate physical mitigation measures are outlined in Table 7.1.

Table 7.1 – Potential Physical Mitigation Measures

Parameter	Details
Noise Barriers	Installation of noise barriers on major roads away from residential areas. A noise barrier can take many forms, e.g. a cutting, an earth bund, a stone wall or a proprietary noise barrier. The closer the barrier is to the source of noise, i.e. the road, the higher the reduction in traffic noise levels.
Road Surface	A low noise road surfacing is a potential way of controlling road traffic noise at source. The most common variant of low noise road surface is porous asphalt, which is generally considered to offer noise level reductions in the order of 2.5 to 3.5dB (A). However the use of a low noise road surface will have to be compared with other road surfacing materials in relation to the whole life and durability costs of the material.
Traffic calming	These measures can be employed where the major road passes through a built-up area.
Realignment of existing roads	If properly planned and implemented, relocating the road away from high-density settlements along a new alignment can be one of the most effective methods of minimising the numbers of dwellings likely to be affected by the road noise. However, considerable alignment changes are required in order to make a significant difference.

7.6.2 Non - Physical Measures

Non-Physical measures are more commonly referred to as Policy Measures and refer to a variety of options to reduce noise levels through regulatory means. Some examples of potentially appropriate non-physical mitigation measures are outlined in Table 7.2.

Table 7.2 – Potential Non-Physical Mitigation Measures

Parameter	Details
Environmental Policy	The inclusion of environmental noise assessment, impacts, mitigation etc., in environmental policy could contribute to improvements in noise management.
Planning Policy	Similar to environmental policy the identification and inclusion of noise as a factor in planning policy and decision making has the potential to include mitigation of noise early in the life of a development and as such noise can be sustainably managed.
Wind Energy Policy	Similar to environmental policy the identification and inclusion of noise as a factor in wind energy policy and decision making has the potential to include mitigation of noise early in the life of a development and as such noise can be sustainably managed.

Table 7.2 – Potential Non-Physical Mitigation Measures Cont’d

Parameter	Details
Transportation Policy	A number of areas of Transportation policy can provide mitigation against environmental noise impacts these include
Bans on HGV's	If properly planned and implemented, a ban on Heavy Goods Vehicles in noise sensitive locations could potentially improve the noise environment at the location. However a ban on HGV's may be an unrealistic option due to the importance of the relevant road as a local, regional, national or international transportation corridor.
Reducing Speed Limits	Similar to a ban of HGV's, if properly planned and implemented, reducing speed limits in noise sensitive locations could potentially improve the noise environment at the location. However implementation of this measure would require significant enforcement to ensure compliance with the reduced speed limits especially during night-time hours where the reduction in noise levels is more critical to avoid sleep disturbance.
Public Transportation initiatives	The promotion of public transportation initiatives which reduces the volume of private transportation could potentially reduce associated environmental noise from road corridors.
Construction Standards	The construction and refurbishment of buildings taking cognisance of current and future best-building practice is a method by which mitigation for environmental noise can be addressed. This could include modern construction materials, moving noise sensitive rooms away from noisy facades etc.
Vehicle Noise Standards	The noise generated by more modern vehicles is generally lower than older vehicles. EU noise limits, scrappage schemes and national vehicle testing have reduced the age of vehicles using the roads and as such a limited reduction in noise emissions has occurred. However modifications to or removal of the vehicle silencer will result in an excessively noisy vehicle. Installation of a sports exhaust on a vehicle is not illegal at present and is a major contributor to nuisance noise from road vehicles.
Tyre Noise	The implementation of the EU Directive (2007/46/EC) in relation to the rolling noise of tyres will in time lead to a reduction of contact noise from road surfaces.

7.6.3 Assessment of Noise Reduction effects of potential measures

When mitigation measures have been implemented at specific locations, further noise monitoring should be carried out after implementation, subject to available funding and resources, in order to determine the effectiveness of the mitigation measures and to quantify the improvement achieved. The results of such assessment should be included in subsequent Noise Action Plans to assist in dealing with Environmental Noise going forward.

7.7 Budgets & Cost Benefit Analysis

7.7.1 General

As with all works undertaken by any local authority, Wicklow County Council is required to make adequate financial provisions and to account for expenditure of public finances in a transparent manner to carry out its statutory functions.

7.7.2 Budgetary Provisions

The provision of adequate finances to implement the requirements of the Regulations is one which is a challenge to all Local Authorities, including Wicklow County Council. Financial provisions have not been made available at national level to fund any noise assessment measures, mitigation measures or additional noise mapping requirements resulting from implementation of this plan. Wicklow County Council is committed to implementing the provisions of this Noise Action Plan in as far as it is practicable within existing financial and staffing resources. As part of the actions contained within the Noise Action Plan, any proposed noise mitigation measures shall require estimates prior to formal approval, along with a cost benefit analysis to determine the effectiveness of the proposal.

Currently the spending of the Regional and Local Road Grant Allocations from the Department of Transport together with income from the Councils own resources (e.g. Development Contribution Schemes etc.) are prioritised on the maintenance and upkeep of the county's 2,400km road network and ensuring that they are kept to an acceptable and safe standard, with the focus of work and spending given to road safety and the preservation of the road infrastructure.

TII directly manage the M11/N11 through a Maintenance and Renewals Contracts (MMaRC) for the northern half of the route (DLRCC County Boundary to Rathnew) and a Public Private Partnerships (PPP) Scheme for the southern section (Rathnew to WXCC Boundary) and will assist in administrating any mitigation measures along this route. The financing of works on the remaining national route in County Wicklow, the N81, is provided by grant allocations from TII. It is expected that TII will also be involved with any mitigation measures on this route. Financial provisions have yet to be made available at national level to fund any noise assessment measures, mitigation measures or additional noise mapping requirements resulting from implementation of this action plan.

Staff resources have not been increased to assist in implementation of the plan so any mitigation measures must be strictly prioritised. It is hoped that where mitigation measures are identified,

their implementation will also be found to be of benefit to other local authority sections e.g. Environment, Planning & Development, Roads & Transportation, and Housing.

7.7.3 Cost Benefit Analysis

Evaluation of the impact of noise nuisance is complicated because noise nuisance is subjective; it is largely related to the type of noise, the source of the noise and whether it is welcome or unwelcome, and background noise levels in the environment. Responses to noise from the different transport sources can vary considerably (ref: HEATCO).

The impact of mitigating measures to address noise nuisance is further complicated because noise is measured on a logarithmic scale and human perception of loudness does not directly coincide with increased sound pressure levels (e.g. a 3dB increase in noise, which represents a doubling in sound pressure level, is the smallest statistically significant increase in loudness detectable by the human ear).

To reduce the subjective “loudness” of a noise source by 50% would require a 10dB drop in noise level and may be very difficult to achieve without major investment in noise mitigation. Assigning a monetary cost to the noise nuisance can enable cost benefit analysis to be used as a decision support tool in determining what (if any) noise mitigation measure is to be implemented.

The recommended method of cost benefit analysis is set out in part D-03 Guide to Economic Appraisal CBA, 2012 of The Spending Code, published by the Central Expenditure Evaluation Unit (CEEU) of The Department of Public and Expenditure Reform. In 2017 The Conference of European Directors of Roads (CEDR) published a report entitled “*State of the art in managing road traffic noise: cost benefit analysis and cost effective analysis (Technical Report 2017-03)*”. This report will also be considered in order to determine the feasibility of implementing potential noise mitigation measures.

8 IMPLEMENTATION OF SECOND NOISE ACTION PLAN

8.1 General

Wicklow County Council as an Action Planning Authority was required to prepare a Noise Action Plan in accordance with the Regulations for the Second Round of Noise Action Planning by the 18th July 2013.

A proposed programme of works was included in the Second Round Noise Action Plan for the duration of the Plan. The outcome of this programme of works is detailed in Section 8.2

8.2 Report on Outcome of Actions Proposed

Tables 8.1 to 8.6 details the actions proposed and the resultant outcome as a result of the Second Noise action Plan

Table 8.1 - Outcome of proposed Second Round Actions – Base Year/Year One (2013 / 2014)

Details	Outcome
<u>Base Year (2013)</u>	
Submit the Draft Noise Action Plan 2013 to EPA for comments.	Completed
Review comments received from the EPA, revise Draft Noise Action Plan 2013 as necessary.	Completed
Advertise the Revised Draft Noise Action Plan 2013 in the local press and on the Wicklow County Council Website inviting emailed / written submissions or observations from the public.	Completed
Put the Revised Draft Noise Action Plan 2013 on public display.	Completed
Issue the Revised Draft Noise Action Plan 2013 to relevant Statutory Bodies for submissions or observations.	Completed
Review submissions or observations received through the consultation process and amend Revised Draft noise Action Plan 2013 as necessary to produce Final Noise Action Plan 2013.	Completed
Submit Final Noise Action Plan 2013 to the EPA by 18th. July 2013 to allow the EPA to report on the Action Plan to the EC in January 2014.	Completed
Upload Final Noise Action Plan 2013 onto the Wicklow County Council Website for public information.	Completed

**Table 8.1 - Outcome of proposed Second Round Actions – Base Year/Year One (2013 / 2014)
Cont'd**

Details	Outcome
Progress the construction and delivery of the Rathnew to Arklow Road Improvement Scheme during 2013.	Completed
Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2013.	No Action
<u>Year One (2014)</u>	
Superimposing the relevant Strategic Noise Maps (L_{den} and L_{night}) over detailed OSI background mapping and the Geodirectory to identify particular “hot spot” locations.	Not completed due to non availability of funding
Use the Decision Support Matrix to identify and prioritise areas requiring further assessment and / or potential mitigation measures on a phased basis subject to funding availability.	Not completed due to non availability of funding
Collate location and sources of areas for further assessment and /or possible mitigation measures.	Not completed due to non availability of funding
Liaise with relevant stakeholder regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	No Action
Progress the construction and delivery of the Rathnew to Arklow Road Improvement Scheme during 2014.	Completed
Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2014.	No Action

Table 8.2 - Outcome of proposed Second Round Actions – Year Two (2015)

Details	Outcome
<u>Year Two (2015)</u>	
Liaise with Wicklow County Council Planning Department as part of Preparation Process for next County Development Plan 2016- 2022 regarding strengthening the policy in relation to protecting against Environmental Noise Impacts.	Completed
Subject to funding commence on a prioritised basis the assessment of areas identified as requiring further assessment for mitigation measures.	Not completed due to non availability of funding
Continue liaising with relevant stakeholders regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	No Action

Table 8.2 - Outcome of proposed Second Round Actions – Year Two (2015) Cont'd

Details	Outcome
<u>Year Two (2015) Cont'd</u>	
Identify prioritised potential mitigation measures post additional assessment and carry out a Cost Benefit Analysis to assess relative benefit from mitigation measures subject to funding.	Not completed due to non availability of funding
Review the effectiveness of the Decision Support Matrix in identifying and prioritising areas requiring further assessment and / or potential mitigation measures.	Not completed due to non availability of funding
Progress the construction and delivery of the Rathnew to Arklow Road Improvement Scheme towards completion in Q4 of 2015.	Completed
Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2015.	No Action

Table 8.3 - Outcome of proposed Second Round Actions – Year Three (2016)

Details	Outcome
<u>Year Three (2016)</u>	
Continue liaising with Wicklow County Council Planning Department as part of Preparation Process for next County Development Plan 2016-2022 regarding strengthening the policy in relation to protecting against Environmental Noise Impacts.	Completed
Subject to funding continue on a prioritised basis the assessment of areas identified as requiring further assessment for mitigation measures.	Not completed due to non availability of funding
Continue liaising with relevant stakeholders regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	No Action
Continue to identify prioritised potential mitigation measures post additional assessment and carry out a Cost Benefit Analysis to assess relative benefit from mitigation measures subject to funding.	Not completed due to non availability of funding
Implement on a phased basis over the balance of the plan period the implementation of required mitigation measures subject to available funding	Not completed due to non availability of funding
Carry out a mid plan review to assess progress in implementation of Action Plan in Q3 of 2016. Report Findings to SPC and publish on Website.	No Action
Ensure financial provisions are in place to carry out relevant assessments in 2016 in order to produce new strategic noise maps in 2017 for assessment year 2016.	Completed
Assess the extent (in Q2 to Q4 of 2016) of the non national road network in County Wicklow which will be required to be strategically noise mapped in 2017 for assessment year 2016.	Completed

Table 8.3 - Outcome of proposed Second Round Actions – Year Three (2016) Cont'd

Details	Outcome
<u>Year Three (2016) Cont'd</u>	
Carry out traffic counts at the locations assessed in 2011 (in Q2 to Q4 of 2016) to identify changes in traffic volumes.	Completed
Carry out additional traffic counts as necessary (in Q2 to Q4 of 2016) on roads considered for inclusion in 2017 noise mapping exercise.	Completed
Collate and quality check source data in Q4 of 2016 for inclusion in 2017 noise mapping exercise.	Completed
Conclude the construction and delivery of the Rathnew to Arklow Road Improvement Scheme in 2016 if not completed in 2015.	Scheme Opened 2015
Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2016.	No Action

Table 8.4 - Outcome of proposed Second Round Actions – Year Four (2017)

Details	Outcome
<u>Year Four (2017)</u>	
Ensure financial provisions are in place to produce new strategic noise maps in 2017 for assessment year 2016.	Completed
Subject to funding continue on a prioritised basis the assessment of areas identified as requiring further assessment for mitigation measures.	Not completed due to non availability of funding
Continue liaising with relevant stakeholders regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	No Action
Continue to identify prioritised potential mitigation measures post additional assessment and carry out a Cost Benefit Analysis to assess relative benefit from mitigation measures subject to funding.	Not completed due to non availability of funding
Implement on a phased based over the balance of the plan period the implementation of required mitigation measures subject to available funding	Not completed due to non availability of funding
Cooperate with relevant stakeholder agencies to produce new strategic noise maps in 2017 for 2016 assessment year	Completed
Publish New Strategic Noise Maps in 2017 for assessment year 2016 in Q4 of 2017 on Wicklow County Council website.	Completed
Commence collating and quality checking source data in Q4 of 2016 for inclusion in 2018 Noise Action Plan.	Completed
Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2017.	No Action

Table 8.6 - Outcome of proposed Second Round Actions – Year Five (2018)

Details	Outcome
<u>Year Five (2018)</u>	
Carry out End of Plan Review to assess progress in implementation of Action Plan in Q1 of 2018. Include findings in Draft Noise Action Plan 2018.	Ongoing
Ensure financial provisions are in place to produce new Noise Action Plan 2018.	Completed
Prepare Draft Noise Action Plan 2018 (Round 3) in Q1.	Ongoing
Submit the Draft Noise Action Plan 2018 to EPA for comments.	Completed
Review comments received from the EPA, revise Draft Noise Action Plan 2018 as necessary.	To be completed
Advertise the Revised Draft Noise Action Plan 2018 in the local press and on the Wicklow County Council Website inviting emailed / written submissions or observations from the public.	To be completed
Put the Revised Draft Noise Action Plan 2018 on public display.	To be completed
Issue the Revised Draft Noise Action Plan 2018 to relevant Statutory Bodies for submissions or observations.	To be completed
Review submissions or observations received through the consultation process and amend Revised Draft noise Action Plan 2018 as necessary to produce Final Noise Action Plan 2018.	To be completed
Submit Final Noise Action Plan 2018 to the EPA by 18th. July 2018 to allow the EPA to report on the Action Plan to the EC in January 2019.	To be completed
Upload Final Noise Action Plan 2018 onto the Wicklow County Council Website for public information.	To be completed
Progress the construction and delivery of the Rathnew to Arklow Road Improvement Scheme.	Scheme Opened 2015
Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2018.	To be completed

8.3 Public Observations Received During 2nd Round of Noise Action Plan

During the period of the 2nd Round Noise Action Plan, Wicklow County Council received numerous observations and reports from the general public of areas and locations that they deemed had a high level of noise annoyance. Most of the locations identified are situated in close proximity to major roads, all of which are the reported sources of the noise annoyance. The locations reported are detailed in Table 8.7 overleaf:

Table 8.7 – Public Reported Locations of High Levels of Noise Annoyance

Location Ref	Location Details	Reported Source of Noise Annoyance
L-001	Drummin Lane, Delgany, Co Wicklow	N11
L-002	Lower Main Street, Arklow. Co Wicklow	L2901
L-003	Johnstown North, Arklow, Co Wicklow	M11
L-004	Huntsbury, Kilquade, Co Wicklow	R774
L-005	Sunnybank, Kilpedder, Co Wicklow	N11
L-006	Kilcronev, Bray, Co Wicklow	N11

These reported locations shall be considered and evaluated in line with the overall strategy as detailed in Chapter 7, Noise and Mitigation Measures.

8.4 Report on Reduction of (2nd Round) Population affected by Environmental Noise

Further review and analysis is required before Wicklow County Council can determine if there was a reduction in the population affected by environmental noise in the Action Planning Area over the life of the Second Round Noise Action Plan. Factors which could have altered the environmental noise patterns either positively or negatively in the Action Plan are over the period include the following:

- Higher road traffic levels due to the recovery of the economy and increased economic activity.
- Population growth of various settlement areas, particularly along the N11/M11 & N81 corridors.
- Completion of the N11 Rathnew to Arklow Road Improvement Scheme, which included noise mitigation measures as part of the project.
- Completion of a number of road pavement improvement works by Sacyr Jons (GSJ), the Contractor appointed by TII to Area A of the Motorway Maintenance and Renewals Contracts (MMaRC) along sections of the N11 between Kilmacanoge and Glen of the Downs, which incorporated the use of low noise road surfacing.
- The adoption and implementation of countywide “Special Speed Limit Bye-Laws”.

9 CONSULTATION & PUBLIC PARTICIPATION

9.1 Requirement for Public Participation and Consultation with Statutory Bodies

Wicklow County Council as an Action Planning Authority is required by The Regulations to consult the public when drawing up and revising Action Plans. The public must be consulted about the proposals in the Draft Action Plan and given early and effective opportunities to participate in the preparation and review of the Plan. The public must be informed of decisions taken and reasonable time must be provided for each stage of public participation. Furthermore the Draft Noise Action Plan will also be forwarded for review and comment to relevant stakeholders i.e. TII, Local Authorities and Action Planning Authorities for neighbouring counties and other relevant Statutory Bodies to encourage wide participation in the consultation process.

Wicklow County Council is subject to the provisions of the Freedom of Information (FOI) Act 2014. And if subject to a Freedom of Information request under these Acts may have no option but to release the information in accordance with the requirements of the relevant legislation. Members of the General Public, Statutory Bodies and other Groups and Organisations should be aware of this fact in relation to any submissions or observations made in relation to participation in the consultation phase of the Draft Noise Action Plan.

All personal data received as part of this consultation process will be protected in line with Wicklow County Council's privacy policy which is available to view at <https://www.wicklow.ie/Living>

9.2 Public Participation and Consultation

The Draft Noise Action Plan was put on public display at Wicklow County Council offices and was made available in electronic format on the Wicklow County Council website. Submissions from the public were reviewed and considered and the Action Plan will be amended as necessary, taking account of the submissions and the suggestions contained therein, wherever appropriate.

The Draft Noise Action Plan was available for inspection on the council web site at <https://www.wicklow.ie/Living/Services/Roads-Transport/Road-Policy>

The Draft Noise Action Plan was available to be inspected at the following locations during normal opening hours i.e. 9.00am to 5.00pm, Monday to Friday (excluding public holidays) from the 4th July 2019 to 15th August 2019.

Wicklow County Council

County Buildings,
Whitegates,
Wicklow,
Co. Wicklow

**Bray Municipal District
Offices,**

Main Street,
Bray,
Co. Wicklow

**Arklow Municipal District
Offices,**

1 Castle Park,
Arklow,
Co. Wicklow

**Greystones Municipal
District Offices,**

Civic Offices,
Mill Road,
Greystones
Co Wicklow

Baltinglass Municipal District Offices,

Baltinglass Municipal District Civic Offices,
Blessington Business Park,
Blessington,
Co Wicklow

Any submissions or observations in relation to the Draft Noise Action Plan were to be made in writing to,

*The Senior Executive Officer,
Transportation, Water and Emergency Services,
Wicklow County Council,
Station Road,
Whitegates,
Wicklow,
Co. Wicklow*

or may be made by email to noiseplan@wicklowcoco.ie within the period from 4th July 2019 to 15th August 2019.

Submissions should be clearly marked “**Draft Noise Action Plan 2018 to 2023**”. A notice was placed in local newspapers inviting the public to submit their views on the Draft Noise Action Plan.

To summarise, Wicklow County Council’s requirements when preparing and revising Noise Action Plans include the following:

- the public is consulted about proposals for Action Plans;

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

9.3 Consultation and Outcome of Consultation with Statutory and Other Bodies

Wicklow County Council sought consultation from relevant groups such as:

- Department of the Environment
- Environmental Protection Agency
- Transport Infrastructure Ireland
- Irish Rail
- Responsible Authorities for adjacent areas including local and regional authorities
- Local and national pressure groups
- Non-Government Organisations and professional bodies
- Local citizen groups

9.4 Responses to the Public Consultation

Due to the volume of submissions received during the consultation period of the 4th July 2019 to 15th August 2019, submissions have been summarised into particular areas as appropriate. The Register of Submissions is available for inspection at Wicklow County Council, County Buildings, Whitegates, Wicklow, Co. Wicklow.

A total of fifty-four (54) Submissions were received by Wicklow County Council during the six weeks Public Consultation Period which commenced on 4th July 2019 and concluded on 15th August 2019. 50 of these submissions were received via e-mail, and a further 4 of these submissions were received via the on line consultation portal. 52 of the total submissions concerned road traffic noise; the remaining two do not concern road noise directly. One of these submissions, from Transport Infrastructure Ireland (TII), was related to legislative amendments and formatting in nature and content. The other submission that does not concern road noise

directly furnished a National Protocol document for dealing with all noise complaints *“The National Protocol for Dealing with Noise Complaints for Local Authorities”*.

Sections of the N11/M11 major road received the majority of submissions, a total of 44, which are outlined below as follows:

- Coynes Cross/Junction 14 – 13 Submissions
- Sunnybank, Kilpedder – 11 Submissions
- Drummin, Delgany – 7 Submissions
- Ballywaltrim/Kilcrouney, Bray – 7 Submissions
- Johnstown North, Arklow – 5 Submissions
- Glen of the Downs – 1 Submission

The remaining 8 submissions were from non-major roads and they concerned the R774 through Charlesland (5 submissions) and roads with Arklow town (3 submissions).

The main points of TII’s submission letter dated 31st July 2019 were;

- Section 1.4.1 of the Draft Noise Action Plan 2018 to 2023 stated that *“The mapping of major roads outside the agglomeration of Dublin was undertaken by TII...”*. TII advised that they undertook the mapping of major roads outside the agglomerations of Dublin and Cork.
- Section 2.1.3 of the Draft Noise Action Plan 2018 to 2023 stated that *“Under Section 77 of the Roads Act 1993, the Minister is empowered to make regulations requiring road authorities to take measures to mitigate the effects of road traffic noise. The Minister may also specify limits for road traffic noise, which, if exceeded, would require mitigating action from the road authorities. To date, no such regulations have been enacted.”* Section 77 of the Roads Act 1993 was repealed by the Public Transport Regulation Act 2009. Therefore, please remove the paragraph above from the draft NAP.
- TII welcomed the approach detailed within Section 7.2 of the Draft Noise Action Plan 2018 to 2023 for how areas above the onset assessment criteria will be processed. TII state that the arrangement of funding for the implementation of the measures detailed within the Draft Noise Action Plan is not the responsibility of TII. TII are available to meet with, review and discuss potential noise mitigation measures and the cost benefit analysis to be complete by Wicklow County Council.
- TII advised that in 2017 the Conference of European Directors of Roads (CEDR) published a report entitled *“State of the art in managing road traffic noise: cost benefit analysis and cost effective analysis (Technical Report 2017-03)”*, and suggested that this report may be useful when preparing any cost benefit analysis as part of the Noise Action Plan.

All issues outlined in TII's submission of 31st July 2019 were amended in this final Noise Action Plan.

No other submissions were received from any other statutory body.

All of these submissions were considered in the finalisation of noise action plan for the county of Wicklow. These will promote the pro-active management of noise when it is likely to have a significant impact on health and quality of life. This action will be genuine, meaningful, timely, balanced and with the ultimate objective of leading to better outcomes. The proposed measures in all cases will not be the same. In some cases, an individual measure will apply and in others, a combination of measures may be more applicable and beneficial. Wicklow County Council will endeavour to resolve issues for non-major roads where possible, and will interact to an agreed fashion with Transport Infrastructure Ireland on major roads where they have responsibility.

9.5 Next Steps

Following the Public Consultation process and the comments and replies received as outlined above, no significant amendments were deemed necessary to be made to the Wicklow County Council Noise Action Plan. The finalised Action Plan and maps were signed off by the Director of Services (Planning Development & Environmental Services) and will be ratified by the Council at the next meeting. It will then be placed on the Wicklow County Council website.

10 IMPLEMENTATION OF NOISE ACTION PLAN

10.1 Roles & Responsibilities for Implementation of Noise Action Plan

The Regulations (S.I. No. 140 of 2006) designate on certain state Agencies and Authorities roles and responsibilities in relation to implementing the Regulations.

10.1.1 Wicklow County Council

Wicklow County Council is the designated Action Planning Authority as defined in the Regulations for the preparation of Noise Action Plans for County Wicklow. Wicklow County Council is also the designated noise mapping body for non-national roads within County Wicklow which have a traffic flow above the major roads flow threshold.

10.1.2 Transport Infrastructure Ireland (TII)

Transport Infrastructure Ireland as the state agency with ultimate responsibility for the funding, management and upgrading of the national road network have a function in relation to the implementation of the Noise Action Plan. TII are also the noise mapping body for the major national road in County Wicklow which accounts for 63% (or 65kms) of the total major road network of 103 kilometres.

The main measure TII will implement over the lifespan of the current Noise Action Plan will be the ongoing maintenance, including pavement improvement works, of the M11/N11, which is being managed directly by using both a Public Private Partnership (PPP) scheme for the southern section and a Motorway Maintenance & Renewals Contract (MMaRC) for the northern half.

10.1.3 Environmental Protection Agency (EPA)

The EPA as the regulatory body as defined by the Regulations will provide continued guidance and advice on the implementation of the Regulations including the implementation of the Noise Action Plan.

10.1.4 Irish Rail

Irish Rail as the relevant designated noise mapping body for major railways will have a limited involvement in the implementation of the Noise Action Plan due to the limited extent of major railway lines in County Wicklow.

10.1.5 Neighbouring Noise Action Planning Authorities

Wicklow County Council will during the Implementation of the Noise Action Plan seek to liaise closer with adjoining Action Planning Authorities with regard to the implementation of the Noise Action Plan as it affects areas of County Wicklow which border other counties.

10.2 Targets and Objectives for Implementation of the Noise Action Plan

It is a target for Wicklow County Council during the implementation of the Noise Action Plan to undertake the Programme of Works detailed in Section 10.3.

Wicklow County Council includes as a core objective compliance with the requirements of the Environmental Noise Regulations 2006, S.I. No. 140 of 2006 and any other relevant environmental noise legislative requirements to the satisfaction of the Environmental Protection Agency.

Furthermore Wicklow County Council wishes to promote through sustainable development policies preservation in environmental noise levels within the county. Wicklow County Council also includes noise reduction as a significant part of its long term strategic policy objective for the management of environmental noise.

10.3 Programme of Works

Wicklow County Council has developed the following planned programme of works which it proposes to implement over the duration of the Noise Action Plan on a phased basis. The programme of work will be subject to an End of Programme Review in 2018 and the results of this review will be included in the 2018 (Round 3) Noise Action Plan.

10.3.1 Current Year / Year One (2018 / 2019)

The Proposed Programme of Works for the Current Year / Year One is contained in Table 10.1.

Table 10.1 – Current Year / Year One (2018 / 2019) Proposed Programme of Works

Item	Details	Outcome
	<u>Current Year (2018)</u>	
10.3.1.1	Submit the Draft Noise Action Plan 2018 to EPA for comments.	
10.3.1.2	Review comments received from the EPA, revise Draft Noise Action Plan 2018 as necessary.	
10.3.1.3	Advertise the Revised Draft Noise Action Plan 2018 in the local press and on the Wicklow County Council Website inviting emailed / written submissions or observations from the public.	
10.3.1.4	Put the Revised Draft Noise Action Plan 2018 on public display.	
10.3.1.5	Issue the Revised Draft Noise Action Plan 2018 to relevant Statutory Bodies for submissions or observations.	
10.3.1.6	Review submissions or observations received through the consultation process and amend Revised Draft noise Action Plan 2018 as necessary to produce Final Noise Action Plan 2018.	
10.3.1.7	Submit Final Noise Action Plan 2018 to the EPA by 18th. July 2018 to allow the EPA to report on the Action Plan to the EC in January 2019.	
10.3.1.8	Upload Final Noise Action Plan 2018 onto the Wicklow County Council Website for public information.	
10.3.1.9	Liaise with the M11/N11 Corridor (J4 M50 – J14 Coyne’s Cross) Works Project Team on noise related issues.	
10.3.1.10	Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2018.	
	<u>Year One (2019)</u>	
10.3.1.10	Superimposing the relevant Strategic Noise Maps (L_{den} and L_{night}) over detailed OSI background mapping and the Geodirectory & review observations from the General Public to identify particular “hot spot” locations.	
10.3.1.11	Use the Decision Support Matrix to identify and prioritise areas requiring further assessment and / or potential mitigation measures on a phased basis subject to funding availability.	
10.3.1.12	Collate location and sources of areas for further assessment and /or possible mitigation measures.	
10.3.1.13	Liaise with relevant stakeholder regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	
10.3.1.14	Continue to Liaise with the M11/N11 Corridor (J4 M50 – J14 Coyne’s Cross) Works Project Team on noise related issues.	
10.3.1.15	Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2019.	

10.3.2 Year Two (2020)

The Proposed Programme of Works for Year Two is contained in Table 10.2.

Table 10.2 – Year Two (2020) Proposed Programme of Works

Item	Details	Outcome
	<u>Year Two (2020)</u>	
10.3.2.1	Liaise with Wicklow County Council Planning Department as part of Preparation Process for next County Development Plan 2023- 2029 regarding strengthening the policy in relation to protecting against Environmental Noise Impacts.	
10.3.2.2	Subject to funding commence on a prioritised basis the assessment of areas (including observations from the General Public) identified as requiring further assessment for mitigation measures.	
10.3.2.3	Continue liaising with relevant stakeholders regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	
10.3.2.4	Identify prioritised potential mitigation measures post additional assessment and carry out a Cost Benefit Analysis to assess relative benefit from mitigation measures subject to funding.	
10.3.2.5	Review the effectiveness of the Decision Support Matrix in identifying and prioritising areas requiring further assessment and / or potential mitigation measures.	
10.3.2.6	Continue to Liaise with the M11/N11 Corridor (J4 M50 – J14 Coyne’s Cross) Works Project Team on noise related issues.	
10.3.2.7	Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2020.	

10.3.3 Year Three (2021)

The Proposed Programme of Works for Year Three is contained in Table 10.3.

Table 10.3 –Year Three (2021) Proposed Programme of Works

Item	Details	Outcome
	<u>Year Three (2021)</u>	
10.3.3.1	Continue liaising with Wicklow County Council Planning Department as part of Preparation Process for next County Development Plan 2023- 2029 regarding strengthening the policy in relation to protecting against Environmental Noise Impacts.	

Table 10.3 –Year Three (2021) Proposed Programme of Works Cont’d

Item	Details	Outcome
10.3.3.2	Subject to funding continue on a prioritised basis the assessment of areas (including observations from the General Public) identified as requiring further assessment for mitigation measures.	
10.3.3.3	Continue liaising with relevant stakeholders regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	
10.3.3.4	Continue to identify prioritised potential mitigation measures post additional assessment and carry out a Cost Benefit Analysis to assess relative benefit from mitigation measures subject to funding.	
10.3.3.5	Implement on a phased based over the balance of the plan period the implementation of required mitigation measures subject to available funding	
10.3.3.6	Carry out a mid plan review to assess progress in implementation of Action Plan in Q3 of 2021. Report Findings to SPC and publish on Website.	
10.3.3.7	Ensure financial provisions are in place to carry out relevant assessments in 2021 in order to produce new strategic noise maps in 2022 for assessment year 2021.	
10.3.3.8	Assess the extent (in Q2 to Q4 of 2021) of the non national road network in County Wicklow which will be required to be strategically noise mapped in 2022 for assessment year 2021.	
10.3.3.9	Carry out traffic counts at the locations assessed in 2016 (in Q2 to Q4 of 2021) to identify changes in traffic volumes.	
10.3.3.10	Carry out additional traffic counts as necessary (in Q2 to Q4 of 2021) on roads considered for inclusion in 2022 noise mapping exercise.	
10.3.3.11	Collate and quality check source data in Q4 of 2021 for inclusion in 2022 noise mapping exercise.	
10.3.3.12	Continue to Liaise with the M11/N11 Corridor (J4 M50 – J14 Coyne’s Cross) Works Project Team on noise related issues.	
10.3.3.13	Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2021.	

10.3.4 Year Four (2022)

The Proposed Programme of Works for Year Four is contained in Table 10.4.

Table 10.4 –Year Four (2022) Proposed Programme of Works

Item	Details	Outcome
	<u>Year Four (2022)</u>	
10.3.4.1	Ensure financial provisions are in place to produce new strategic noise maps in 2022 for assessment year 2021.	
10.3.4.2	Subject to funding continue on a prioritised basis the assessment of areas (including observations from the General Public) identified as requiring further assessment for mitigation measures.	
10.3.4.3	Continue liaising with relevant stakeholders regarding sourcing finance to carry out further assessment and implementation of potential mitigation measures.	
10.3.4.4	Continue to identify prioritised potential mitigation measures post additional assessment and carry out a Cost Benefit Analysis to assess relative benefit from mitigation measures subject to funding.	
10.3.4.5	Implement on a phased basis over the balance of the plan period the implementation of required mitigation measures subject to available funding	
10.3.4.6	Cooperate with relevant stakeholder agencies to produce new strategic noise maps in 2022 for 2021 assessment year	
10.3.4.7	Publish New Strategic Noise Maps in 2022 for assessment year 2021 in Q4 of 2022 on Wicklow County Council website.	
10.3.4.8	Commence collating and quality checking source data in Q4 of 2021 for inclusion in 2023 Noise Action Plan.	
10.3.4.9	Continue to Liaise with the M11/N11 Corridor (J4 M50 – J14 Coyne’s Cross) Works Project Team on noise related issues.	
10.3.4.10	Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2022.	

10.3.5 Year Five (2023)

The Proposed Programme of Works for Year Five is contained in Table 10.5.

Table 10.5 – Year Five (2023) Proposed Programme of Works

Item	Details	Outcome
	<u>Year Five (2023)</u>	
10.3.5.1	Carry out End of Plan Review to assess progress in implementation of Action Plan in Q1 of 2023. Include findings in Draft Noise Action Plan 2023.	
10.3.5.2	Ensure financial provisions are in place to produce new Noise Action Plan 2023.	
10.3.5.3	Prepare Draft Noise Action Plan 2023 (Round 4) in Q1.	

Table 10.5 – Year Five (2023) Proposed Programme of Works Cont’d

Item	Details	Outcome
10.3.5.4	Submit the Draft Noise Action Plan 2023 to EPA for comments.	
10.3.5.5	Review comments received from the EPA, revise Draft Noise Action Plan 2023 as necessary.	
10.3.5.6	Advertise the Revised Draft Noise Action Plan 2023 in the local press and on the Wicklow County Council Website inviting emailed / written submissions or observations from the public.	
10.3.5.7	Put the Revised Draft Noise Action Plan 2023 on public display.	
10.3.5.8	Issue the Revised Draft Noise Action Plan 2023 to relevant Statutory Bodies for submissions or observations.	
10.3.5.9	Review submissions or observations received through the consultation process and amend Revised Draft noise Action Plan 2023 as necessary to produce Final Noise Action Plan 2023.	
10.3.5.10	Submit Final Noise Action Plan 2023 to the EPA by 18th. July 2023 to allow the EPA to report on the Action Plan to the EC in January 2024.	
10.3.5.11	Upload Final Noise Action Plan 2023 onto the Wicklow County Council Website for public information.	
10.3.5.12	Continue to Liaise with the M11/N11 Corridor (J4 M50 – J14 Coyne’s Cross) Works Project Team on noise related issues.	
10.3.5.13	Annual Briefing on Noise Action Plan to Transportation and Road Infrastructure Strategic Policy Committee in December 2023.	

10.4 Evaluation, Review and Corrective Action Programmes

The Programme of Works detailed in Section 10.3 is the current best assessment of the works required to preserve and mitigate where necessary the environmental noise in County Wicklow. Implementation of the Programme of Works is dependent on the availability of sufficient technical staff, expertise and financial resources in order to progress the programme.

The Transportation and Roads Strategic Policy Committee (SPC) of Wicklow County Council will be briefed on an annual basis in relation to the Noise Action Plan at the December meeting over the duration of the Noise Action Plan. Briefings or Information Mornings may, over the course of the Action Plan, be held to inform other SPC groups and technical staff in other departments in relation to the requirements, actions and plans regarding the Noise Action Plan.

10.5 End of Programme Review

A complete review of the Programme detailed in Section 10.3 will be undertaken in 2018 during the preparation of the 2018 Noise Action Plan (Round 3). This end of programme review will focus on the original programme of Works and the implementation of same, the details of which will be included in the 2018 Noise Action Plan.

11 SUMMARY & CONCLUSIONS

The Environmental Noise Regulations 2006 (S.I. No. 140 of 2006), which gives effect to the EU Environmental Noise Directive, requires that Local Authorities prepare Noise Action Plans for their functional areas in respect of specified environmental noise sources. Noise Action Plans are based upon the results of strategic noise mapping carried out by the relevant Noise Mapping Bodies identified in the Regulations.

This Noise Action Plan describes the action planning area, existing noise management legislation and guidance and the responsible authorities. Mitigation and protection measures are set out for these areas and a provisional implementation plan has been drawn up. This Noise Action Plan covers a five-year period beginning in 2018 and must be reviewed and revised if necessary in 2023.

Strategic Noise Mapping in respect of major roads with traffic in excess of 3 million movements per year (8,250 AADT) was carried out by TII in respect to national roads and by TII on behalf of Wicklow County Council in respect to major non national roads. A total of 103 kilometres of major roads (equating to less than 5% of the total length of roads in County Wicklow) were identified and mapped. This Noise Action Plan is based on the results of these strategic noise maps and the previous Noise Action Plans (2010 & 2013) issued to date by Wicklow County Council.

The length of major railway lines (in excess of 30,000 passages per annum) passing through County Wicklow is limited to a short section (1.6 km) within the Dublin Agglomeration to the north of Bray and Irish Rail has included this section of track as part of the Dublin Agglomeration area assessment.

The strategic noise mapping has been assessed and areas that are to be subject to further assessment and potential noise management activities, subject to available funding and resources, have been identified.

The public has been given an opportunity to participate in the preparation of the Wicklow County Council Noise Action Plan 2018, by conducting a public consultation process on the Draft Noise Action Plan 2018. The results of the public participation will be taken into account when preparing the final document and the public will be informed of the decisions taken. Other bodies including TII, adjacent Local Authorities and other relevant organisations were consulted on the draft document.

The Noise Action Plan has been drawn up with the twin aims of:

- 1) Protecting the future noise climate,
- 2) Improving the existing noise climate where necessary.

The effective management of future environmental noise arising from new developments or developments adjacent to existing sources of environmental noise can be addressed to some extent through the planning consent process.

The current Wicklow County Council Development Plan 2016 – 2022, covers the issue of environmental noise under a number of interlinked headings including, Economic Development, Centres & Retail, Infrastructure, Waste & Environmental Emissions, and Climate Change and Energy.

12 REFERENCES

- Directive 2002/49/EC relating to the assessment and management of environmental noise.
- Environmental Noise Regulations 2006, (S.I. No. 140 of 2006)
- Environmental Protection Agency, Guidance Note on Action Planning, July 2009.(March 2018 – Version 3 Draft)
- Environmental Protection Agency, Guidance Note for Strategic Noise Mapping (Version 2) August 2011.
- Environmental Protection Agency, Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), January 2016
- Environmental Protection Agency, Frequently Asked Questions on NG4, 2016
- Environmental Protection Agency Act 1992, (S.I. No. 7 of 1992)
- Freedom of Information Act 2014
- Roads Act 1993, (S.I. No. 14 of 1993)
- Building Regulations (Part E Amendment) Regulations 2014 (S.I. No. 606/2014)
- TII Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25th October 2004.
- TII Good Practice Guidance for the Treatment of Noise During the Planning of National Road Schemes (March 2014)
- Wind Energy Development Guidelines 2006, DoEHLG
- Quarries and Ancillary Activities: Guidelines for Planning Authorities, DoEHLG April 2004.
- National Planning Framework 2040
- Regional Planning Guidelines for the Greater Dublin Region 2010-2022
- Dublin Agglomeration Noise Action Plan.
- Transport Strategy for the Greater Dublin Area 2016-2035
- Wicklow County Council Development Plan 2016-2022
- Wicklow County Council Wind Strategy 2016-2022
- Irish Rail Strategic Noise Maps: www.irishrail.ie/about-us/strategic-noise-maps

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HEATCO, Developing Harmonised European Approaches for Transport Costing and Valuation of Noise: Position Paper of the Working Group on Health and Socio Economic Aspects.

FEHRL Study S12.408210 Tyre Road Noise.

ISO 1996-1:2016 – Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures
www.iso.org/standard/59765.html

UK Professional Practice Guidance Planning Noise Policy & Guidance Note, May 2017.

EEA Good Practice Guide on Noise Exposure & Potential Health Effects 2010

WHO Burden of Disease from Environmental Noise

WHO Methodological Guidance for Estimating the Burden of Disease from Environmental Noise 2012

EEA & JRC Environment and Human Health 2013

RIVM Health Implication of Road, Railway and Aircraft Noise in the European Union 2014

Part D-03 Guide to Economic Appraisal CBA, 2012 of The Spending Code, Central Expenditure Evaluation Unit (CEEU) of The Department of Public and Expenditure Reform.

Appendix A

Glossary of Acoustic and Technical Terms

Term	Definition
AADT	Average Annual Daily Traffic
Agglomeration	Major Continuous Urban Area as set out within the Regulations
ANC	UK Association of Noise Consultants
Attribute Data	A trait, quality, or property describing a geographical feature, e.g. vehicle flow or building height
Attributing (Data)	The linking of attribute data to spatial geometric data
BAT	Best Available Technique" is defined as 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 measures designed to prevent or eliminate or, where that is not practicable, generally to reduce an impact on the environment as a whole.
CCC	Carlow County Council
CEEU	Central Expenditure Evaluation Unit
CEDER	Conference of European Directors of Roads
CIEH	Chartered Institute of Environmental Health
CRN	The Calculation of Railway Noise 1995. The railway prediction methodology published by the UK Department of Transport.
CRTN	The Calculation of Road Traffic Noise 1988. The road traffic prediction methodology published by the UK Department of Transport.
Data	Data comprises information required to generate the outputs specified, and the results specified
dB	Decibel
DCC	Dublin City Council
DEM	Digital Elevation Model
DLRCC	Dun Laoghaire Rathdown County Council
DoEHLG	Department of the Environment, Heritage & Local Government
DSM	Digital Surface Model
DTM	Digital Terrain Model
EC	European Commission
EEA	European Environment Agency
Environmental Noise	Environmental noise means unwanted or harmful outdoor sound

Term	Definition
	created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity
END	Environmental Noise Directive (2002/49/EC)
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
EU	European Union
GDA	Greater Dublin Area
GIS	Geographic Information System
IE	Iarnród Éireann or Irish Rail
INM	Integrated Noise Model
Irish National Grid (ING)	The official spatial referencing system of Ireland
IOA	Institute of Acoustics
ISO	International Standards Organisation
JRC	Joint Research Centre (European Commission)
KCC	Kildare County Council
Major Airport	A Major airport means a civil airport which has more than 50,000 movements per year, excluding those movements purely for training purposes on light aircraft; in this context, “a movement” means a single take-off or landing of an aircraft
Major Railway	A Major railway means a railway line which has more than 30,000 train passages per year
Major Road	A Major road means a national, regional or international road which has more than three million vehicle passages per year
Metadata	Descriptive information summarising data
MMaRC	Motorway Maintenance and Renewals Contract
NA	Not Applicable
Noise Bands	Areas lying between contours of the following levels (dB): L _{den} <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >74 L _d <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >74 L _e <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, >74 L _n <50, 50 – 54, 55 – 59, 60 – 64, 65 – 69, >70
Noise Levels	Free-field values of L _{den} , L _d , L _e , L _n , and L _{A10,18h} at a height of 4m above local ground level
Noise Level - L _d - Daytime	L _d (or L _{day}) = L _{Aeq,12h} (07:00 to 19:00)

Term	Definition
Noise Level - Le - Evening	L_e (or L_{evening}) = $L_{\text{Aeq},4h}$ (19:00 to 23:00)
Noise Level - Ln - Night	L_n (or L_{night}) = $L_{\text{Aeq},8h}$ (23:00 to 07:00)
Noise Level - Lden – Day/Evening/Night	A combination of L_d , L_e and L_n as follows: $L_{\text{den}} = 10 * \log \frac{1}{24} \{ 12 * 10^{((L_{\text{day}})/10)} + 4 * 10^{((L_{\text{evening}}+5)/10)} + 8 * 10^{((L_{\text{night}}+10)/10)} \}$
Noise Level – LA10,18h	$L_{\text{A10},18h} = L_{\text{A10},18h}$ (06:00 to 24:00)
Noise Mapping (General)	Noise-mapping means the presentation of data on an existing or predicted noise situation in terms of a noise indicator, indicating breaches of any relevant limit value in force, the number of people affected in a certain area, or the number of dwellings exposed to certain values of a noise indicator in a certain area.
Noise Mapping (Input) Data	Two broad categories: (1) Spatial (e.g. road centre lines, building outlines). (2) Attribute (e.g. vehicle flow, building height – assigned to specific spatial data)
Noise Mapping Software	Computer program that calculates required noise levels based on relevant input data
Noise Model	All the input data collated and held within a computer program to enable noise levels to be calculated.
Noise Model File	The (proprietary software specific) project file(s) comprising the noise model
Output Data	The noise outputs generated by the noise model
OSI	Ordnance Survey for Ireland
PPP	Public Private Partnership
ProPG	Professional Practice Guidance
Processing Data	Any form of manipulation, correction, adjustment factoring, correcting, or other adjustment of data to make it fit for purpose. (Includes operations sometimes referred to as ‘cleaning’ of data)
QA	Quality Assurance
The Regs	The Regulations – Statutory Instrument 140 of 2006
RIVM	The Dutch National Institute for Public Health and the Environment
RMR	The railway noise calculation method published in the Nether lands in ‘Reken- en Meetvoorschrift Railverkeerslawaaai ’96, Ministerie Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, 20 November 1996’.

Term	Definition
RPG	Regional Planning Guidelines
SDCC	South Dublin County Council
SMA	Stone Mastic Asphalt
Spatial (Input) Data	Information about the location, shape, and relationships among geographic features, for example road centre lines and buildings.
Stakeholders	Any individual, group of individuals, organisation, government agency (e.g. EPA, NRA) who has any relevant input in relation to the implementation of Noise Action Planning.
TII	Transport Infrastructure Ireland.
WG - AEN	Working Group – Assessment of Exposure to Noise
WHO	World Health Organisation
WXCC	Wexford County Council
XPS	The French road traffic noise calculation method published in ‘NMPB-Routes-96 (SETRA-CERTULCPC-CSTB)’, referred to in ‘Arrêté du 5 mai 1995 relatif au bruit des infrastructures routières, Journal Officiel du 10 mai 1995, Article 6’ and in the French standard ‘XPS 31-133’.

Appendix B

Action Planning Area Map

Figure B.1 Action Planning Area - County Wicklow



Appendix C

Strategic Noise Maps – Major Roads

Figure C.3 Strategic Noise Mapping for Major Roads L_{den}

<http://www.tii.ie/technical-services/environment/noise-maps/>

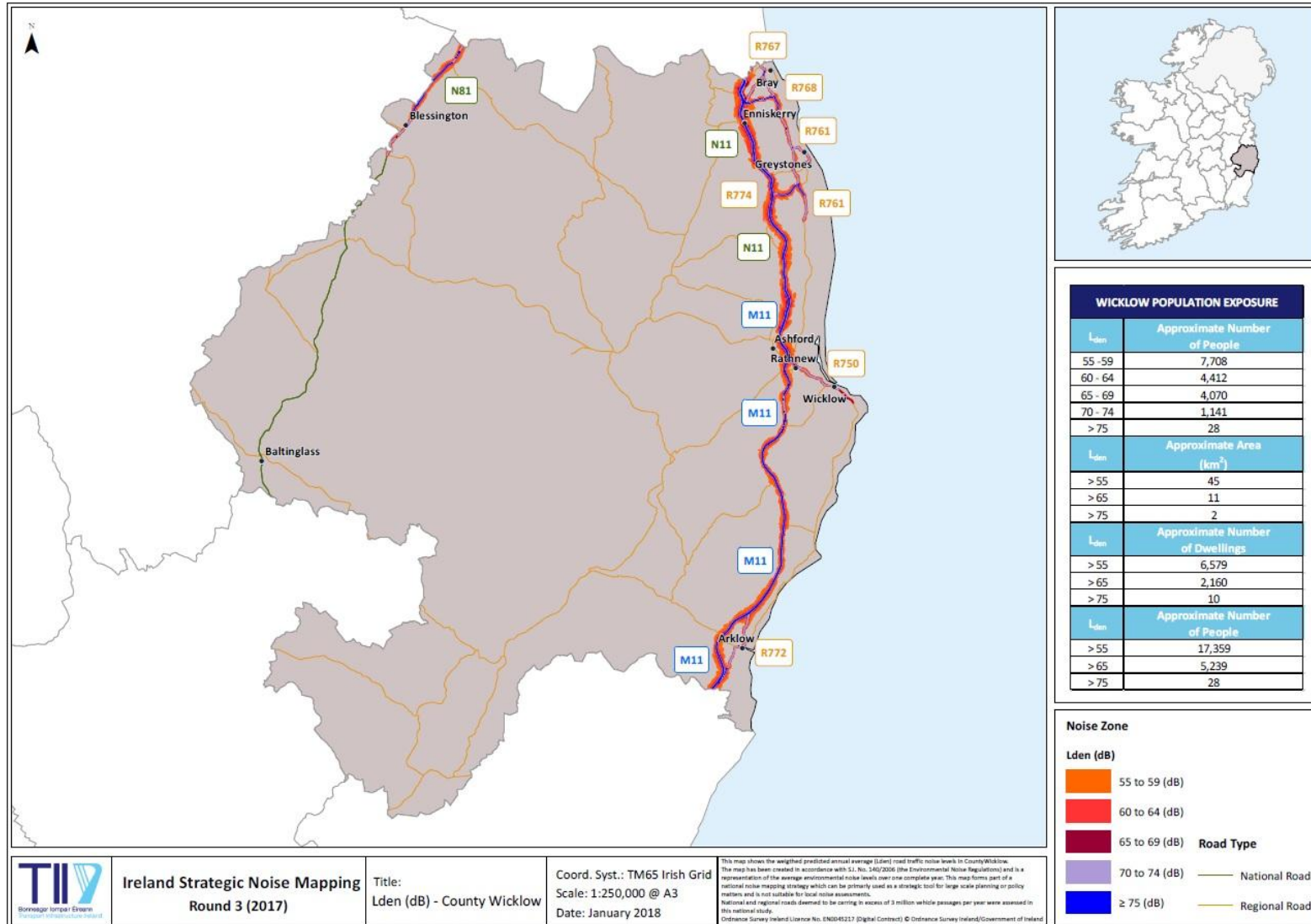
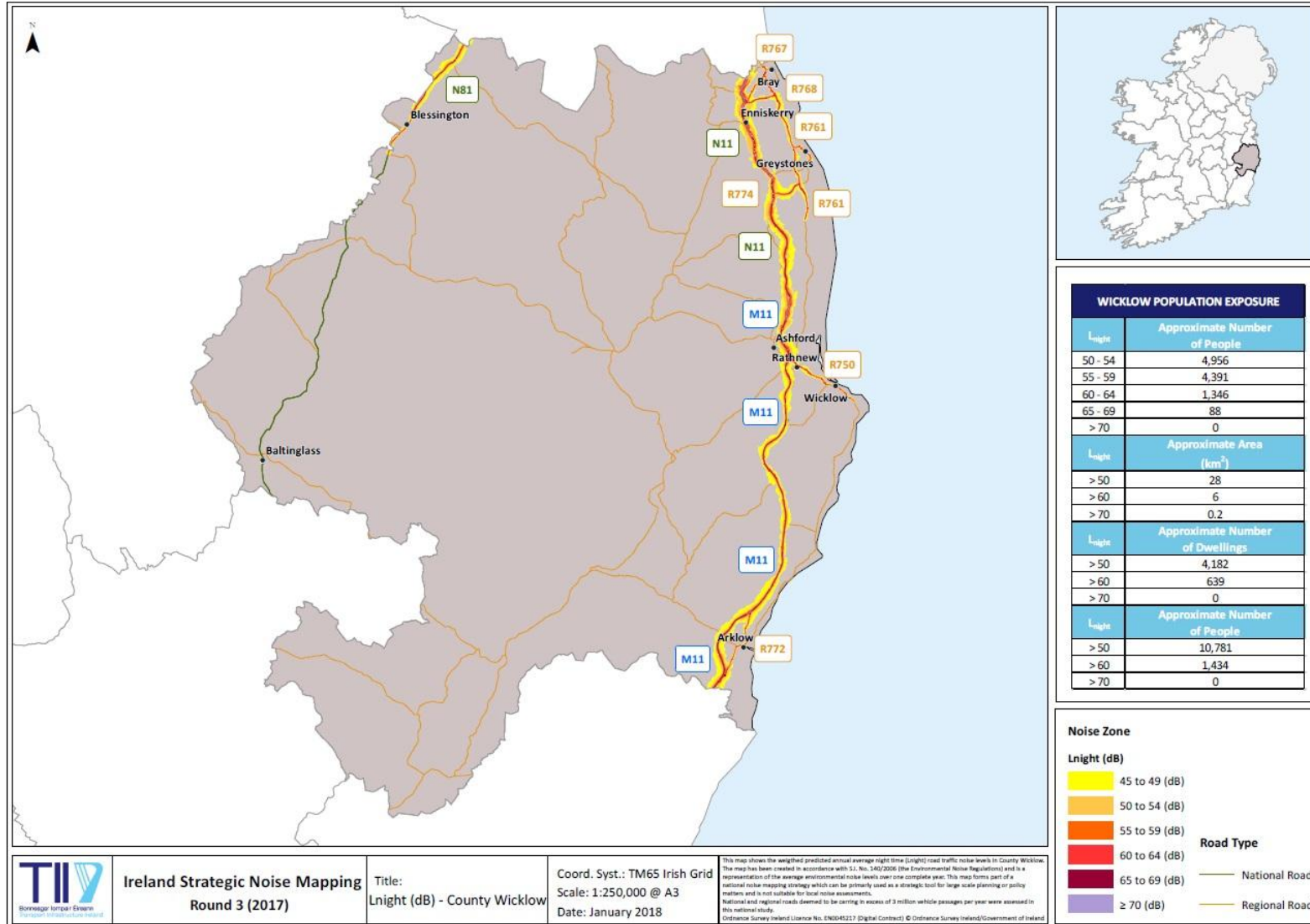


Figure C.4 Strategic Noise Mapping for Major Roads L_{night}

<http://www.tii.ie/technical-services/environment/noise-maps/>



Appendix D

Strategic Noise Maps – Major Railways

Figure D.1 Rail Network in County Wicklow

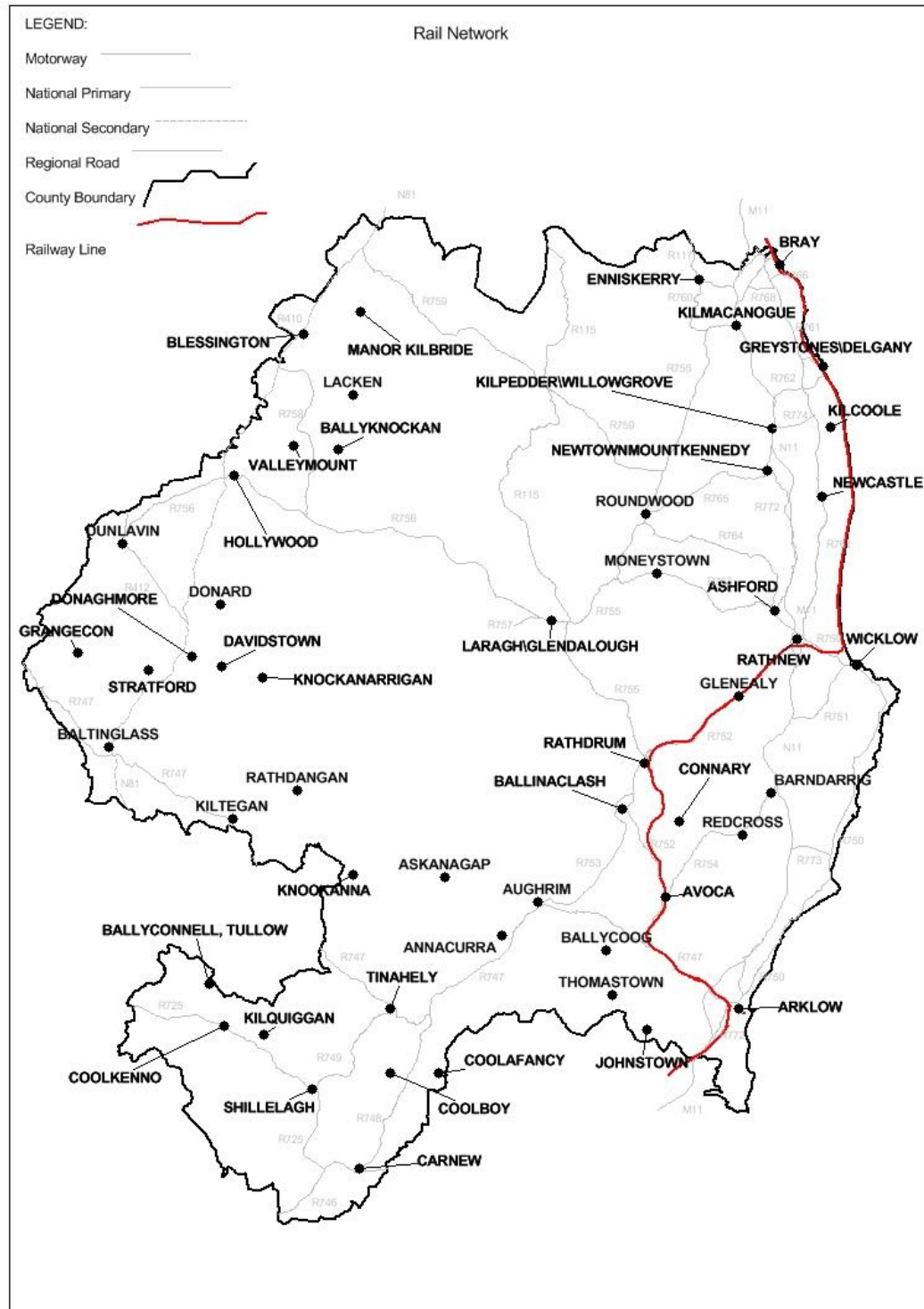
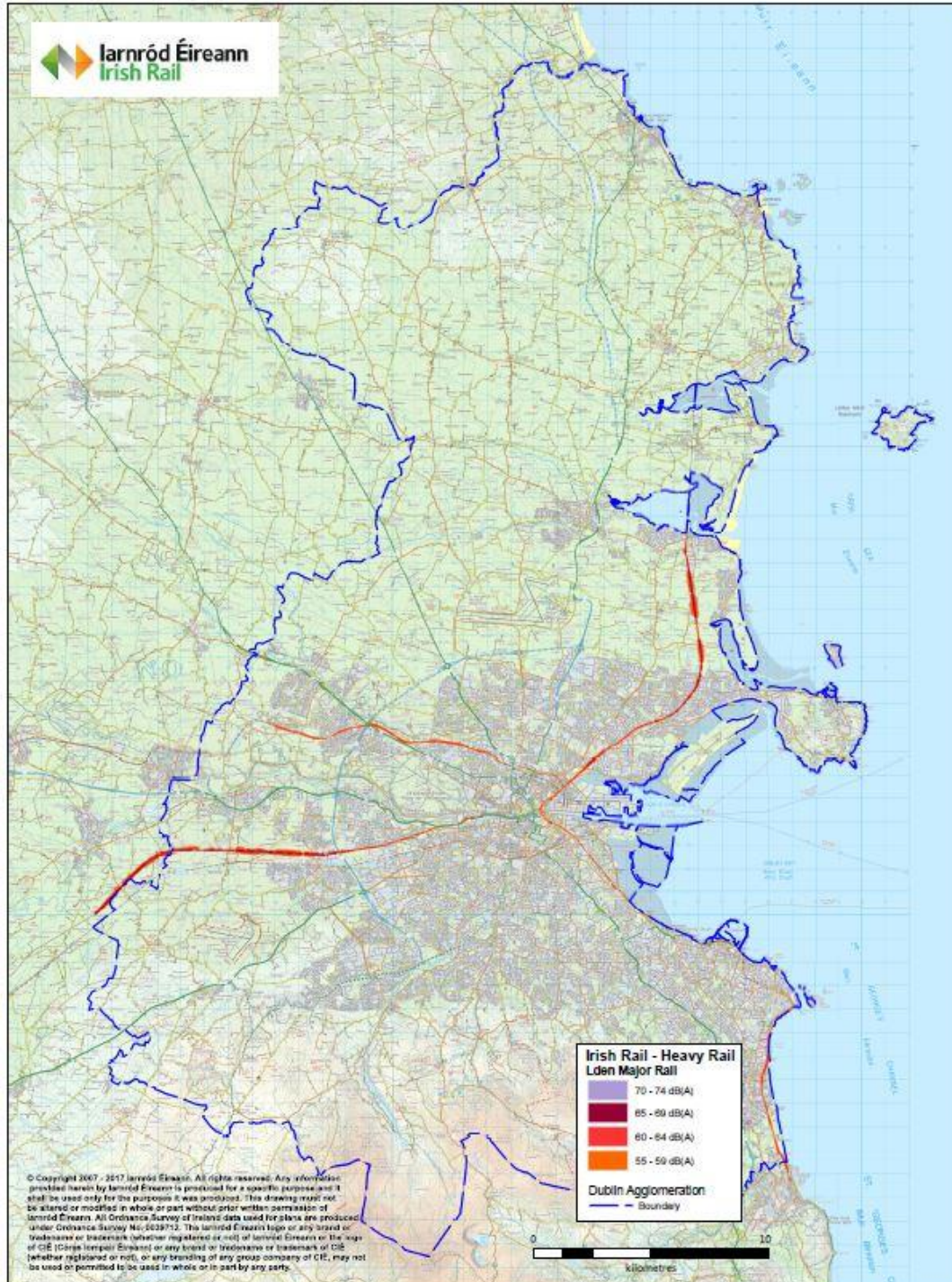


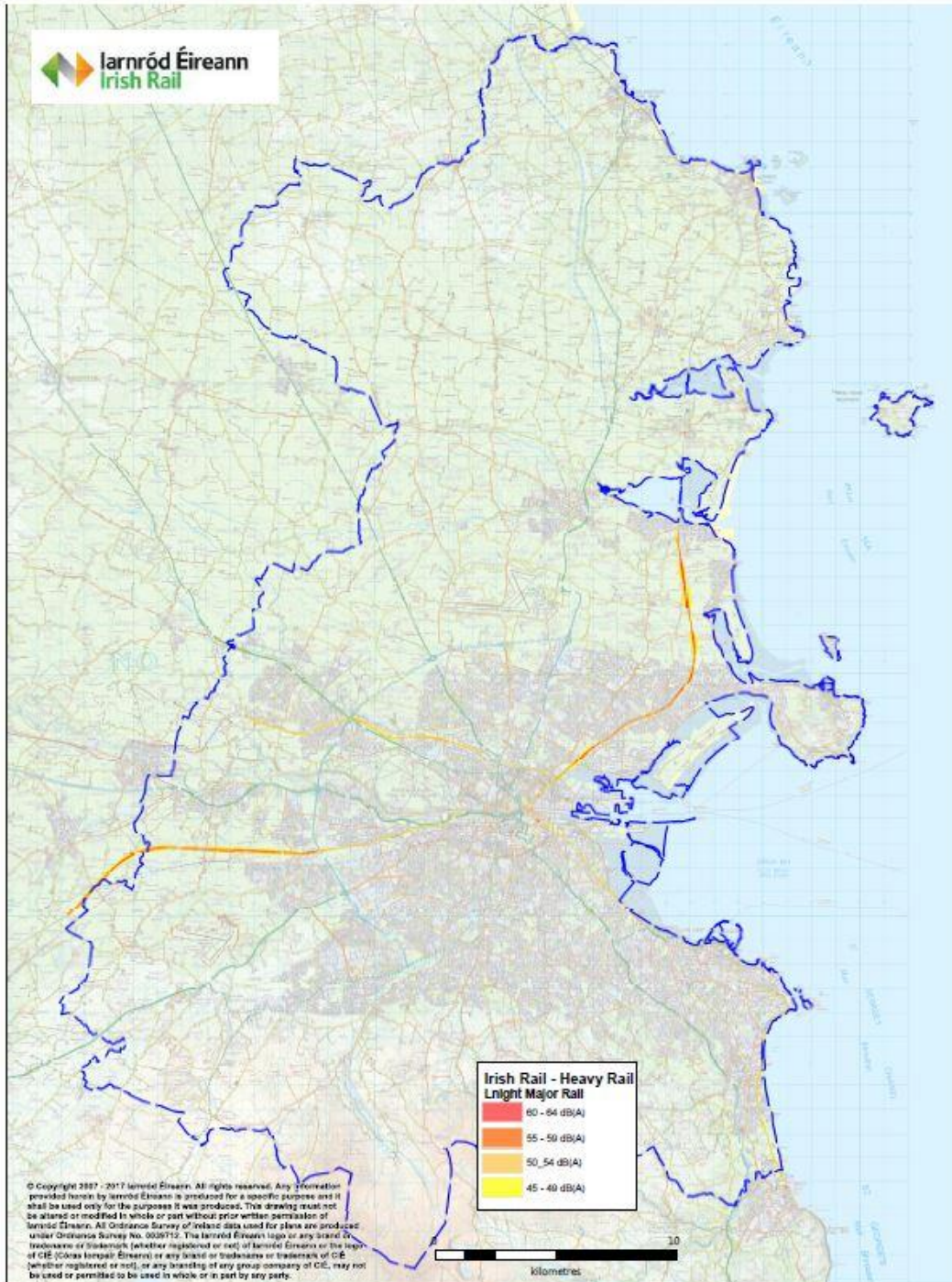
Figure D.3 Strategic Noise Mapping for Major Railway L_{den}



Lden 2017, Irish Rail - Major Heavy Rail, Dublin Agglomeration

Lden is the calculated day-evening-night noise level and represents the noise indicator for overall annoyance. It is calculated over all day-evening-night periods for one year. The day period is from 07:00 to 19:00, the evening period is from 19:00 to 23:00 and the night period is from 23:00 to 07:00. The Lden indicator contains extra weighting for the evening and night periods as noise is generally more annoying during these periods. The map above indicates the Lden decibel (dB) bands reported for Strategic Noise Mapping 2017.

Figure D.4 Strategic Noise Mapping for Major Railways L_{night}

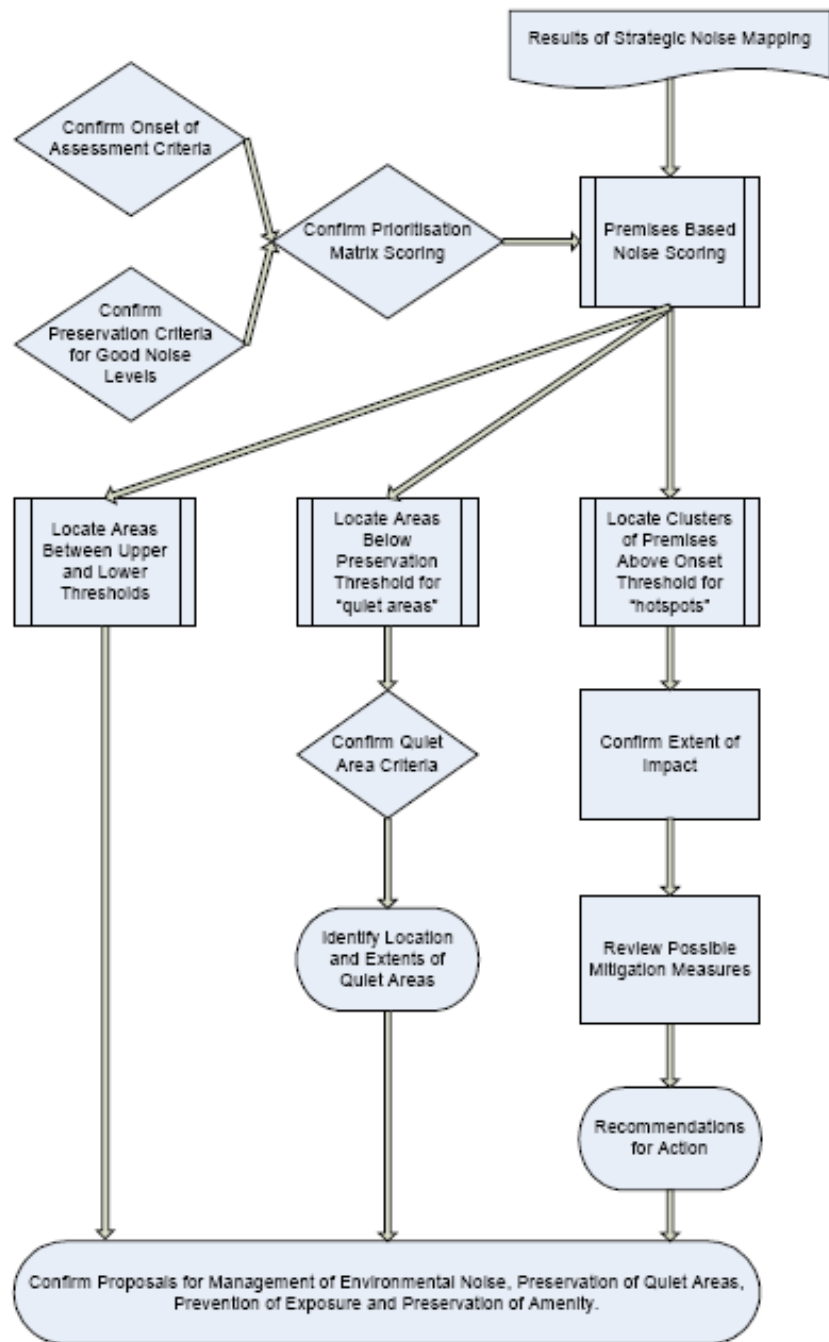


L_{night} 2017, Irish Rail - Major Heavy Rail, Dublin Agglomeration

L_{night} is the night time noise indicator and is used in the assessment of sleep disturbance. It is the average noise level calculated over all night periods, 23:00 to 07:00, for one year. The map above indicates the L_{night} decibel (dB) bands reported for Strategic Noise Mapping 2017.

Appendix E

Overview / Flow Diagram of Process for Action Planning Decision Making



Appendix F

Decision Support Matrix – Worked Example

The following table presents a worked example of the Decision Support Matrix. The example is an arbitrary one using assumed data to achieve the relevant scoring.

Example - Main Street, Any Town

Noise Bands 70-74 dB L_{den} And 60-64 dB L_{night}

Location - Town Centre

Noise Source – Road Noise

Assessment Area		Score Range L _{den}	Score Range L _{night}	Sub total
Noise Band	<45 dB	5	6	
	45 - 49 dB	4	5	
	50 - 54 dB	3	4	
	55 - 59 dB	2	2	
	60 - 64 dB	1	3	3
	65 - 69 dB	2	4	
	70 - 74 dB	3	5	3
	75 - 79 dB	4	6	
	>80 dB	5	7	
Location	Town Centre	1	1	2
	Commercial	1	2	
	Residential	2	3	
	Noise Sensitive	3	3	
	Open Countryside	3	3	
	Recreational open space	2	2	
Source Type	Air	3	4	
	Industry	2	3	
	Rail	2	3	
	Road	3	4	7
Priority: High, Medium or Low		15		

The final score in the worked example in the case is 15 which falls below the threshold of 17 which would require further assessment for potential mitigation measures.

Appendix G

“Investigation of Noise Hotspots along Busy Traffic Routes in County Wicklow”



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Investigation of Noise Hotspots along Busy Traffic Routes in County Wicklow

For

Wicklow County Council

Document Number 2245-01 v1.00

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- ▶ ISO9001:2015 Registration No. 2015/2170
- ▶ ISO14001:2015 Registration No. 2012/1427
- ▶ MCERTS Certified personnel for stack testing
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Document Lead Sheet

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	Client contact	Margaret Hartnett		
	Permit/Lic No. (if applic)	N/A		
Order	Proposal number	email		
	Client PO or other reference	TBA		
Deliverable	Report title	Identification & analysis of Noise Hot Spots		
	Document number	2245-01		
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	Type of document	Report		
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Approval & Issue	Site visit by	N/A	Date last site visit	N/A
	Document author	TK	Date written	01/03/2019
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	If not satisfactory, further testing required	N/A		
	If satisfactory, when is next test due?	N/A		

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Report History

1.00 Issued

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1. Introduction

Environmental Efficiency was approached by Wicklow County Council to assist with their noise action plan along N11/M11 corridor and other busy traffic routes in County Wicklow. The purpose of this document is to prioritise noise “hotspots” along these routes to assist with Wicklow County Councils noise action plan as described by the EPA in their document titled “Guidance Note for Noise Action Planning for the first round of the Environmental Noise Regulations 2006, July 2009”.

This legislation states; “As set out in the Framework for Action Plans, each local authority will need to identify their noise sensitive locations or hotspots that are above the proposed onset levels for noise mitigation measures. This will involve identifying priority areas using a noise scoring decision matrix, and then drawing 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)”. This will be the primary purpose of this document. For further information on this legislation the priority threshold scoring system and the noise scoring decision matrix can be found in the Appendix.

2. Summary

Work on this project commenced in early January by Environmental Efficiency consultants and was comprised of desk based research. Upon initial inspection of the road network, a total of 115 locations were selected as potential noise hotspot areas along all traffic routes.

As a resource, the Transport Infrastructure Ireland (TII) strategic noise map was utilised coupled with current geographic maps to assess noise intensity at each of the 115 locations, this map can be seen in the Appendix. The number of hotspot locations was narrowed down to 62 locations for further analysis, utilising the noise scoring decision matrix as stated by the EPA. The final hotspot locations after analysis can be seen in table 2-1 below, the initial 62 locations analysed can be seen in the appendix.

Upon completing the analysis, 31 locations of the 62 were found to be noise sensitive locations or “hotspots” that are above the proposed onset levels for noise mitigation or preservation measures as they scored equal or higher than the threshold level of 17 as recommended by the EPA. These locations can be seen below.

Table 2-1: Final noise hotspot locations which have been selected based upon their score on or above the threshold value of 17 using the noise scoring decision matrix as recommended by the EPA.

No.	Road	Name of Hotspot	Address	Description	Type location
1	N11/M11	Kilbride Church of Ireland	Springfield, Co. Wicklow	Church	Residential
2	R750/R772	Westmount Clinic	Church Hill, Bollarney South, Wicklow	Healthcare	Residential
3	R761	St Peters Church	Chapel Ln, St Peter's Rd, Little Bray, Bray, Co. Wicklow	Church	Residential
4	R761	Rise Counselling and Psychotherapy	1 Druids Court Kilcoole Industrial Estate, Creowen, Kilcoole, Co. Wicklow	Healthcare	Residential
5	N11/M11	Dargle Valley Nursing Home	7 Cookstown Cottages, Cookstown, Enniskerry, Co. Wicklow, A98 NA46	Healthcare	Quiet Area
6	N11/M11	Medicare Health Studio and Clinic	Glencormack Park, Kilmacanoge North, Co. Wicklow	Healthcare	Residential
7	N11/M11	Sunbeam House Services Ballyraine	Vale Rd, Yardland, Arklow, Co. Wicklow	Healthcare	Quiet Area
8	N81	Our Lady of Mercy Crosschapel	Red Lane, Co. Wicklow	Church	Residential
9	R750/R772	ASL Safety and Training	Wicklow County Campus, Clermont College, Rathnew, Commons, Wicklow	School	School
10	R750/R772	Wicklow Golf Club	Dunbur Rd, Corporation Lands, Wicklow	Recreational	Recreational Open Space
11	R761	Little Bunnies Montessori	Aubrey court, Parnell Rd, Bray, Co. Wicklow	School	School
12	R761	St Patricks Loreto PS	Vevay Rd, Bray, Co. Wicklow	School	School
13	R761	Gaelscoil Ui Cheadaigh	Vevay Rd, Bray, Co. Wicklow	School	School
14	R761	St Andrews NS	Newcourt Rd, Newcourt, Bray, Co. Wicklow	School	School
15	R761	Newcourt Special School	Newcourt Rd, Newcourt, Bray, Co. Wicklow	School	School
16	R761	Kilcoole Primary School	St Brigids Buildings, Kilcoole, Co. Wicklow	School	School
17	R761	Colaiste Chraobh Abhann	Ballycrone, County Wicklow	School	School
18	R761	Greystones Golf Club	Burnaby Estate, Whitshed Rd, Killincarrig, Greystones, Co. Wicklow	Recreational	Recreational Open Space
19	N11/M11	Little Harvard Bray	Riversdale, Upper Dargle Rd, Kilbride, Bray, Co. Wicklow	School	School
20	N11/M11	Dublin Oak Academy	Kilcrouney Lane Kilcrouney Castle, Kilcrouney, Bray, Co. Wicklow	School	School
21	N11/M11	Mini Hands Montessori	Kilmacanoge North, Kilmacanogue, Co. Wicklow	School	School

No.	Road	Name of Hotspot	Address	Description	Type location
22	N11/M11	St Catherine's Special School	Killadreenan, Greystones, Co. Wicklow	School	School
23	N11/M11	Kilmacanogue National School	Kilmacanogue, Kilmacanoge North, Bray, Co. Wicklow	School	School
24	N11/M11	The Avoca Clinic	Glencormack Business Park, Kilmacanoge North, Kilmacanogue, Co. Wicklow, A98 WK27	Healthcare	Residential
25	N81	Peter Finnegan Park	Troopersfield, Blessington, Co. Wicklow	Recreational	Recreational Open Space
26	R750/R772	The Pentecostals of Dublin	1 Lakelands, Commons, Rathnew, Co. Wicklow, A67 K683	Church	Residential
27	R761	St Anthony's School	Saint Anthony, Church Rd, Kilcoole, Bray, Co. Wicklow	School	School
28	R761	The Village Montessori	Main St, Kilcoole, Co. Wicklow	School	School
29	R761	Our Lady Queen of Peace	Putland Rd, Newcourt, Bray, Co. Wicklow	Church	Residential
30	R761	St Anthony's Catholic Church	Kilcoole, Co. Wicklow	Church	Residential
31	R761	Enable Ireland	Marino Centre, Church Rd, Bray, Co. Wicklow	Healthcare	Residential

3. Method

As discussed previously, 115 locations were selected as potential noise hotspot areas along four of the busiest traffic routes in county Wicklow, the N11/M11 motorway, the N81 motorway, the R750/R772 regional roads and the R761 regional road. These hotspots were comprised of particularly sensitive location types which include schools, churches, healthcare facilities and recreational areas within 300 meters of each road.

These locations were selected using the Transport Infrastructure Ireland (TII) strategic noise map including current geographic maps to assess noise intensity from traffic at each location. TII is the noise mapping body for all National roads in the Republic of Ireland. Of the 115 locations, 62 were selected for further analysis using the noise scoring decision matrix as recommended by the EPA. The locations were narrowed down primarily based upon the noise intensity from traffic at each potential hotspot. Areas with a noise reading lower than the threshold of the TII noise map during the daytime (55 dB) was cut from the shortlist.

Analysis of the final 62 locations was based upon EPA guidance for noise action planning as part of the Environmental Noise Regulations 2006. This guidance discusses the identification of priority noise areas or noise hotspots. As set out in the framework for noise action plans, each local authority must identify their noise sensitive locations that are above the proposed onset levels for noise mitigation measures via the identification of noise hotspots using a noise scoring decision matrix. A shortlist of potential areas for action must then be drawn up for hotspots that are both above the onset values, and below for preservation of quiet areas. Using the decision matrix, the proposed threshold score whereby action must be taken has been selected by the EPA as 17. The scoring matrix can be seen below, Figure 1-3.

		Priority Matrix		
		Location:		
Decision Selection Criteria		Score Range Lden	Score Range Lnight	SubTotal
Noise Band	<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	4	6	
Type of Location	City Centre	1	1	
	Residential	2	3	
	Noise Sensitive	3	3	
	School	3	1	
	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

Figure 3-1: The noise scoring decision matrix which should be used to identify hotspot locations as recommended by the EPA.

As described the EPA Guidance Note for Noise Action Planning for the first round of the Environmental Noise Regulations July 2009, the scoring on the matrix aims to identify two scenarios;

- People exposed to high levels of noise where it may be necessary to consider noise mitigation measures,
- Areas of low noise levels where it may be relevant to consider declaring an urban “quiet area” to help preserve this situation.

This is a dual approach which leads to low noise levels being assigned a high score in order for them to achieve a total on or above the threshold value of 17, hence <45 dB will score higher than 45-49 dB. Each noise band has an assigned score for both day (Lden) and night (Lnight) as seen in Figure 3-1. These scores are added to give a subtotal for the noise band, the type of location and the type of noise source. The three subtotals are then added to give a total score for that location, this score is compared to the EPA threshold value of 17 and if found to equal or breach this location becomes a noise hotspot as either a location where noise mitigation is necessary, or a quiet area where preservation is required. These hotspot locations are the key areas that should be brought forward in the noise action plan process.

4. Results

The results of the investigation using the noise scoring decision matrix are documented in this section. The 62 locations analysed along with their respective scores can be seen in Table 4-1. The resulting 31 hotspot locations (noise sensitive locations) with a score on or above the threshold value of 17 can be seen in Table 4-2.

Table 4-1: The potential hotspot locations after analysis using the noise scoring decision matrix including each locations total score.

No.	Road	Name of Location	Description	Noise day (dB)	Noise night (dB)	Type of location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
7	N11/M11	Kilbride Church of Ireland	Church	75-79	65-69	Residential	Road	4	4	2	3	3	4	20
31	R750/R772	Westmount Clinic	Healthcare	55-59	45-49	Residential	Road	2	5	2	3	3	4	19
47	R761	St Peters Church	Church	55-59	45-49	Residential	Road	2	5	2	3	3	4	19
58	R761	Rise Counselling and Psychotherapy	Healthcare	55-59	45-49	Residential	Road	2	5	2	3	3	4	19
9	N11/M11	Dargle Valley Nursing Home	Healthcare	60-64	50-54	Quiet Area	Road	1	4	3	3	3	4	18
11	N11/M11	Medicare Health Studio and Clinic	Healthcare	70-74	60-64	Residential	Road	3	3	2	3	3	4	18
12	N11/M11	Sunbeam House Services Ballyraine	Healthcare	60-64	50-54	Quiet Area	Road	1	4	3	3	3	4	18
20	N81	Our Lady of Mercy Crosschapel	Church	60-64	45-49	Residential	Road	1	5	2	3	3	4	18
26	R750/R772	ASL Safety and Training	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
34	R750/R772	Wicklow Golf Club	Recreational	55-59	45-49	Recreational Open Space	Road	2	5	2	2	3	4	18
37	R761	Little Bunnies Montessori	School	55-59	45-49	School	Road	2	5	3	1	3	4	18

No.	Road	Name of Location	Description	Noise day (dB)	Noise night (dB)	Type of location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
38	R761	St Patricks Loreto PS	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
39	R761	Gaelscoil Ui Cheadaigh	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
41	R761	St Andrews NS	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
42	R761	Newcourt Special School	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
44	R761	Kilcoole Primary School	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
46	R761	Colaiste Chraobh Abhann	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
60	R761	Greystones Golf Club	Recreational	55-59	45-49	Recreational Open Space	Road	2	5	2	2	3	4	18
2	N11/M11	Little Harvard Bray	School	70-74	60-64	School	Road	3	3	3	1	3	4	17
3	N11/M11	Dublin Oak Academy	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
4	N11/M11	Mini Hands Montessori	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
5	N11/M11	St Catherine's Special School	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
6	N11/M11	Kilmacanogue National School	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
10	N11/M11	The Avoca Clinic	Healthcare	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
22	N81	Peter Finnegan Park	Recreational	70-74	60-64	Recreational Open Space	Road	3	3	2	2	3	4	17

No.	Road	Name of Location	Description	Noise day (dB)	Noise night (dB)	Type of location	Type of Noise Source	Score Range Lden	Score Range Nnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
28	R750/R772	The Pentecostals of Dublin	Church	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
43	R761	St Anthony's School	School	70-74	60-64	School	Road	3	3	3	1	3	4	17
45	R761	The Village Montessori	School	70-74	60-64	School	Road	3	3	3	1	3	4	17
51	R761	Our Lady Queen of Peace	Church	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
52	R761	St Anthony's Catholic Church	Church	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
53	R761	Enable Ireland	Healthcare	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
1	N11/M11	Woodlands Academy	School	60-64	50-54	School	Road	1	4	3	1	3	4	16
14	N11/M11	Glen Mill Golf Club	Recreational	60-64	50-54	Recreational Open Space	Road	1	4	2	2	3	4	16
18	N81	O'Reilly Training Centre Ltd	School	60-64	50-54	School	Road	1	4	3	1	3	4	16
24	N81	June Blake's Garden	Recreational	60-64	50-54	Recreational Open Space	Road	1	4	2	2	3	4	16
35	R750/R772	Wicklow Tennis Club	Recreational	60-64	50-54	Recreational Open Space	Road	1	4	2	2	3	4	16
40	R761	Scoil Chualann	School	60-64	50-54	School	Road	1	4	3	1	3	4	16
50	R761	Calvary Baptist Church	Church	70-74	65-69	City Centre	Road	3	4	1	1	3	4	16

No.	Road	Name of Location	Description	Noise day (dB)	Noise night (dB)	Type of location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
57	R761	The Village Practice Medical Centre	Healthcare	65-69	55-59	Residential	Road	2	2	2	3	3	4	16
62	R761	Bray Head Hiking Trail	Recreational	60-64	50-54	Recreational Open Space	Road	1	4	2	2	3	4	16
8	N11/M11	Saint Mochonogs Church	Church	60-64	55-59	Residential	Road	1	2	2	3	3	4	15
13	N11/M11	Glen View Park	Recreational	65-69	55-59	Recreational Open Space	Road	2	2	2	2	3	4	15
15	N11/M11	Glen of The Downs Nature Trail	Recreational	65-69	55-59	Recreational Open Space	Road	2	2	2	2	3	4	15
16	N81	Blessington Further Education and Training Centre	School	65-69	55-59	School	Road	2	2	3	1	3	4	15
25	R750/R772	St Joseph's Girls NS	School	65-69	55-59	School	Road	2	2	3	1	3	4	15
27	R750/R772	Treasures Montessori Pre School	School	65-69	55-59	School	Road	2	2	3	1	3	4	15
30	R750/R772	Wicklow Primary Healthcare Centre	Healthcare	60-64	55-59	Residential	Road	1	2	2	3	3	4	15

No.	Road	Name of Location	Description	Noise day (dB)	Noise night (dB)	Type of location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
36	R750/R772	Wicklow Rovers AFC	Recreational	65-69	55-59	Recreational Open Space	Road	2	2	2	2	3	4	15
54	R761	Bray Health Centre	Healthcare	60-64	45-49	City Centre	Road	1	5	1	1	3	4	15
61	R761	County Wicklow Lawn Tennis Club	Recreational	65-69	55-59	Recreational Open Space	Road	2	2	2	2	3	4	15
17	N81	Sakura Montessori	School	60-64	55-59	School	Road	1	2	3	1	3	4	14
21	N81	Blessington Family Practice	Healthcare	65-69	60-64	City Centre	Road	2	3	1	1	3	4	14
23	N81	Blessington Pitch and Putt	Recreational	60-64	55-59	Recreational Open Space	Road	1	2	2	2	3	4	14
48	R761	Cornerstone Church of The Well	Church	60-64	50-54	City Centre	Road	1	4	1	1	3	4	14
49	R761	The Holy Redeemer Church	Church	65-69	60-64	City Centre	Road	2	3	1	1	3	4	14
56	R761	Lucena Clinic Bray	Healthcare	70-74	55-59	City Centre	Road	3	2	1	1	3	4	14
59	R761	Town Hall Clinic Bray	Healthcare	70-74	55-59	City Centre	Road	3	2	1	1	3	4	14
29	R750/R772	Banner of Love Church	Church	65-69	55-59	City Centre	Road	2	2	1	1	3	4	13
32	R750/R772	Wicklow Dental	Healthcare	65-69	55-59	City Centre	Road	2	2	1	1	3	4	13
33	R750/R772	Chinese Medicine Clinic	Healthcare	65-69	55-59	City Centre	Road	2	2	1	1	3	4	13

No.	Road	Name of Location	Description	Noise day (dB)	Noise night (dB)	Type of location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
55	R761	Smiles Dental Bray	Healthcare	65-69	55-59	City Centre	Road	2	2	1	1	3	4	13
19	N81	St Marys Church Blessington	Church	60-64	55-59	City Centre	Road	1	2	1	1	3	4	12

Table 4-2: The final noise hotspot locations which have been selected based upon their score on or above the threshold value of 17 from highest to lowest using the EPA noise scoring decision matrix.

No.	Road	Name of Hotspot	Description	Noise day	Noise night	Type location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
1	N11/M11	Kilbride Church of Ireland	Church	75-79	65-69	Residential	Road	4	4	2	3	3	4	20
2	R750/R772	Westmount Clinic	Healthcare	55-59	45-49	Residential	Road	2	5	2	3	3	4	19
3	R761	St Peters Church	Church	55-59	45-49	Residential	Road	2	5	2	3	3	4	19
4	R761	Rise Counselling and Psychotherapy	Healthcare	55-59	45-49	Residential	Road	2	5	2	3	3	4	19
5	N11/M11	Dargle Valley Nursing Home	Healthcare	60-64	50-54	Quiet Area	Road	1	4	3	3	3	4	18
6	N11/M11	Medicare Health Studio and Clinic	Healthcare	70-74	60-64	Residential	Road	3	3	2	3	3	4	18
7	N11/M11	Sunbeam House Services Ballyraine	Healthcare	60-64	50-54	Quiet Area	Road	1	4	3	3	3	4	18
8	N81	Our Lady of Mercy Crosschapel	Church	60-64	45-49	Residential	Road	1	5	2	3	3	4	18
9	R750/R772	ASL Safety and Training	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
10	R750/R772	Wicklow Golf Club	Recreational	55-59	45-49	Recreational Open Space	Road	2	5	2	2	3	4	18
11	R761	Little Bunnies Montessori	School	55-59	45-49	School	Road	2	5	3	1	3	4	18

No.	Road	Name of Hotspot	Description	Noise day	Noise night	Type location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
12	R761	St Patricks Loreto PS	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
13	R761	Gaelscoil Ui Cheadaigh	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
14	R761	St Andrews NS	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
15	R761	Newcourt Special School	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
16	R761	Kilcoole Primary School	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
17	R761	Colaiste Chraobh Abhann	School	55-59	45-49	School	Road	2	5	3	1	3	4	18
18	R761	Greystones Golf Club	Recreational	55-59	45-49	Recreational Open Space	Road	2	5	2	2	3	4	18
19	N11/M11	Little Harvard Bray	School	70-74	60-64	School	Road	3	3	3	1	3	4	17
20	N11/M11	Dublin Oak Academy	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
21	N11/M11	Mini Hands Montessori	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
22	N11/M11	St Catherine's Special School	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
23	N11/M11	Kilmacanogue National School	School	55-59	50-54	School	Road	2	4	3	1	3	4	17
24	N11/M11	The Avoca Clinic	Healthcare	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
25	N81	Peter Finnegan Park	Recreational	70-74	60-64	Recreational Open Space	Road	3	3	2	2	3	4	17

No.	Road	Name of Hotspot	Description	Noise day	Noise night	Type location	Type of Noise Source	Score Range Lden	Score Range Lnight	Score Location Day	Score Location Night	Score Noise Type Day	Score Noise Type Night	Total score
26	R750/R772	The Pentecostals of Dublin	Church	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
27	R761	St Anthony's School	School	70-74	60-64	School	Road	3	3	3	1	3	4	17
28	R761	The Village Montessori	School	70-74	60-64	School	Road	3	3	3	1	3	4	17
29	R761	Our Lady Queen of Peace	Church	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
30	R761	St Anthony's Catholic Church	Church	60-64	50-54	Residential	Road	1	4	2	3	3	4	17
31	R761	Enable Ireland	Healthcare	60-64	50-54	Residential	Road	1	4	2	3	3	4	17

5. Discussion

Of the initial 115 locations assessed in this investigation, a total of 62 potential hotspot locations were identified, of these 31 hotspots or noise sensitive areas were highlighted by utilising the noise scoring decision matrix as per EPA guidance. It is recommended that these hotspot locations be brought forward in the Wicklow County Council noise action plan process as potential areas where noise mitigation or equally quiet area preservation is required.

On the topic of noise mitigation vs quiet area preservation which the decision matrix has the dual ability to highlight, it appears that most hotspots in this investigation are noise mitigation hotspots during the day, as no Lden noise below 55 dB was encountered. Looking at the decision scoring matrix, it is only once Lden noise drops below 50 dB that the score begins to increase considerably indicating the entry into a quiet area for preservation. In contrast to this many hotspots seem to change during the night, a considerable amount of Lnight noise of 45-49 dB was encountered. Looking at the decision scoring matrix in this instance, a very high score was assigned to this noise band during the night which indicates progression into a quiet area for preservation.

To conclude, it seems that a lot of hotspots encountered in this analysis have the potential to be both an area for noise mitigation during the day and in contrast, an area for quiet area preservation during the night. This portrays the dual capability and effectiveness of the decision scoring matrix, this concept should be considered when moving forward with the noise action plan with regard to all the hotspots highlighted in this report.

6. Conclusion

To conclude, 31 hotspots or noise sensitive areas were discovered in this assessment. It is recommended that Wicklow County Council pay considerable attention to these hotspot locations and understand the scenarios whereby which both noise mitigation and quiet area preservation may be required at any particular location during the changing day to night cycle. The hotspots highlighted in this report should be brought forward in the noise action plan process.

Appendix 1

All 62 locations analysed using the noise scoring decision matrix with address information.

No.	Road	Name of Location	Address	Description	Type location
1	N11/M11	Woodlands Academy	Wingfield House, Kilcrone, Bray, Co. Wicklow, A98 FK10	School	School
2	N11/M11	Little Harvard Bray	Riversdale, Upper Dargle Rd, Kilbride, Bray, Co. Wicklow	School	School
3	N11/M11	Dublin Oak Academy	Kilcrone Lane Kilcrone Castle, Kilcrone, Bray, Co. Wicklow	School	School
4	N11/M11	Mini Hands Montessori	Kilmacanoge North, Kilmacanogue, Co. Wicklow	School	School
5	N11/M11	St Catherine's Special School	Killadreenan, Greystones, Co. Wicklow	School	School
6	N11/M11	Kilmacanogue National School	Kilmacanogue, Kilmacanogue North, Bray, Co. Wicklow	School	School
7	N11/M11	Kilbride Church of Ireland	Springfield, Co. Wicklow	Church	Residential
8	N11/M11	Saint Mochonogs Church	5V96+CQ Kilmacanoge North, County Wicklow	Church	Residential
9	N11/M11	Dargle Valley Nursing Home	7 Cookstown Cottages, Cookstown, Enniskerry, Co. Wicklow, A98 NA46	Healthcare	Quiet Area
10	N11/M11	The Avoca Clinic	Glencormack Business Park, Kilmacanoge North, Kilmacanogue, Co. Wicklow, A98 WK27	Healthcare	Residential
11	N11/M11	Medicare Health Studio and Clinic	Glencormack Park, Kilmacanoge North, Co. Wicklow	Healthcare	Residential
12	N11/M11	Sunbeam House Services Ballyraine	Vale Rd, Yardland, Arklow, Co. Wicklow	Healthcare	Quiet Area
13	N11/M11	Glen View Park	Ballydonagh, Co. Wicklow	Recreational	Recreational Open Space
14	N11/M11	Glen Mill Golf Club	Timmore, Newcastle, Co. Wicklow	Recreational	Recreational Open Space
15	N11/M11	Glen of The Downs Nature Trail	Nature Reserve,, Glen Of The Downs, Co. Wicklow	Recreational	Recreational Open Space
16	N81	Blessington Further Education and Training Centre	Community Education Centre, Old Vocational School, Blessington, Co. Wicklow	School	School
17	N81	Sakura Montessori	Main St, Blessington, Co. Wicklow	School	School
18	N81	O'Reilly Training Centre Ltd	Tinode, Co. Wicklow	School	School
19	N81	St Marys Church Blessington	The Green, Haylands, Co. Wicklow	Church	City Centre
20	N81	Our Lady of Mercy Crosschapel	Red Lane, Co. Wicklow	Church	Residential

No.	Road	Name of Location	Address	Description	Type location
21	N81	Blessington Family Practice	Blessington, Co. Wicklow	Healthcare	City Centre
22	N81	Peter Finnegan Park	Troopersfield, Blessington, Co. Wicklow	Recreational	Recreational Open Space
23	N81	Blessington Pitch and Putt	Burgage Moyle, Blessington, Co. Wicklow	Recreational	Recreational Open Space
24	N81	June Blake's Garden	Tinode, Blessington, Co. Wicklow	Recreational	Recreational Open Space
25	R750/R772	St Joseph's Girls NS	Commons, Rathnew, Co. Wicklow	School	School
26	R750/R772	ASL Safety and Training	Wicklow County Campus, Clermont College, Rathnew, Commons, Wicklow	School	School
27	R750/R772	Treasures Montessori Pre School	Dunbur Rd, Corporation Lands, Wicklow	School	School
28	R750/R772	The Pentecostals of Dublin	1 Lakelands, Commons, Rathnew, Co. Wicklow, A67 K683	Church	Residential
29	R750/R772	Banner of Love Church	Wicklow House, Market Square, Wicklow	Church	City Centre
30	R750/R772	Wicklow Primary Healthcare Centre	Knockrobin, Wicklow, A67 K5C7	Healthcare	Residential
31	R750/R772	Westmount Clinic	Church Hill, Bollarney South, Wicklow	Healthcare	Residential
32	R750/R772	Wicklow Dental	Abbey St, Wicklow, A67 WF74	Healthcare	City Centre
33	R750/R772	Chinese Medicine Clinic	2, The Mall Business Centre, Main St, Wicklow, Wicklow Town, Co. Wicklow	Healthcare	City Centre
34	R750/R772	Wicklow Golf Club	Dunbur Rd, Corporation Lands, Wicklow	Recreational	Recreational Open Space
35	R750/R772	Wicklow Tennis Club	The Glebe, Wicklow, A67 KX40	Recreational	Recreational Open Space
36	R750/R772	Wicklow Rovers AFC	238 Glebemount, Bollarney South, Wicklow, A67 FD45	Recreational	Recreational Open Space
37	R761	Little Bunnies Montessori	Aubrey court, Parnell Rd, Bray, Co. Wicklow	School	School
38	R761	St Patricks Loreto PS	Vevay Rd, Bray, Co. Wicklow	School	School
39	R761	Gaelscoil Ui Cheadaigh	Vevay Rd, Bray, Co. Wicklow	School	School
40	R761	Scoil Chualann	31A Vevay Rd, Newcourt, Bray, Co. Wicklow, A98 E2T5	School	School
41	R761	St Andrews NS	Newcourt Rd, Newcourt, Bray, Co. Wicklow	School	School

No.	Road	Name of Location	Address	Description	Type location
42	R761	Newcourt Special School	Newcourt Rd, Newcourt, Bray, Co. Wicklow	School	School
43	R761	St Anthony's School	Saint Anthony, Church Rd, Kilcoole, Bray, Co. Wicklow	School	School
44	R761	Kilcoole Primary School	St Brigids Buildings, Kilcoole, Co. Wicklow	School	School
45	R761	The Village Montessori	Main St, Kilcoole, Co. Wicklow	School	School
46	R761	Colaiste Chraobh Abhann	Ballycrone, County Wicklow	School	School
47	R761	St Peters Church	Chapel Ln, St Peter's Rd, Little Bray, Bray, Co. Wicklow	Church	Residential
48	R761	Cornerstone Church of The Well	The Well, Church Terrace, Main St, Bray, Co. Wicklow, A98 VE43	Church	City Centre
49	R761	The Holy Redeemer Church	Main St, Bray, Co. Wicklow	Church	City Centre
50	R761	Calvary Baptist Church	43 Main St, Bray, Co. Wicklow, A98 XH74	Church	City Centre
51	R761	Our Lady Queen of Peace	Putland Rd, Newcourt, Bray, Co. Wicklow	Church	Residential
52	R761	St Anthony's Catholic Church	Kilcoole, Co. Wicklow	Church	Residential
53	R761	Enable Ireland	Marino Centre, Church Rd, Bray, Co. Wicklow	Healthcare	Residential
54	R761	Bray Health Centre	Block B, The Civic Centre, Main St, Bray, Co. Wicklow	Healthcare	City Centre
55	R761	Smiles Dental Bray	1 Main St, Bray, Co. Wicklow	Healthcare	City Centre
56	R761	Lucena Clinic Bray	Sessa House, Vevay Rd, Bray, Co. Wicklow	Healthcare	City Centre
57	R761	The Village Practice Medical Centre	3 Main St, Kilcoole, Co. Wicklow	Healthcare	Residential
58	R761	Rise Counselling and Psychotherapy	1 Druids Court Kilcoole Industrial Estate, Creowen, Kilcoole, Co. Wicklow	Healthcare	Residential
59	R761	Town Hall Clinic Bray	Town Hall Centre, Bray, Co. Wicklow	Healthcare	City Centre
60	R761	Greystones Golf Club	Burnaby Estate, Whitshed Rd, Killincarrig, Greystones, Co. Wicklow	Recreational	Recreational Open Space
61	R761	County Wicklow Lawn Tennis Club	Vevay Rd, Newcourt, Bray, Co. Wicklow	Recreational	Recreational Open Space
62	R761	Bray Head Hiking Trail	Kilruddery Demesne East, Co. Wicklow	Recreational	Recreational Open Space

Appendix 2

The Noise Scoring Decision Matrix.

		Priority Matrix		
		Location:		
Decision Selection Criteria		Score Range Lden	Score Range Lnight	SubTotal
Noise Band	<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	4	6	
Type of Location	City Centre Residential	1	1	
	Noise Sensitive	2	3	
	School	3	3	
	Quiet Area	3	1	
	Recreational open space	3	3	
Type of Noise Source	Air	2	2	
	Industry	3	4	
	Rail	2	3	
	Road	2	3	
			Total Score	0

Appendix 3

The Noise Scoring Decision Matrix in Use, rating an Lden of 71 dB and an Lnight of 63 dB in a residential location with a road noise source.

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

Appendix 4

The Priority Threshold Scoring System.

The scoring on the matrix tries to identify two scenarios,

- people exposed to high levels of noise where it may be necessary to consider noise mitigation measures, and
- areas of low noise levels where it may be relevant to consider declaring an urban quiet area to help protect this situation.

This dual approach leads to low noise levels being given a high score in order for them to achieve a total above the threshold, which is why the <45 dB scores higher than the 45-49 dB contour.

Appendix D of the EPA Guidance¹⁶ talks about how to use the matrix, but in short you have the L_{den} and L_{night} noise levels for the most exposed facade of each property within the noise mapping, you also know the use of the building, and the noise source which created the levels i.e. road traffic.

- If the $L_{den} = 70-74$ then subtotal = 3
- if the $L_{night} = 68$ then subtotal = 4
- It is residential, so L_{den} subtotal = 2 + 3 = 5
- noise source is roads, so subtotal = 3 + 4 = 7
- Total score = 19

So, it may be worth considering this location for noise mitigation.

If you have a house, exposed to road traffic of 46 L_{den} and 43 L_{night} , the scores (using format above) will be:

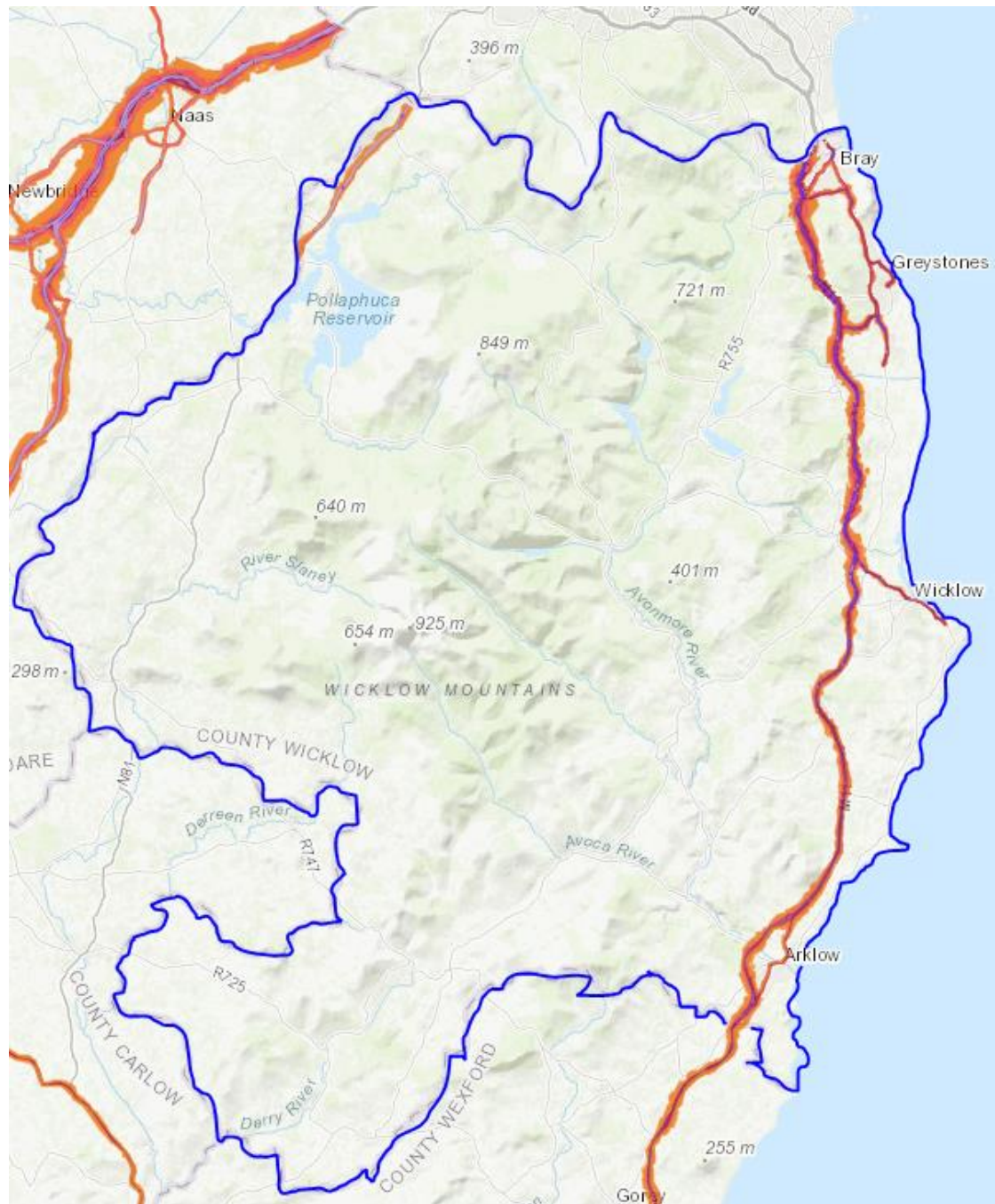
- $L_{den} = 4$
- $L_{night} = 6$
- residence = 5
- roads = 7
- Total = 22

So, it may be worth considering if this is in an area which could be declared a "quiet area"

You follow this process for every property within the noise mapping area, and look for the highest scoring locations, these will either be high noise or low noise, and should be the locations which move forward in the action plan process. The EPA Guidance suggests 17 or above should be considered for the shortlist, as this is used in DCC, however this is no "magic number" and you should consider what would be an appropriate threshold once you have completed the scoring and can review the results. It may be that in a less urban area a threshold score of 14, 15 or 16 may be more appropriate to identify the most important areas for possible mitigation.

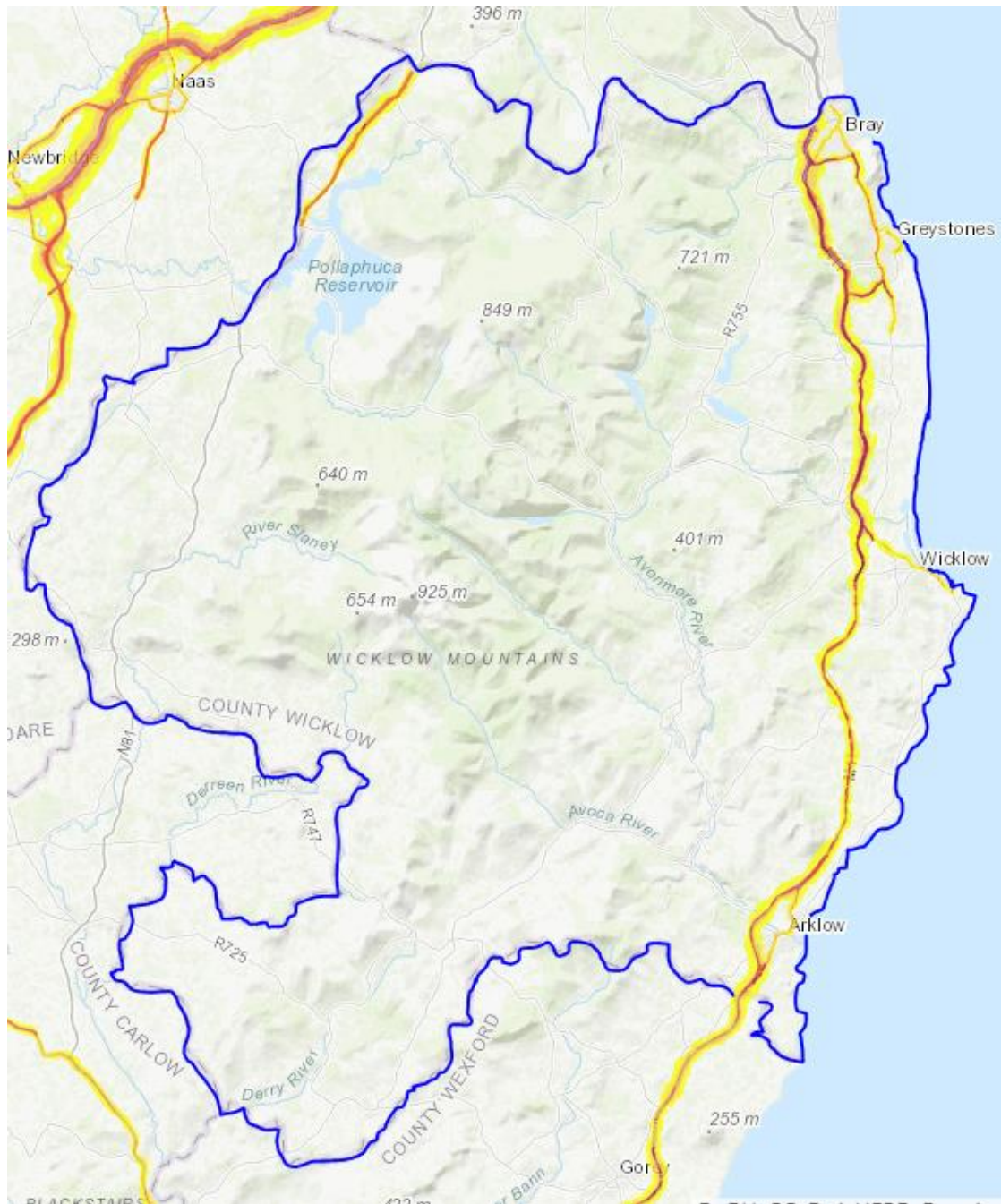
Appendix 5

Transport Infrastructure Ireland (TII) strategic noise map Lden.



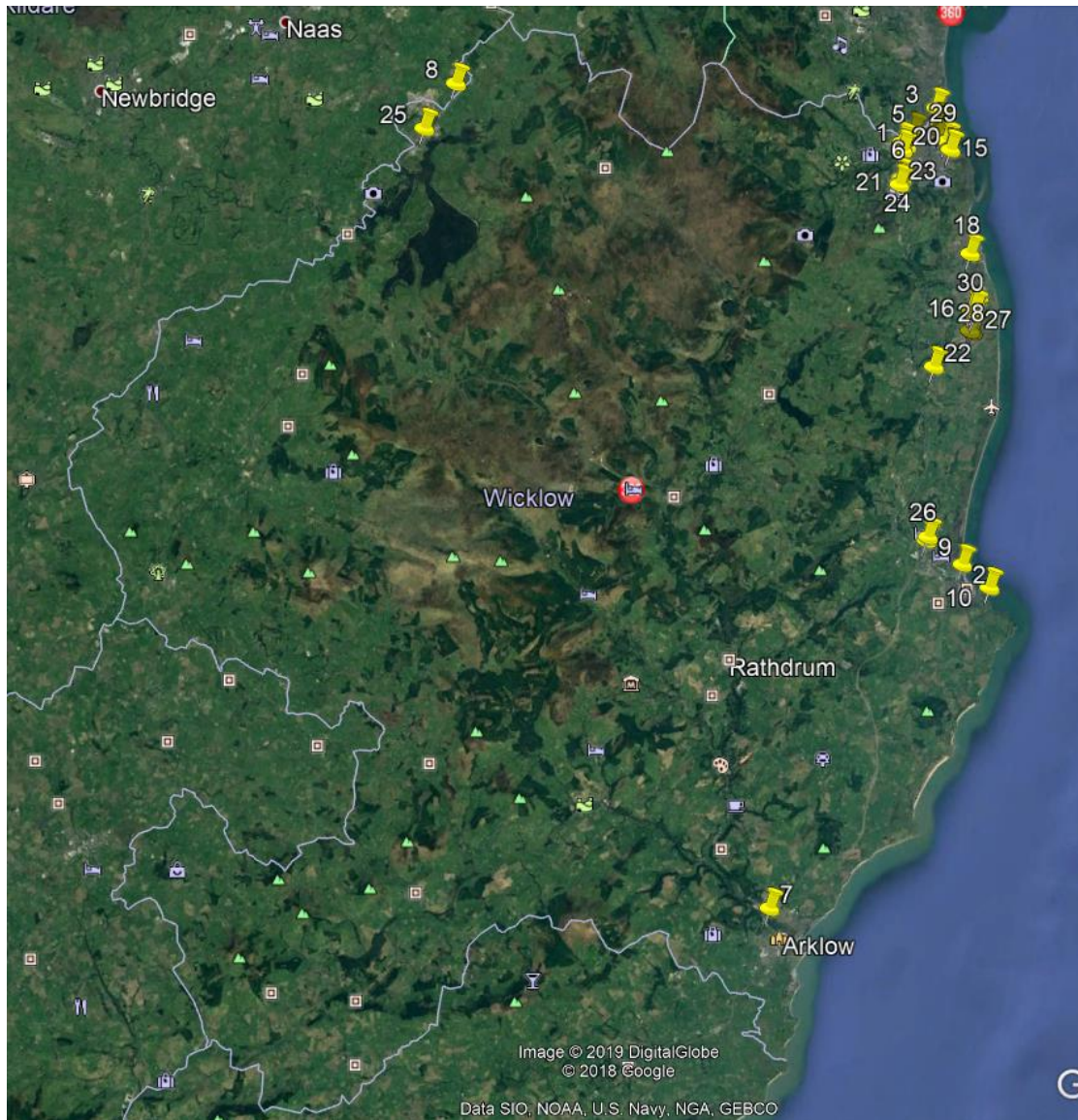
Appendix 6

Transport Infrastructure Ireland (TII) strategic noise map Lnight.



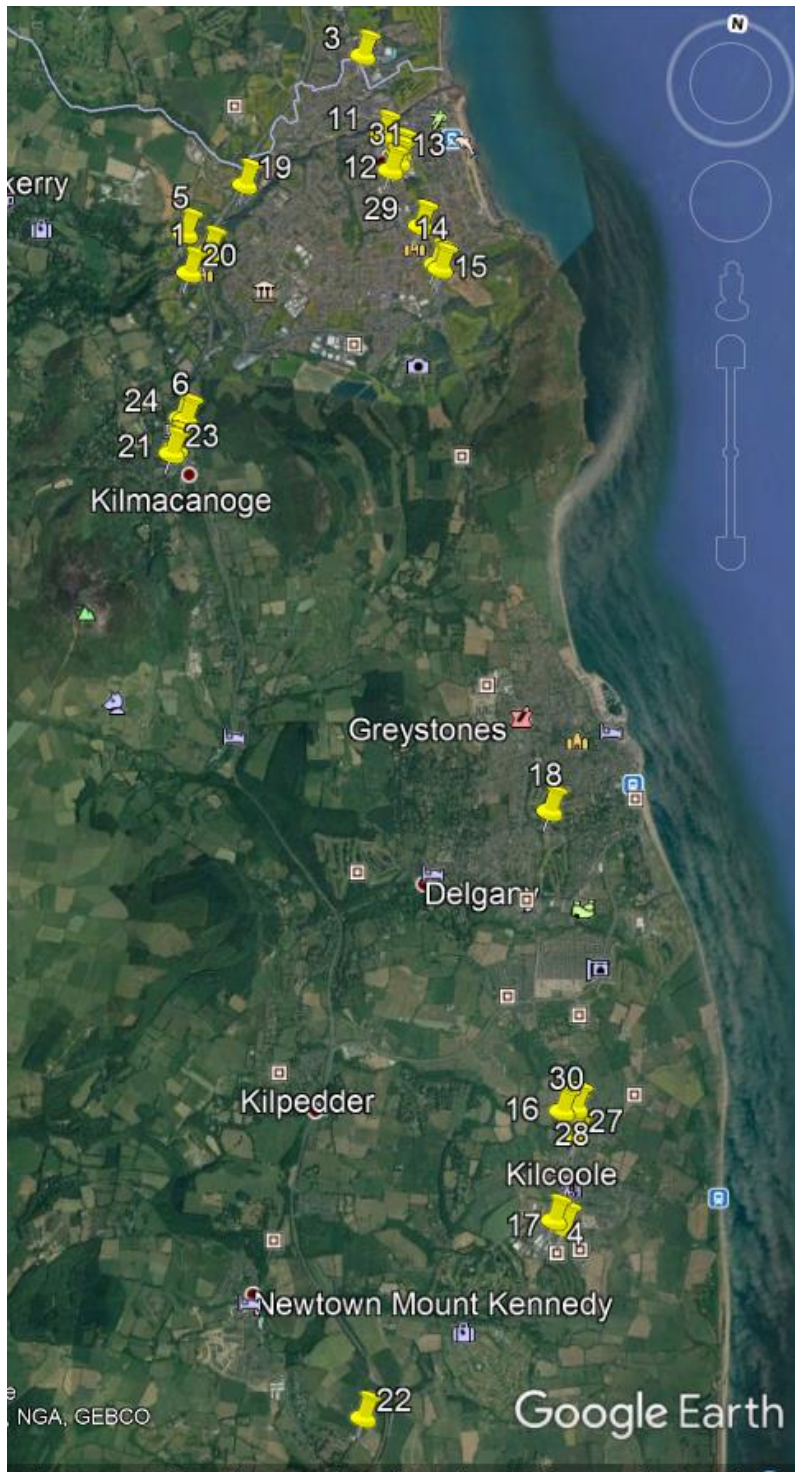
Appendix 7

Hotspot Location Map of Wicklow.



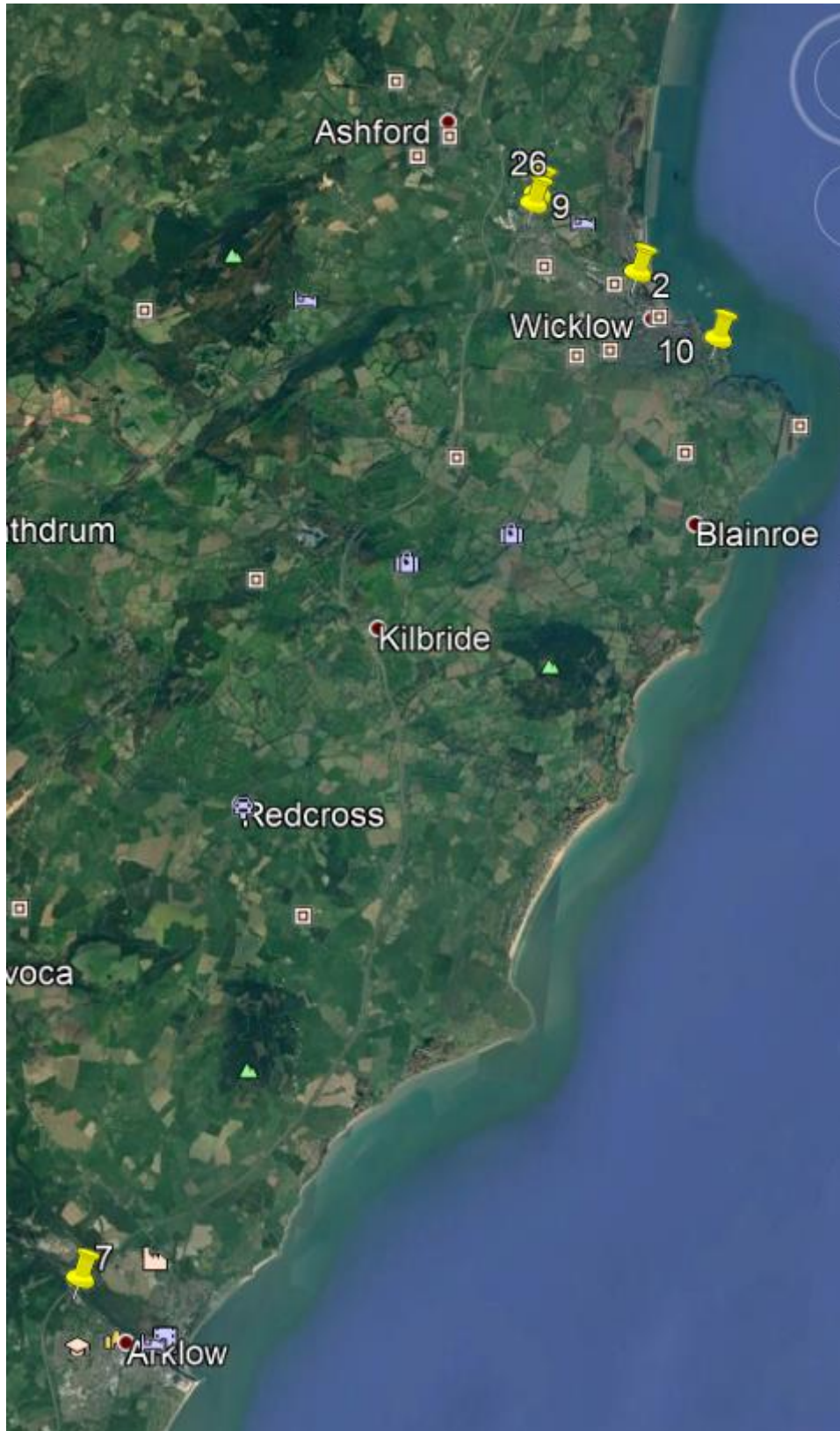
Appendix 8

Hotspot Location Map of North Eastern Wicklow.



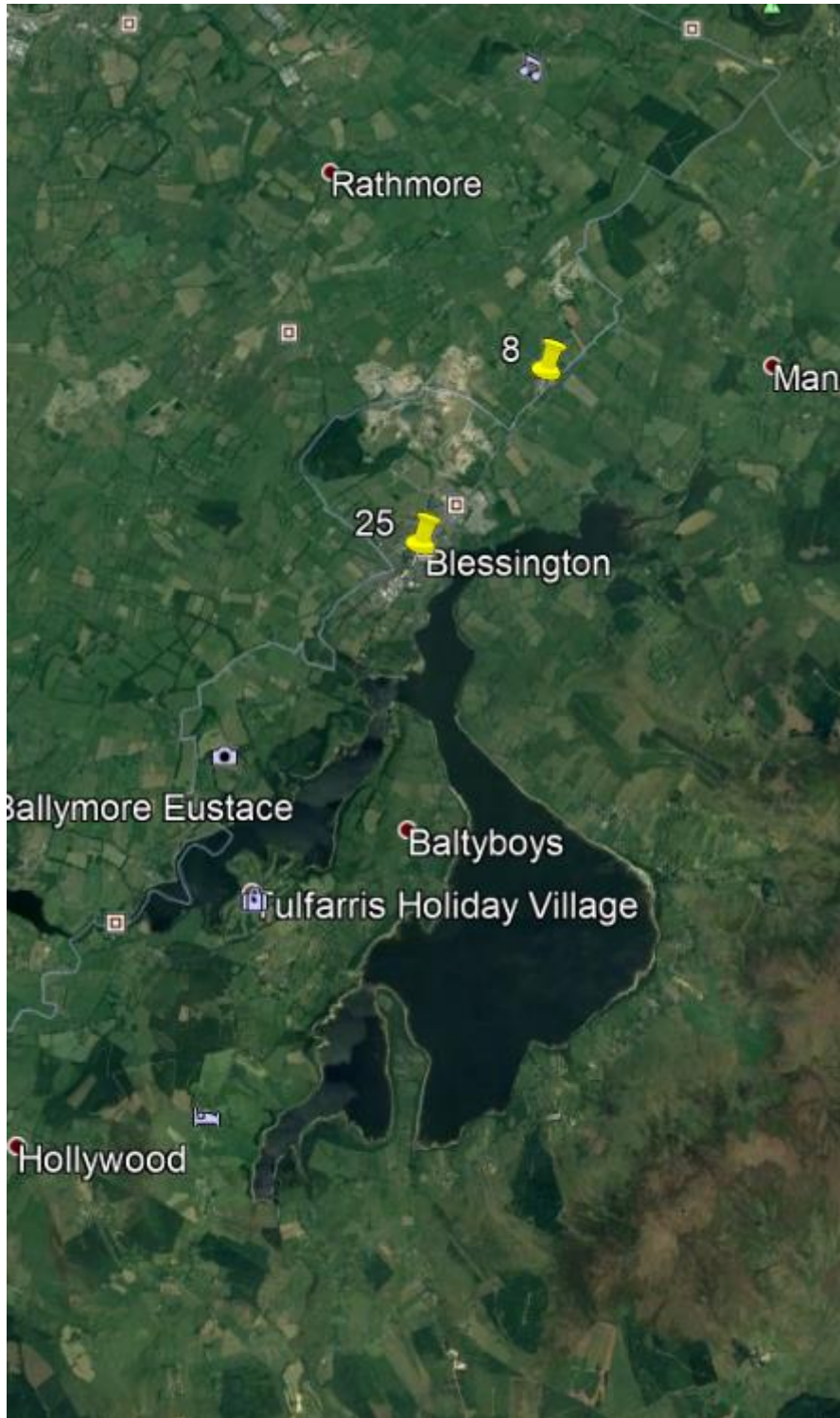
Appendix 9

Hotspot Location Map of South Eastern Wicklow.



Appendix 10

Hotspot Location Map of North Western Wicklow.



About Environmental Efficiency

Environmental Efficiency was founded in 1996 by two experienced consulting engineers, both with extensive backgrounds in manufacturing, quarrying, IT and construction in the UK, Ireland and overseas.

Our mission is to help improve our clients' environmental and H&S performance in cost effective and practical ways and as a result build long term relationships.

Engineers are natural problem solvers and this, coupled with the expertise of our staff of environmental consultants, enables us to offer solutions to environmental problems that are cost effective and practical.

Environmental Efficiency is engaged in energy, environmental and H&S consultancy across the entire range of manufacturing and commercial activity. Our clients range from US and European based multinationals to indigenous start-ups. What these clients have in common is a requirements for cost effective consultancy and pragmatic solutions to their issues.

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