

# Monaghan County Council

Comhairle Contae Mhuineacháin



## **Draft** Noise Action Plan (2024-2028)

*Relating to Major Roads  
Within County Monaghan  
Carrying More Than 3,000,000  
Vehicle Passages Per Year*

April 2024

## Executive Summary

This Noise Action Plan has been prepared by Monaghan County Council for major roads carrying more than three million vehicles per annum, which in County Monaghan comprises the national road - N2 and small sections of the N12 & N54, as well as Regional roads around the towns of Monaghan (R162 & R937), Castleblayney (R181, R183 & R938) and Carrickmacross (R927). This is the third Noise Action Plan devised for Co. Monaghan and it supersedes the 2018-2023 Noise Action Plan. The method of assessment of noise for this plan (Round 4 Noise Mapping) uses the common EU noise calculation methodology, CNOSSOS-EU 2015, which is different from the UK CRTN 1988 method used for previous Noise Action Plan.

The plan was prepared in accordance with the (Environmental Noise) Regulations 2018, S.I. No. 549 of 2018 and the (Environmental Noise) (Amendment) Regulations 2021 (S.I. No. 663/2021). These Regulations give effect to the EU Directive 2002/49/EC relating to the assessment and management of environmental noise (END Directive). The aim of the Directive and the Regulations is to provide for the implementation of an EC common approach to avoid, prevent or reduce on a prioritized basis the harmful effects, including annoyance, due to exposure to environmental noise. Adverse health effects of noise from road traffic can cause High Annoyance (HA), High Sleep Disturbance (HSD) and Ischaemic Heart Disease (IHD).

Environmental noise can be 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 these Regulations are noise that is caused by the exposed person, noise from domestic activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas.

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

- Major railways with more than 30,000 trains per annum (not applicable to Monaghan)
- Major airports with more than 50,000 flights per annum (not applicable to Monaghan)
- Major Roads with more than 3 million vehicles per annum (applicable to the N2, and part of the N12 & N54 and the R162 & R937 in Monaghan town, the R181, R183 & R938 in Castleblayney and the R927 in Carrickmacross) and
- Agglomerations of greater than 100,000 inhabitants (not applicable to Monaghan)

In 2021 Transport Infrastructure Ireland (TII), as the designated Noise Mapping Body for major national roads, prepared noise maps and population exposure assessments for national roads. Monaghan County Council, as the designated Noise Mapping Body for major non-national roads, engaged in a centralised approach with a number of other Local Authorities to commission TII to prepare noise maps and population exposure assessments for major non-national roads carrying more than 3 million vehicles per annum. In this assessment TII mapped the N2 and parts of the N12 and N54 along with roads in the towns of Monaghan, Castleblayney and Carrickmacross.

Noise maps for County Monaghan are presented in terms of two noise indicators;  $L_{den}$  and  $L_{night}$ .  $L_{den}$  is the day-evening-night noise indicator and it represents the noise indicator for overall annoyance. It is based on day (07:00-19:00), evening (19:00-23:00) and night (23:00-07:00) time periods and it is weighted to account for extra annoyance in the evening and night periods.  $L_{night}$  is the night time

noise indicator and is used in the assessment of sleep disturbance. It is based on night (23:00-07:00) time period. Both of these indicators are based on year-long averages of the day, evening and night time periods and each are plotted separately for the required roads in the County. Maps for the N2 and major roads in Monaghan, Castleblayney and Carrickmacross are presented in Appendix C. Each map presents the noise levels in 5dB contour bands.

The results of the strategic noise mapping provide information on the predicted noise levels at all noise sensitive properties within the assessment area, along with an estimate of the number of inhabitants. This data is then used to identify **Important Areas (IAs)**, as required under the Regulations, where long term noise exposure to noise from infrastructure is likely to produce negative health effects on the exposed population. **Important Areas (IAs)** are all areas exposed above the outdoor noise levels of  $L_{den} = 53\text{dBA}$  and  $L_{night} = 45\text{dBA}$ .

A summary of the number of people in dwellings and number in noise sensitive receptors (schools and hospitals) in Monaghan, which experience environmental noise from major roads, above the guide levels is provided here:

### Numbers Exposed to Noise Levels above Guide Level

Guide Level	No. People in Dwellings Exposed	No. School Buildings (& Hospital Buildings)
>53 dBA $L_{den}$	6727	7 (1)
>45 dBA $L_{night}$	6508	16(2)

For each Important Area i.e. noise sensitive location that comes within the  $L_{den}$  53dBA limit value and/or  $L_{night}$  45dBA limit value, the population exposure at that noise sensitive location was assessed and the harmful effects. This data was then used to determine **Most Important Areas (MIAs)**, which are a sub-set of Important Areas where the health effects are highest, typically through a product of noise exposure level and the number of people highly annoyed at geographically specific locations. This is done using the criterion of number of people Highly Annoyed per 100m<sup>2</sup>. Guide density criteria of 15 or more people per 100m<sup>2</sup> was used to determine Most Important Areas in main urban areas, with lower criterions of 10 and 7.5 people per 100m<sup>2</sup> appropriate on the edge of urban or in rural areas.

The approach to identifying Most Important Areas is of a statistical nature and pertains to the entire population encompassed by the noise maps. It should not be construed as a precise assessment of harmful effects for specific buildings, nor are the extents of the Most Important Areas definitive. Instead, they are indicative in identifying areas with a relatively high number of people who may be potentially highly annoyed due to noise. A summary of the Most Important Areas identified along the major routes using the EPA Guidance density criterions is shown:

HIGHLY ANNOYED (HA) THRESHOLD/100M <sup>2</sup>	NO. OF MIAS NEAR MAJOR ROADS	NO. PEOPLE IN MIA			
		Total	Highly Annoyed (HA)	Highly Sleep Disturbed (HSD)	Ischaemic Heart Disease (IHD)
7.5	10	545	149	50	0
10	7	306	90	30	0
15	1	33	11	4	0

The MIA calculation process identified 18 MIAs along major routes in the County. Seven of the MIA locations overlapped at various threshold levels, therefore a total of eleven MIA locations were available for consideration. The next stage in the process prioritised this list to 5-10 Priority Important Area (PIA). Monaghan County Council selected five PIAs from the information provided and give a commitment to undertake an assessment of noise mitigation measures for these areas, within the life cycle of the NAP. The five Priority Important Areas are shown in Appendix C and include:

1. **PIA1, PIA3 and PIA4 in Monaghan town**
2. **PIA2 in Castleross Retirement Village**
3. **PIA5 in Emyvale Main Street (Combining three closely located MIA's)**

It is accepted that the methodology used for selection of MIAs and PIAs may result in locations with similar or even higher noise exposure levels and lower levels of population density not being identified as MIAs. However, Monaghan County Council may consider examining locations along major routes and including them as PIAs under the lifetime of this NAP, in cases where complaints relating to road traffic noise emanated prior to the adoption of this NAP.

The previous Noise Action Plan (2018-2023) used a different approach to assess locations for consideration for noise mitigation using a decision matrix, which identified 18 dwellings, located within 5m of the N2. No works were carried out on the N2 during the lifetime of the previous NAP that would impact noise levels for the 18 dwellings. A noise barrier was placed on one section of the N2 which was the subject of an ongoing noise complaint as this was deemed a practical solution at this location. The provision of barriers as a measure to reduce noise for the 18 identified dwellings was not possible due to their close proximity to the N2.

The purpose of the Noise Action Plan is to endeavour to manage the existing noise environment on the N2 and major roads within the towns of Monaghan, Castleblayney and Carrickmacross and protect the future noise environment within the action planning area. Management of the existing noise environment will be achieved by verifying noise in the PIAs and undertaking a cost-benefit analysis for noise mitigation, where required. Protection of the future noise environment will be achieved through the planning process such as land-use planning, development planning, sound insulation measures, traffic planning and control of environmental noise sources.



A pre-screening check on this Noise Action Plan was carried out in line with Strategic Environmental Assessment (SEA) Directive which requires that assessment of the effects of certain plans and programmes on the environment be carried out. The SEA Screening concluded that the County Monaghan NAP does not require further SEA. A Statement of Screening for Appropriate Assessment (AA) was also conducted, which concluded that the proposed development, individually or in combination with other plans or projects, will not have a significant effect on any European sites. Further Screening for Appropriate Assessment (AA) will be conducted for any actions required under the Noise Action Plan to determine whether any project required over the 4-year period of the of the Noise Action Plan, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives.

The Noise Action Plan covers a four-year period beginning in 2024 and will be reviewed every five years thereafter in 2028. The views of the public will be taken into account by conducting an 8-week public consultation process on the Draft Plan. The results of the public consultation will be taken into account when preparing this document. Other bodies including Transport Infrastructure Ireland, adjacent Local Authorities and other relevant organisations will be consulted on the draft document. Guidance and advice was obtained from the designated national authority, the EPA, at all stages of the process.

The following key actions are proposed over the lifetime of the NAP;

- Conduct noise monitoring and validate noise model for all five PIAs.
- Review potential mitigation measures for all PIAs and cost benefit analysis.
- If applicable seek funding and approval to implement mitigation measures.

All proposals for development/works under the Noise Action Plan will be required to demonstrate compliance with the requirements of environmental and planning legislation and planning and licensing processes, including existing provisions of relevant land use plan(s) and policy documents such as the National Planning Framework and the Regional Spatial, the Economic Strategy for the Northern and Western Region and Monaghan County Development Plan 2019-2025.

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## 1. Introduction

### 1.1 Policy Objective

Monaghan County Council's Noise Action Plan is aimed at strategic long term management of environmental noise from traffic on major routes within the County, particularly where the noise exposure levels have the potential to induce harmful effects on human health. This will require reduction of existing environmental traffic noise where practical and also protection of the future noise climate in areas not currently impacted by traffic noise.

### 1.2 Purpose

The objective of this Noise Action Plan is to comply with The EU Environmental Noise Directive (END), EC 2002/49/EC, transposed into Irish law as under The European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549/2018) and The European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. No. 663/2021).

The aim of the Environmental Noise Directive (END) is to provide a common framework to avoid, prevent or reduce, on a prioritised basis, the harmful effects of exposure to environmental noise. The END requires member states to prepare and publish strategic noise maps and noise management action plans every five years. This Noise Action Plan is the 3<sup>rd</sup> produced by Monaghan County Council and it replaces the previous Noise Action Plan 2018-2023.

### 1.3 Scope

The Regulations define "environmental noise" as unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic and from sites of industrial activity. Types of noise not included within these 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 apply to environmental noise to which people are exposed, in built up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, near hospitals, and near other noise-sensitive buildings and areas.

The Regulations set a threshold for roads, railways, agglomerations and airports falling under the scope of the Environmental Noise Regulations and strategic noise maps are prepared to display noise exposure levels in a given area, resulting from particular noise sources as follows;

- Major Roads >3 million vehicles/annum
- Major Railways >30,000 trains/annum
- Agglomerations >100,000 inhabitants (Dublin, Cork, Limerick)
- Airports >50,000 movements/annum

Within County Monaghan some sections of road fall within the definition of a major road, as defined in the Regulations and it is these areas that the Noise Action Plan has been devised for; the N2, part of the N12 and N54 and regional roads around the towns of Monaghan, Castleblayney and Carrickmacross. These thresholds will be used on an on-going basis normally at 5 yearly intervals, but this plan is devised for 4 years and will be revised in 2028.

This Noise Action Plan is prepared in line with the EPA DRAFT Version 2 (January 2024) - *Guidance Note for Noise Action Planning for the European Communities (Environmental Noise) Regulations 2018*. The EPA is the national authority for overseeing the implementation of the Environmental Noise Regulations and Monaghan County Council is the Action Planning Authority assigned with devising and implementing this Noise Action Plan. Strategic Noise Maps prepared for this Noise Action Plan were undertaken by Transport Infrastructure Ireland (TII), the designated Noise Mapping body.

## 1.4 Consultation

As required under the Regulations, the Public are invited to participate in the development of the Monaghan County Council Noise Action Plan. This allows the general public and relevant stakeholders an opportunity to review and participate in the formulation of strategic noise policy, with a view to preventing and reducing, where necessary, exposure to environmental noise.

The public consultation for the Noise Action Plan will be undertaken in Quarter 2 – 2024, comprising 6 weeks for consultation, and a further 2 weeks for submissions, which allows the general public to have adequate time to participate in this process.

The Draft Noise Action Plan will be put on public display for 6 weeks, beginning on 2<sup>nd</sup> May 2024, with a further 2 weeks for submissions, ending at 5pm on 27<sup>th</sup> June 2024. A notice regarding the public consultation will be placed in the local paper, the Northern Standard and social media advising the public of the locations where and when the plan will be on display.

- Monaghan County Council Offices, Glen Road, Monaghan
- Monaghan County Council Offices, M-TEK Building 1, Armagh Road, Monaghan
- Monaghan County Council, Carrickmacross-Castleblayney Municipal District, Civic Offices, Riverside Road, Carrickmacross
- Monaghan County Council, Ballybay-Clones Municipal District Office, The Diamond, Clones

A copy of the Draft Noise Action Plan is also available to download on the Monaghan County Council website [www.monaghancoco.ie](http://www.monaghancoco.ie). The Draft plan will be accompanied by Screening Reports for Strategic Environmental Assessment and Appropriate Assessment.

Comments, observations or suggestions in relation to the Draft Plan are to be made electronically through Monaghan County Council's Consultation Portal at the following address:

<http://consult.monaghancoco.ie/browse>

select the

**Draft Noise Action Plan 2024-2028**

In addition to seeking submissions from the general public, the following stakeholders were asked to comment on this Noise Action Plan.

- Environmental Protection Agency
- Transport Infrastructure Ireland
- All Monaghan County Council Elected Representatives
- Louth County Council
- Newry & Mourne District Council

- Dungannon & South Tyrone Borough Council
- Fermanagh District Council
- The Department for Regional Development (DRD) (Northern Ireland)
- Department of Environment, Climate and Communications
- Department of Transport
- An Taisce
- Public Participation Networks

## 1.5 Noise Action Plan Timeline

Under the Regulations, Monaghan County Council will publish the Noise Action Plan by 18<sup>th</sup> July 2024 and adhere to timelines indicated in Table 1.

**Table 1. Noise Action Plan Timeline**

Date	Requirement
Q1 2024	Draft Noise Action Plan
Q2 2024	Public consultation (6 – 8 weeks) on Draft Noise Action Plan
18 July 2024	Publish Noise Action Plan
18 Aug 2024	Summary of Noise Action Plan to be submitted to the EPA
18 Jan 2025	Summary of all Noise Action Plans to be reported by the EPA to the European Environmental Agency

## 2. Noise and effects on Health and Quality of Life

### 2.1 Noise Level Indicators

Noise maps for County Monaghan are presented in terms of two noise indicators;  $L_{den}$  and  $L_{night}$ , as specified in Article 6.2 of the END.  $L_{den}$  is the day-evening-night noise indicator and it represents the noise indicator for overall annoyance. It is based on day (07:00-19:00), evening (19:00-23:00) and night (23:00-07:00) time periods and it is weighted to account for extra annoyance in the evening and night periods.  $L_{night}$  is the night time noise indicator and is used in the assessment of sleep disturbance. It is based on night (23:00-07:00) time period. Both of these indicators are based on year-long averages of the day, evening and night time periods and each are plotted separately for the required roads in the County. Table 2 summarises the noise level indicators commonly used for environmental noise measurement, all expressed in terms of decibels (dB).

**Table 2. Noise Level Indicators**

Indicator	Details
$L_{den}$	<ul style="list-style-type: none"> <li>➤ Day-evening-night noise indicator</li> <li>➤ Representative of 24hr period</li> <li>➤ 5 dB penalty applied to evening levels and 10 dB penalty to night levels to reflect people's extra sensitivity to noise during these periods</li> <li>➤ Noise indicator for overall annoyance</li> </ul>
$L_{night}$	<ul style="list-style-type: none"> <li>➤ Night-time equivalent sound level</li> <li>➤ Representative of night period (2300-0700 hr)</li> <li>➤ Noise indicator for sleep disturbance</li> </ul>
$L_{Aeq, T}$	<ul style="list-style-type: none"> <li>➤ Equivalent sound level of period of T hours</li> <li>➤ Most common are <math>L_{Aeq, 16hr}</math>, <math>L_{Aeq, 24hr}</math></li> </ul>
$L_{Amax}$	<ul style="list-style-type: none"> <li>➤ Maximum sound level during measurement period</li> </ul>
$L_{Aeq, 16hr}$	<ul style="list-style-type: none"> <li>➤ The overall daytime noise level (07:00-23:00) used in planning and noise management decisions</li> </ul>
<b>SEL</b>	<ul style="list-style-type: none"> <li>➤ Numerically equivalent to the total sound energy of an event normalised to 1-second</li> </ul>

### 2.2 Effects on Health and Quality of Life

Environmental noise exposure from transportation noise sources including road, rail and aircraft can significantly impact human health and research from the World Health Organisation (WHO) and the European Environment Agency (EEA) shows that environmental noise can contribute to:

- Cardiovascular disease - including hypertension, coronary heart disease (CHD), acute myocardial infraction (AMI) and stroke;
- Cognitive impairment – including the impact on children’s reading and education;
- Sleep disturbance – i.e., interference with sleep and awakenings;
- Annoyance – i.e., becoming or increasingly disturbed or bothered by noise; and
- Wellbeing – i.e., impacts on quality of life and mental health.

The World Health Organisation (WHO) *Environmental Noise Guidelines for the European Region* (October 2018) sets  $L_{den}$  53dB and  $L_{night}$  45dB guide levels for annoyance, above which adverse

health effects and adverse effects on sleep may occur. EPA DRAFT guidelines adopt the same guide levels. Therefore this Noise Action Plan will consider Important Areas (IAs) where people are exposed to the following noise level, as determined by the strategic noise maps.

**Road Traffic Noise – Important Area (IA)**

- **L<sub>den</sub> - 53 dB (outside)**
- **L<sub>night</sub> - 45 dB (outside)**

Research on exposure to environmental noise and health impacts is ongoing and further guidelines from WHO issued during the course of this Noise Action Plan will be considered, where relevant to road traffic noise.



### 3. EU Legal and Policy Framework

Noise management measures outlined in this Action Plan must reflect EU Policies and Guidelines, along with EU Regulations. A summary of relevant EU Regulations are outlined in this section.

#### 3.1 EU Policy and Guidance

##### 3.1.1 Zero Pollution Action Plan

The EU Zero Pollution Action Plan (ZPAP), launched 2021 has a vision for 2050 that air, water and soil pollution is reduced to levels no longer harmful to health and natural ecosystems. This is translated into key 2030 targets to speed up reducing pollution at source, one of which is *reducing the share of people chronically disturbed by transport noise by 30%, compared to 2017 levels.*

The first integrated Zero Pollution Monitoring and Outlook Report from the Commission to the European Parliament was published in December 2022 and estimated that the number of people chronically disturbed by road transport noise is unlikely to decline by more than 19% by 2030 (i.e. well below the 30% reduction target set in the zero pollution action plan) unless a substantial set of additional measures is taken at national, regional and local level and unless reinforced EU action across relevant sectors delivers significant further reduction in noise pollution.

In support of the ZPAP noise target for 2030, an EU study on the *Assessment of Potential Health Benefits of Noise Abatement Measures in the EU – Phenomena Project* was undertaken to identify cost-effective noise mitigation measures which may help competent authorities to achieve noise reductions across large parts of the exposed population.

##### 3.1.2 EEA Reports

The European Environment Agency publication *Good practice guide on quiet areas - EEA Technical report No 4/2014* makes recommendations based on examples of good practice in assessing and managing quiet areas in Europe. It uses Ireland in its example of applying a “suitability for quietness index map” at country level and it is planned to develop this for the whole of Europe.

#### 3.2 EU Regulations and Directive

The management and control of environmental noise is enacted through International, European, national and local legislation, regulation and guidance. European Union directives and regulations most relevant to noise are outlined in this section.

##### 3.2.1 Environmental Noise Directive – END - 2002/49/EC

EU Directive 2002/49/EC on the assessment and management of environmental noise is commonly referred to as the Environmental Noise Directive or END. This Directive is transposed into Irish law as under The European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549/2018) and The European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. No. 663/2021).

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

The Directive requires that Member States:

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

A number of Regulations to amend the END 2002/49/EC have been introduced and are detailed in the following sections.

### **3.2.2 Common Noise Assessment Methods – CNOSSOS-EU - 2015/996 & Directive 2021/1226 Amending, for the Purposes of Adapting to Scientific and Technical Progress, Annex II to Directive**

Directive 2015/996 establishing common noise assessment methods according to Directive 2002/49/EC replaced Annex II of the END, removed the recommended Interim Methods, and established the common noise assessment methods. It sets out the noise calculation methods (CNOSSOS-EU) in the Annex and some guidance on aircraft modelling and database tables of input data for roads, railways and aircraft. The CNOSSOS-EU methods set out within the Directive are to be used for strategic noise maps under the END (since December 2018). A Corrigendum to Directive 2015/996 was published in January 2018 to address errors in the original Directive.

Directive 2021/1226 introduces a number of amendments to CNOSSOS-EU (Annex II of the END), some of which relate to road traffic noise modelling required to produce strategic noise maps. Both Directives were transposed into the Irish Regulations under The European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549/2018).

### **3.2.3 Alignment of Reporting Obligations in the Field of Legislation Related to the Environment – 2019/1010 & Mandatory Data Repository and a Mandatory Digital Information Exchange Mechanism in Accordance with Directive 2002/49/EC - 2021/1967**

Regulation 2019/1010 on the alignment of reporting obligations in the field of legislation related to the environment and amending Directive 2002/49/EC outlines the mandatory reporting requirements to the European Environment Agency (EEA) and it provides for an additional 12 months for the development of R4 noise action plans (this one), which are due before 18 July 2024.

Commission Implementing Decisions (EU) 2021/1967 setting up a mandatory data repository and a mandatory digital information exchange mechanism in accordance with Directive 2002/49/EC, fulfils the requirement under Regulation 2019/1010 for an implementing act to establish mandatory reporting under the END to the EEA Reportnet platform.

Both 2019/1010 and 2021/1967 were transposed into Irish law via the European Communities (Environmental Noise) (Amendment) Regulations 2021.

### 3.2.4 Establishment of Assessment Methods for Harmful Effects of Env. Noise – 2020/367

Directive 2020/367 amends Annex III of the END and establishes health impact assessment methods i.e. assessment methods for the harmful effects of environmental noise based on the dose-response relationship established in the WHO *Environmental Noise Guidelines for the European Region* (2018). The health impacts to be assessed and reported for major sources specified in the END are:

- Number of people Highly Annoyed (HA)
- Number of people Highly Sleep Disturbed (HSD) for roads, railways and aircraft; and
- Instances of Ischemic Heart Disease (IHD) for roads.

This Directive was transposed into Irish Regulations via the European Communities (Environmental Noise) (Amendment) Regulations 2021

### 3.2.5 Industrial Emissions (Integrated Pollution Prevention and Control) – 2010/75/EU

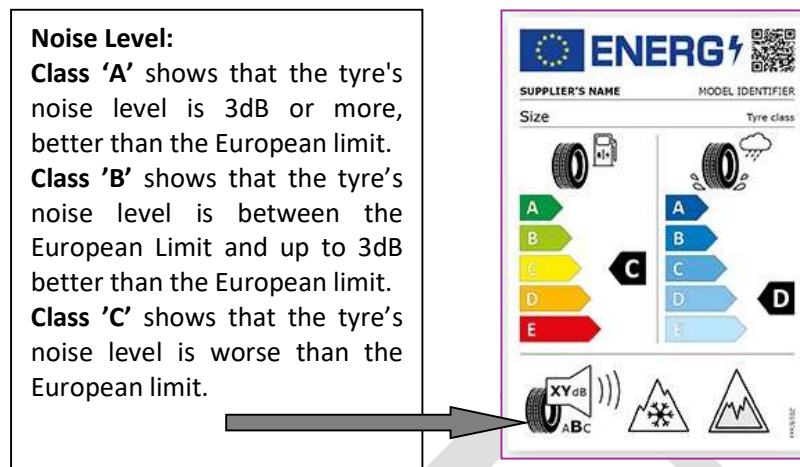
Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (recast) is the main EU instrument regulating pollutant emissions, including noise from industrial installations. The Industrial Emissions Directive (IED) aims to achieve a high level of protection of human health and the environment taken as a whole by **reducing harmful industrial emissions (including noise)** across the EU, in particular through better application of Best Available Techniques (BAT). In Ireland, Directive 2010/75/EU is transposed under European Union (Industrial Emissions) Regulations 2013, S.I. No. 138/2013, with the EPA designated as the competent authority for permitting under the Regulations.

### 3.2.6 Vehicle / Tyre Regulations Relating to Noise

A range of legislation for the automotive industry is in place and each of the 'automotive' sectors has specific regulations and provisions concerning noise emissions.

- Regulation (EU) 2020/740 on labelling of tyres with respect to fuel efficiency and other parameters sets out requirements through labelling of tyres to allow end-users to make an informed choice when purchasing tyres, for the purpose of increasing safety, the protection of health, and the economic and environmental efficiency of road transport, by promoting fuel-efficient, long-lasting and safe tyres with **low noise levels**. This Directive was transposed into Irish Legislation through European Union (Tyre Labelling) (Energy Efficiency) Regulations 2022, S.I. No. 670 or 2022.

**Figure 1: Label Required on C1, C2 & C3 Tyres (from May 2021)**



- Regulation (EU) 2019/2144 (which amends 2018/858) concerning type-approval requirements for motor vehicles and their trailers, systems, components and separate technical units intended for such vehicles, as regards to their general safety and the protection of vehicle occupants and vulnerable road users, lays down fundamental provisions on vehicle safety, carbon dioxide (CO<sub>2</sub>) and **rolling noise emissions from tyres**. These regulations were transposed into Irish Regulations via the European Union (Road Vehicles: Type-Approval and Market Surveillance) Regulations 2020, S.I. No. 556/2020. Regulation (EU) 2019/2144, and the requirements for tyre performance included therein are replaced by the equivalent in UN Regulation Number 117 of the Economic Commission for Europe of the United Nations (UNECE) — Uniform provisions concerning the approval of tyres with regard to **rolling sound emissions** and/or to adhesion on wet surfaces and/or to rolling resistance [2016/1350]. Amongst others, UN Regulation Number 117 classifies tyres in different categories depending on intended use and sets uniform provisions concerning the approval of tyres with regard to rolling sound emissions and/or to adhesion on wet surfaces and/or to rolling resistance.
- Regulation No 51 of the Economic Commission for Europe of the United Nations (UNECE) — Uniform provisions concerning the approval of motor vehicles having at least four wheels with regard to their **sound emissions** [2018/798] on noise of M and N categories of vehicles contains provisions on the **sound emitted by motor vehicles** and applies to vehicles of categories M and N. The specifications in this Regulation are intended to reproduce sound levels which are generated by vehicles during normal driving in urban traffic.
- Regulation (EU) No 540/2014 on the **sound level of motor vehicles** and of **replacement silencing systems** establishes the administrative and technical requirements for the EU type-approval of all new vehicles of the categories M and N with regard to their **sound level, and of replacement silencing systems and components**. This Regulation came into force in July 2016 and has been amended by Commission Delegated Regulation (EU) 2017/1576 regarding the **Acoustic Vehicle Alerting System** requirements for vehicle EU-type approval and Commission Delegated Regulation (EU) 2019/839 regarding the **sound level of motor vehicles and of replacement silencing systems**.
- Directive 2014/45/EU regarding periodic roadworthiness tests for motor vehicles and their trailers establishes requirements for the periodic roadworthiness testing of motor vehicles. This Directive has been transposed into Irish legislation under the European Union (National

Car Test - EU Roadworthiness Certificates) Regulations 2020, S.I. No. 554/2020, amending the Road Traffic Act 1961 (as amended), No. 24 of 1961; and the European Union (Commercial Vehicle Roadworthiness) (Roadworthiness Certificate and Roadworthiness Test) Regulations 2021, S.I. No. 617/2021, amending the Road Safety Authority (Commercial Vehicle Roadworthiness) Act 2012 (No. 16 of 2012). Under these Regulations, motor vehicles registered in a European Union (EU) country and their trailers must undergo periodic roadworthiness tests to ensure that they are fit to be used on the road. Under the periodic roadworthiness test, the **vehicle's noise suppression system (including exhaust silencers and under bonnet noise) is inspected**. Maximum permissible exhaust sound limits for different vehicle categories and fuel types are set out in the directive and the vehicle is tested at revolutions that are at three-fourths of the maximum rated speed. A motor vehicle will fail the roadworthiness test if the noise levels are in excess of those permitted. The roadworthiness testing of the noise of motor cycles is required as from 2022.

- Directive 2014/47/EU on the technical roadside inspection of the roadworthiness of commercial vehicles sets out requirements for carrying goods and passenger transport vehicles carrying more than eight passengers. The roadside test is mainly visual (**and aural in the case of noise testing**). Inspected vehicles identified as having exhaust noise levels in excess of those permitted, are subjected to a more elaborate test at a nearby designated testing centre.
- Regulation (EU) No 168/2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles is transposed into Irish Regulations via European Union (Two or Three Wheel Motor Vehicles and Quadricycles Type-Approval) Regulations 2015, S.I. No. 614/2015. This Regulation prohibits the use of defeat devices that reduce the effectiveness of, amongst others, **sound abatement systems during normal vehicle operation and use**.
- Regulation (EU) No 167/2013 on the approval and market surveillance of agricultural and forestry vehicles is transposed into Ireland via the European Union (Agricultural or Forestry Vehicle Type Approval and Entry into Service) Regulations 2017, S.I. No. 645/2017
- Regulation No 41 of the Economic Commission for Europe of the United Nations (UN/ECE) Uniform provisions concerning the **approval of motorcycles with regard to noise** (2012)

In Ireland, the general safety and the protection of vehicle occupants and vulnerable road users comes within the remit of the Road Safety Authority (RSA) and the authority responsible for issuing all national approvals for brand new unregistered vehicles is the National Standards Authority of Ireland (NSAI). They are responsible for issuing type-approval, which is the process to certify that a model of a vehicle meets all EU safety, environmental and conformity of production requirements before allowing it to be placed on the EU market. The regulations typically include test procedures for vehicle **specific sound level requirements** and a Certificate of Conformity is required for each vehicle.

## 4. National Legal and Policy Framework

### 4.1 National Policy and Guidance

#### 4.1.1 Project Ireland 2040 - National Planning Framework

The Government of Ireland produced a report - Project Ireland 2040 - National Planning Framework (2018) and this included National Policy Objective 65 relating to Environmental Noise.

##### National Policy Objective 65

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

In addressing these issues, the National Planning Framework will support:

##### **Noise Management and Action Planning**

Measures to avoid, mitigate, and minimise or promote the pro-active management of noise, where it is likely to have significant adverse impacts on health and quality of life, through strategic noise mapping, noise action plans and suitable planning conditions.

##### **Noise, Amenity and Privacy**

This includes but is not limited to, good acoustic design in new developments, in particular residential development, through a variety of measures such as setbacks and separation between noise sources and receptors, good acoustic design of buildings, building orientation, layout, building materials and noise barriers and buffer zones between various uses and thoroughfares.

##### **Quiet Areas**

The further enjoyment of natural resources, such as our green spaces, through the preservation of low sound levels or a reduction in undesirably high sound levels, is particularly important for providing respite from high levels of urban noise. As part of noise action plans, an extra value placed on these areas, in terms of environmental quality and the consequential positive impact on quality of life and health, due to low sound levels and the absence of noise, can assist in achieving this.

##### **Transport Initiatives**

National and regional transport initiatives that may arise from implementation of the National Planning Framework (NPF) and the Regional Spatial and Economic Strategy (RSES) for the Northern and Western Region have the potential to result in adverse health effects that will need to be mitigated and/or beneficial effects with regard to preserving environmental noise quality. Such issues will be considered during the implementation of the NPF and RSES, including as part of the environmental assessments, where required, for individual transport initiatives.



The National Planning Framework lists noise management as one of its Environment and Sustainability Goals for creating a clean environment for a healthy society.

**Noise Management: *Incorporating consistent measures to avoid, mitigate and minimise or promote the pro-active management of noise.***

The inclusion of noise as a national policy objective ensures that it is considered in all future developments within the country.

#### 4.1.2 National Planning Guidance

Local Authorities have it within their powers to set conditions relating to noise as part of a planning permission however, there is currently no national policy or guidance which addresses the issue of noise during planning, and no obligatory sector-specific limits. Two notable exceptions are:

- those referenced in the Planning and Development Regulations 2008, S.I. No. 235/2008, which specifies a 43dB noise limit in relation to small scale energy production sources such as boilers, wind turbines, heat pumps and CHP plants, and
- by-laws issued in relation to busking.

DoECLG Spatial Planning and National Roads Guidelines (2012) requires Planning authorities to engage with applicants and their agents to address, as an integral element of their development proposals, potential negative impacts (including noise and vibration) arising from existing or planned national roads. This could include mitigating impacts through appropriate design of buildings, landscaping features and site layout as part of the development proposal.

Other than IED/IPPC facilities regulated by the EPA, most facilities are controlled by Local Authorities, through planning permission and permits. Where limits attached to such consents have been proven to be breached a Local Authority may use the Planning & Development Acts 2000-2020 and/or the EPA Act.

The current Irish Building Regulations (1997-2017) require that new dwellings and existing altered dwellings achieve a reasonable level of sound insulation from sound transmission emanating from attached dwellings or differently occupied parts of the same building. The Technical Guidance Document E on Sound relating to the Building Regulations/ 2014 (S.I. No.606 of 2014) outlines sound transmission values for airborne and impact sound. It is mandatory for new attached dwellings and altered dwellings built after 1<sup>st</sup> July 2015 to be sound tested by competent testers and adhere to the sound insulation values set in Technical Guidance Document E on Sound.

#### 4.1.3 TII Guidance

Transport Infrastructure Ireland (TII) has published the Guidelines for the Treatment of Noise and Vibration in National Road Schemes, October 2004. These guidelines are based on TII's phased approach to road scheme planning and development. They cover the Constraints, Route Corridor Selection and Environmental Impact Assessment stages. The Guidelines also set out a "design goal" for noise to ensure that the current roads programme proceeds on a path of sustainable development. The current design goal is that all new national road schemes should be designed, where feasible, to meet a day-evening-night sound level of 60dB Lden (free-field residential façade criterion), to be met both in the year of opening and in the design year, typically 15 years after projected year of opening. TII accepts that it may not always be sustainable to provide adequate mitigation in order to achieve the design goal. Therefore, a structured approach should be taken

in order to ameliorate, as far as is practicable within the particular circumstances of a given scheme, road traffic noise through the consideration of measures such as horizontal and vertical alignment, barriers, low noise road surfaces, etc. The Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, March 2014 expands and supplements the advice already provided in the 2004 Guidelines.

TII is also in the processes of producing the following additional two 'Standards Documents' relating to noise, which are scheduled to be published in Q4 2024; A Standards Document regulating the noise impact assessment of 'Proposed National Roads'; and A Standards Document regulating the management of noise and vibration during the construction stage.

#### **4.1.4 Wind Energy Planning Guidelines**

The Department of Environment, Heritage and Local Government *Wind Energy Development Guidelines* (2006) provides recommended noise limits for houses near wind turbine developments which recommends a "lower fixed noise limit of 45dB(A) or a maximum increase of 5dB(A) above background noise at nearby noise sensitive locations". The latter requirement may be relaxed in areas with low background levels. A fixed limit of 43dB(A) at night-time is deemed appropriate as there is no requirement to protect external amenity.

Draft Revised Wind Energy Development Guidelines were produced in December 2019 and propose new robust noise restriction limits which 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. The noise limits will apply to outdoor locations at any residential or noise sensitive properties. Local authorities will enforce the noise limits as conditioned in the planning permission, in conjunction with the Environmental Protection Agency who will provide independent noise monitoring of wind farms. It is proposed that where there is evidence of non-compliance with noise limits, wind turbines will be required to be turned off until compliance with the noise limits is proven.

The EPA *Guidance Note on Noise Assessment of Wind Turbine Operations at EPA Licensed Sites* (NG3) (2011) proposes the following Cumulative Site and Turbine Noise Limits

- Daytime 55 dB  $L_{Ar,T}$
- Night-time 45 dB  $L_{Aeq}$
- Wind turbine noise not to exceed 45 dB  $L_{Aeq}$  at any time, or to contain any significant tonal components

#### **4.1.5 Quarries & Ancillary Activities Planning Guidelines**

The Department of the Environment, Heritage and Local Government have published Guidelines for Planning Authorities on Quarries and Ancillary Activities (2004). This publication contains a discussion of the primary sources of noise associated with quarrying and offers guidance in relation to the correct approach to be followed in respect of assessment and mitigation.



Suggested noise limit values are 55 dB  $L_{Aeq,1hr}$  and 45 dB  $L_{Aeq,15min}$  for daytime and night-time respectively, although more onerous values may be appropriate in areas with low levels of pre-existing background noise.

## 4.2 National Legislation

### 4.2.1 Environmental Noise Regulations 2018 & 2021

The END Directive 2002/14/EU is transposed into Irish Regulations under the European Communities (Environmental Noise) Regulations 2018, S.I. No. 549 of 2018 and the European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. No. 663/2021). The regulations also transpose Directives 2015/996, 2019/1010, 2020/367, 2021/1226, 2021/1967, as outlined in Section 3.2.

The European Communities (Environmental Noise) Regulations 2018 replace Environmental Noise Regulations 2006 (S.I. No.140 of 2006). The Regulations set out a two-stage process for addressing environmental noise. Firstly, noise must be assessed through the preparation of strategic noise maps for areas and infrastructure falling within defined criteria, e.g. large agglomerations major roads, railways and airports. Secondly, based on the results of the mapping process, the Regulations require the preparation of noise action plans for each area concerned. Every five years from the date of preparation of the noise maps and action plans, and whenever there is a major development affecting noise, the maps and plans are required to be reviewed and revised, if necessary. The fundamental objective of action plans is the prevention and reduction of environmental noise. The Regulations designate noise-mapping bodies and action planning authorities for the making and reviewing of strategic noise maps and action plans. Primary responsibility for both noise mapping and action planning is assigned to local authorities. While a number of other bodies also have noise mapping functions, they will be carried out on behalf of the local authorities concerned. The Regulations designate the Environmental Protection Agency as the National Authority for the purposes of the Regulations. The Agency's role includes supervisory, advisory and coordination functions in relation to both noise mapping and action planning, as well as reporting requirements for the purpose of the Directive. The Regulations provide for strategic noise maps and action plans and revised noise maps and action plans to be made available to the general public. They also provide for public consultation on proposed action plans and the review of action plans and for the results of public consultation to be taken into account in finalising action plans or reviews of action plans.

The European Communities (Environmental Noise) (Amendment) Regulations 2021 give further effect to the implementation of Directive 2002/49/EC. The Regulations transpose EU Directive 2020/367 as regards the establishment of dose-effect relations to be introduced by way of adaptations to technical and scientific progress. The Regulations also transpose Commission Delegated Directive (EU) 2021/1226, for the purposes of adapting to scientific and technical progress Annex II to Directive 2002/49/EC. The Regulations also transpose EU Regulation 2019/1010 and the associated Commission Implementing Decision (EU) 2021/1967, which develop a mandatory data repository and a mandatory digital information exchange mechanism to enable Member States to share information on strategic noise maps and noise action plans. The

Regulations also update agglomeration definitions in light of expansions in the urban landscape over the last 15 years.

#### 4.2.2 EPA Act 1992

Environmental Noise Regulations in Ireland have come about on foot of the Environmental Protection Agency Act of 1992. Three Sections of the Act are of direct relevance to noise, as follows.

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

The powers set out within the EPA act largely relate to the control of noise nuisance which may include neighbourhood nuisance, music, industry or other activities.

#### 4.2.3 IED/IPPC Regulations

Certain activities that fall under the requirements for an Industrial Emissions (IE) Licence, Integrated Pollution Prevention Control (IPPC) Licence or Waste Licence from the EPA may be subject to noise conditions. The EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Jan 2016)* sets out the requirements for noise assessments and sets the typical limit values for noise from licensed sites as;

- Daytime (07:00 to 19:00hrs) – 55dB L<sub>Ar,T</sub>
- Evening (19:00 to 23:00hrs) – 50dB L<sub>Ar,T</sub>
- Night-time (23:00 to 07:00hrs) – 45dB L<sub>Aeq,T</sub>

Lower noise limit criteria is suggested for areas of low background noise and quiet areas. Noise limits are generally set at nearby noise sensitive locations to the development and an annual noise survey is typically required by the licence holder.

### 4.3 Regional or Local Policy and Guidance

#### 4.3.1 Regional Spatial and Economic Strategy

The Northern and Western Regional Assembly Regional Spatial and Economic Strategy 2020-2032, produced by the Government of Ireland Project Ireland 2040 will be considered by Monaghan County Council for future Noise Action Planning.

#### 4.3.2 Monaghan County Development Plan

The Monaghan County Development Plan 2019-2025 sets a **Noise Policy NC1** - *To promote the implementation of the Noise Directive 2002/49/EC and associated Environmental Noise Regulations 2006*. In addition, noise conservation listed in a number of areas throughout the plan.

Chapter 4, on Economic Development, Section 4.8 on the Extractive Industry states that; *Mineral extraction, such as working with stone, sand and gravel, can generate environmental capacity problems for the surrounding areas. As such, applications for mineral extraction must*

*account for issues relating to noise, dust, vibration, visual intrusion, water pollution, traffic generation, etc.*

Chapter 8 on Environment, Energy & Climate, Section 8.15 on Wind Energy states;  
*The assessment of wind energy development proposals will include consideration of the following as appropriate; - Local environmental impacts including noise and shadow flicker.*

Section 8.40 on Noise states:

*The impact of noise pollution is an important consideration in assessing all new development proposals as it can impact on people's quality of life and health. The Environmental Noise Regulations 2006 give effect to EU Directive 2002/49/EC relating to the assessment and management of noise pollution. A Noise Action Plan is in place by the Council for major roads within County Monaghan carrying more than 3,000,000 vehicles per year.*

*Using the provisions of the development management process, the planning authority will aim to take account of and mitigate noise and/or vibration at site boundaries or adjacent to noise sensitive locations, in particular residential properties with reference to layout, design and/or noise attenuation measures.*

*Consideration also needs to be given to avoid adverse impacts when introducing noise sensitive uses in proximity to existing and future national roads. Where warranted proposals should include mitigation and should have regard to Section 3.7 of the DoECLG Spatial Planning and National Roads Guidelines.*

Section 8.40 on Air Quality list the following policy objective;

**Policy AQP2** *To contribute toward compliance with air quality legislation; greenhouse gas emission targets; management of noise levels; and reductions in energy usage.*

Chapter 15 on Development Management Standards, Section 15.14 Industrial & Commercial Developments states the following policy objective;

**Policy ICP1** *Proposals for industrial and commercial developments will be permitted subject to the following criteria:*

*d) The provision of a buffer zone up to 15m in width, or as otherwise determined by the Planning Authority according to the proposed operations, where industrial and other sensitive land uses adjoin, to ensure amenities of adjacent properties are not adversely affected and that there is no significant amenity loss by way of noise, smell or other nuisance to immediate neighbours or the area in general as a result of the proposed development, lighting and the amount of traffic generated or the servicing arrangements.*

Section 15.15 Agricultural Development states the following policy objective;

**Policy AGP1** *To permit development on an active and established agricultural or forestry holding where it is demonstrated that:*

*d) The proposal will not result in a detrimental impact on the amenity of residential dwellings outside of the holding including potential for issues arising from noise, smell and pollution. Where a development is proposed within 100m of any residential property not located on the holding within the rural area (i.e. outside of a designated settlement) written consent, witnessed by a solicitor or a peace commissioner, from the adjoining property owner stating there is no objection to the proposal must be provided,*

Section 15.20 Renewable Energy states that;

*The most common form of renewable energy developments in County Monaghan are wind farms. However other forms of development can include biomass, solar, geothermal and hydro power. In assessing planning applications for these types of development, particular regard will be shown to the following:*

*- Level of noise disturbance and where applicable shadow flicker.*

Section 15.30 Construction & Environmental Management Plan states that;

*Large scale planning applications will be required to be accompanied by a Construction and Environmental Management Plan (CEMP) that shall incorporate relevant mitigation measures indicated in any lower tier Environmental Impact Assessment or Appropriate Assessment. CEMPs typically provide details of intended construction practice for the proposed development. The following information and issues should be included:*

*i) Details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels.*

Section 15.31 Public Assets & Infrastructure has the following policy objective;

**Policy DM2:** *To assess proposals for development in terms of, inter alia, potential impact on existing adjacent developments, existing land uses and/or the surrounding landscape. Where proposed developments would be likely to have a significant adverse effect on the amenities of the area through pollution by noise, fumes, odours, dust, grit or vibration, or cause pollution of air, water and/or soil, mitigation measures shall be implemented in order to eliminate adverse environmental impacts or reduce them to an acceptable operating level.*

## 5. The Responsible Authority for Action Planning

### 5.1 Name and contact details for the Responsible Authority

Monaghan County Council is the Action Planning Authority for this Noise Action Plan. In County Monaghan, the noise source to be considered in this Noise Action Plan, as required under the Regulations relates to major roads carrying in excess of 3 million vehicles per year. The Action Planning Authority contact details are;

**Noise Action Plan  
Road Design Office  
Monaghan County Council  
MTEK II  
Knockaconny  
Armagh Road  
Monaghan  
Co. Monaghan  
Tel: 047 30597, 047 30541 & 047 30570  
Email:roads@monaghancoco.ie**

### 5.2 Description of other bodies of relevance

The Environmental Protection Agency (EPA) is the designated national authority responsible for overseeing the implementation of the Regulations. The EPA is required to provide advice and guidance to the relevant noise mapping bodies and action planning authorities and is responsible for reporting information to the European Commission. Further details can be found at <https://www.epa.ie/our-services/monitoring--assessment/noise/noise-mapping-and-action-plans/>.

Transport Infrastructure Ireland (TII) is the designated noise mapping body for national roads identified as major roads within the County and Monaghan County Council is the designated noise mapping body for non-national major roads. However, For the purposes of this Noise Action Plan, TII prepared the noise maps for all major national and non-national roads with >3million passenger vehicles for County Monaghan. Further details can be found at <https://www.tii.ie/technical-services/environment/noise-maps/>.

Transport Infrastructure Ireland has overall responsibility for the national road network and provides funding to the Council for the maintenance and improvement of the national roads within the county. Monaghan County Council Roads Department is responsible for the planning, design, improvement and upkeep of the road network within the county. They provide a number of services including road opening licences, temporary road closures, road safety, winter maintenance, traffic management, public lighting, winter maintenance and emergency situations, abnormal load permits, facility information signage, speed limits and reporting on planning applications as they relate to roads. Non-national roads are funded through the Department of Transport and from the Council's own resources.

### 5.3 Review of Previous Noise Action Plan

The previous Noise Action Plan (2018-2023) used a different approach to assess locations for consideration for noise mitigation. In the previous plan, locations that exceeded the proposed onset levels of 70dBA  $L_{den}$  and 57dBA  $L_{night}$  noise due to road traffic were considered. The recommended approach at that time was to use a decision matrix to obtain a score for individual locations, based on three variables:

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

When this assessment was carried out, 18 individual dwellings were identified along the N2 that had predicted noise levels above the onset level for assessment of noise mitigation measures and no schools with elevated noise levels were identified. From the 18 dwellings identified, all were located within 5m of the N2. No works were carried out on the N2 during the lifetime of the NAP that would impact noise levels for the 18 dwellings. A noise barrier was placed on one section of the N2 which was the subject of an ongoing noise complaint as this was deemed a practical solution at this location. The provision of barriers as a measure to reduce noise for the 18 identified dwellings was not possible due to their close proximity to the N2.

## 6. Description of the Action Planning Area

### 6.1 Extent of the area

In County Monaghan, the only noise source to be considered by the Action Planning Authority relates to major roads carrying >3 million vehicles per year, as defined in the Regulations. There are 2,408.97km of public road in Co. Monaghan of which 107 km is national road, comprising four national routes (N2, N12, N53 & N54). One of these national roads, the N2 is included in this Noise Action Plan and short sections of the N12 and N54. In addition, some sections of non-National road, primarily around the towns of Monaghan, Castleblayney and Carrickmacross were also designated a major road and included in the study. The total road area considered in this Noise Action Plan is approximately 87km.

Strategic Noise Maps have been produced that include the following Roads:

- N2, from the Louth/Monaghan border at Aclint Bridge, on the River Fane to the Monaghan/Tyrone border at Moy Bridge, on the River Blackwater. This road by-passes the major towns of Carrickmacross, Castleblayney and Monaghan and runs through the village of Emyvale, with a total distance of approximately 75km.
- Part of the N12 from Coolshanagh roundabout to Knockaconny 1km
- Part of the N54 from Old Cross Square to the Junction with the R187 Roslea 6km.
- The following Regional Roads in Monaghan, Castleblayney and Carrickmacross towns, a distance of approximately 4.8km in total;
  - R937, Dublin Road, Monaghan town
  - R162, Glen Road, Monaghan Town
  - R181, Main Street Castleblayney
  - R183, Monaghan Road, Castleblayney
  - R938, York Street, Castleblayney
  - R927 Main Street, Carrickmacross

Maps of the areas included in the Noise Action Plan are provided in Appendix C.

Once all required areas to be included in the strategic noise map was determined, the TII noise model looked at receivers in the region of a major road, within approximately 1km each side of the centreline of the road. The Regulations require the Action Plan to cover places near major roads affected by noise from the major sources. Noise from major sources is regarded as affecting an area if it causes either an  $L_{den}$  value of 53dB(A) or greater or an  $L_{night}$  value of 45dB(A) or greater anywhere within the area. For noise modelling purposes, TII took this to be within about 1km of the centreline of the major road as beyond this road traffic noise will not be a significant contributor in the background noise of an area. In practice, from examination of the noise maps produced in Appendix C, the  $L_{den} \geq 55dBA$  zone and the  $L_{night} \geq 45dBA$  zone extends approximately 500-600m from the centre line of the major road. Therefore, for the purposes of noise action planning, all lands within 500-600m of the centreline of the major road are considered 'near' a major road. Properties within this band will be seen as eligible for inclusion in the assessment stage of noise action planning.

This definition of proximity will not hold for sections of major road passing through developed areas as factors such as reduced vehicle speed and more complex sound propagation will influence the results in these areas. This can reduce the noise exposure distance significantly. Therefore, it is



proposed that, within a built-up area only properties in the immediate vicinity of the road be designated as being 'near' the source.

## 6.2 Description of the topography/geographical location

Monaghan is one of the country's landlocked counties, characterised by rolling drumlin hills and wetlands. It contains 129,093 acres of land or 1.9% of the total area of the Republic of Ireland. Of this total, 69% of the area is dedicated to agriculture (mainly grassland), 4% to forestry and 1.7% covered by lakes. County Monaghan is one of three Ulster Counties bordering with Northern Ireland. The county shares 173.8km of border with Northern Ireland, giving the county the longest share of border between Northern Ireland and the Republic of all southern counties. There are six counties in total that border Monaghan; Fermanagh, Tyrone and Armagh in Northern Ireland and Louth, Meath and Cavan in Southern Ireland. Two of these counties are significant in terms of this noise action plan as the N2 adjoin them; Louth and Tyrone.

## 6.3 Description of the general population

County Monaghan has a population of 65,288 (2022 census). It is a predominantly rural county with approximately 68% of its population living in population centres of less than 1,000 people. There are five major towns in the county: Monaghan (7,894), Carrickmacross (5,745), Castleblayney (3,926), Clones (1,885) and Ballybay (1,329).

The housing units in the county are predominantly single dwelling with multi-unit development generally confined to larger towns and some villages. Within the Noise Action Plan area, single unit dwellings predominate, comprising once off rural housing. There are some areas of ribbon development adjacent to sections of national and non-national roads near built up areas and a number of rural houses adjacent to the road, which are continually exposed to environmental noise from road traffic. In general, the houses closest to the road are older dwellings which likely existed before the road existed or was upgraded, which brought increased traffic volumes past them on a daily basis.

## 6.4 Location of Noise Sensitive Groups

A noise sensitive location is any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels. For the purposes of this Noise Action Plan, the following locations are considered noise sensitive within the action plan area detailed in Section 6.1.

- All residential properties within 600m of the centreline of the N2.
- In a built-up area, only residential properties in the immediate vicinity of the major road.
- Schools (playschool/creche, primary or post schools) located along the N2, N12, N54 and sections of the R937, R162, R181, R183, R938 & R927 also designated as major routes.

## 6.5 Description of the main infrastructure/services

Monaghan provides an important transport link between the north and south and the N2, which travels through the county has been recognised as an important strategic link servicing Derry and the North West.



## 7. Existing Noise Management Framework

### 7.1 Roads

All major towns in Monaghan, including Carrickmacross, Castleblayney and parts of Monaghan Town heading North (to N2 & N12) are by-passed, which diverted traffic (hence noise) away from towns and concentrate it in less built up areas.

Noise barriers are in place in parts of the N2 on some sections of road near houses.

Noise Impact Assessments are undertaken for all major road upgrades in the County. In addition, a Noise Impact Assessment is requested for all major planning developments in the County, particularly those along major routes that may be impacted by existing noise levels. The current Planning and Licensing system will manage potential development within the Monaghan area, where noise impact of developments is required to be assessed before planning is granted.

No other noise-reduction measures are planned or in preparation in the action planning area.

### 7.2 Licensed Industrial Facilities

There are five licensed industrial facilities along the N2 major route relevant to this Noise Action Plan and none of these are thought to significantly contribute to environmental noise. These are licensed and managed by the EPA and noise management conditions are set in the relevant licence for the site. <https://gis.epa.ie/EPAMaps/>.

## 8. Summary of the Results of the Noise Mapping

### 8.1 Overview of the preparation of the noise map

Transport Infrastructure Ireland (TII) carried out noise mapping for the County and produced the strategic noise map for all major roads. This was done following the EPA *Round 4 Strategic Noise Mapping of Major Roads For the fourth round of the Environmental Noise Regulations 2018 (March 2021 - V2)*. A major road for R4 noise mapping could be any section of a National, Regional or Local road with a total annual bi-directional traffic flow across all carriageways during 2021 of more than 3 million vehicle passages per year, or approximately 8,219 per average 24 hours.

A strategic noise map is a graphical representation of the predicted noise level in a given area. A noise map has different colour coded bands, which represent the predicted decibels (dB(A)) within a certain range, also detailed on the map.

A noise map is produced using a computer software package - *Predictor* Noise Model was used in this case. To develop a noise map, a number of variables must be determined in order to correctly represent the amount of noise generated by traffic driving on the road. For road traffic noise, the noise level at the source is primarily influenced by the speed at which traffic is travelling, the overall quantity of vehicles in the traffic flow, the proportion of heavy commercial vehicles (HCVs) in the flow and the type of road surface in the area. The nominal assessment year for traffic data for Round 4 of the strategic noise mapping was 2021. For R4 a new common EU noise calculation methodology was used, CNOSSOS-EU 2015, which is different from the UK CRTN 1988 method used for previous noise mapping. The CNOSSOS-EU method groups road vehicles into different classes compared to CRTN.

The manner in which the noise level decreases with distance must then be calculated, which involves determining the reduction in noise level as it propagates from the source. Distance, ground cover and the presence of barriers such as walls, noise barriers etc will all influence the level of noise attenuation.




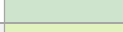







Noise maps for County Monaghan are presented in terms of two noise indicators;  $L_{den}$  and  $L_{night}$ .  $L_{den}$  is the day-evening-night noise indicator and it represents the noise indicator for overall annoyance. It is based on day (07:00-19:00), evening (19:00-23:00) and night (23:00-07:00) time periods and it is weighted to account for extra annoyance in the evening and night periods.  $L_{night}$  is the night time noise indicator and is used in the assessment of sleep disturbance. It is based on night (23:00-07:00) time period. Both of these indicators are based on year-long averages of the day, evening and night time periods and each are plotted separately for the required roads in the County.

The results of the strategic noise mapping include noise levels calculated around the facades of noise sensitive buildings and an estimate of the number of dwellings and people in dwellings within each residential building, derived from GeoDirectory and Census population statistics.

Because of the change to the calculation methods to the common European CNOSSOS-EU for R4 noise maps, it is difficult to compare these noise maps to the previous ones undertaken for Round 3. In addition, for Round 4 noise mapping, the terrain model is based on more detailed and accurate data, which has in turn has led to more reliable noise results with much less tendency to over predict the impact.

## 8.2 Presentation of Results

Two noise maps were produced by TII in 2021 for the County's major roads; one showing the  $L_{den}$ (dB) and one showing the  $L_{night}$ (dB) noise contour bands. Each map presents the noise levels in 5dB contour bands and are shown in Appendix C.

dB Band	Sample
30 – 34dB	
35 – 39dB	
40 – 44dB	
45 – 49dB	
50 – 54dB	
55 – 59dB	
60 – 64dB	
65 – 69dB	
70 – 74dB	
75 – 79dB	
80 – 99dB	

The  $L_{den}$  map shows the loudest noise is the road itself, while moving out from the road, the noise level reduces. The lowest noise band shown is 55-59dB (orange) and beyond this the noise level from the road ( $L_{den}$ ) is not reported under the Regulations i.e. <55dB. The strategic noise maps in Appendix C do not provide the  $L_{den}$  53dB noise band, but calculations of the exposed population within the  $L_{den}$  53dB noise band are considered in this NAP.

The  $L_{night}$  map similarly shows noise contours in 5dB bands. The highest noise on the road itself at night is in the 65-69dB range. Moving out from the road, the noise level decreases with distance with the lowest noise band shown as 45-49dB (yellow) and beyond this the noise level from the road ( $L_{night}$ ) is not reported under the Regulations i.e. <45dB.

As detailed in Section 6.1, noise from major sources is regarded as affecting an area if it causes either an  $L_{den}$  value of 53dB(A) or greater or an  $L_{night}$  value of 45dB(A) or greater anywhere within the area. The extent of the orange band (55-59dB) in the  $L_{den}$  map and the pale yellow band (45-49dB) in the  $L_{night}$  map is the approximate extent of the area eligible for inclusion in the assessment stage of this Noise Action Plan. This area extends approximately 500m from the centre line of the main road. On some stretches of road, the extent is much less and some areas, it may be slightly greater.

The results of the strategic noise mapping provide information on the assessed noise levels at all noise sensitive properties within the assessment area, along with an estimate of the number of inhabitants. These resultant datasets are then used to identify **Important Areas (IAs)**, as required under the Regulations, where long term noise exposure to noise from infrastructure is likely to produce negative health effects on the exposed population. **Important Areas (IAs)** are all areas exposed above the outdoor noise levels of;

- $L_{den}$  = 53dBA
- $L_{night}$  = 45dBA

A summary of the number of people in dwellings and number in noise sensitive receptors (schools and hospitals) in Monaghan, which experience environmental noise from major roads, above the guide levels is summarised in **Table 3**.

**Table 3. Numbers Exposed to Noise Levels above Guide Level**

Guide Level	No. People in Dwellings Exposed	No. School Buildings (& Hospital Buildings)
>53 dBA $L_{den}$	6727	7 (1)
>45 dBA $L_{night}$	6508	16(2)

Harmful effects of environmental noise from road traffic need to be assessed in line with the Regulations, by means of the dose effect relations. WHO Guidelines (2018 and 1999) specify that adverse health effects of noise from road traffic can cause:

- High Annoyance (HA),
- High Sleep Disturbance (HSD) and
- Ischaemic Heart Disease (IHD).

These harmful effects are also considered in SI No. 663, which provides calculations for Relative Risk (RR) of the harmful effect and the Absolute Risk (AR) of the harmful effect.

For each Important Area i.e. noise sensitive location that comes within the  $L_{den}$  53dBA limit value and/or  $L_{night}$  45dBA limit value, the population exposure at that noise sensitive location was assessed and also the harmful effects. This data was then used to determine **Most Important Areas (MIAs)**, which are a sub-set of Important Areas where the health effects are highest, typically through a product of noise exposure levels and the number of people highly annoyed, as discussed in the following section.

## 9. Identification of areas to be subjected to Noise Management Activities

### 9.1 Description of approach to identify IAs, MIAs and PIAs

The Regulations require that Monaghan County Council as the Action Planning Authority address “priorities” and “the most important area or areas” with a view to identifying “measures” that will help “avoid, prevent or reduce” the “harmful effects, including annoyance, due to exposure to environmental noise”. The EPA Guidance sets out the following three-step approach to identifying priorities:

1. **Important Areas (IAs)** – these are locations exposed to environmental noise which exceed the relevant noise limit, as discussed in the previous section.
2. **Most Important Areas (MIAs)** – these locations are a sub-set of Important Areas where the health effects are highest, typically through a product of noise exposure levels and the number of people highly annoyed; and
3. **Priority Important Areas (PIAs)** – between 5 and 10 Most Important Areas or group of similarly affected Most Important Areas, identified, through a prioritisation process, as those which will be evaluated and addressed during the implementation of the NAP.

Identified Important Areas have been used to inform the identification of Most Important Areas and this process was done by external consultants for Local Authorities outside agglomerations. The process of identifying MIAs is set out in the EPA Guidance and is an automated process within GIS software which uses the results of the strategic noise maps assigned to population statistics in areas with exposures greater than the Important Area guide levels.

The assignment of population to the calculated noise levels is set out within Annex II of the END (CNOSSOS-EU), where harmful effects due to noise are statistically assessed at geographically specific locations. The EPA Guidance sets out the process for using the calculated number of people Highly Annoyed to generate a gridded “heatmap” of values which represent (approximately) the number of people 100m<sup>2</sup>. Using the heatmap, the areas of higher concentrations of people highly annoyed (HA) are identified and delineated as a digital polygon. The EPA Guidance sets a density criterion of 15 or more people per 100m<sup>2</sup> as being the most appropriate for Most Important Areas in main urban areas, with lower criteria of 10 and 7.5 people per 100m<sup>2</sup> appropriate on the edge of urban or in rural areas.

It is crucial to emphasise that the approach to identifying Most Important Areas is of a statistical nature and pertains to the entire population encompassed by the noise maps. It should not be construed as a precise assessment of harmful effects for specific buildings, nor are the extents of the Most Important Areas definitive. Instead, they are indicative in identifying areas with a relatively high number of people who may be potentially highly annoyed due to noise.

A summary of the Most Important Areas identified along the major routes using the EPA Guidance density criteria (Highly Annoyed Threshold) of 7.5, 10 and 15 or more people per 100m<sup>2</sup> is provided in Table 4 (Note numbers rounded to the nearest whole number).

**Table 4. Most Important Area (MIA) Summary**

HIGHLY ANNOYED (HA) THRESHOLD/100M <sup>2</sup>	NO. OF MIAS NEAR MAJOR ROADS	NO. PEOPLE IN MIA			
		Total	Highly Annoyed (HA)	Highly Sleep Disturbed (HSD)	Ischaemic Heart Disease (IHD)
<b>7.5</b>	<b>10</b>	<b>545</b>	<b>149</b>	<b>50</b>	<b>0</b>
<b>10</b>	<b>7</b>	<b>306</b>	<b>90</b>	<b>30</b>	<b>0</b>
<b>15</b>	<b>1</b>	<b>33</b>	<b>11</b>	<b>4</b>	<b>0</b>

The MIA calculation process identified 18 MIAs along major routes in the County. Seven of the MIA locations overlapped at various threshold levels, therefore a total of eleven MIA locations were available for consideration. The next stage in the process is to rank these and to determine 5-10 Priority Important Area (PIA), where there would be a commitment to undertake an assessment of noise mitigation measures within the life cycle of the NAP.

The EPA Guidance requires consideration be given to the following aspects, where information is available:

- Number of people exposed to noise, and the harmful effects
- Level of noise exposure
- Potential for grouping adjacent Most Important Areas into a larger Priority Important Area
- The main source of transport noise
- Competent body to carry out any proposed mitigation measures
- History of complaints
- Planned road maintenance and resurfacing programme
- Planned speed or traffic calming measures
- Planned nearby developments
- Existing noise reduction measures

To inform the decision on the selection of Priority Important Areas, consistent with the requirements of the EPA Guidance, associated statistical information has been developed for each Most Important Area, including:

- Noise source identifying the Most Important Area, i.e., railways or roads
- Area (m<sup>2</sup>)
- Total population
- Number of people highly annoyed (HA)
- Number of people highly sleep disturbed (HSD)
- Population increased risk of ischaemic heart disease (IHD)
- Number of dwellings

- Population noise exposure above END threshold values for road traffic noise exposure in 5 dB bands ( $L_{den}$  55 - 75 dB,  $L_{night}$  50 - 70 dB)

A list of nine Priority Important Areas was provided by external consultant, based on the criteria above and summarised in Table 5. Figures in Table 5 are based on those Most Important Areas with the highest total population, generated using the EPA Guidance density criterion ('HA Threshold') 15/10/7.5 or more people per 100m<sup>2</sup>.

**Table 5. Indicative List of Priority Important Areas (PIA) Summary from Major Roads**

PIA	Location	Total Population in PIA	MIA Criterion - people HA/100m <sup>2</sup>	Area m <sup>2</sup>	No. of People		
					HA	HSD	IHD
MNC_1	Monaghan (Dublin St.)	33.05	15	3,800	10.74	3.65	0.01
MNC_3	Castleross Retirement Village	80.12	10	4,200	15.38	4.98	0.02
MNC_4	Monaghan (Adj. Barrack Lane)	76.58	10	13,000	22.09	7.44	0.03
MNC_5	Monaghan (Adj. M. Skinnader RaB)	26.11	10	3,500	10.08	3.44	0.01
MNC_6	Emyvale Village (N)	20.31	10	3,100	7.92	2.71	0.01
MNC_7	Emyvale Village (S)	19.4	10	3,400	6.78	2.29	0.01
MNC_8	Castleblayney (York St.)	10.54	10	600	2.79	0.96	0
MNC_9	Carrickmacross (Main Street) R178	24.02	7.5	4,700	3.94	1.18	0
MNC_10	Monaghan (Clones Rd.)	23.37	7.5	5,400	6.98	2.33	0.01
MIA_ID 1	Emyvale (Centre of Village)	7.28	7.5	1400	2.44	0.82	0

PIA – Priority Important Area, HA – Highly Annoyed, HSD – Highly Sleep Disturbed, IHD – Ischaemic Heart Disease

From the nine PIAs identified in Table 5, five were chosen by Monaghan County Council, who give a commitment to undertake an assessment of noise mitigation measures for these areas, within the life cycle of the NAP. Note MIA's in close proximity e.g. on the same street, can be combined to create a single PIA.

The approved list of PIAs is provided in Table 6, which is based on locations with the highest density of people. There are three separate locations in Monaghan town, one at Castleross Retirement Village and the final one in Emyvale Main Street, which encompasses two PIAs and an adjacent identified MIA into one single PIA.

It is accepted that the methodology used for selection of MIAs and PIAs may result in locations with similar or even higher noise exposure levels and lower levels of population density not being identified as MIAs. However, Monaghan County Council may consider examining locations along major routes and including them as PIAs under the lifetime of this NAP, in cases where complaints relating to road traffic noise emanated prior to the adoption of this NAP.

**Table 6: List of Approved Priority Important Area (PIA) 2024-2028**

Approved PIA (2024-2028)	MIA	Location
PIA_1	MNC_1	Monaghan (Dublin St.)
PIA_2	MNC_3	Castleross Retirement Home
PIA_3	MNC_4	Monaghan (Adj. Social Welfare)
PIA_4	MNC_5	Monaghan (Adj. M. Skinnader RaB)
PIA_5	MNC_6	Emyvale Village (N)
	MNC_7	Emyvale Village (S)
	MIA_ID 1	Emyvale (Centre of Village)

## 9.2 Description of approach to identify Quiet Areas

A Quiet Area is an area where environmental noise levels are deemed to be good. An area where the exposure to noise is below the  $L_{den} < 53\text{dBA}$  and  $L_{night} < 45\text{dBA}$  should be preserved.

Under the Regulations there is a requirement to delimit Quiet Areas within agglomerations. However, as there are no agglomerations (population  $> 100,000$ ) within County Monaghan, this is not relevant. The Regulations also require to delimit quiet areas in the open country. The requirement for such an area is that it is “undisturbed by noise from traffic, industry or recreational activities”. The strategic noise mapping undertaken by TII for this Noise Action Plan is not suitable



to delimit quiet areas in open countryside as it did not take into account industrial noise or noise from recreational activities and it was undertaken near major noise sources (major roads) and not at locations which will be undisturbed by them.

The EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* outline how to undertake Quiet Area Screening of a Development Location, according to the Agency publication *Environmental Quality Objectives - Noise in Quiet Areas*. This Guidance Note only applies to Scheduled Activities that require a licence with the EPA and not to other potential noise sources which could impact upon a currently quiet area in open countryside. However, it can be used as a guideline for this purpose, in the absence of other Guidelines on this issue.

Quiet Area Screening involves determining of the following criteria are satisfied:

- At least 3km from urban areas with a population >1,000 people;
- At least 10km from any urban areas with a population >5,000 people;
- At least 15km from any urban areas with a population >10,000 people;
- At least 3km from any local industry;
- At least 10km from any major industry centre;
- At least 5km from any National Primary Route, and
- At least 7.5km from any Motorway or Dual Carriageway.

If the site does not meet these criteria it is not considered to be a quiet area as per the Agency definition.

Based in the current TII noise maps, there is not sufficient information on the acoustic environment to show quiet areas in open country, to enable specific areas to be delimited for approval. The EPA Quiet Area Screening Method could be used by Monaghan County Council Planning Department for future developments. Any proposals to designate Quiet Areas would be discussed with the EPA for approval.

## 10. Mitigation and protection measures

### 10.1 Investigation of PIAs

Priority Important Areas will be investigated over the timeframe of this NAP (2024-2028).

This assessment will include:

- Noise monitoring,
- Noise modelling calculations, and
- Cost-benefit analysis

### 10.2 Investigation of candidate Quiet Areas

Strategic noise mapping undertaken for this Noise Action Plan does not provide a resource which may be extensively used to help identify quiet areas in open country. This is partially due to the nature of the assessed noise sources, which do not include recreational activities, and partially due to the area of coverage of the strategic noise mapping, which is near to major sources, and therefore they are not locations which will be undisturbed by them.

The EPA Quiet Area Screening Method could be used by Monaghan County Council Planning Department for future developments. Any proposals to designate Quiet Areas would be discussed with the EPA for approval.

### 10.3 Future Developments and Noise Impact

There are plans to construct two major N2 road schemes. They are the 'Ardee to Castleblayney' and the 'Clontibret to Border' road schemes, however their delivery will not take place within the lifetime of the 2024-2028 Noise Action Plan. The road developments will be undertaken in line with TII guidelines. In addition, the siting of residential properties in close proximity to the N2 will be undertaken giving careful consideration of the Noise Action Plan and noise results obtained from TII Noise Mapping exercise.

The upgrade of existing road pavements is managed by the TII Network Management section as part of a Pavement Asset Repair and Renewal (PARR) programme. Monaghan County Council will engage with TII Network Management to explore solutions if applicable for PIA's, during the lifetime of the 2024-2028 Noise Action Plan.

### 10.4 Confirmation of Noise Exposure Levels

For each PIA identified in Table 6, Monaghan County Council will:

- Undertake ambient noise monitoring at representative locations within the Priority Important Area; and
- Review and refine the noise model, where necessary, against the local situation at the Priority Important Area.

Ambient noise monitoring will be undertaken at an appropriate number of locations, based on the size of the Priority Important Area and the noise source. The measurements will be used to confirm that the noise exposure correlates with that assessed by the strategic noise maps, and help validate

the calculation model baseline scenario for the assessment of mitigation measures.

Measurement results will be reviewed and any spurious noise events, periods of rain, or excessive wind speeds, removed from the average levels. The long-term average  $L_{day}$ ,  $L_{evening}$ ,  $L_{night}$  and  $L_{den}$ , measured levels will then be compared with calculated results. If possible, road traffic flow data will be captured near the measurement locations during the survey period to validate the noise model.

If necessary after noise monitoring is complete, Monaghan County Council will review the noise models for the PIAs, based upon information captured through field survey work, with particular attention being paid to aspects such as:

- Road surface type;
- Railhead roughness;
- Traffic speed;
- Traffic volume and compositions;
- Location and height of any noise barriers; and
- Any other noise mitigation measures present on site.

Noise modelling results are compared to the levels measured during the ambient noise survey, and any systematic under or over calculations adjusted to validate the models. This approach helps to establish a validated baseline model for the assessment. Once a noise model is validated, it may be considered as the existing situation for the purpose of the Cost-Benefit Analysis (CBA). The update of current noise modelling to inform the cost benefit analysis of any future mitigation measures planned for a PIA will require co-operation from TII to coordinate information from the original model, to allow direct and realistic comparisons between model runs, if possible.

## 10.5 Review of possible mitigation measures, where necessary

Once the extent of the existing noise exposure levels have been confirmed for a PIA, potential noise mitigations measures will be investigated and a cost benefit analysis undertaken for each, with the aim of developing a selection matrix which leads towards a recommendation for action.

PIA1, PIA3 & PIA4 are all located within Monaghan town and PIA5 (comprising 3 MIAs) is located in Emyvale village, main street. PIA2 is located at a retirement village just off the N2.

Noise mitigation measures can be implemented on or directly alongside the sources, in this case the road (source control), others may be in the region between the roads and the dwellings (pathway control) and others may be at the noise sensitive locations (receiver control). Four of the PIAs relate to dwellings located directly along busy transport routes within towns, in Monaghan and Emyvale, so the traditional options for road traffic noise mitigation via pathway control (barrier etc.) may be limited in these cases.

Table 7 provides an indication of the types of mitigation measures which may be relevant to consider for noise sensitive locations exposed to noise from road sources.

**Table 7. Road Traffic Noise Mitigation Measures**

<p><b>Source Control</b></p>	<p><b>Technical Measures</b></p> <ul style="list-style-type: none"> <li>○ Re-surface roads with 10mm stone mastic asphalt (SMA)</li> <li>○ Re-surface roads with low noise road surfaces, or thin surface treatments</li> <li>○ Road surface maintenance</li> </ul> <p><b>Traffic Planning</b></p> <ul style="list-style-type: none"> <li>○ Vehicle speed management, or speed limit reductions</li> <li>○ Speed bumps to reduce speed and deter vehicles from travelling on route</li> <li>○ Traffic management – looking at routes and HGVs to reduce traffic volume</li> <li>○ Bans on HGV's/trucks</li> <li>○ Redesigning junctions - roundabouts may create a steadier driving pattern</li> <li>○ Co-ordinated signalisation at intersections for smoother driving</li> </ul> <p><b>Land Use Planning</b></p> <ul style="list-style-type: none"> <li>○ New road construction (bypass)</li> <li>○ Car-free zones – redesign of street space</li> <li>○ Quiet Façade i.e. ensure dwelling have at least one quiet side e.g. (garden/balcony)</li> <li>○ Safe cycle lanes along major routes</li> </ul> <p><b>Quieter Sources</b></p> <ul style="list-style-type: none"> <li>○ Quieter tyres</li> <li>○ Specific lower vehicle sound limits</li> <li>○ Increased electrification of the road vehicle fleet</li> <li>○ Low-noise waste collection vehicles</li> <li>○ Low-noise night time delivery</li> <li>○ Check on noisy vehicles</li> </ul> <p><b>Local Organisational Measures</b></p> <ul style="list-style-type: none"> <li>○ Liaise with residents in PIA's regarding road traffic noise perceptions</li> <li>○ Awareness raising campaign regarding driver behaviour in PIA's</li> <li>○ Increased signage in PIA's relating to traffic noise or traffic speed</li> </ul> <p><b>National Measures</b></p> <ul style="list-style-type: none"> <li>○ Regulatory measures to require the selection of quieter sources</li> <li>○ Increase in EV charging stations</li> <li>○ Economic measures and incentives to support the selection of quieter sources</li> <li>○ Increase in public transport fleet</li> <li>○ Enforcement of speed limits</li> </ul>
<p><b>Pathway Control</b></p>	<p><b>Reduction of Sound Transmission</b></p> <ul style="list-style-type: none"> <li>○ Earthworks, such as earth bunds, mounds or cuttings</li> <li>○ Roadside noise barriers and screening measures</li> <li>○ Coverage, including baffles or tunnels</li> </ul>
<p><b>Receiver Location Control</b></p>	<p><b>Building Control Measures</b></p> <ul style="list-style-type: none"> <li>○ Dwelling insulation, either new build or retrofit</li> <li>○ Acoustic windows or secondary glazing</li> <li>○ Acoustics ventilation, passive or active</li> <li>○ Chimney caps and dampers</li> <li>○ Specify building construction details for new developments exposed to environmental noise</li> </ul>

The Draft EPA guidance provides relevant documents regarding road noise mitigation and these will be reviewed by the council when considering possible mitigation measures for PIAs. For road traffic noise, the most cost-effective scenarios may comprise a combination of complementary noise mitigation measures. For example, in the context of the ZPAP target of a 30% reduction in the number of people chronically exposed to environmental noise by 2030, the following measures were shown to offer the most cost-effective noise mitigation measures for road traffic noise:

- Reducing the road traffic noise through road resurfacing and low noise road surfaces;
- Speed restriction or speed limit reductions;
- Car-free zones;
- Dwelling façade insulation, either new build or retrofit; and
- Planning new developments with quiet facades.

Cost-benefit analysis will be undertaken in three stages:

1. Appraisal of monetised benefits to health;
2. Estimate of costs for implementing and maintaining noise mitigation works; and
3. Comparison of monetised health benefits against cost of mitigation.

Measures and options for noise control and costs for each PIA outlined in this NAP will be evaluated over the lifetime of this NAP and a shortlist of practical noise mitigation measures for each PIA will be compiled. It is a statutory requirement that Monaghan County Council liaise and consult with TII when selecting feasible noise mitigation measures for detailed assessment.

## 10.6 Assessment of Noise Reduction Effects

At present there is no recommended Irish methodology for the assessment of the monetised benefits to health of noise mitigation. EPA Guidelines recommended to use the UK WebTAG workbooks - Department for Transport (UK), *Transport Analysis Guidance (TAG)*, *TAG: environmental impacts worksheets*, *Noise workbook*, November 2023, with adjustments to suit Irish settings, which enables the noise impact of a proposed scheme to be monetised to support a cost benefit assessment. The valuation of the change in noise level due to the proposed noise mitigation scheme considers the long-term effects on sleep disturbance, amenity (annoyance), AMI (acute myocardial infarction), stroke, and dementia during the daytime, and sleep disturbance at night. The assessment requires noise calculation results for all the dwellings within 600m of the scheme, for the opening year, and forecast year (typically 15 years after opening), both with and without the proposed noise mitigation measures.

The most cost-effective noise mitigation measures, or combination of measures will be proposed to the relevant departments, agencies and fund holders to be incorporated within their future work plans. Where funding is available and approved, the recommended noise mitigation measures will be implemented. After implementation, post-completion noise measurement surveys will be conducted to confirm the predicted noise reduction.

The objective of this NAP is to reduce the number of people affected (annoyed, sleep disturbed, or other) by road traffic noise. If feasible noise mitigation measures are implemented over the lifetime of the NAP, the health effects will be assessed and reported in the annual NAP progress report and in the Noise Action Plan when next revised. It is anticipated that the next round of TII national noise

modelling will provide the updated data necessary to assess any improvements gained from mitigation measures introduced at PIA's during the lifetime of this Noise Action Plan.

DRAFT

## 11. Implementation Plan

### 11.1 Roles and Responsibilities.

Monaghan County Council is the designated Action Planning Authority for this Noise Action Plan and will oversee the implementation of the plan.

The implementation of the Planning and licensing regulations is a matter for the appropriate statutory body including Monaghan County Council, EPA and An Bord Pleanala.

TII is the key external stakeholder during the implementation of this Action Plan. Review of the strategic noise maps will be carried out in consultation with TII and the EPA. TII also allocates and administers funding for the construction, maintenance and improvement of national roads. Non-national roads are solely the responsibility of the local authority and TII is not responsible for their upkeep.

### 11.2 Targets and Objectives.

This 4-year Noise Action Plan is intended to manage noise issues from major roads, avoiding, preventing or reducing on a prioritised basis the harmful effects of environmental noise based on a communal approach within the European Community.

### 11.3 Programme of Works

All measures identified in the programme of works are subject to funding and resources and cost benefit analysis.

#### 2025

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- Conduct noise monitoring and validate noise model for PIA1, PIA3 & PIA4 in Monaghan town
- Collect traffic data for noise monitoring period also if possible
- Review potential mitigation measures for these three PIAs
- Provide NAP annual report to EPA

#### 2026

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- Conduct noise monitoring and validate noise model for PIA2 in Castleross Retirement Village
- Collect traffic data for noise monitoring period also if possible
- Review potential mitigation measures for this PIA if applicable and conduct cost benefit analysis
- Provide NAP annual report to EPA

#### 2027

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- Conduct noise monitoring and validate noise model for PIA5 in Emyvale
- Collect traffic data for noise monitoring period also if possible
- Review potential mitigation measures for this PIA and conduct cost benefit analysis



- Provide NAP annual report to EPA

## 2028

- Undertake full cost benefit analysis for PIA1, PIA3, PIA4 & PIA5
- If applicable seek approval from TII to implement mitigation measures, subject to funding.
- Provide NAP annual report to EPA
- Participate in review process for R5 NAP

## 11.4 Evaluation, Review and Corrective Action Programmes

A review of this Noise Action Plan will be carried out by Monaghan County Council to assess progress against the programme of works. An interim summary report will be prepared annually. This report will highlight progress in implementation of action plan measures and will also identify areas where corrective action is required or where the proposed measures must be modified for reasons unforeseen at present.

There are a number of risk factors associated with the delivery of this Noise Action Plan, particularly financial risks. Some critical elements of the Action Plan are outside the control of Monaghan County Council and will require the approval of other statutory bodies. Also, the financial resources required to deliver the programme has yet to be determined and the delivery of the noise action plan will be contingent on adequate funding being available. In view of these uncertainties, it is important that the programme is subject to an ongoing review so as to alert all relevant parties to any change in circumstances.

In 2028 the Council will carry out a review of the program of works implemented under this action plan. Progress and results will be evaluated using information gathered through local assessment of environmental noise exposure. This will include “before and after” evaluations of any noise mitigation measures. A review of new noise maps will also be carried out by TII, giving an indication of the change in environmental noise levels and the numbers of people exposed.

## 12. Summary and Conclusions

The European Communities (Environmental Noise) Regulations 2018, S.I. No. 549 of 2018 and the European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. No. 663/2021), which gives effect to the EU Environmental Noise Directive, requires that Noise Action Planning Authorities prepare Noise Action Plans for their functional areas in respect of specified environmental noise sources. Noise Action Plans must be based upon the results of strategic noise mapping carried out by the designated noise mapping body, TII.

In County Monaghan traffic noise on major roads in excess of 3 million vehicles per year applies to this Noise Action Plan. This includes the N2 and short sections of N12, N53 and the R937, R162, R181, R183, R938 & R927 in the towns of Monaghan, Castleblayney and Carrickmacross. Strategic noise mapping in respect of those roads was carried out by Transport Infrastructure Ireland (TII) in 2021.

This Noise Action Plan, which is based on the results of these noise maps, was prepared by Monaghan County Council. The Noise Action Plan describes the action planning area and the responsible authorities. It discusses existing noise management legislation and guidance. The plan is relevant to Important Areas (IAs) that are exposed above the outdoor noise levels of  $L_{den}$  53dBA and/or  $L_{night}$  45dBA, above which adverse health effects and adverse effects on sleep may occur. Harmful health effects of environmental noise are measured by the number of people Highly Annoyed (HA), number of people Highly Sleep Disturbed (HSD) and instances of Ischemic Heart Disease (IHD).

From the list of Important Areas (IAs) derived from the Strategic Noise Maps, nine Most Important Areas (MIAs) were provided to Monaghan County Council, based on locations with the highest density of people. From this list, five were chosen as Priority Important Areas (PIAs), for which Monaghan County Council give a commitment to undertake an assessment of noise mitigation measures for these PIAs, within the life cycle of the NAP. The five PIAs include:

- PIA1, PIA3 and PIA4 in Monaghan town
- PIA2 in Castleross Retirement Village
- PIA5 in Emyvale Main Street (which encompasses three PIAs in one)

Potential mitigation options for road traffic noise are included in the plan and once the noise level in the PIAs has been confirmed by monitoring to be as predicted in the noise model, a cost benefit analysis for potential mitigation measures will be undertaken.

The Noise Action Plan covers a four-year period beginning in 2024 and will be reviewed every five years thereafter in 2028. The views of the public will be taken into account by conducting an 8-week public consultation process on the Draft Plan. The results of the public consultation will be taken into account when preparing this document.

The following key actions are proposed over the lifetime of the NAP;

- Conduct noise monitoring and validate noise model for all five PIAs
- Collect traffic data for noise monitoring period also if possible
- Review potential mitigation measures for the PIAs and cost benefit analysis
- If applicable seek funding and approval to implement mitigation measures.

All proposals for development/works under the Action Plan will be required to demonstrate compliance with the requirements of environmental and planning legislation and planning and licensing processes, including existing provisions of relevant land use plan(s) and policy documents such as the National Planning Framework and the Regional Spatial, the Economic Strategy for the Northern and Western Region and Monaghan County Development Plan 2019-2025.

A pre-screening check on this Noise Action Plan was carried out in line with the Strategic Environmental Assessment (SEA) Directive which concluded this plan does not satisfy the conditions for mandatory SEA under S.I. 435/2004, so does not require further SEA. A Statement of Screening for Appropriate Assessment (AA) was also conducted, which concluded that the proposed development, individually or in combination with other plans or projects, will not have a significant effect on any European sites. Further Screening for Appropriate Assessment (AA) will be conducted for any actions required under the Noise Action Plan to determine whether any project required over the 4-year period of the of the Noise Action Plan, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives.

## Appendix A: Glossary of acoustic and technical terms

Term	Definition
<b>Absolute Risk (AR)</b>	SI 663/2021 gives a calculation for the absolute risk (AR) of a harmful effect of Environmental noise as: $AR = \left( \frac{\text{Occurrence of the harmful effect in a population exposed to a specific level of environmental noise}}{\text{to a specific level of environmental noise}} \right) \text{ (Formula 2)}$
<b>Acoustical planning</b>	Controlling future noise by planned measures, such as land-use planning, systems engineering for traffic, traffic planning, abatement by sound-insulation measures and control of noise sources
<b>Action Planning Authority - APA</b>	This is the Authority responsible for implementing the Noise Action Plan, in this case Monaghan County Council
<b>ADDT</b>	Average Annual Daily Traffic
<b>Agglomeration</b>	An Agglomeration is defined under the European Communities Environmental Noise Regulations 2018 & 2021 and includes: <b>Cork</b> - encompassing area regulated by Cork City Council and Cork County Council <b>Dublin</b> – encompassing areas regulated by Dublin City Council, Dun Laoghaire / Rathdown County Council, Fingal County Council, South Dublin County Council, Kildare County Council & Wicklow County Council. <b>Limerick</b> – encompassing areas regulated by Limerick City and County Council & Clare County Council.
<b>Appropriate Assessment - AA</b>	A report on the assessment of the potential adverse effects of a plan or project (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas.
<b>Attenuation</b>	The reduction in level of a sound between the source and a receiver due to any combination of effects including distance, atmospheric absorption, acoustic screening, the presence of a building façade, etc.
<b>Attribute Data</b>	A trait, quality, or property describing a geographical feature, e.g. vehicle flow or building height
<b>CNOSSOS-EU</b>	Common Noise Assessment Methods for Europe, Directive 996/2015
<b>CRTN</b>	Calculation of Road Traffic Noise 1988. The Road traffic prediction methodology published by the UK Department of Transport
<b>dB</b>	Decibel is the unit of noise measurement
<b>EC</b>	European Commission
<b>EEA</b>	European Environment Agency
<b>END</b>	Environmental Noise Directive (2002/49/EC)
<b>Environmental Noise</b>	Unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity including those defined in Annex I to Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevent and control (2)
<b>EPA</b>	Environmental Protection Agency

Term	Definition
<b>EU</b>	European Union
<b>Free Field</b>	An environment in which the sound can freely propagate and in which there is no reflective surfaces of size that affect the frequency region of interest
<b>GIS</b>	Geographic Information System, is a computer system that analyses and displays geographically referenced information.
<b>Harmful Effects</b>	SI 663/2021 defines Harmful Effects of Environmental Noise as follows: <ul style="list-style-type: none"> <li>• Ischaemic heart disease (IHD) corresponding to codes BA40 to BA6Z of the international classification ICD-11 established by the World Health Organisation;</li> <li>• High annoyance (HA);</li> <li>• High sleep disturbance (HSD).</li> </ul>
<b>HCV</b>	Heavy Commercial Vehicle
<b>HGV</b>	Heavy Goods Vehicle (lorry/truck)
<b>IED</b>	Industrial Emissions Directive 2010/75/EU on Industrial Emissions (Integrated Pollution Prevention and Control)
<b>Important Area - IA</b>	Important Areas where the noise level exceeds a Lden of 53dBA and/or the Lnight of 45dBA
<b>IPPC</b>	Integrated Pollution Prevention Control Licence
<b>ISO</b>	International Standards Organisation
<b>L<sub>Aeq</sub></b>	The steady sound level which has the same energy as a time varying sound signal when averaged over the same time interval, T.
<b>L<sub>day</sub> (L<sub>d</sub>)</b>	Noise indicator for annoyance during the day period L <sub>Aeq,12hr</sub> (07:00 to 19:00)
<b>L<sub>evening</sub> (L<sub>e</sub>)</b>	Noise indicator for annoyance during the evening period L <sub>Aeq,4hr</sub> (19:00 to 23:00)
<b>L<sub>night</sub> (L<sub>n</sub>)</b>	Noise indicator for sleep disturbance L <sub>Aeq,8hr</sub> (23:00 to 07:00)
<b>L<sub>den</sub></b>	L <sub>den</sub> is the day-evening-night noise indicator which is generally used for traffic noise assessments and it represents the noise indicator for overall annoyance. As traffic noise varies from moment to moment, a single figure indicator the L <sub>den</sub> is used, termed L <sub>day</sub> , L <sub>evening</sub> and L <sub>night</sub> . It is the energy average sound pressure level (L <sub>Aeq</sub> ) over a 24-hour period, with a penalty of 5 dB added for the evening hours or 19:00 to 23:00, and a penalty of 10 dB added for the nighttime hours of 23:00 to 07:00, calculated as follows: $L_{den} = 10 * \log 1/24 \{12 * 10^{((L_{day})/10)} + 4 * 10^{((L_{evening}+5)/10)} + 8 * 10^{((L_{night}+10)/10)}\}$
<b>Most Important Area - MIA</b>	These locations are a sub-set of Important Areas where the health effects are highest, typically through a product of noise exposure levels and the number of people exposed to noise
<b>Major road</b>	A national, regional or minor road which has more than three million vehicle passages per year
<b>NAP</b>	Noise Action Plan

Term	Definition
<b>Noise Mapping Body - NMB</b>	Transport Infrastructure Ireland (TII) is the Noise Mapping Body for this Noise Action Plan and they have prepared the strategic noise maps for this purpose.
<b>Noise Bands</b>	Areas lying between contours of the following levels (dB): $L_{den}$ <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥75 $L_d$ <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥75 $L_e$ <55, 55 – 59, 60 – 64, 65 – 69, 70 – 74, ≥75 $L_n$ <45, 45-49, 50 – 54, 55 – 59, 60 – 64, 65 – 69, ≥70 Notes: It is recommended that class boundaries be at .00, e.g. 55 to 59 is actually 55.00 to 59.99 The assessment and reporting of the 45 – 49 dB band for $L_{night}$ is optional under the Regulations
<b>Noise Levels</b>	Free-field values of $L_{den}$ , $L_d$ , $L_e$ , $L_n$ , and $L_{Aeq,16h}$ at a height of 4m above local ground level
<b>Noise Mapping (Input) Data</b>	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)
<b>Noise Mapping Software</b>	Computer program that calculates required noise levels based on relevant input data. Predictor software was used by TII for preparing strategic noise maps for areas outside agglomeration for Round 4 NAPs
<b>Noise Model</b>	All the input data collated and held within a computer program to enable predicted noise levels to be calculated at a specific location.
<b>Noise sensitive location</b>	NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
<b>OSI</b>	Ordnance Survey for Ireland (now under Tailte Eireann)
<b>Priority Important Area - PIA</b>	Priority Important Areas are those which will be addressed during the implementation of the Noise Action Plan
<b>Relative Risk (RR)</b>	SI 663/2021 gives a calculation for the relative risk (RR) of a harmful effect of Environmental noise as: $RR = \left( \frac{\text{Probability of occurrence of the harmful effect in a population exposed to a specific level of environmental noise}}{\text{Probability of occurrence of the harmful effect in a population non exposed to environmental noise}} \right)$ (Formula 1)
<b>RSA</b>	Road Safety Authority
<b>Scheduled Activity</b>	Activity normally subject to an Integrated Pollution Control Licence under the EPA Acts
<b>Soundscape</b>	A soundscape is a sound or combination of sounds that forms or arises from an immersive environment. The study of soundscape is the subject

<b>Term</b>	<b>Definition</b>
	of acoustic ecology. The idea of soundscape refers to both the natural acoustic environment, consisting of natural sounds, including animal vocalizations and, for instance, the sounds of weather and other natural elements, and environmental sounds created by humans such as ordinary human activities including conversation or work, and sounds of mechanical origin resulting from use of industrial technology. The disruption of these acoustic environments results in noise pollution.
<b>Strategic Environmental Assessment - SEA</b>	Strategic Environmental Assessment (SEA) is the process by which environmental considerations are required to be fully integrated into the preparation of plans and programmes prior to their final adoption.
<b>Strategic Noise Map</b>	A graphical representation of the predicted noise in a particular area and from particular noise sources, with different colours representing different noise levels in decibels [dB(A)]. Strategic Noise Maps are required under the Environmental Noise Directive and are produced every 5 years for major roads, rail and airports and reported by each Local Authority in their Noise Action Plan
<b>Stone mastic asphalt - SMA</b>	A finished durable surface materials for use on the national road network.
<b>TII</b>	Transport Infrastructure Ireland
<b>WHO</b>	World Health Organisation
<b>ZPAP</b>	Zero Pollution Action Plan



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## Appendix C: Strategic noise maps

This Appendix contains

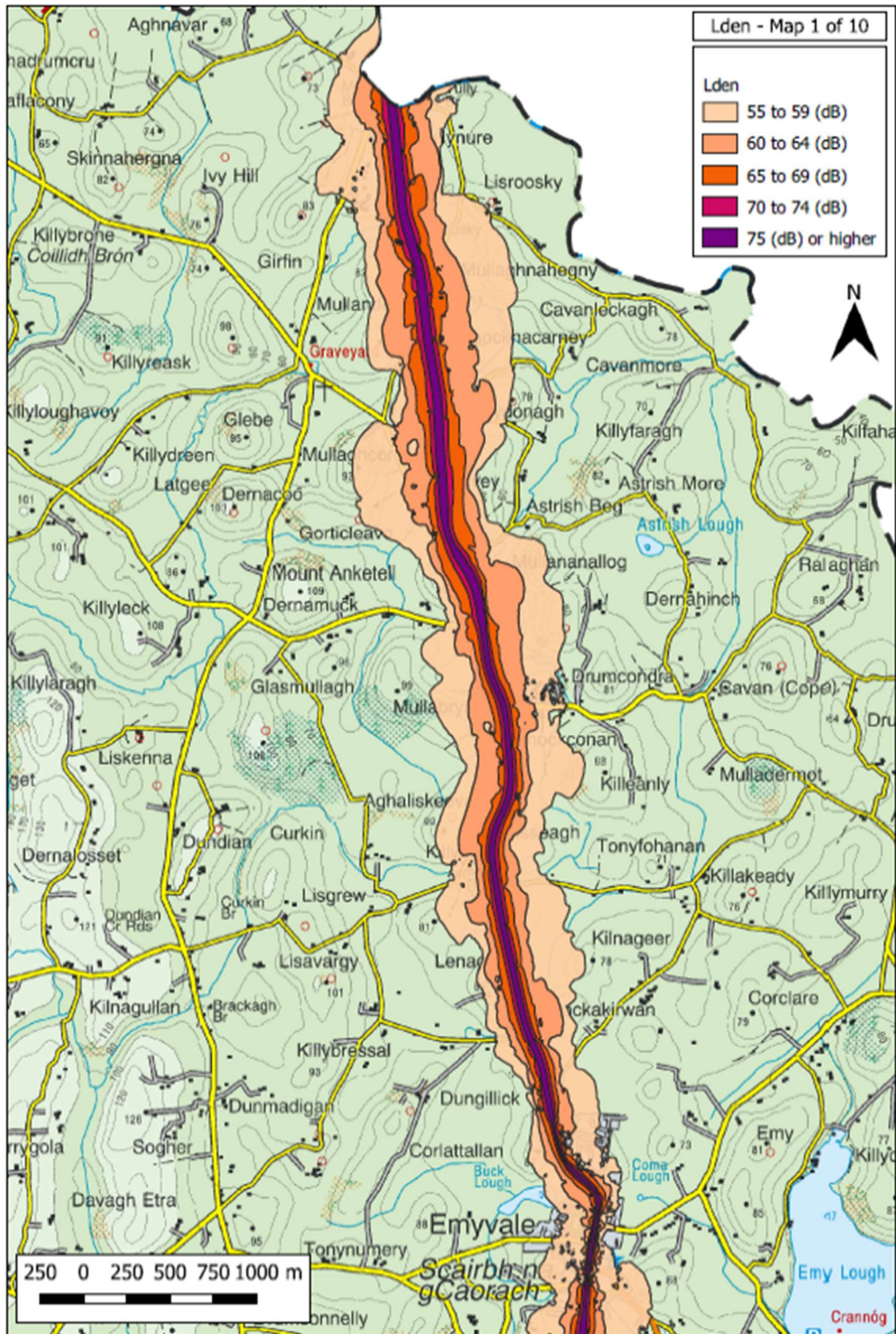
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**10 x  $L_{night}$  maps for Major Roads in County Monaghan**

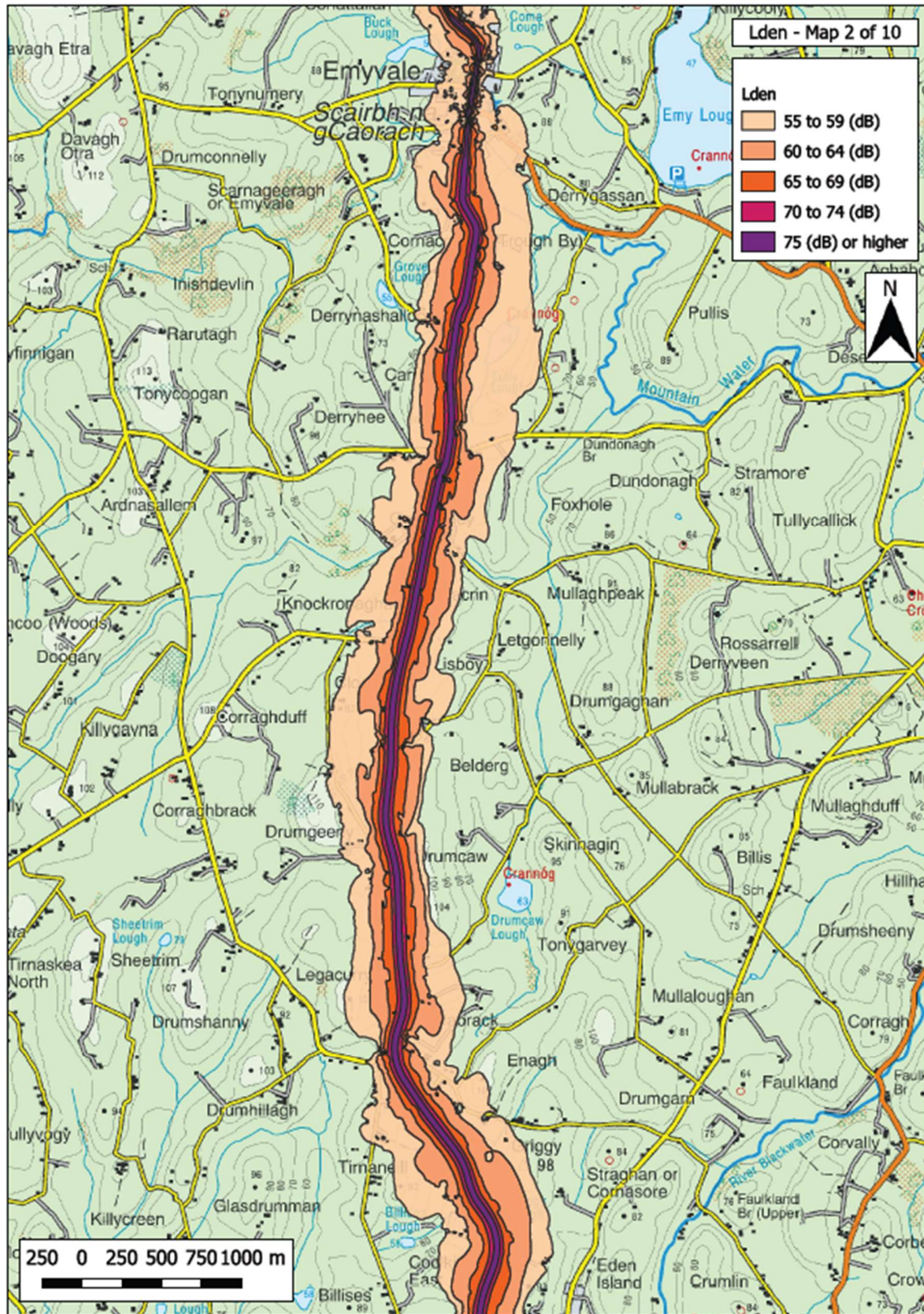
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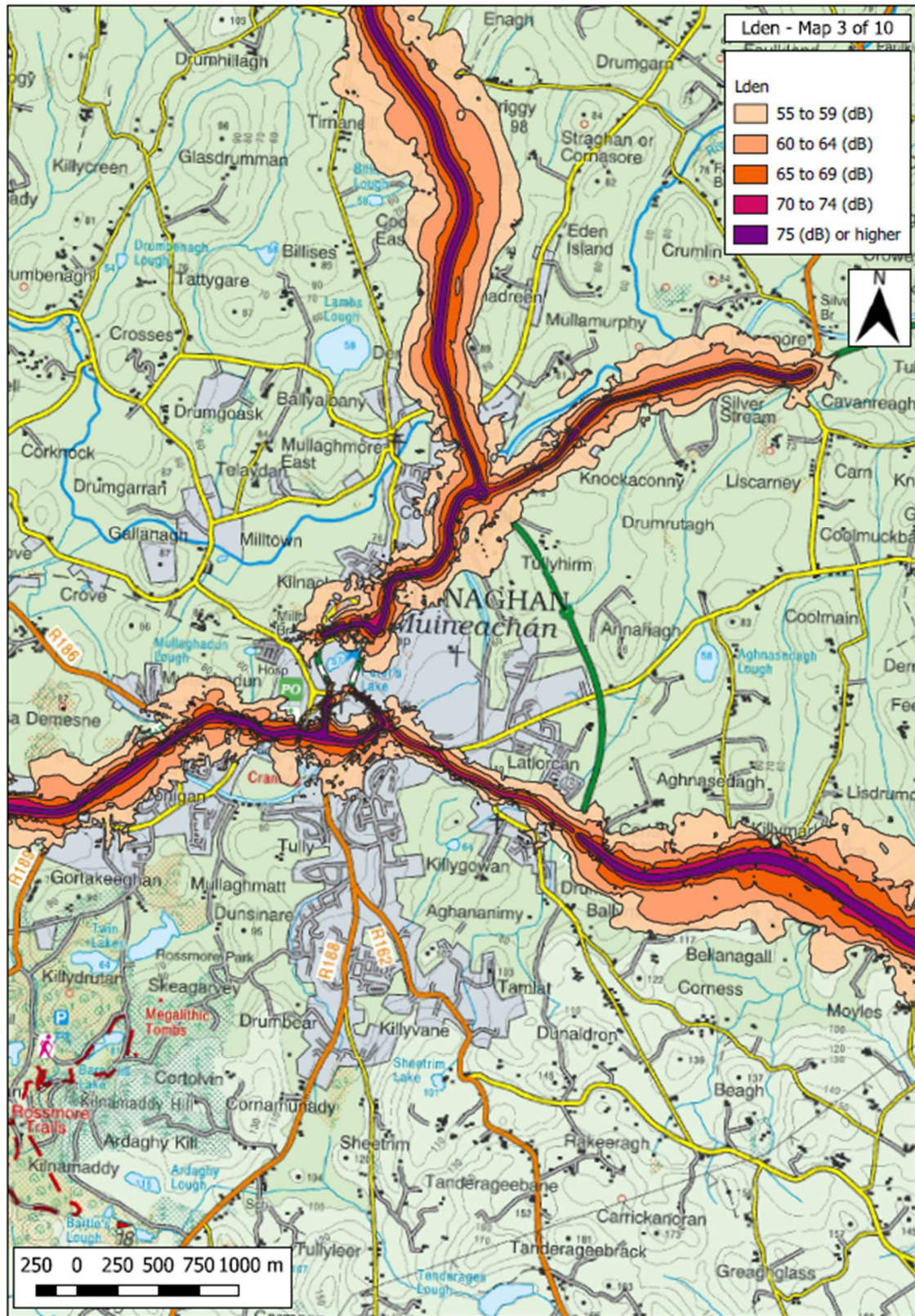




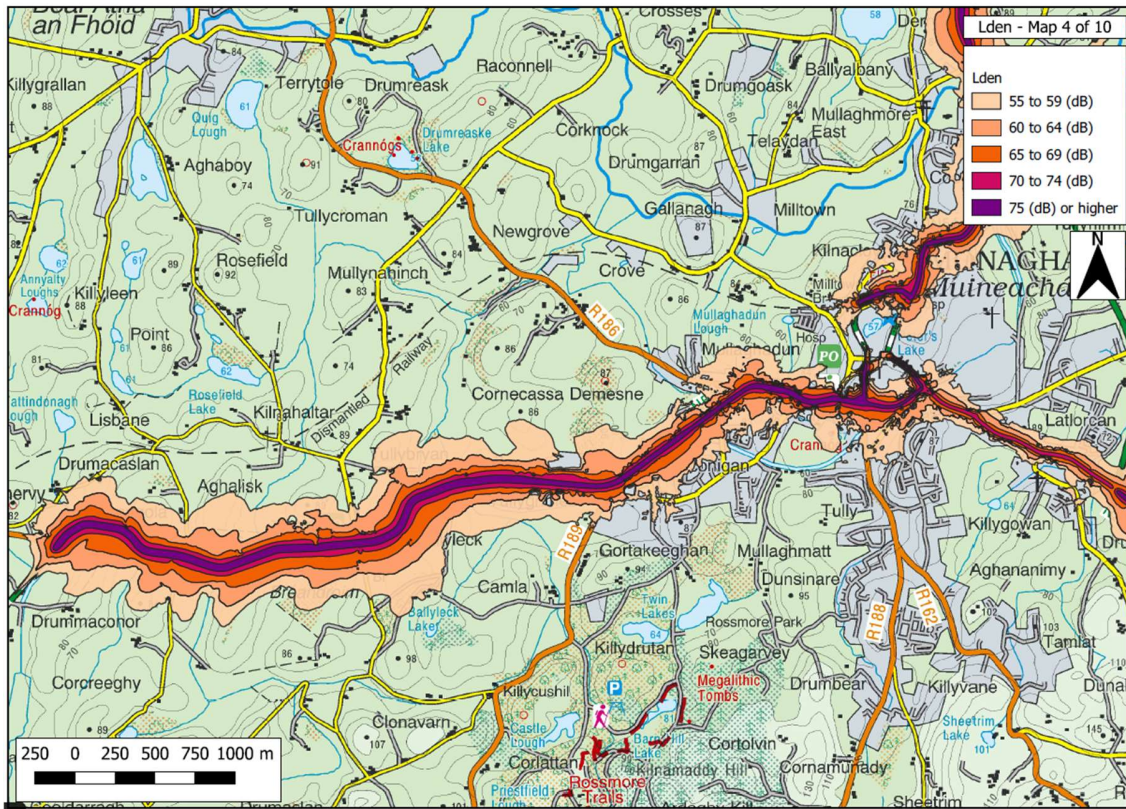




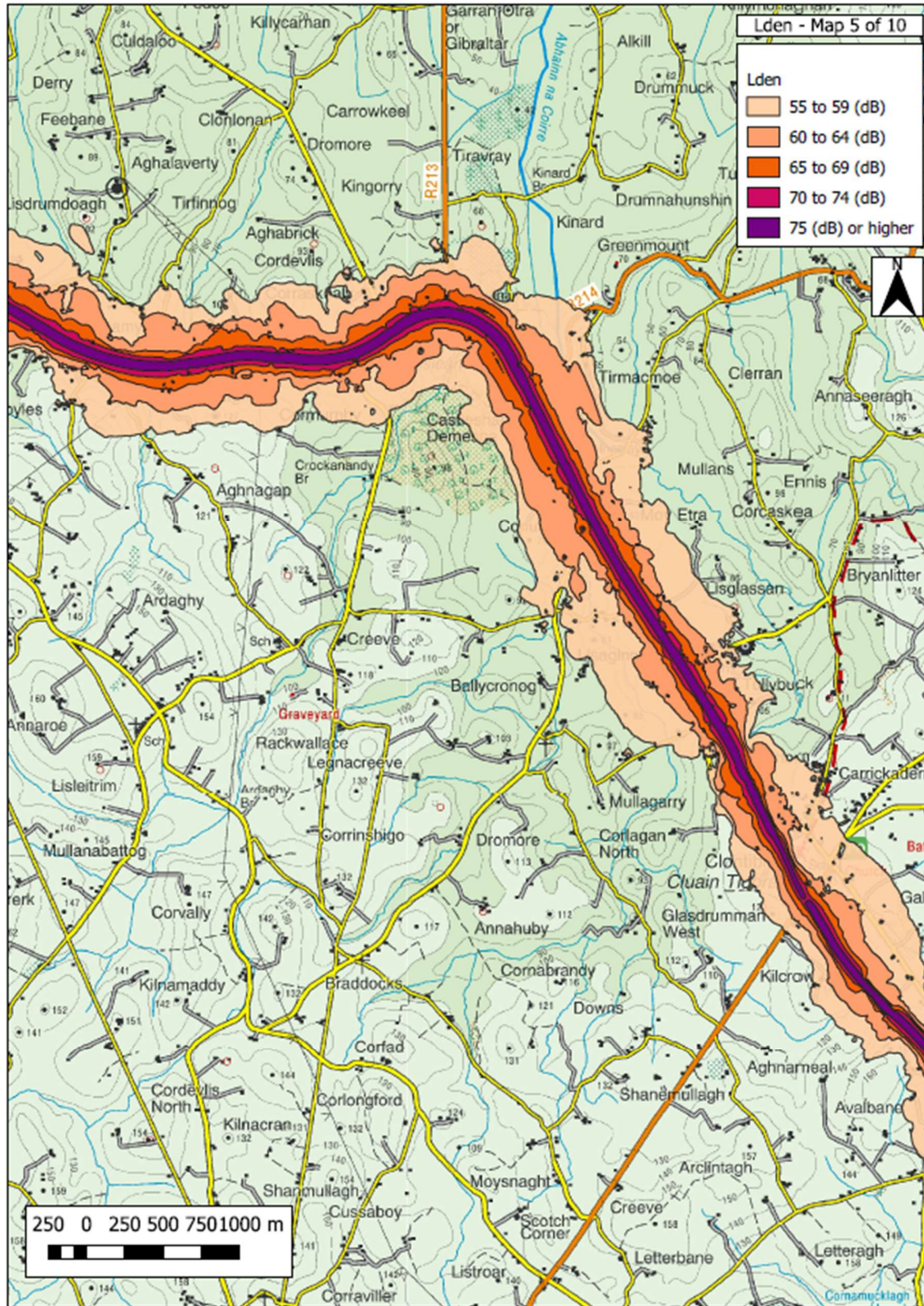




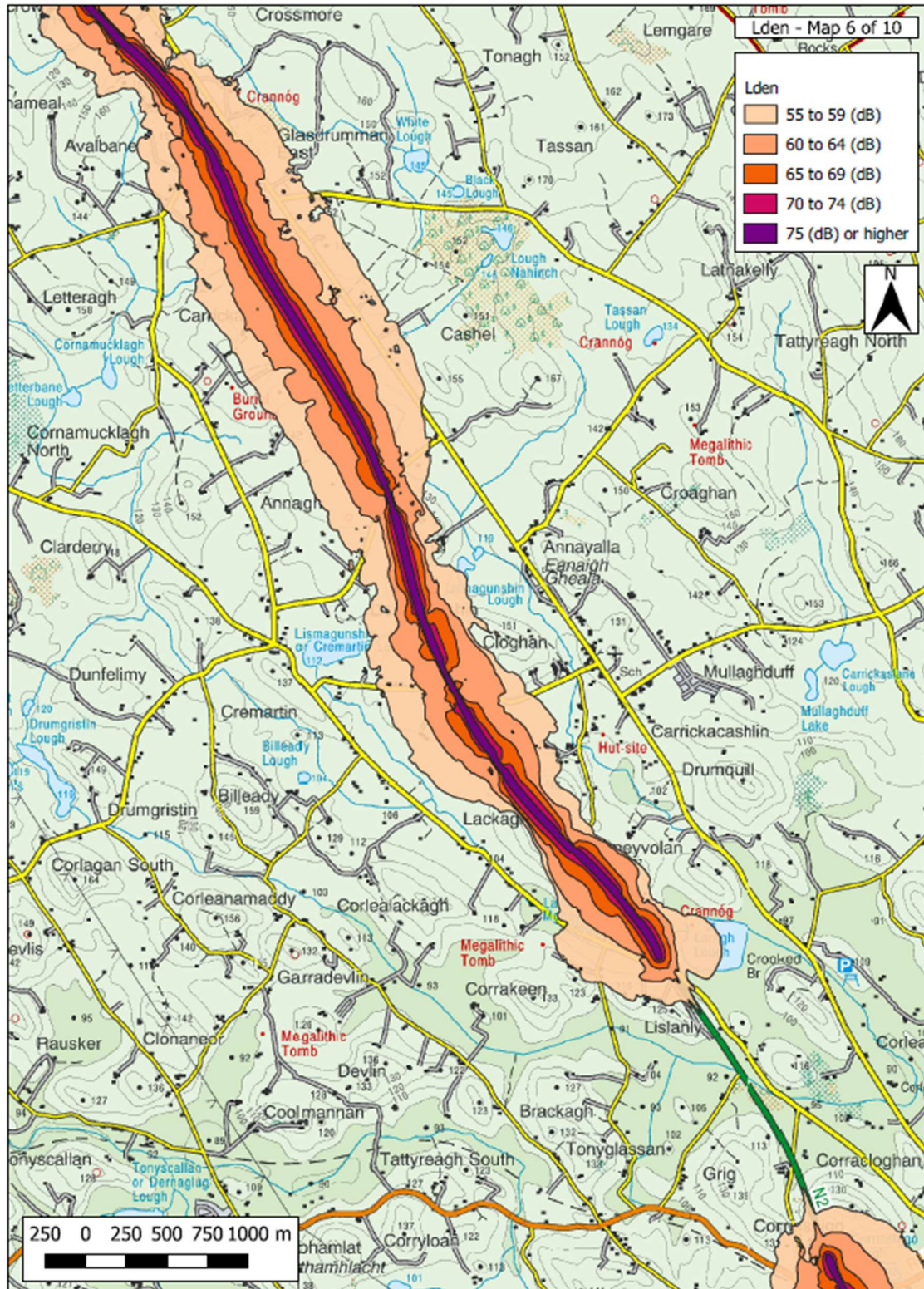




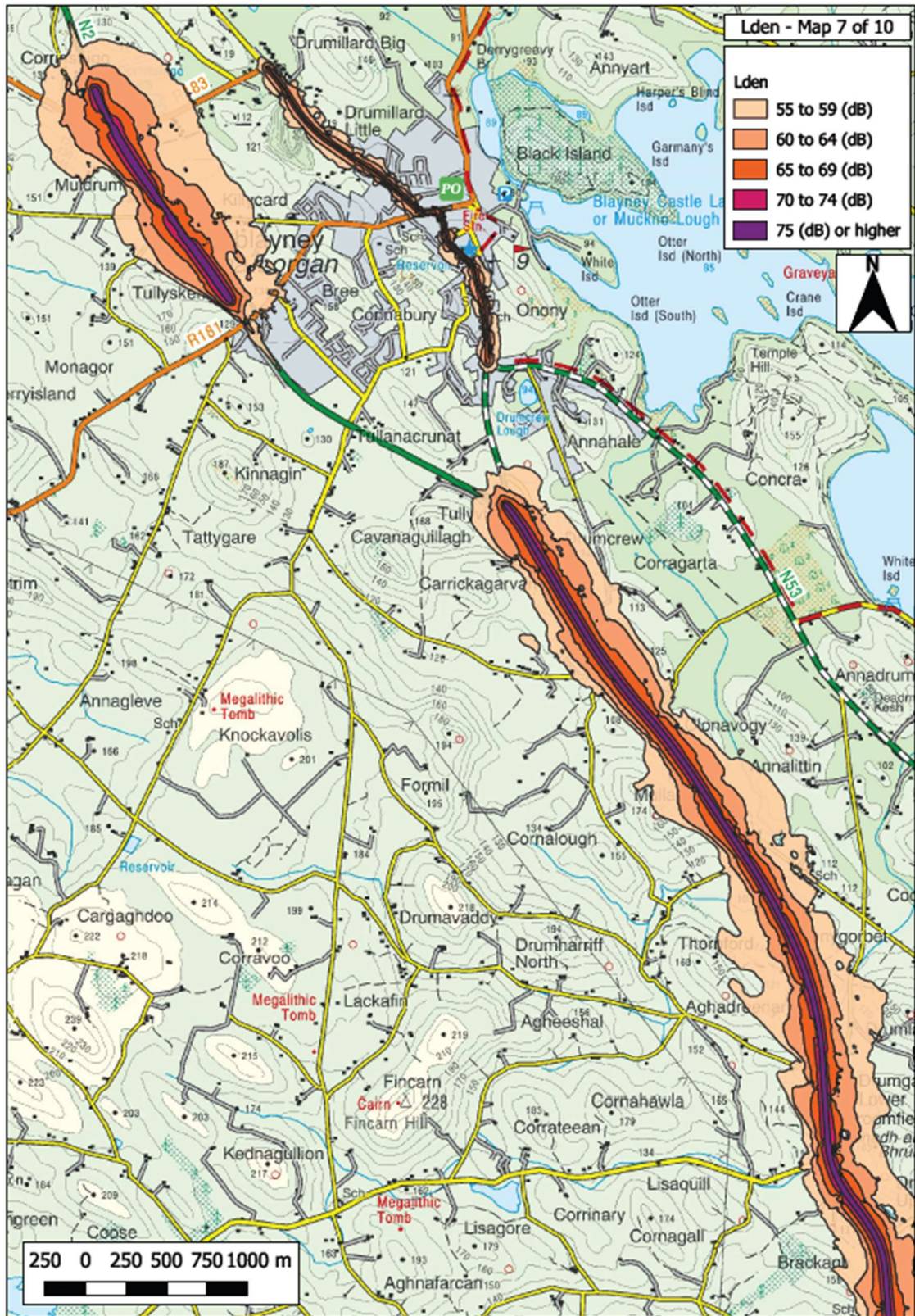




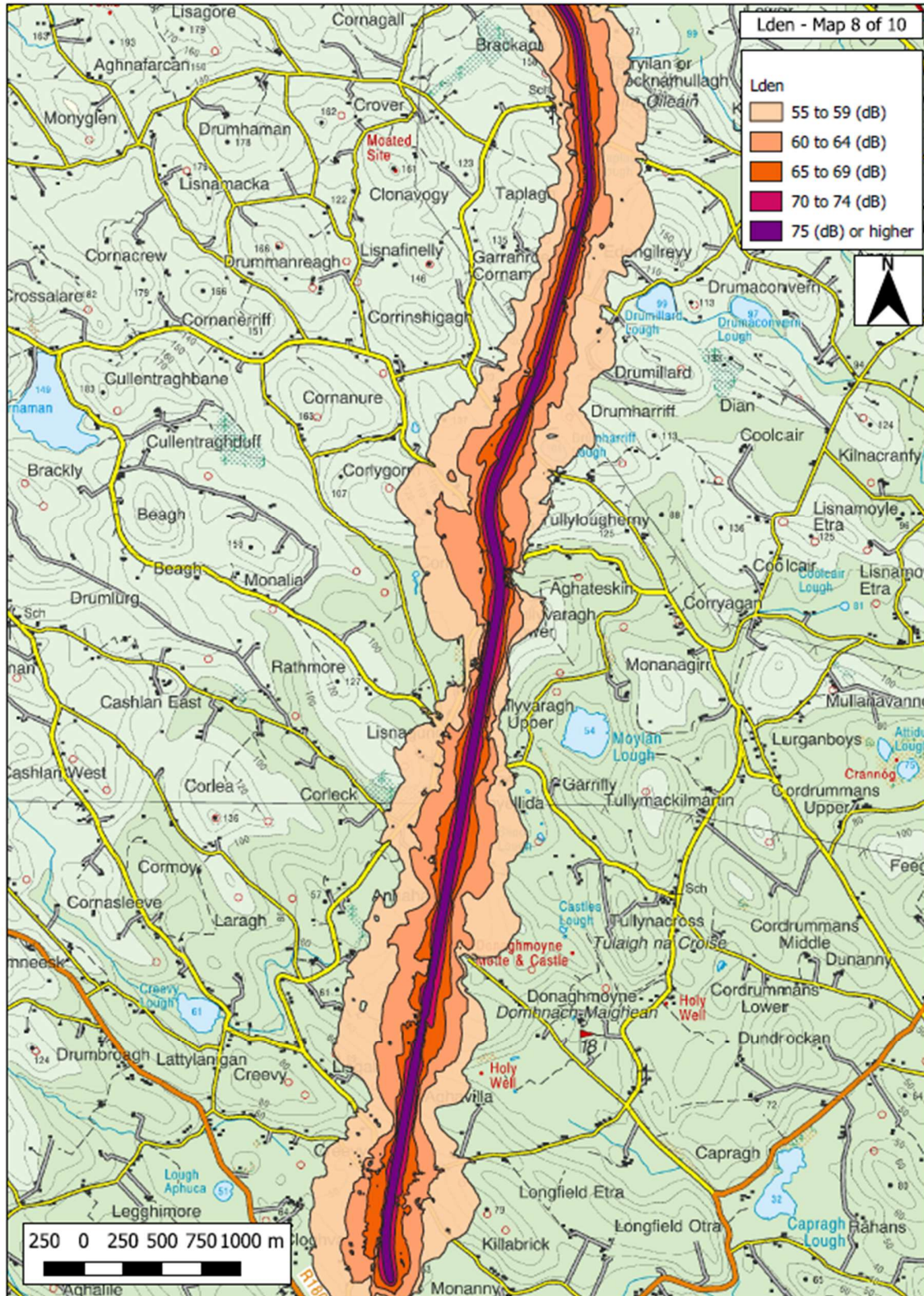




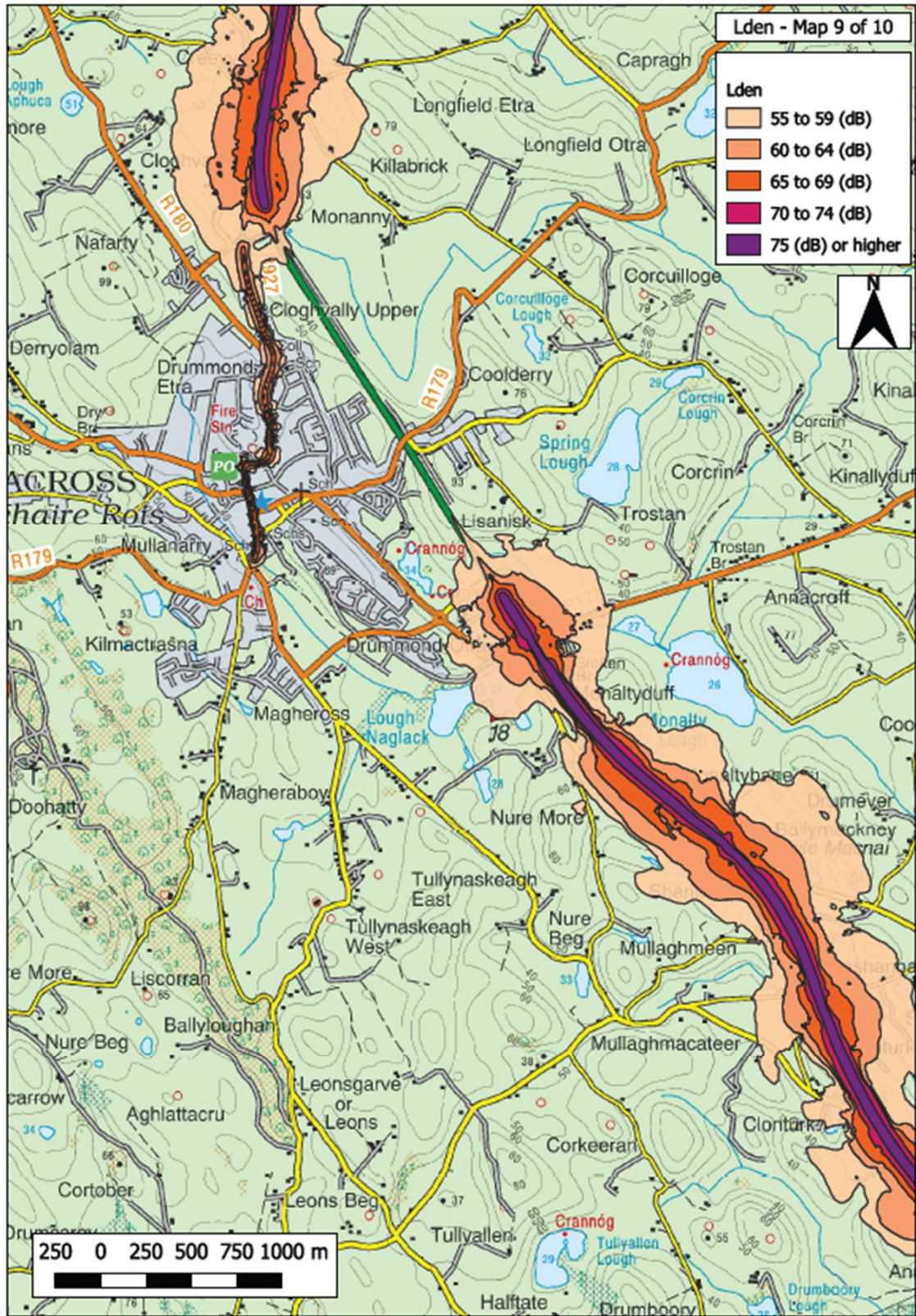




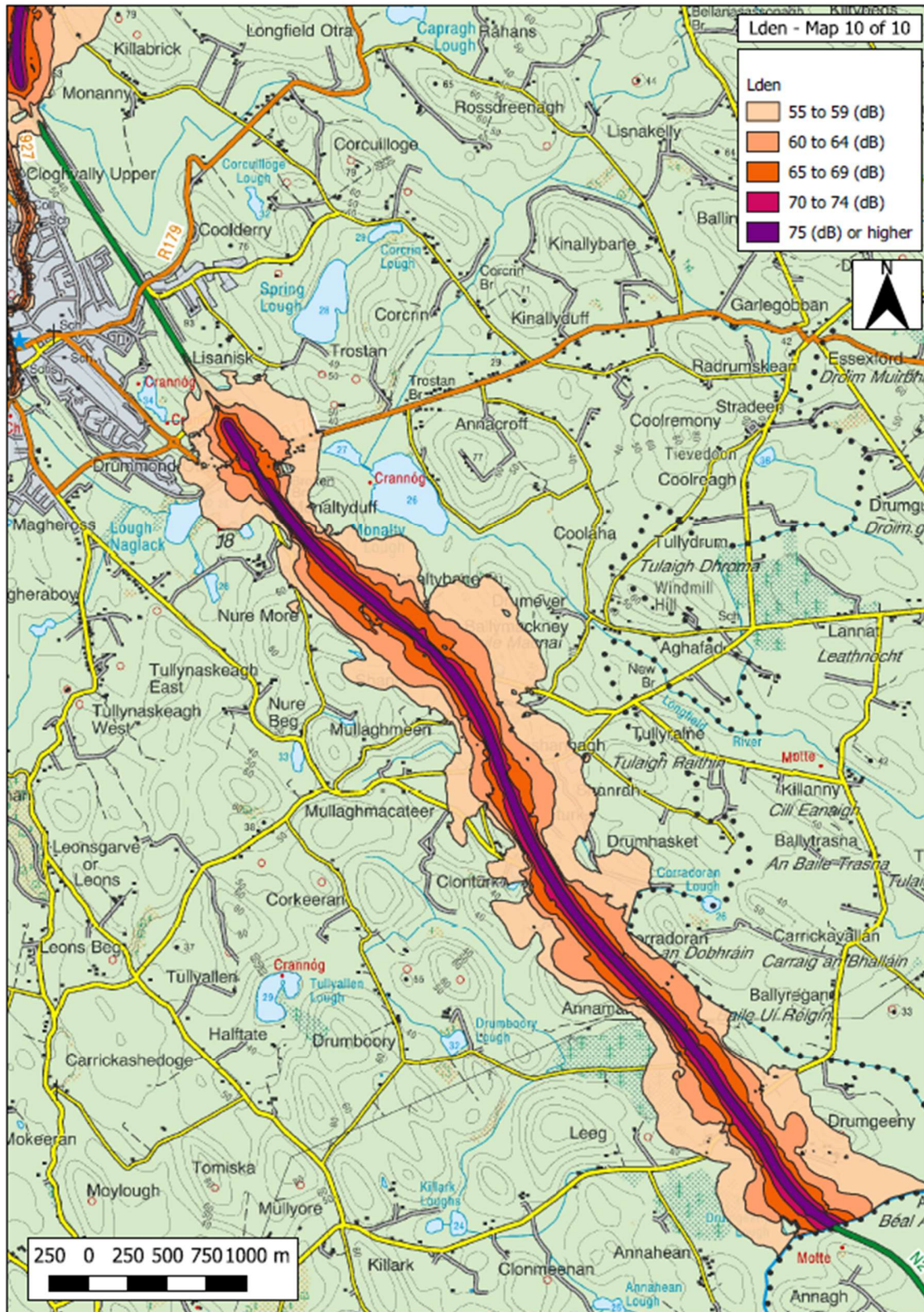




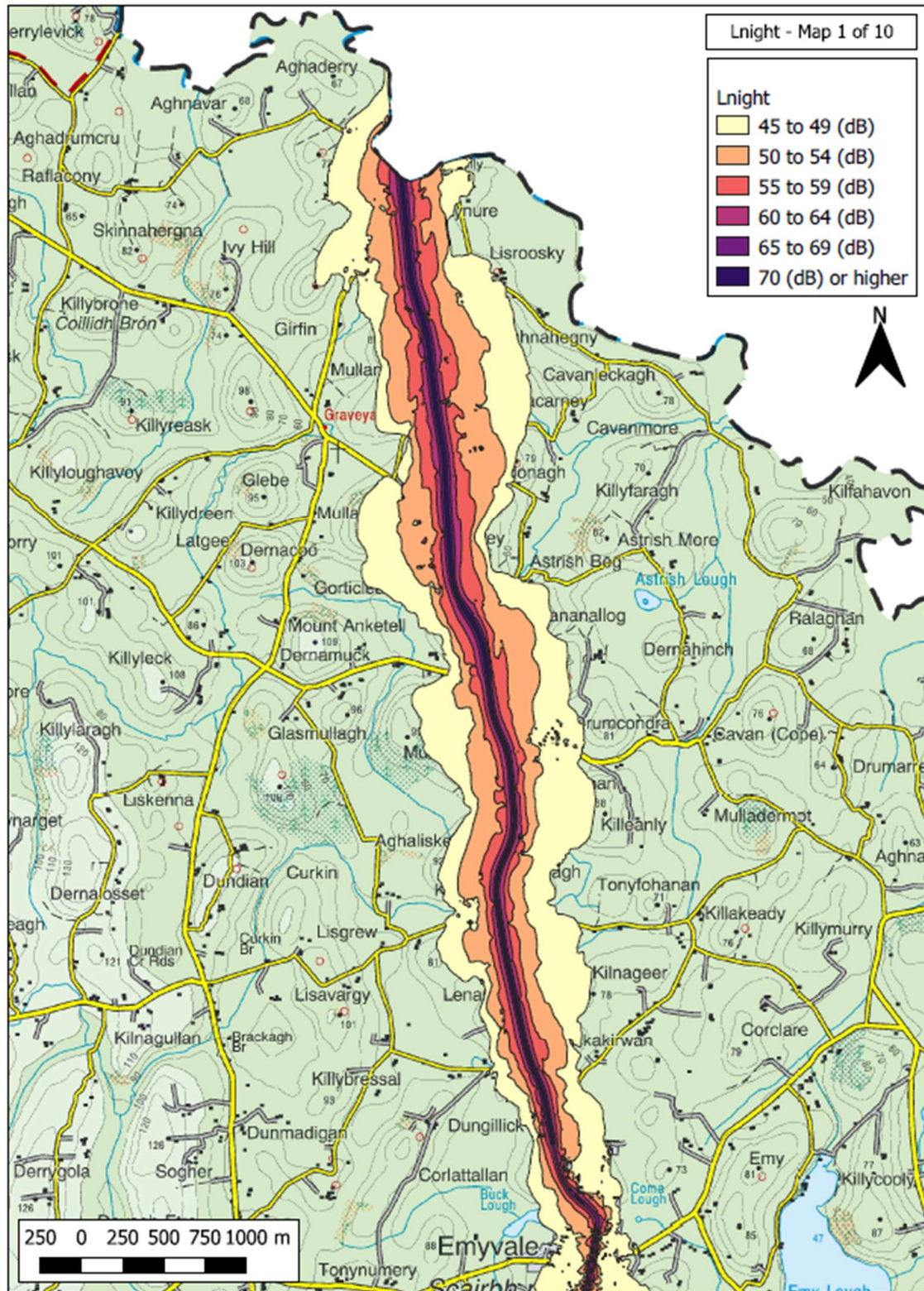




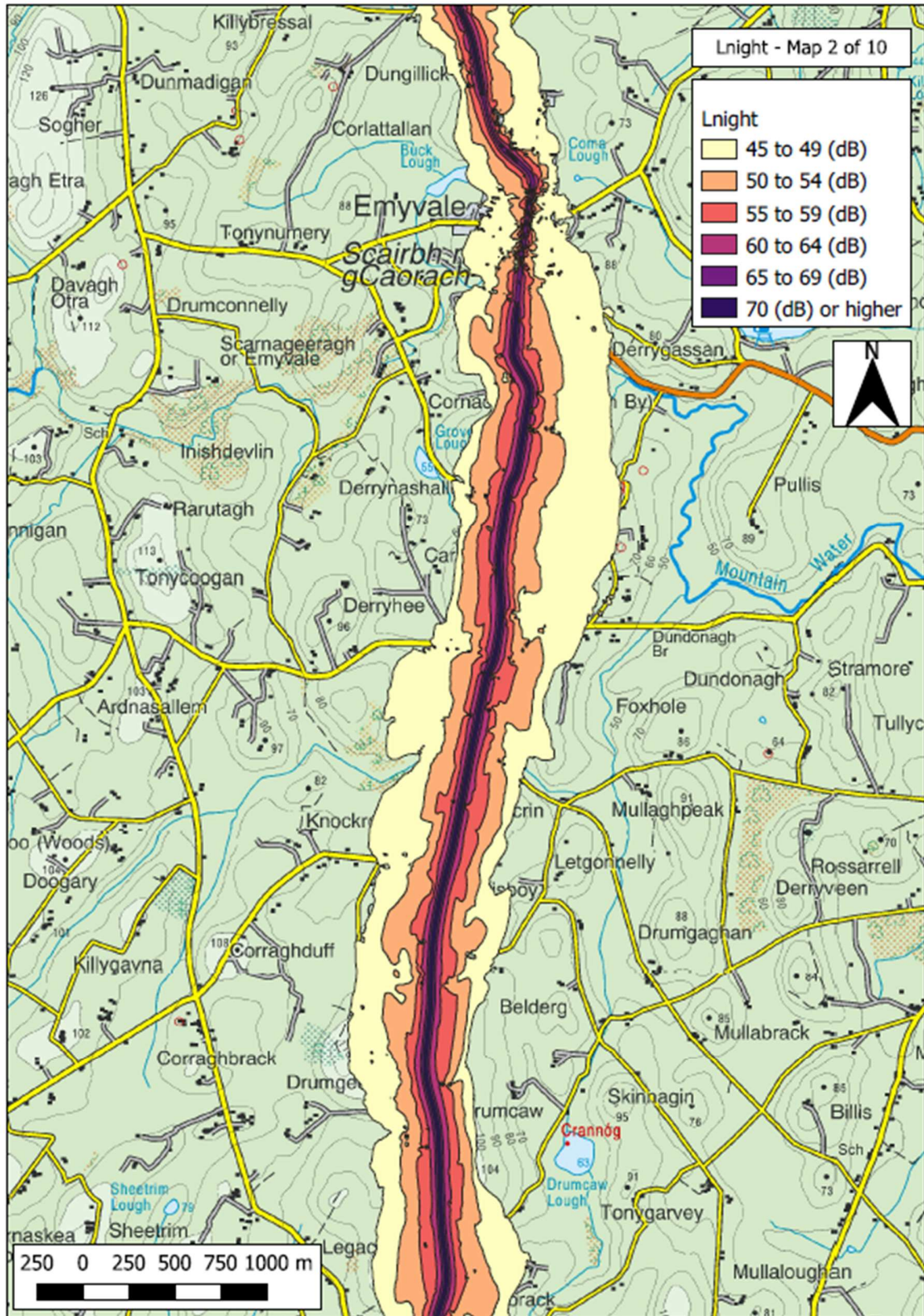




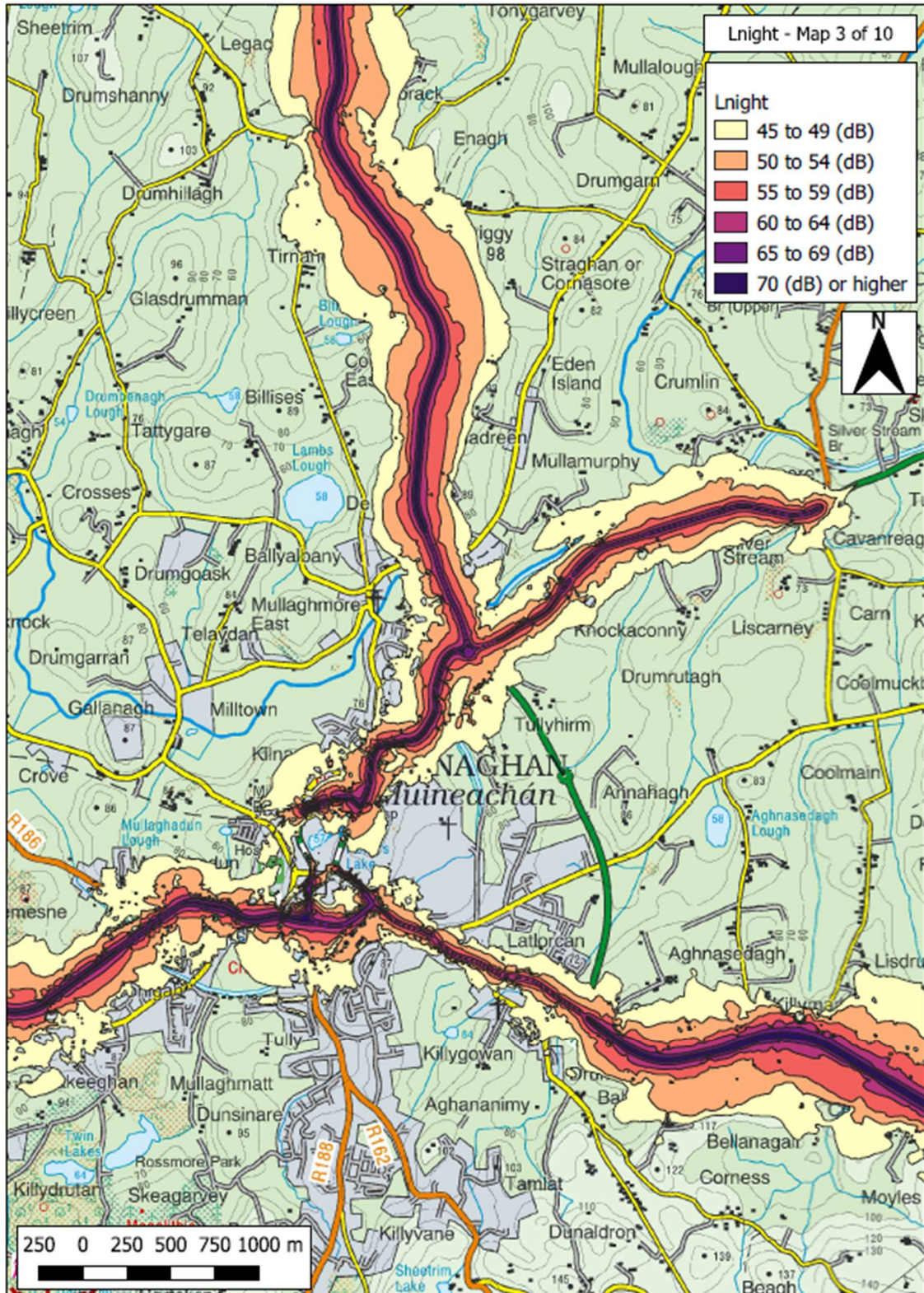




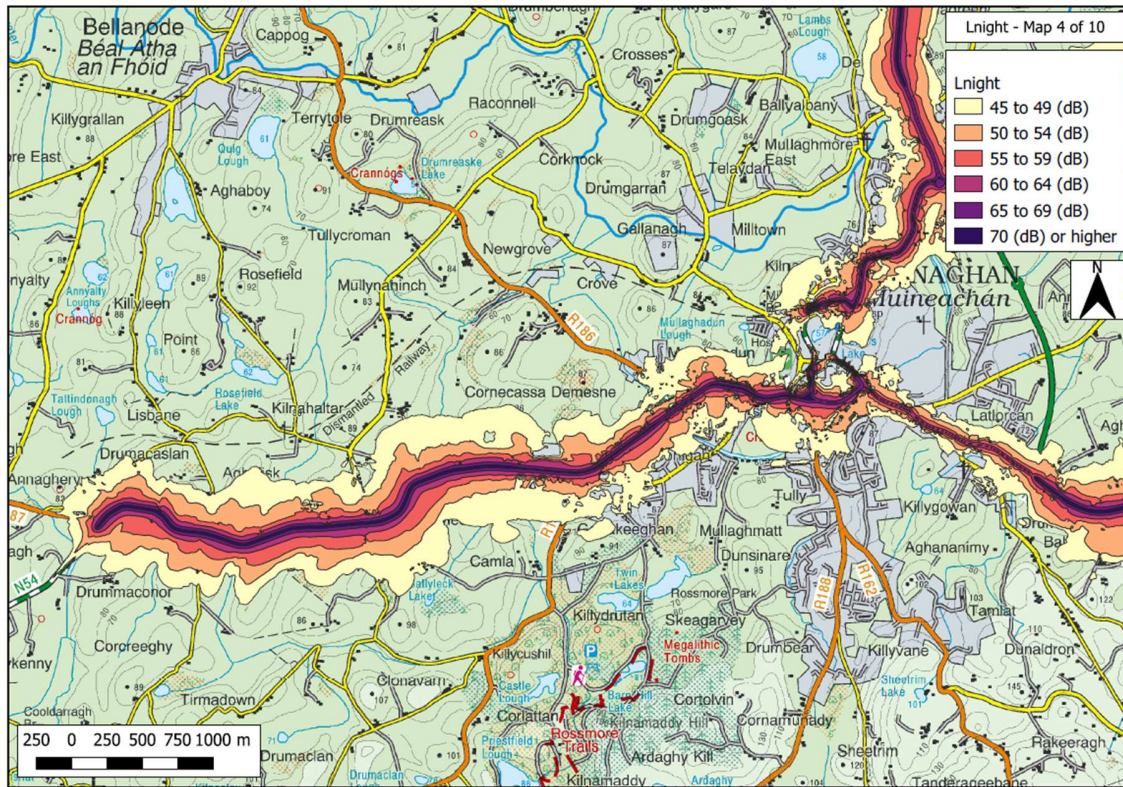




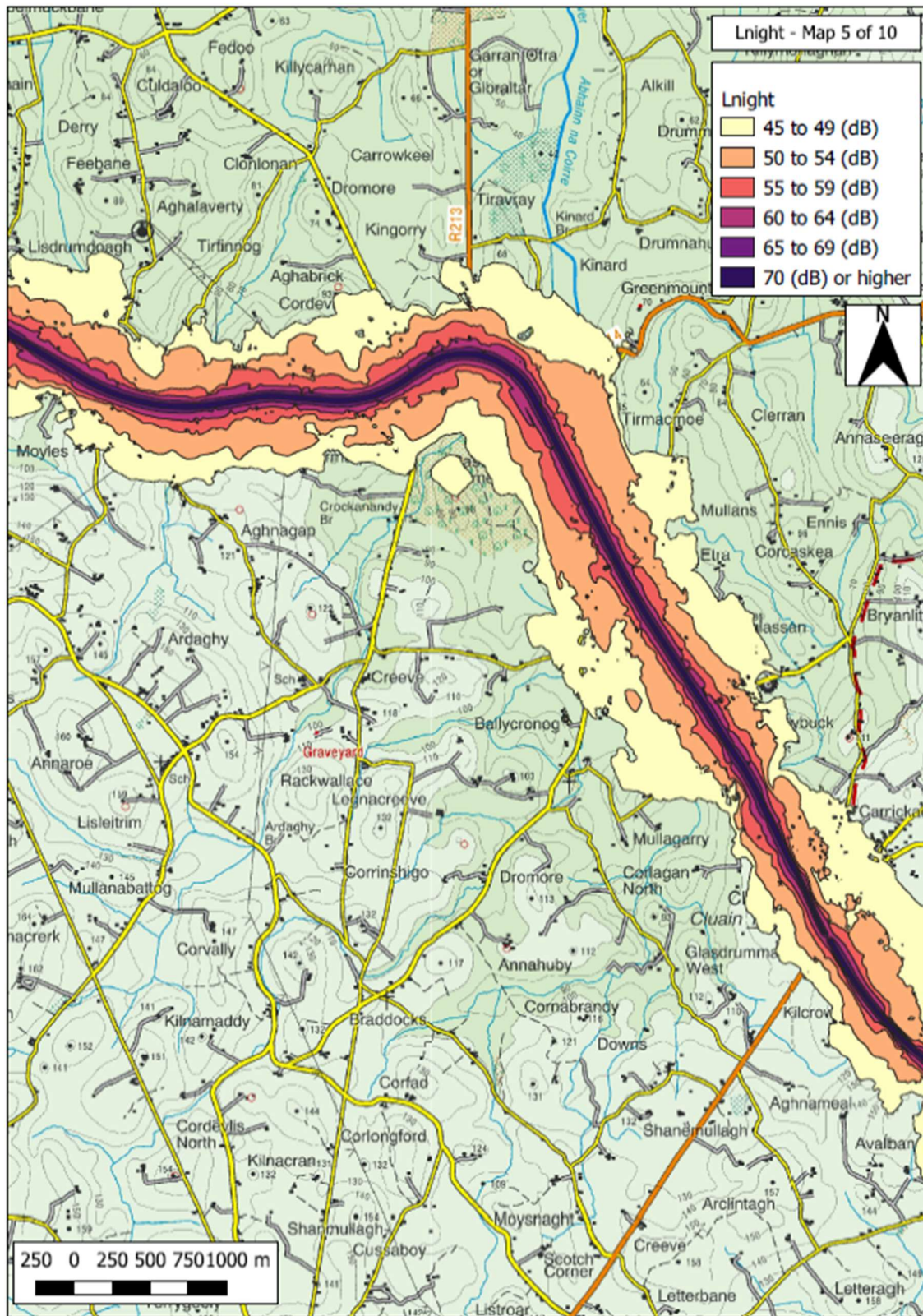




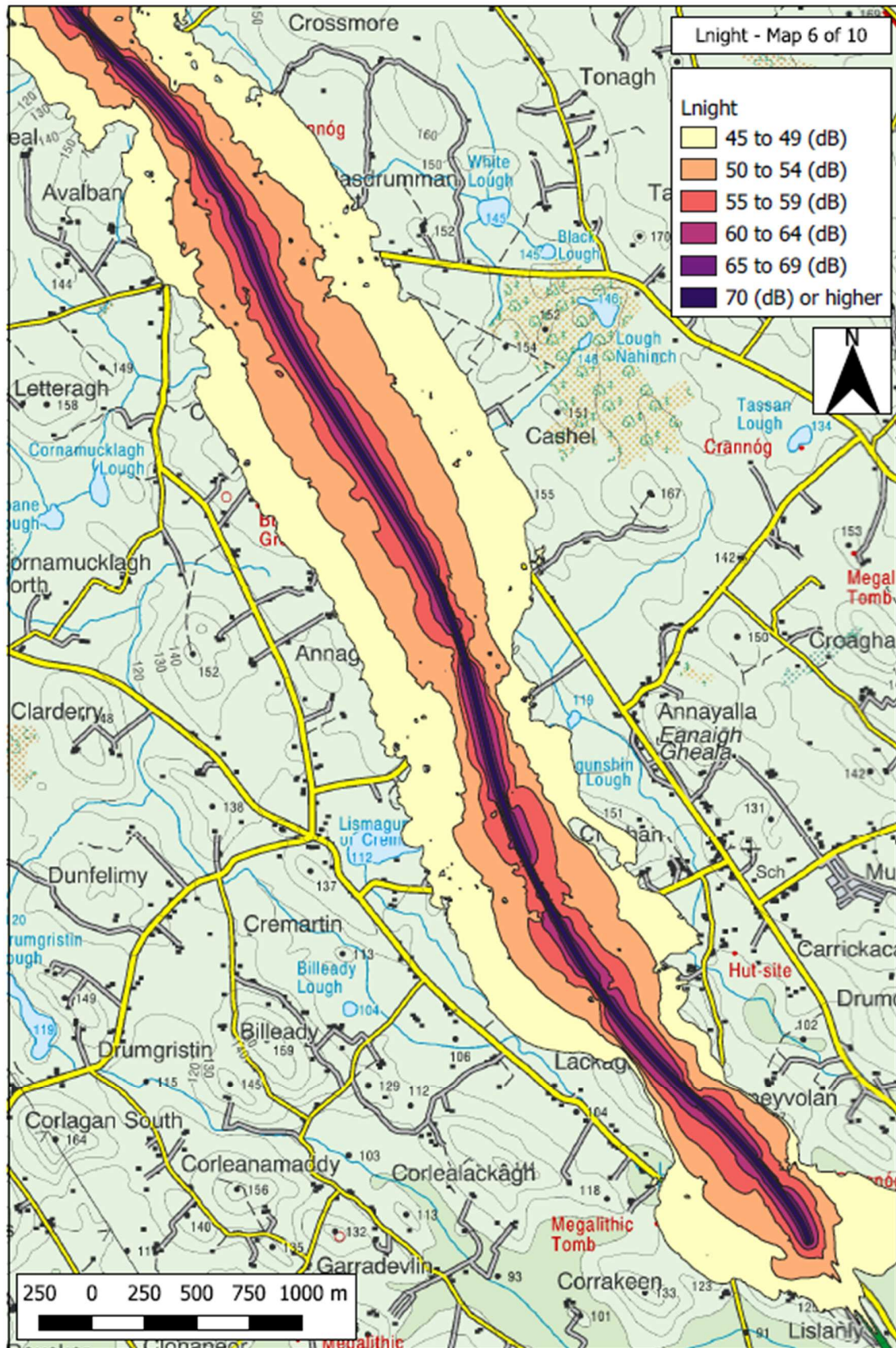




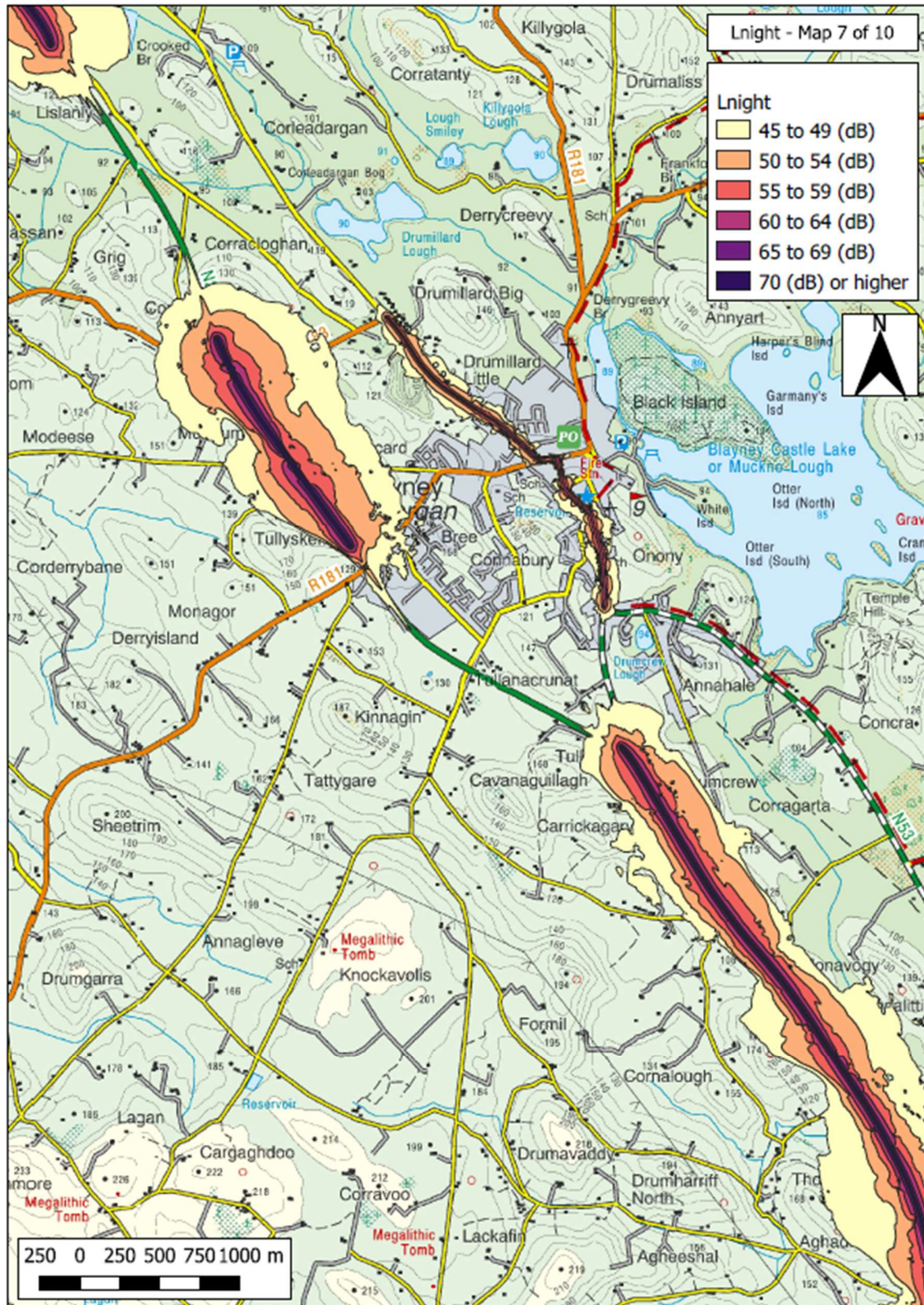




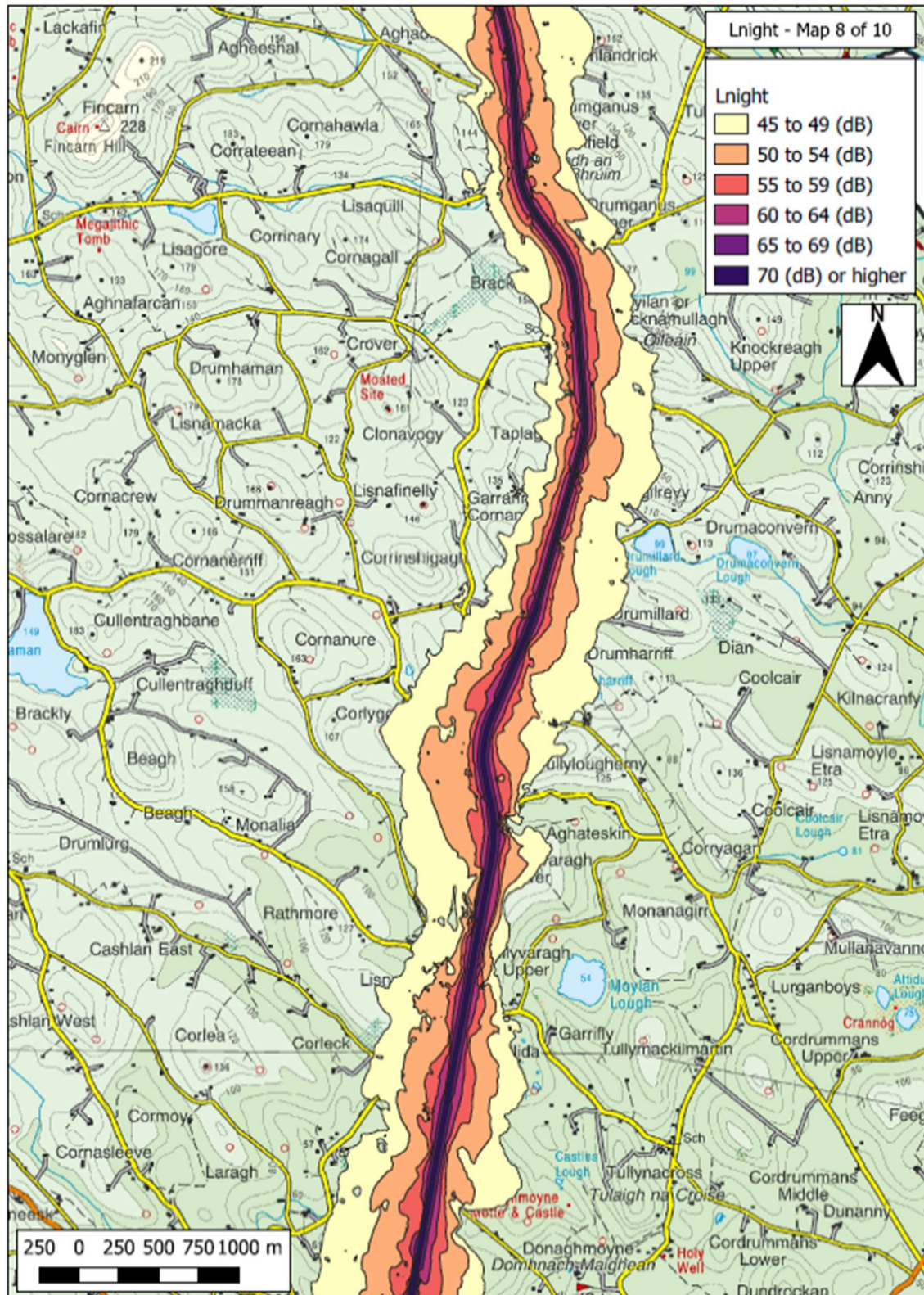




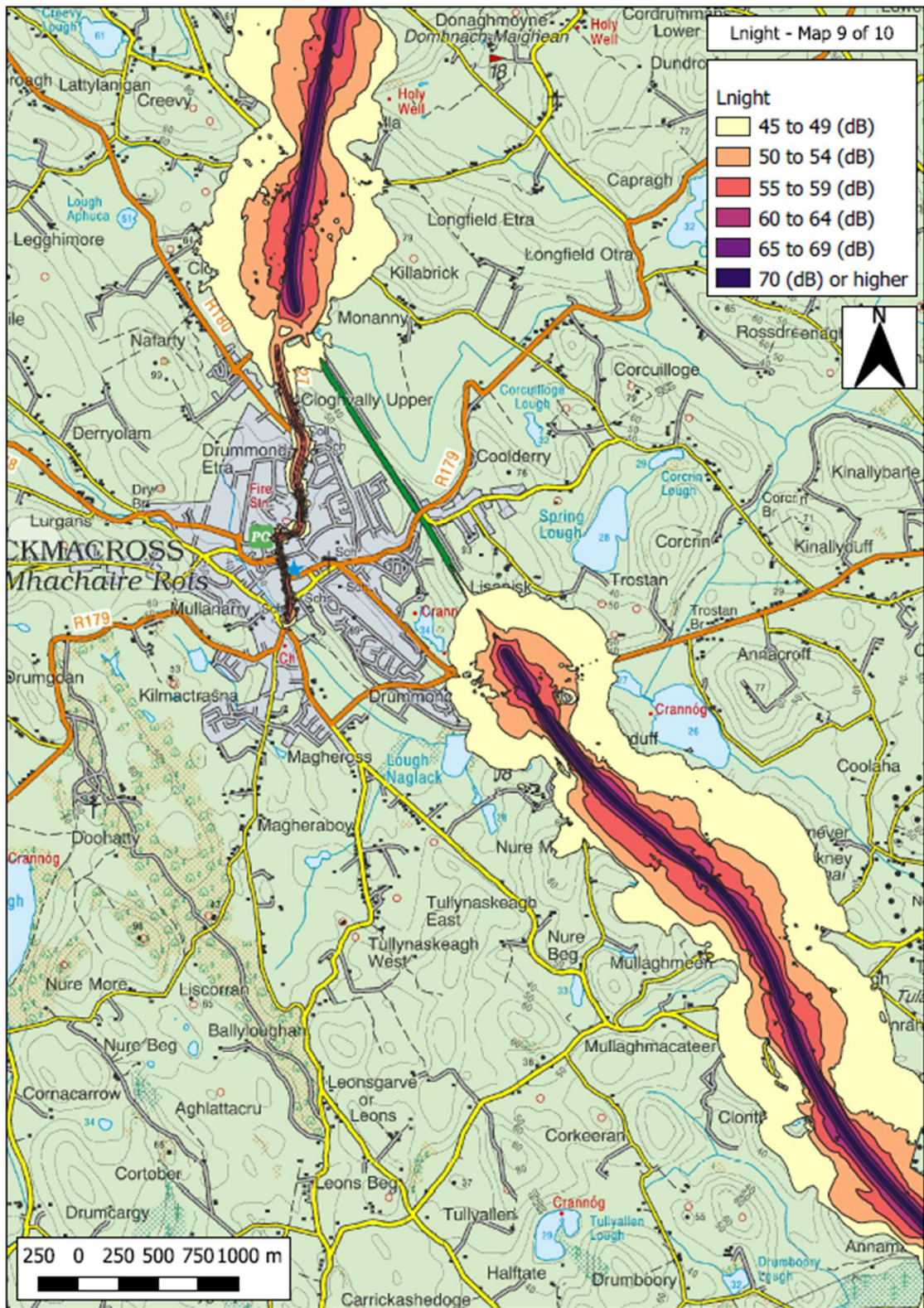




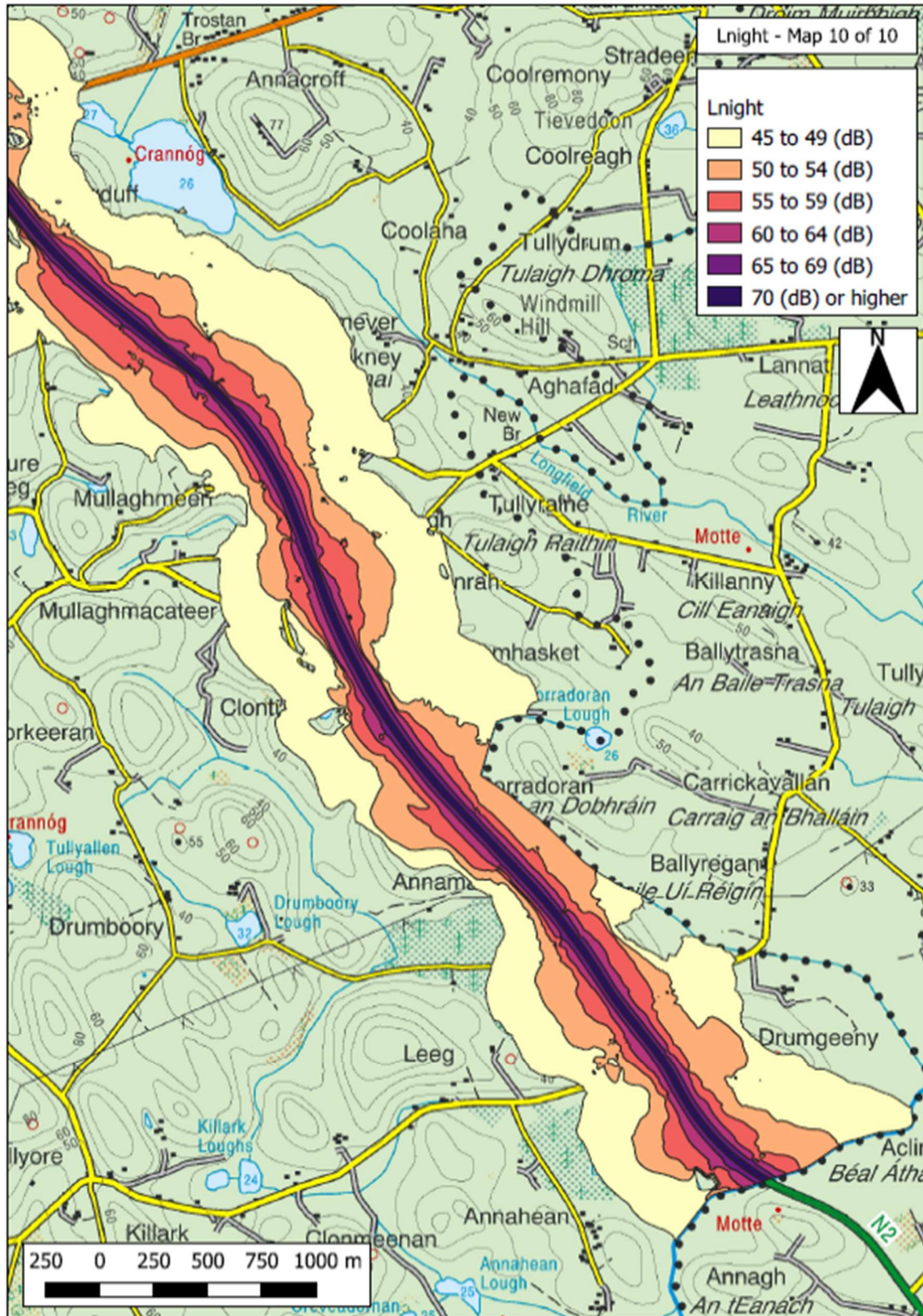




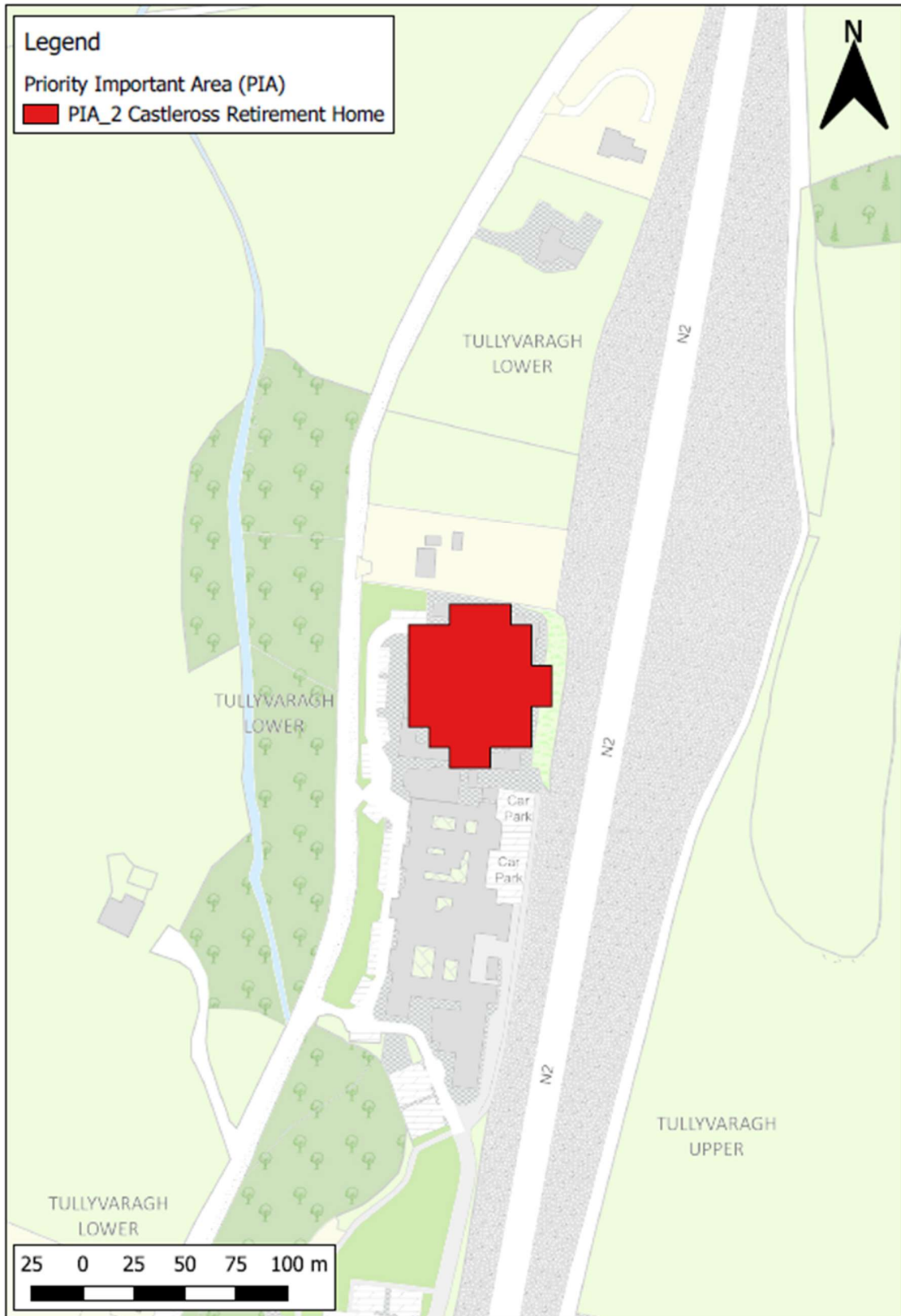








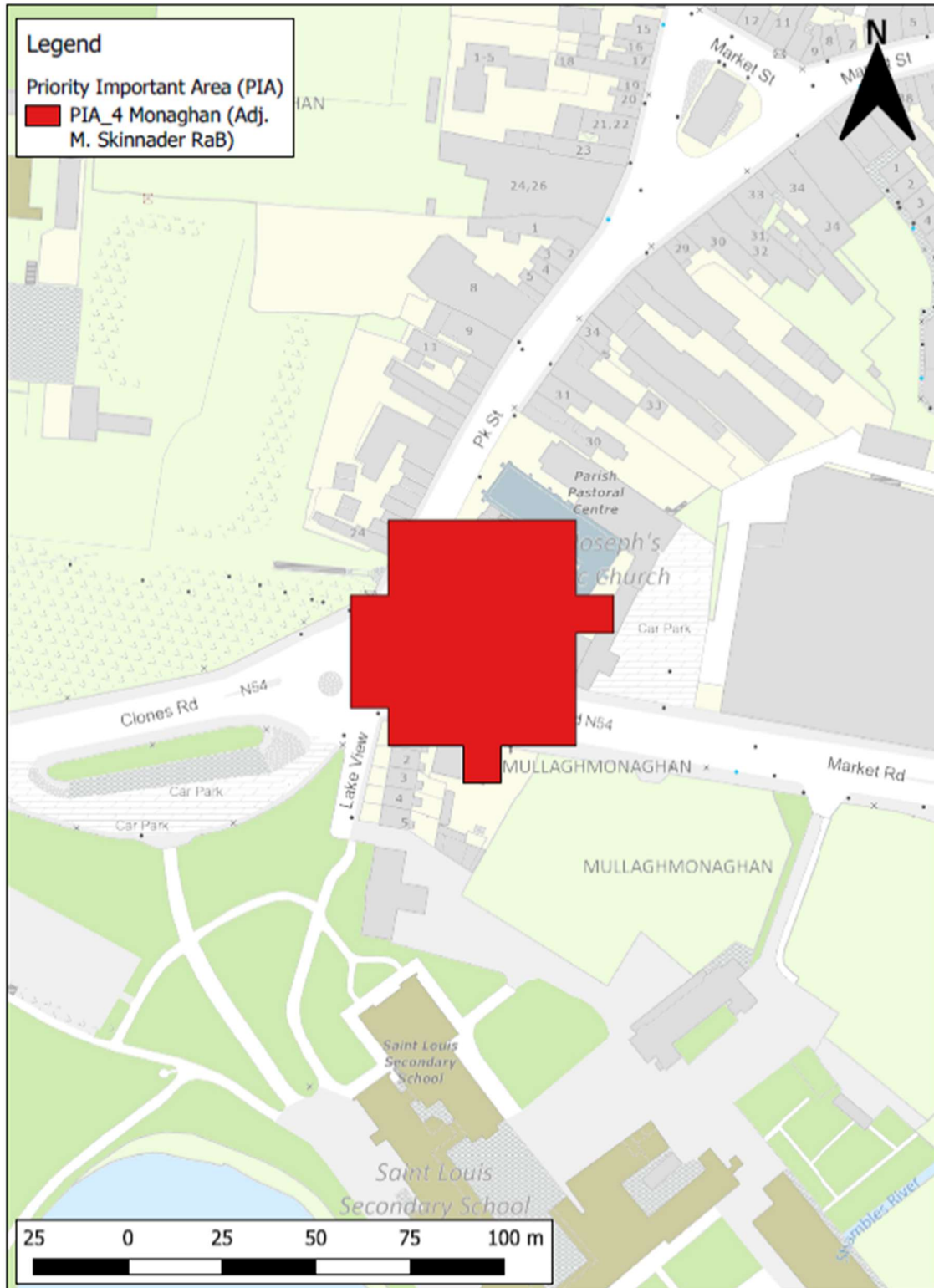


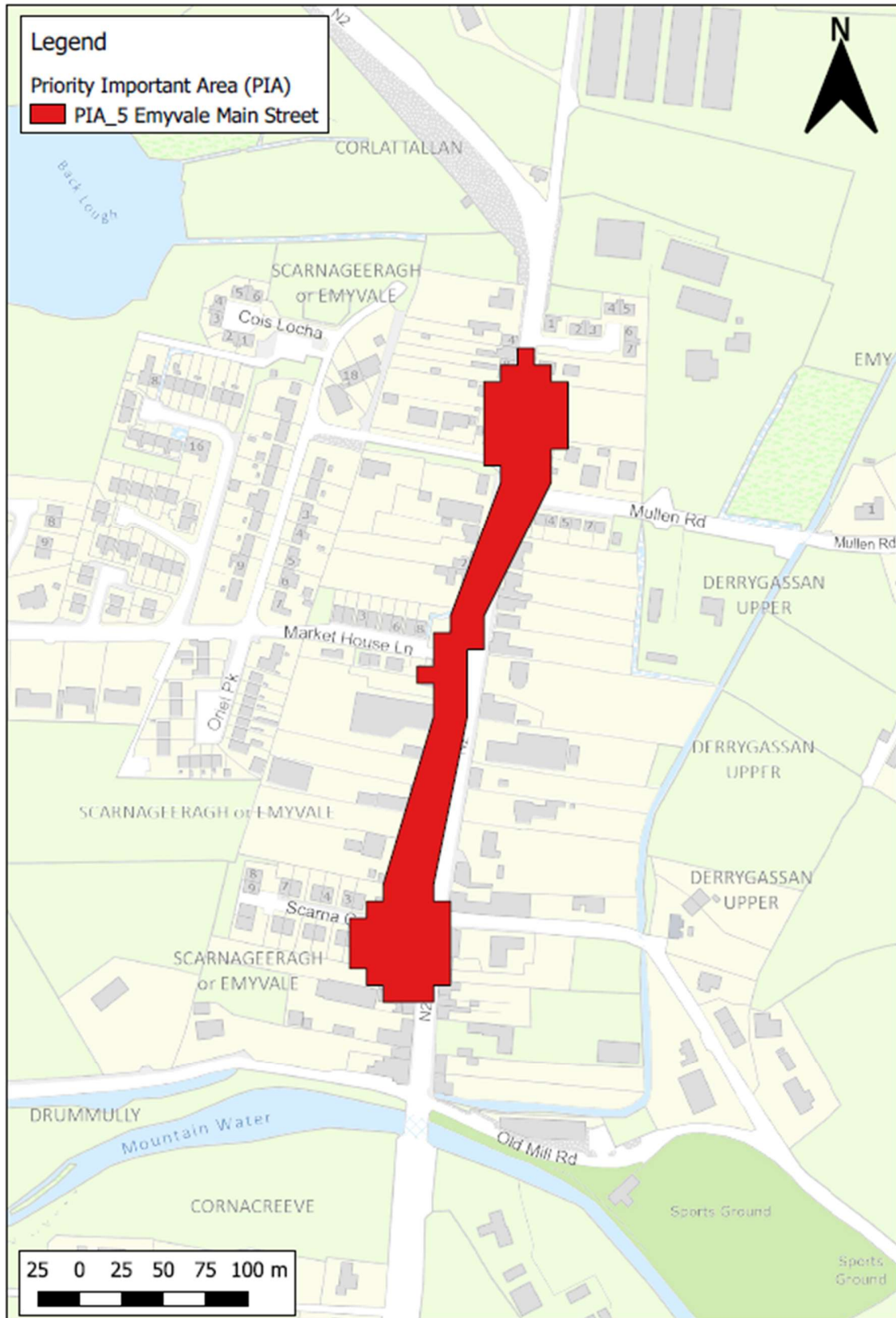












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## Appendix D: Public Consultation

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