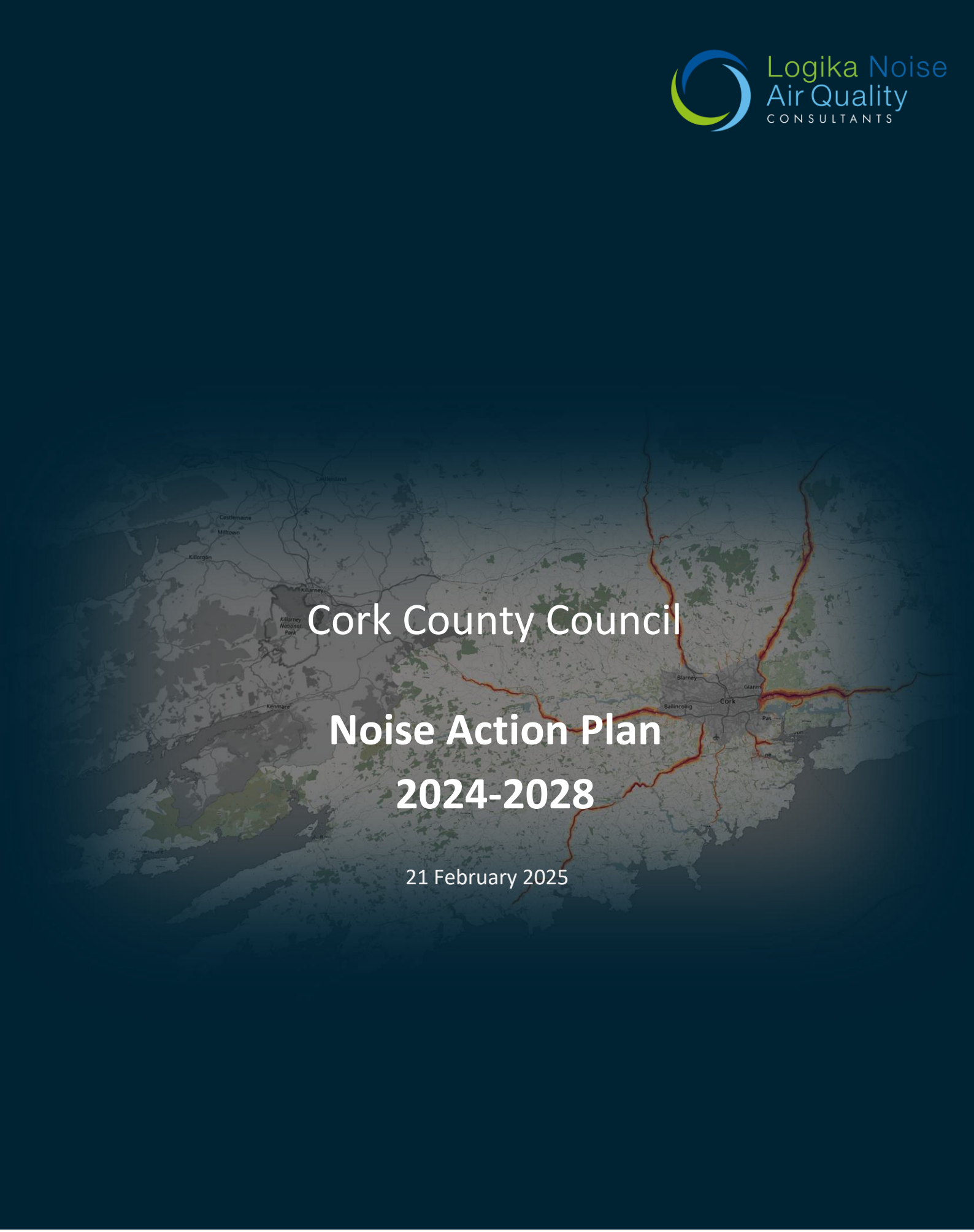
Logika Noise Air Quality CONSULTANTS



Cork County Council

Noise Action Plan 2024-2028

21 February 2025

Comhairle Contae Chorcaí
Cork County Council

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Executive Summary

The Environmental Noise Directive ('END') (2002/49/EC) aims to establish a European-wide system for identifying sources of environmental noise, informing the public about relevant noise data, and taking the necessary steps to avoid, prevent or reduce noise exposure.

The END was transposed into Irish Law by the Environmental Noise Regulations 2006 (S.I. 140/2006) (the 'Regulations'). The Regulations were revised by the European Communities (Environmental Noise) Regulations 2018 (S.I. 549/2018) and amended through the European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. 663/2021).

Under the Regulations, the 31 Local Authorities are designated as Action Planning Authorities responsible for making and approving Noise Action Plans in consultation with the Environmental Protection Agency (the 'Agency'), and the Noise-Mapping Bodies[1]. Local Authorities within the Agglomerations of Cork, Dublin and Limerick, are required to combine activities within their administrative boundaries, in order to make and approve a Noise Action Plan for each Agglomeration.

The Agglomeration of Cork includes the entirety of the administrative boundary of Cork City Council, and part of the administrative boundary of Cork County Council, and has regards to: all railways; all roads, all airports; and major industrial facilities.

This Noise Action Plan[2] is for the administrative area of Cork County Council which falls outside Cork Agglomeration[3] and takes into account major roads.

While this Noise Action Plan is a separate document from the Noise Action Plan for the Agglomeration of Cork, they have been developed collaboratively and complement one another.

This Noise Action Plan has been prepared in accordance with the Regulations and is aimed at strategic long-term management of environmental noise from transport systems, and is based on the results of the strategic noise maps which informed assessments of population exposure and harmful effects of noise.

The results have been used to identify areas within Cork County to be subject to noise management activities during the implementation of the Noise Action Plan should funding and resources be available. These areas are referred to as Priority Important Areas.

The Cork County Council will, subject to relevant collaboration with the Noise Mapping Bodies, resources and funding, assess these Priority Important Areas and confirm the relevant noise

[1] Noise Mapping Bodies: Local Authorities; Transport Infrastructure Ireland (TII); Irish Rail; and Dublin Airport Authority

[2] The Noise Action Plan is draft until completion of a formal public consultation exercise

[3] Hereafter referred to as 'Cork County' and meaning the administrative area of Cork County Council outside the Agglomeration of Cork.

management measures for each Priority Important Area, including processing of cost-benefit analysis and health benefits.

Additionally, the Noise Action Plan considers areas potentially free from long-term noise effects caused by human activity, with the aspiration of preserving their environmental noise quality. These are referred to as Candidate Quiet Areas.

This Noise Action Plan includes Strategic Environmental Assessment (SEA) screening checks following the processes outlined in the Environmental Protection Agency (EPA) report *Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland (2001-DS-EEP-2/5)' – Synthesis Report* (Appendix B; SEA Checklist). The SEA screening concluded that no SEA is required.

The Noise Action Plan includes an assessment to determine if it is required to be subject to an 'Appropriate Assessment' under the Habitats Directive. The screening assessment concluded that the implementation of the Noise Action Plan in isolation or in combination with any other Action Plans is not directly related to the conservation management of any Natura 2000 site in the assessment area. It was determined that there is no likelihood of a significant impact on a Natura 2000 site. Consequently, there is no need to conduct a 'Stage 2 AA' for the purposes outlined in Article 6(3) of the Habitat Regulations.

This Noise Action Plan is supported by a four-year programme for implementation (2024-2028), with progress reported to the Agency on an annual basis. It is underpinned by a set of overarching noise policy principles outlined in the **Noise Policy Statement**. These noise policy principles are supported by a series of **Responsible Aims** for managing noise issues within Cork County, which are consistent with and complementary to those adopted in the Noise Action Plan for the Agglomeration of Cork.

NOISE POLICY STATEMENT

Cork County Council will adopt a strategic approach to managing environmental noise from major roads within its functional area, and will aim to:

- **Prevention** – manage the risk of additional members of the community being exposed to undesirable noise levels where it is likely to have significant adverse impact on health and quality of life.
- **Protection** - protect areas which are desirably quiet, or which offer a sense of tranquillity through a process of identification and validation followed by formal designation of 'Quiet Areas in open country'.
- **Mitigation** – identify and prioritise appropriate mitigation measures to reduce noise levels where they are potentially harmful.

RESPONSIBLE AIMS

Cork County Council commit to the following Responsible Aims during current and future noise action planning:

RA_1 - Policy and Guidance Development – Encourage the integration of noise considerations into the ongoing process of policy and guidance development, and actively promote existing policies and guidance related to noise.

RA_2 - Working Groups – Participate in technical working groups pertinent to the implementation of the Environmental Noise Directive and with the assistance of the Environmental Protection Agency, a Round 4 Noise Action Plan Implementation Working Group shall be established.

RA_3 - Noise Mitigation - In collaboration and consultation with relevant Noise Mapping Bodies, noise management interventions shall be applied on a priority basis during existing maintenance and improvement programs, where appropriate. This application will be based on a relevant evaluation of whole-life costs and benefits.

RA_4 - Protection - Assess and, where appropriate, propose Candidate Quiet Areas to the Environmental Protection Agency for designation as Quiet Areas in open country by the Minister.

RA_5 - Prevention – Evaluate and condition planning proposals for noise sensitive development near major noise sources.

RA_6 - Community Engagement – Commit to proactive and inclusive engagement with communities and collaboratively address noise issues for the improvement of our shared living environment.

RA_7 – Manage Noise Complaints - Review and respond to all environmental noise complaints in accordance with their Customer Charter.

RA_8 - Regulatory Engagement – Report the progress on the implementation of Noise Action Plans, including the investigation and implementation of noise management measures in Priority Important Areas, and the assessment of Candidate Quiet Areas in open country for preservation of environmental noise quality, to the Environmental Protection Agency on an annual basis.

Contents

1 Introduction

1.1 Purpose of the Noise Action Plan

The Environmental Noise Directive ('END') (2002/49/EC) is a European Union legal instrument vital for protecting public health and the environment by addressing the adverse effects of environmental noise.

The END was transposed into Irish Law by the Environmental Noise Regulations 2006[4] (S.I. 140/2006) (the 'Regulations'). The Regulations were revised by the European Communities (Environmental Noise) Regulations 2018[5] (S.I. 549/2018) and amended through the European Communities (Environmental Noise) (Amendment) Regulations 2021[6] (S.I. 663/2021).

The END does not set any limit values or prescribe noise management measures to fulfil its aims. Through the establishment of noise regulations, the execution of strategic noise maps and implementation of Noise Action Plans, the END strives to raise public awareness, prevent and reduce environmental noise, and preserve environmental noise quality in areas where it is good.

In Ireland, it is recommended that the Noise Action Plans support Policy Objective 65 from the National Planning Framework 2040[7], which states:

"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."

This Noise Action Plan, and its subsequent implementation, is critical to ensuring Cork County Council achieves the aims and objectives of the END, compliance with national policy and to address local environmental noise issues.

1.1.1 Strategic Environmental Assessment (SEA)

Strategic Environmental Assessment (SEA) is a formal and systematic process (including the stages of Screening, Scoping and Environmental Assessment) designed to assess the potential significant environmental impacts of implementing a plan or program before deciding to adopt it.

The requirement for SEA for plans and programs is outlined in European Directive 2001/42/EC ('SEA Directive'). In the context of transport sector plans (which could include a Noise Action Plan), this directive is implemented in Irish law through the European Communities (Environmental Assessment

[4] https://www.irishstatutebook.ie/eli/2006/si/140/made/en/print [Accessed July 2024]
[5] https://www.irishstatutebook.ie/eli/2018/si/549/made/en/print [Accessed July 2024]
[6] https://www.irishstatutebook.ie/eli/2021/si/663/made/en/print [Accessed July 2024]
[7] National Planning Framework 2040: http://www.gov.ie/en/project-ireland-2040/ [Accessed July 2024]

of Certain Plans and Programmes) Regulations, 2004[8] (S. I. 435/2004). This legislation has been amended by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011[9] (S.I. 200/ 2011).

SEA screening has been undertaken with respect to this Noise Action Plan, to firstly consider the applicability of the Regulations, and then consider if this Noise Action Plan would likely give any significant environmental impacts and therefore that further SEA would be required. SEA Screening has concluded that no further SEA work is required.

1.1.2 Appropriate Assessment (AA)

The primary purpose of the Directive 92/43/EEC ('Habitats Directive') is to promote the conservation of natural habitats and wild fauna and flora across the European Union. The Habitats Directive is transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011[10] (S. I. 477/2011) ('Habitats Regulations').

The European Environment Agency has designated a network of protected areas ('Natura 2000' sites) covering Europe's most valuable and threatened species and habitats.

This Noise Action Plan has been assessed to determine if it is required to be subject to an 'Appropriate Assessment' under the Habitats Directive. The screening assessment determined that there is no likelihood of a significant impact on a Natura 2000 site. Consequently, there is no need to conduct a 'Stage 2 AA' for the purposes outlined in Article 6(3) of the Habitat Regulations.

1.1.3 Roles and Responsibilities

The Regulations designate the Environmental Protection Agency (EPA) as the national authority (the 'Agency') responsible for overseeing the implementation of the Regulations and for reporting information relating to strategic noise mapping and Noise Action Planning to the European Commission in accordance with Article 10(2) of the END.

The Agency provides guidance, which for Round 4 is current at the draft stage, ('draft EPA Guidance'), on the required activities to be undertaken during the implementation of the Regulations. These requirements have been fully accounted for in the preparation of this *draft* Noise Action Plan.

Under the Regulations, the 31 Local Authorities in Ireland are designated as Action Planning Authorities responsible for making and approving Noise Action Plans in consultation with the 'Agency, and the Noise-Mapping Bodies (NMBs)[11]. Local Authorities within the Agglomerations of Cork, Dublin and Limerick, are required to combine activities within their administrative boundaries, in order to

[8] S.I. No. 435/2004 - European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (irishstatutebook.ie) [Accessed July 2024]
[9] S.I. No. 200/2011 - European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011. (irishstatutebook.ie) [Accessed July 2024]
[10] https://www.irishstatutebook.ie/eli/2011/si/477/made/en/print [Accessed July 2024]
[11] Noise Mapping Bodies (NMBs): Local Authorities; Transport Infrastructure Ireland (TII); Irish Rail; and Dublin Airport Authority

make and approve a Noise Action Plan for each Agglomeration. The Agglomeration of Cork includes the entirety of the administrative boundary of Cork City Council, and part of the administrative boundary of Cork County Council.

This Noise Action Plan[12] is for the administrative area of Cork County Council which falls outside Cork Agglomeration[13].

Further details on the roles and responsibilities of all parties in respect of their obligations under the Regulations and the collaboration required to deliver the priorities of this Noise Action Plan are set out in **Table 5**.

1.1.4 Scope of the END

The END applies to environmental noise to which humans are exposed in built-up areas, in public parks or other quiet areas in an Agglomeration, in quiet areas in open country, near schools, hospitals and other noise sensitive buildings and areas. Noise sources required to be considered within the study area are detailed in **Section 1.2**.

The END does not apply to noise that is caused by the exposed person, noise from domestic activities, neighbourhood noise, noise at workplaces or noise inside means of transport or due to military activities in military areas.

Strategic noise maps are strategic tools and should not be used for the assessment of local noise nuisances or planning decisions.

1.2 Scope of the Noise Action Plan

This Noise Action Plan has been prepared in accordance with the Regulations and is aimed at strategic long-term management of environmental noise from transport systems referring to the results of the strategic noise maps to inform assessments of population exposure and harmful effects of noise.

The strategic noise maps for Cork County have been prepared by the responsible NMB and pertain to the calendar year 2021 for noise from the following source:

- Major roads - sections of road with a flow threshold of 3,000,000 vehicle passages per year).

The Regulations require the strategic noise mapping to be based upon an assessment year of 2021. However, due to COVID-19 related travel restrictions and the operational impacts of the pandemic, noise contour results for 2021 may not be fully representative. The greatest anomalies in transportation noise during this period are likely associated with airport noise, which saw significant reductions in air traffic, and therefore a reduction in most noise contours with fewer people shown to be affected by aircraft noise. Rail and road traffic travel during this period saw some reductions,

[12] The Noise Action Plan is draft until completion of a formal public consultation exercise

[13] Hereafter referred to as 'Cork County' and meaning the administrative area of Cork County Council outside the Agglomeration of Cork.

but not as significant as air travel, therefore the use of the 2021 assessment year for these sources is deemed representative for the purpose of the Round 4 action planning.

There have been three rounds of strategic noise maps and Noise Action Plans in Ireland (2008-2013, 2013-2018 and 2018-2023) with this Noise Action Plan for Cork County being Round 4 (2024-2028)[14].

The first three rounds of strategic noise maps have been developed using computation methods set out in Environmental Noise Regulations 2006 (S.I. 140/2006). For Round 4, Member States are required to use the Common Noise Assessment Methods for Europe (CNOSSOS-EU). This change in methodology makes a direct comparison of the Round 4 noise exposure statistics with the previous three rounds methodologically complex.

For the noise action planning process, the Regulations require[15]:

"Each action plan or revision of an action plan shall address priorities which—

(i) may be identified on the basis of exceedances of any relevant noise limit value or other relevant criteria established by the Agency [EPA] *in accordance with subparagraph (3), and*

(ii) shall, in the first instance, address the most important area or areas, as the case may be, established by strategic noise mapping."

Furthermore the Regulations require each Action Planning Authority to *"determine the measures to be included in an action plan."* Finally, the action plan must *"have as its objective that of also protecting quiet areas in an agglomeration and quiet areas in open country"*.

This Noise Action Plan therefore includes the identification of existing noise emissions, the identification of Priority Important Areas based on an assessment of harmful effects and details of noise management measures for consideration and evaluation at implementation stage. The Noise Action Plan also includes discussion of Candidate Quiet Areas in open country.

While this Noise Action Plan is a separate document from the Noise Action Plan for the Agglomeration of Cork, they have been developed collaboratively and complement one another.

1.2.1 Noise Indicators

The Regulations specify two main noise indicators which much be used in the preparation of the strategic noise maps:

- L_{den} – the annual average noise level for the day, evening and night periods and is designed to indicate overall annoyance; and

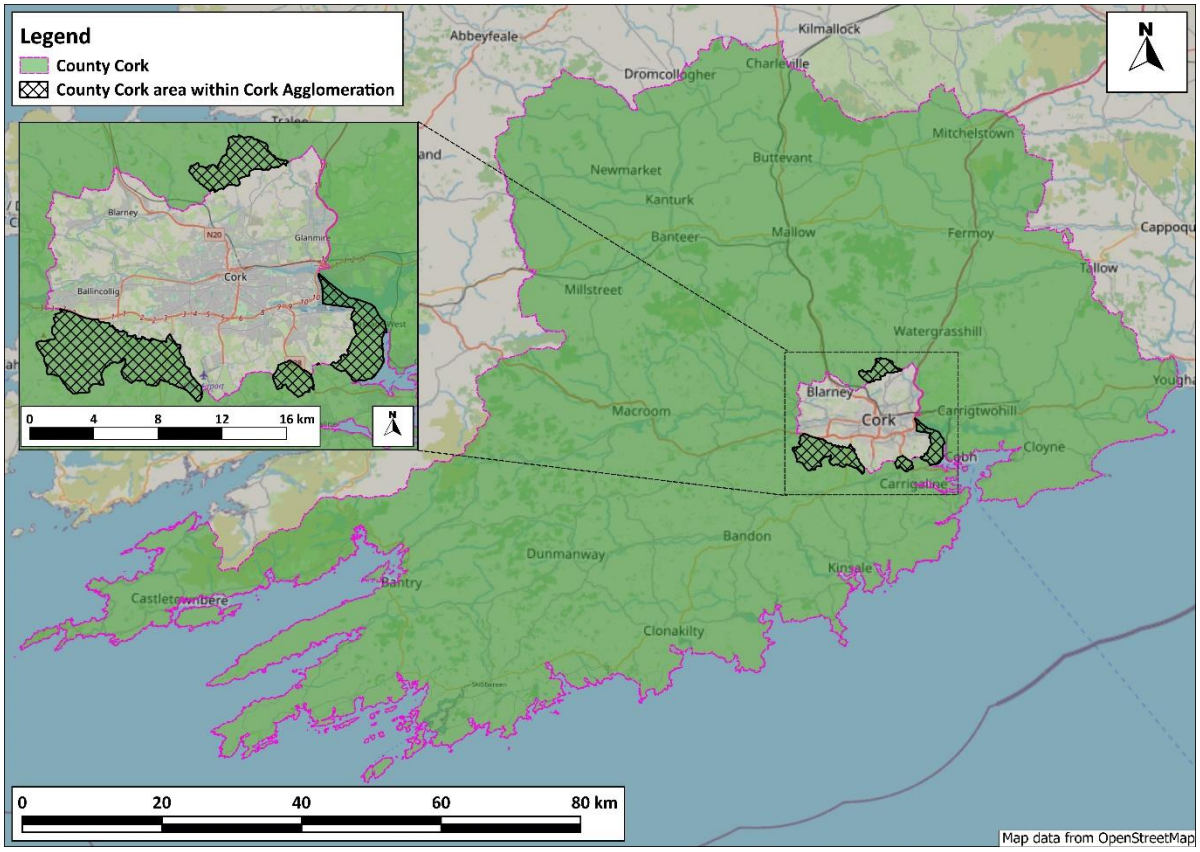
[14] The European Commission allowed for one additional year for the Round 4 Noise Action Plans, reducing the five-year implementation period to four-years.
[15] Regulation 12(2)

- L_{night} – the annual average noise level for the night-time periods, from 23:00 – 07:00 hours, and is designed to indicate sleep disturbance.

1.3 Cork County

The extents of Cork County, as well as the area under the jurisdiction of Cork County Council that falls within the Cork Agglomeration as defined in the Regulations, are shown in **Figure 1**. The area within the Cork Agglomeration is shown for illustrative purposes only, and is not included in any assessment within this Noise Action Plan.

Figure 1: Cork County and Cork Agglomeration Boundaries



A summary of the populations in Cork County, and the Cork County Area within the Cork Agglomeration is given in **Table 1**. This shows a majority of the population of Cork County is in the area outside the Cork Agglomeration, and therefore the focus of this Noise Action Plan.

Table 1: Total Population[16]

Cork County Area outside Cork Agglomeration[#]	Cork County Area within Cork Agglomeration	Cork County Total
351,029	9,123	360,152

[#] Area which is the subject of this Noise Action Plan

The total length of major roads included in the Cork County strategic noise maps is summarised in **Table 2**.

Table 2: Summary of Strategic Noise Map Sources

Noise Sources	Total Length/No. of Sites (metres, m)
Major Roads	328,762m

The number of noise sensitive buildings (Schools and Hospitals) within Cork County and considered by the strategic noise mapping, are summarised in **Table 3**.

Table 3: Total number of Noise Sensitive Buildings

Noise Sensitive Building	Number of Noise Sensitive Buildings
Schools	122
Hospitals	6

1.4 Structure of the Noise Action Plan

The Noise Action Plan covers the overarching principles of the noise action planning process, including the existing international, national and regional noise management legislation and guidance, a description of the noise mapping process, and methodologies advocated in the draft EPA Guidance for identifying and addressing the most important areas, as established by the strategic noise mapping.

The Noise Action Plan includes a four-year implementation plan. Progress will be tracked through annual reports to the Agency throughout its execution. The Noise Action Plan includes an update on the implementation progress of the measures set out in previous Noise Action Plans, and identification of the specific areas within the administrative area to be considered for noise

[16] Based upon analysis from CSO Census Data (April 2022) which was provided at Small Area Population Statistics (SAPS) level, and GeoDirectory Data points (Q4 2021)

management measures or as Candidate Quiet Areas in open country for the preservation of environmental noise quality.

1.5 Round 4 Timetable

A timetable of the key activities for the development and implementation of the Noise Action Plans for Round 4, and delivery to the European Environment Agency (EEA) by the Agency, is set out below:

- July - December 2024: Deadline for Noise Action Plans, publishing Noise Action Plans, and summaries of Noise Action Plans submitted to the Agency; and
- January 2025: Noise Action Plans to be reported to the EEA by the Agency.

1.6 Consultation

1.6.1 Public Consultation

Cork County Council prepared the *Cork County Council: Draft Noise Action Plan 2024-2028 (15570A-20-R01-05-F03, 5 December 2024)*, which was issue for public consultation 6 December 2024, with submissions accepted until 5pm, Friday 17 January 2025.

No public consultation responses were received during the consultation period. A summary of the submissions received from external sources, and responses to them, is provided in **Section 11**.

1.7 Acknowledgements

The background mapping used in the figures presented in this report are taken from OpenStreetMap (© OpenStreetMap contributors. See: https://www.openstreetmap.org/copyright).

2 Noise Management Legislation and Guidance

2.1 Noise and Effects on Health and Quality of Life

2.1.1 Environmental Noise Guidelines (World Health Organization, WHO), 2018

Noise can have a significant and disruptive effect on everyday life. Since the implementation of the Regulations, there have been extensive studies into the links between environmental noise exposure and health.

The World Health Organization (WHO) in its publication 'Environmental Noise Guidelines for the European Region 2018'[17] and 'Night Noise Guidelines for Europe 2009'[18] has also presented several key health outcomes including: noise annoyance; sleep disturbance; cardiovascular health; mental health, wellbeing, and quality of life; and children's learning.

The Environmental Noise Guidelines for the European Region provides recommendations for protecting human health from exposure to environmental noise originating from various sources including road traffic, railway and aircraft noise.

The recommendations include guideline values using L_{den} and L_{night} metrics in terms of the onset of health effects.

However, no single noise metric best correlates with all adverse health outcomes associated with environmental noise effects, and health effects can be correlated with more than one metric. The noise metrics which are generally considered to best correlate with the different health effects, and are the subject of this Noise Action Plan, are set out in **Table 4**.

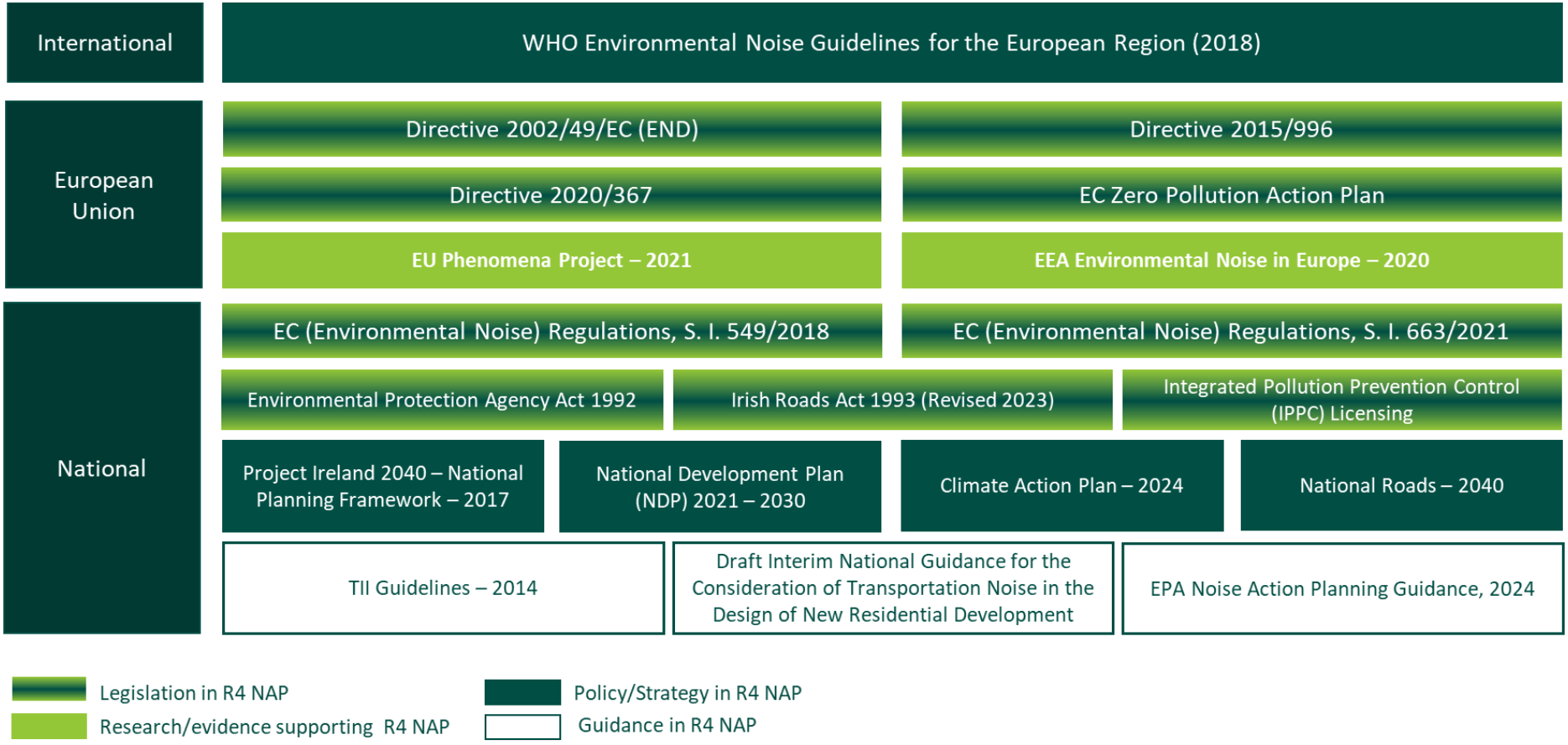
Table 4: Noise Metrics and the Associated Health Effects

Noise Metric	Health Effects
L_{den}	Cardiovascular disease, Cognitive impairment, and Annoyance
L_{night}	Sleep disturbance and Wellbeing

Existing international, European Union and national noise management legislation and guidance is shown in **Figure 2**, with brief summarises provided in **Section 2.2**.

[17] Environmental Noise Guidelines for the European Region, World Health Organisation, 2018
[18] Night Noise Guidelines for Europe, World Health Organisation, 2009

Figure 2: Existing Noise Management Legislation and Guidance



2.2 European Union Legislation and Regulations

2.2.1 European Communities Directive 2002/49/ EC

The Environmental Noise Directive ('END') (2002/49/EC) relates to the assessment and management of environmental noise. It is the main instrument of the EU to quantify noise pollution levels and trigger actions within Member States.

The aim of the END is to:

"… define a common approach intended to avoid, prevent or reduce on a prioritized basis the harmful effects, including annoyance, due to exposure to environmental noise."

2.2.2 Commission Directive (EU) 2015/996

Commission Directive EU 2015/996 replaces Annex II of the END and describes the common assessment methods for road, rail and air traffic noise and industrial noise sources, developed within the CNOSSOS-EU project.

Shortly after the publication of Directive 2015/996, some formatting and typographical errors were identified which were addressed in the Corrigendum[19] which was published in 2018.

2.2.3 Commission Directive (EU) 2020/367

Commission Directive EU 2020/367 replaces Annex III of Directive 2002/49/EC in describing the assessment of health effects under END.

The Directive adopts the exposure response functions published within WHO Environmental Noise Guidance, 2018 for the number of people highly annoyed (HA) and highly sleep disturbed (HSD) from road, rail and aircraft noise. The Directive also adopts the calculation of Ischemic Heart Disease (IHD) with respect to road traffic noise.

2.2.4 European Union Zero Pollution Action Plan (ZPAP), 2021

The European Commission Zero Pollution Action Plan (ZPAP) was adopted in 2021. The vision for 2050 under the ZPAP is for air (including noise), water and soil pollution to be reduced to levels no longer considered harmful to health and natural ecosystems. This is translated into key 2030 targets to speed up reducing pollution at source.

The target for noise includes reducing the share of people chronically disturbed by transport noise by 30%. This target has not been transposed into Irish legislation, however, may be in the future, and therefore should be considered in future iterations of Noise Action Plans.

[19] https://www.ecac-ceac.org/documents/ecac-documents-and-international-agreements [Accessed July 2024]

2.2.5 European Commission Assessment of Potential Health Benefits of Noise Abatement Measures in the EU (Phenomena project), 2021

In 2021 the findings of the EU Phenomena project were published. The study aimed to define the potential of measures capable of delivering significant reductions (20%-50%) of health burden arising from the environmental noise of roads, railways and aircraft, and to assess how relevant noise related legislation could increase the implementation of the most effective measures, while considering the constraints and specificities of each transport mode.

The project relied on a combination of policy research, consultation, health economics and environmental assessment. Individual noise abatement measures were examined and their health impact quantified leading to a shortlist of the most effective combinations of measures for each transport mode.

For roads noise, the measures considered included low noise road pavements, low noise zones (speed reductions) and new legislation at an EU level for a low noise tyre fleet. For rail noise, the noise abatement solutions included smooth tracks, quieter vehicles, smooth wheels and quieter tracks.

The analysis found that combination of the road noise abatement measures could achieve health burden reduction by 2030 in the range 18-24%. For rail noise, health burden reductions by 2030 were in the range 37-52%.

2.2.6 European Environment Agency (EEA) Environmental Noise in Europe - 2020

The report summarises the many reviews of evidence on the relationship between environmental noise and specific health effects, including cardiovascular disease, cognitive impairment, sleep disturbance, tinnitus and annoyance.

It is estimated that, in the EU Member States and other western European countries (excluding Turkey) the number of people suffering various health outcomes from the exposure to environmental road noise in urban areas in 2017 was 29,500 for ischemic heart disease (IHD), 12,525,000 for high annoyance, 3,242,000 for high sleep disturbance and 7,600 due to mortality (from noise related IHD)[20].

2.3 National Legislation and Regulations

The END was transposed into Irish Law by the Environmental Noise Regulations 2006[21] (S.I. 140/2006) (the 'Regulations'), establishing a unified framework for mitigating and minimising the adverse consequences of environmental noise exposure. They identify organisations responsible for noise mapping and the development of strategic noise maps and action plans.

[20] Table 3.5, Environmental Noise Guidelines for the European Region, World Health Organisation, 2018
[21] https://www.irishstatutebook.ie/eli/2006/si/140/made/en/print [Accessed July 2024]

The Regulations were revised by the European Communities (Environmental Noise) Regulations 2018[22] (S.I. 549/2018) and amended through the European Communities (Environmental Noise) (Amendment) Regulations 2021[23] (S.I. 663/2021). A summary of these Regulations is presented in the following sections.

2.3.1 European Communities (Environmental Noise) Regulations, 2018 (S. I. 549/2018)

These Regulations replace the Environmental Noise Regulations 2006 (S.I. No. 140 of 2006) and provide for the implementation in Ireland of a common approach within the European Community to avoid, prevent or reduce, on a prioritised basis, the harmful effects, including annoyance, due to exposure to environmental noise.

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.

2.3.2 European Communities (Environmental Noise) (Amendment) Regulations, 2021 (S. I. 663/2021)

This Regulation amends the European Communities (Environmental Noise) Regulations 2018 (S.I. 549/2018), setting out methods for harmful effects, considering ischaemic heart disease (IHD), high annoyance (HA) and high sleep disturbance (HSD) and requiring each NMB to report details of these harmful effects as part of the noise mapping work.

The Regulations also amended the boundaries of the existing Dublin and Cork Agglomerations and defined a new Limerick Agglomeration.

2.3.3 Environmental Protection Agency Act, 1992

In Ireland, statutory provisions relating to environmental noise pollution come primarily from the Environmental Protection Agency Act (1992).

The Act identifies noise as a form of environmental pollution and contains provisions for dealing with noise deemed *"a nuisance or would endanger human health or damage property or harm the environment"*.

With regards to noise, Section 106-107 is most relevant:

- 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;

[22] https://www.irishstatutebook.ie/eli/2018/si/549/made/en/print [Accessed July 2024]
[23] https://www.irishstatutebook.ie/eli/2021/si/663/made/en/print [Accessed July 2024]

- Section 107 gives power to local authorities or the Agency to serve notice requiring measures to be taken to prevent or limit noise from any premises, processes or works; and
- Section 108 sets out a process whereby noise issues may be taken to District County, which may make any order requiring that the person or body responsible for the noise to take measures for the prevention or limitation of the noise in question.

There is no clear official or statutory guidance which could help promote the effectiveness or clarity of the provisions within the Act; however, within the framework of the Regulations the Agency may consider it appropriate to develop such guidance in the future.

2.3.4 Roads Act, 1993 (Revised 2023)

In Ireland, the Roads Act, 1993[24] (revised 2023[25]), outlines the responsibilities of the roads authorities for the maintenance and construction of public roads. Under section 77 of the Roads Act 1993, power had been given to the Minister to make regulations requiring relevant road authorities to take measures to mitigate the effects of road traffic noise and to specify limits for road traffic noise which, if exceeded, would require mitigating action from the road authorities. However, Section 77 was repealed under the Public Transport Regulation Act, 2009[26]. There are no Irish statutory noise limits or standards governing road traffic noise for new or existing roads.

2.3.5 Integrated Pollution Prevention Control (IPPC) Licensing

The Agencies Integrated Pollution Prevention Control Licensing terms require that certain bodies must limit environmental pollution caused by industrial activities to obtain a license to operate. The criteria relating to noise pollution are outlined in the Agency publication "*Guidance Note for Noise: Licence Applications, Surveys and Assessment in Relation to Scheduled Activities (NG4)"*- 2016. This document recommends a 'Best Available Technique" approach to the assessment and mitigation of noise pollution. The document contains typical limit values for daytime (55 dB $L_{Ar,T}$[27]), evening (50 dB $L_{Ar,T}$) and nighttime (45 dB $L_{Ar,T}$) noise, at sensitive locations, from licensed facilities. Alternative limit values are provided for quiet areas and areas of low background noise.

2.3.6 Project Ireland 2040 – National Planning Framework, 2017

The National Planning Framework (NPF) is a high-level strategic plan to guide development and investment over the coming years. In addition to setting aims associated with infrastructure and investment, targets are also set around social outcomes.

[24] https://revisedacts.lawreform.ie/eli/1993/act/14/revised/en/html [Accessed July 2024]
[25] https://revisedacts.lawreform.ie/eli/1993/act/14/revised/en/html [Accessed July 2024]
[26] https://www.irishstatutebook.ie/eli/2009/act/37/enacted/en/print [Accessed July 2024]
[27] The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and/or impulsiveness of the sound.

Project Ireland 2040 – National Planning Framework recognises the importance of noise management which is implemented through the following objectives 52 and 65:

National Policy Objective 52: *"The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital."*

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."*

2.3.7 National Development Plan (NDP) 2021 – 2030

An investment strategy and budget that aims to transform Ireland and support the largest public housing program in the history of the state.

The plan sets out the broad direction for investment priorities over the coming decade and pledges to allocate public investment of €165 billion across all sectors and regions of Ireland. The plan aims to prepare Ireland for population growth of approximately 1 million between 2016 and 2040 and help deal with the ongoing challenges of COVID-19 and Brexit.

2.3.8 Climate Action Plan, 2024

The Climate Action Plan (CAP24) is the third update to Ireland's Climate Action Plan. It sets out a roadmap for actions to halve emissions by 2030, and reach net zero no later than 2050.

CAP24 implements carbon budgets and sectoral emissions ceiling with a view to accelerating the actions required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

2.3.9 National Roads 2040

National Roads 2040 (NR2040) is Transport Infrastructure Ireland's long-term strategy for planning, operating, and maintaining the National Roads network. The strategy has been developed to support the delivery of National Planning Framework 2040 objectives and to align with the Department of Transport's National Investment Framework for Transport in Ireland. One of the key visions for the strategy is that the national road network should be environmentally sustainable:

"Environmental sustainability is the bedrock for social and economic sustainability in Ireland; avoiding and where unavoidable mitigating environmental impacts including climate change, air quality and noise as well as biodiversity impacts of National Roads."

While the strategy primarily addresses decarbonisation and the need to reduce greenhouse gas and carbon emissions as outlined in the Climate Action Plan, there are opportunities for mutual gains for noise reduction through active travel, integrated mobility, maintenance and improvement works on the existing national road network.

The strategy recognises the importance of avoiding, reducing and mitigating adverse environmental impacts such as noise. Section 3.4 of the strategy states:

"Transport infrastructure can bring about social and economic benefits, such as enhanced mobility, access to markets and social participation. However, the development and management of transport

infrastructure must avoid, reduce and mitigate adverse environmental impacts, such as harmful emissions from transport (GHGs, air quality and noise impacts), and direct and indirect impacts to biodiversity and/or habitats, as well as to neighbouring properties and communities adjoining the National Roads network."

2.3.10 Transport Infrastructure Ireland (TII) Guidelines for the Treatment of Noise and Vibration in National Road Schemes, 2004

Considering the absence of standardised methods for the assessment of road traffic noise the then National Roads Authority (NRA) published the 'Guidelines for the Treatment of Noise and Vibration in National Road Schemes.' These guidelines establish noise design objectives for both the construction and operational phases of new road schemes. Following a review of similar guidelines in the UK and adapting methodologies in line with the requirements of the END, the NRA proposed an operational design goal of $L_{den} \leq 60$ dB free field value. This means that any Environmental Impact Assessment Report for a new road scheme must consider this target concerning any nearby sensitive residential properties likely to be impacted.

The guidelines advocate a structured approach to mitigate road traffic noise as much as practicable, acknowledging that it may not always be feasible to achieve the design goal completely. Measures such as alignment adjustments, barrier construction e.g., earth mounds, and the use of low noise road surfaces are recommended to mitigate adverse effects during road construction. Responsibility for noise mitigation policies concerning new sensitive properties near road scheme lies with the relevant Planning Authority.

2.3.11 Transport Infrastructure Ireland (TII) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, 2014

A review was undertaken by the NRA to assess the effectiveness of noise guidelines in environmental impact statements and other studies related to national road schemes. It examined current practices in Europe and beyond, as well as revisions to UK guidelines on noise prediction.

The review sought to evaluate how well noise mitigation measures aligned with the NRA's noise design goals and identify both good practices and potential shortcomings in current approaches. Based on findings from the studies, the Good Practice Guide provides supplementary advice for acousticians, traffic engineers, and others involved in road planning. It emphasises that the guidance serves as a framework rather than strict requirements, aiming to promote and support good practices tailored to individual project contexts.

2.3.12 Draft Interim National Guidance for the Consideration of Transportation Noise in the Design of New Residential Development, 2021

In the absence of Irish planning guidance for new residential development and the consideration of transportation noise local authorities in 2021 prepared draft guidance under a subgroup of the NIECE National Local Authority Noise Working Group.

This draft guidance includes an overarching aspiration that good acoustic design should be implemented from the outset of the design of new residential developments.

2.3.13 Association of Acoustic Consultants of Ireland (AACI), Advice for Local Authority Officers Involved in Enforcement, Assessment of Noise Reports, and Drafting of Noise Conditions for Planning Permissions and Permits, 2021

The report aims to ensure that noise assessments and conditions are consistently and effectively applied to protect public health and environmental quality. It offers detailed advice on interpreting noise reports, setting appropriate noise limits, and implementing mitigation measures. Additionally, the report highlights best practices for noise monitoring, reporting procedures, and enforcement actions to ensure compliance with noise regulations.

This guidance document does not constitute an official government code of practice, nor does it provide an authoritative interpretation of law of government policy. It is included in the Noise Action Plan for reference purposes.

2.3.14 National Sustainable Mobility Policy, Action Plan 2022-2025

A comprehensive strategy to enhance public transport safety, decarbonise the transport sector, and expand sustainable mobility options across Ireland. Key actions include annual public transport safety reports, awareness campaigns, infrastructure renewal, and speed management measures. The plan also focuses on developing fuelling infrastructure for zero-emission buses, transitioning bus fleets in major cities to low/zero emissions, and enhancing cycling and pedestrian infrastructure. Additionally, the policy aims to improve regional and rural transport services, promote inclusive access, and encourage sustainable travel over private car use through a series of targeted initiatives, all while ensuring public engagement and evidence-based decision-making.

2.3.15 Draft Moving Together: A Strategic Approach to the Improved Efficiency of the Transport System in Ireland, 2024

Aims to overhaul Ireland's transport system to enhance efficiency and reduce dependency on cars, addressing economic, environmental, and societal impacts. This strategy, aligned with Climate Action Plan 2023 targets, emphasises reducing carbon emissions, congestion, and improving air quality. It highlights the economic costs of congestion and stresses the personal toll on health and community life. The report recognises the need for systemic changes to achieve climate goals, advocating for policies that promote shared and public transport, and address noise pollution and air quality issues associated with car-centric travel. It calls for collaborative efforts across government sectors and society to implement 35 recommendations aimed at transforming transport behaviours and infrastructure, focusing on accessibility, safety, and sustainability while acknowledging the role of noise pollution in urban congestion.

2.3.16 Draft EPA Noise Action Planning Guidance, 2024

The Agencies guidance for strategic noise mapping for Round 4 using the CNOSSOS-EU assessment methods is published in five parts:

- Part 1: Requirements
- Part 2: Calculation Methodology & Noise Modelling
- Part 3: Noise Exposure Assessment
- Part 4: Publication and Reporting

- Part 5: Harmful Effects Assessment

The Agency provides guidance on noise action planning, which for round 4 is currently at the draft stage. These documents are referred to collectively as the ‘draft EPA Guidance’.

3 Regional Noise Management Policy and Guidance

3.1 Cork Metropolitan Area Transport Strategy

The Cork Metropolitan Area Transport Strategy (CMATS) provides the framework to deliver an accessible, integrated transport network that enables the sustainable growth of the Cork Metropolitan Area as a dynamic, connected, and internationally competitive European city region as envisaged by the National Planning Framework 2040. The guiding principles upon which CMATS is based are:

- The provision of an efficient and safe transport network;
- Prioritise sustainable and active travel and reduce car dependency;
- Provide a high level of public transport connectivity to key destinations with high demands;
- Protect key strategic routes for the movement of freight and services including access to the Port of Cork;
- Enhance public realm through traffic management and transport interventions; and
- Increase public transport capacity and frequencies.

CMATS supports the delivery of the 2040 population growth target for the Cork Metropolitan Area of 172,000 persons (125,000 for Cork City and 47,000 for the County Metropolitan area and attendant jobs and education growth. The Strategy recognises that for the compact growth aspirations of the National Planning Framework to be realised, Cork City will become the focus of significant regeneration opportunities at brownfield locations such as the Cork Docklands, Blackpool and Tivoli.

The Strategy has identified a number of key challenges that require addressing including:

'*Reducing the impact of transport on the environment through targets measures to limit the negative impact of air and noise emissions.'*

The infrastructural proposals contained within CMATS, such as the delivery of a city-wide cycle network, enhancements to the city's bus services through the BusConnects programme of works, the construction of a Light Rail Transit system all have a clear focus on supporting increased active and sustainable transport modes across the city. This approach with respect to the delivery of future transport infrastructure in the city will have positive outcomes in terms of reducing transport related noise and emissions.

3.2 Regional, Spatial and Economic Strategy (RSES) for the Southern Region

The RSES was prepared by the Southern Regional Assembly to provide a long-term strategic development framework for the future physical, economic and social development in the southern region. The strategy contains a policy objective for noise under Regional Policy Objective 131 which echoes the National Planning Framework Objective 65:

"It is an objective to promote the pro-active management of noise where it is likely to have significant adverse impacts on health and the environment. It is also an objective to support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans for major urban centres as considered appropriate."

The RSES supports the development of strategic noise mapping and pro-active management of noise through noise action planning, including highlighting the importance of quiet areas.

3.3 Local Noise Management Policy and Guidance, and Infrastructure Projects

3.3.1 Cork County Development Plan 2022-2028

The Cork County Development Plan 2022 has been prepared in accordance with the steps set out in the Planning and Development Plan Acts. The Elected Members of Cork County Council have adopted the Cork County Development Plan 2022-2028 at the Full Council Meeting held on 25 April 2022 and it came into effect on 6 June 2022.

It is expected to remain in force (subject to any interim variations that the Council may make) until 2028. It is a six-year development plan for the County that attempts to set out, as concisely as possible Cork County Council's current thinking on planning policy looking towards the horizon year of the 2028. The plan also sets out the overall planning and sustainable development strategy for the county which must be consistent with the National Planning Framework 2018 and the Southern Region Regional Spatial and Economic Strategy and Cork Metropolitan Area Strategic Plan (MASP) 2020.

The Cork County Development Plan 2022 is different from the current County Development Plan as it relates to the new administrative boundary of the county, post the extension of the City boundary.

The Cork County Development Plan 2022 replaces:

- The Cork County Development Plan, 2014.
- The 8 Municipal District Local Area Plans adopted in 2017.
- The 9 Town Development Plan of former Town Council Towns.

There are local sustainability programmes driven by Cork County and City Council, which aim to reduce long-term traffic congestion levels. These include initiatives such as provision of Park & Ride facilities, Green Routes, new cycling infrastructure, Intelligent Transport Systems (ITS) etc. whose aim is to facilitate the use of more non-car sustainable forms of travel which will also contribute to the reduction of overall traffic noise generation.

3.4 Relevant Plans, Projects and Studies

Several major transport infrastructure projects are planned for the Cork County Council administrative area during the life of the Round 4 Noise Action Plan. While not their primary purpose, they will have the potential to impact on the noise environment both positively and negatively. Projects that are planned for the lifetime of the Noise Action Plan include:

- Various active travel projects across the city proposed in CMATS
- Dunkettle Interchange

- NM20 Cork to Limerick Project
- M28 Cork to Ringaskiddy

3.4.1 NM20 Cork to Limerick Project

A new M20 motorway linking Limerick to Cork was given the go-ahead by the government in October 2017. Limerick and Cork cities are approximately 100 km apart, yet at present the economic interaction and inter-relationships between the cities is limited with poor transport connectivity being a factor. An opportunity exists to provide better connectivity between the two cities, by improving the quality of the transport network which will address road safety issues associated with the existing N20 route and provide for safer and more efficient journey times.

When completed the new stretch of motorway will link Cork to Limerick and onto Tuam, Co. Galway, forming a major motorway along the western corridor.

The development of a motorway will potentially reduce traffic counts and therefore road noise impacting towns along the route (e.g., Banoge) and ribbon development housing. However, consideration will also have to be given to potential high noise levels along the proposed new M20 on residents' health and amenity.

3.4.2 M28 Cork to Ringaskiddy

This project is a 12.4Km upgrade of a national primary route from the N40 South Ring Road in Cork to the Port of Ringaskiddy. This development will support strategic growth of Port facilities at Ringaskiddy, in accordance with European and National policy, meet TEN-T core network level of service requirements, thus facilitating economic development in the local area and nationally, increase safety and capacity of N28 corridor to meet existing and estimated future traffic needs and improve access to the M28 corridor in a safe and sustainable way.

This motorway will potentially bring high noise levels; however, mitigations measures will be in place, i.e. a low noise surface for the entire scheme and acoustic barriers at recommended locations along the scheme.

3.5 Other Relevant Plans, Studies and Measures

3.5.1 Speed Limit Reductions

A County wide speed limit review is carried out every five years as required by the Guidelines for Setting and Managing Speed Limits in Ireland 2015. While not the primary purpose, reduction of speed limits has the potential to have a positive impact on the noise environment.

4 Responsible Authorities for Action Planning

4.1 Action Planning Authority

Cork County Council, in its role as Action Planning Authority in accordance with the Regulations, is responsible for making and approving Noise Action Plans in consultation with the Agency and the Noise Mapping Bodies responsible for the noise-map involved. The Regulations do not explicitly assign sole responsibility to the Action Planning Authorities for owning or implementing the measures outlined in the Noise Action Plans.

Cork County Council recognises that the competencies and responsibilities required for successful implementation of the Noise Action Plan extend beyond their sole jurisdiction. Therefore, collaboration and consultation are essential for the development and implementation of noise mitigation measures, where necessary. The views of Cork County Council and the Agglomeration Action Planning Authorities on the roles and responsibilities necessary to ensure the successful implementation of the Noise Action Plan are set out in **Table 5**.

Cork County Council are committed to identifying noise mitigation measures in collaboration and consultation with the Noise Mapping Bodies, that offer benefits to public health and are cost-effective, contingent upon available resources and funding.

Acknowledging the current funding shortfall for dedicated noise mitigation measures under the Regulations, Cork County Council will explore all future opportunities for support with delivery partners and other relevant sources until any specific arrangements through the Regulations are established.

Table 5: Cork County Councils View on the Roles and Responsibilities Required for the Successful Implementation of the Noise Action Plan

Organisation	Strategic Noise-Mapping Body (NMB) Responsibility	Noise Action Plan Preparation - Responsibility	Noise Action Plan Implementation - Responsibility
Cork County Council (CCC)	Consult, engage and collaborate with the NMBs	Action Planning Authority responsible for making and approving action plans, in consultation with NMBs.	Detailed evaluation of Priority Important Areas, in consultation with NMBs, including identification of noise mitigation measures and implementation of those measures within the Local Authority's areas of competence and responsibility, subject to resources and budget.
Transport Infrastructure Ireland (TII)	NMB responsible for making and approving strategic noise maps for major roads designated as national roads.	Consultee during action planning, with consideration of issues resulting from the strategic noise maps within their area of responsibility including identification of priority important areas to be included within the Noise Action Plan.	As part of the detailed evaluations of the Priority Important Areas conducted by the Action Planning Authorities; consult, engage and collaborate with the Action Planning Authorities to agree noise mitigation measures for locations within TII's areas of competence and responsibility (National Roads) and agree the strategy for implementation of same in respect of resources, timelines and budget.
Irish Rail	NMB responsible for making and approving strategic noise maps for major railways.	Consultee during action planning, with consideration of issues resulting from the strategic noise maps within their area of responsibility including identification of priority important areas to be included within the Noise Action Plan.	Consult, engage and collaborate with the Action Planning Authorities to identify and agree noise mitigation measures for areas within Irish Rail's areas of competence and responsibility and implementation of same subject to resources and budget.

5 Summary of the Results of the Noise Mapping Process

5.1 Review of Round 3 Noise Action Plan (2018-2023)

The Round 3 Noise Action Plan aims were to:

- Produce noise contour maps of the environmental noise environment from Major Roads in the Cork County Area;
- Summarise the areas of land, number of people and number of dwellings exposed to specific noise ranges from Major Roads in the Cork County area;
- Provide information of potential noise hot-spots to be assessed, and tools for planning authorities in protecting the noise environment adjoining the Major Roads;
- Provide a tool for monitoring the trends in environmental noise adjoining Major Roads;
- Assist in the development of an environmentally sustainable future in the Cork County Area; and
- Provide information to the Noise Action Planning Authorities in the production of the Noise Action Plan.

The Round 3 Noise Action Plan had the focus to manage exposure to environmental noise where necessary, aiming to prevent or reduce noise to minimise the number of people affected by traffic noise emissions. The actions taken were strategic and represented the best practice approach to environmental noise mitigation and the limitation of exposure to environmental noise.

Road traffic was indicated as the dominant noise source within Cork County. The onset levels for assessment of road noise in the Round 3 NAP were 70 dB L_{den} and 57 dB L_{night}, with less than 1% of the population being exposed to these onset levels.

The Round 3 Noise Action Plan used the "Calculation of Road Traffic Noise" UK national method for producing the strategic noise maps for roads, which was in line with the recommendations at the time of the Environmental Noise Regulations 2006. As a result, a back-end calculation was necessary to convert the CRTN values to the required L_{den} and L_{night} values.

In line with draft EPA guidance in "Guidance Note for Noise Action Planning", Round 3 Noise Action Plan set new thresholds for the assessment of noise mitigation measures, as well as the thresholds for the assessment of noise preservation measures, to be consistent with the EPA recommended onset levels.

The Round 3 NAP also utilised a decision support matrix to identify areas which should be prioritised for actions relating to noise intervention or noise management measures.

It was proposed that areas indicated to be subject to environmental noise levels above the assessment threshold would be evaluated by field surveys in order to validate the noise mapping results. In instances where noise levels were confirmed to be unacceptably high the Action Planning Authority would propose the implementation of appropriate measures to reduce the effects of noise exposure, subject to funding being available.

Areas of favourably low environmental noise exposure were to be preserved through management of any activity which could impact on the acoustic environment, and considering the noise impact of any future development at the early stages of the planning process, in order to minimise any adverse effects on the local soundscape, and provide protection for relatively quiet areas.

A number of noise reduction mitigation measures were considered to be suitable dependant on the surrounding environment of an affected area. These included physical measures, as well as non-physical policy measures. the Noise Action Planning Authority endeavoured to manage exposure to environmental noise using the most appropriate measures. The measures stated in Round 3 to be utilised in built up areas included, where necessary:

- Traffic Management;
- Encouraging more environmentally friendly forms of transport such as cycling and walking;
- Encouraging the use of public transport;
- Implementing traffic calming measures; and
- Encouraging the use of low noise road surfacing.

The APA also would consider the use of the following in the planning process, where necessary:

- To integrate the recommendations of noise action plans into future development plans;
- To integrate the mapping as a tool for land use planning;
- To ensure that future developments are designed and constructed in such a way as to minimise noise disturbances due to environmental noise; and
- To integrate environmental noise planning guidelines into planning processes to ensure that new developments give cognisance to environmental noise pollution and noise mitigation.

The APA would consider noise screening where necessary by investigating the suitability of noise screening structures, and would aim to protect the future environmental noise climate by early incorporation of noise action planning into the planning and operational stages of future developments.

5.2 CNOSSOS-EU:2020

The European Commission (EC) published Directive 2015/996[28] established common noise assessment methods according to the END. It replaced Annex II of the END, removing the Interim Methods and now requiring that Member States apply the Common Noise Assessment Methods for Europe (CNOSSOS-EU) for the noise modelling of road, rail, aircraft and industrial sources.

[28] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0996&from=PT [Accessed July 2024]

The use of CNOSSOS-EU has since been transposed into Irish Law via the European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. 663/2021) and has been used to produce the strategic noise maps and to calculate the noise exposure statistics and harmful effects (see **Section 5.3**) for roads, rail and industry, where applicable.

Two result formats have been prepared for the noise indicators specified in the Regulations, L_{den} and L_{night}:

- 10m grid format – where the model outputs a result every 10m in a uniform grid. These results are used to produce the strategic noise maps; and
- Façade receiver format - where the model outputs a result at receiver points digitised at the façades of residential, school and hospital buildings. These results are used to calculate the exposure statistics and harmful effects (see **Section 5.3**).

The model was configured to output results down to the reporting requirements of the END (55 dB L_{den} and 50 dB L_{night}) and the levels required for the calculation of harmful effects.

The model, and calculations for the strategic noise mapping were undertaken by TII, adopting the draft EPA Guidance (Part 2: Calculation Methodology & Noise Modelling).

5.3 Noise Exposure and Harmful Effects

5.3.1 Noise Exposure Assessment

The first three rounds of strategic noise maps have been developed using computation methods set out in Environmental Noise Regulations 2006 (S.I. 140/2006). For Round 4, Member States are required to use the Common Noise Assessment Methods for Europe (CNOSSOS-EU). This change in methodology makes a direct comparison of the Round 4 noise exposure statistics with the previous three rounds methodologically complex. The Round 4 noise exposure statistics for Cork County are presented in the following section.

Exposure statistics are assessed independently for each noise source, and are summarised for the noise metrics across the noise exposure bands defined in the Regulations. The population exposure statistics have been rounded to the nearest 100 as required by the Regulations.

Table 6: Number of People in Dwellings – L_{den}

Noise Exposure ($dB\ L_{den}$)	Major Roads
55-59	18,500
60-64	9,900
65-69	5,200
70-74	3,700
>=75	1,500

*exposure statistics rounded to the nearest 100.

Table 7: Percentage of Total Population Exposed to the Noise Source – L_{den}

Noise Exposure (dB L_{den})	Major Roads
55-59	5 %
60-64	3 %
65-69	2 %
70-74	1 %
>=75	<1 %

Table 8: Number of School Buildings (& Hospital Buildings) – L_{den}

Noise Exposure (dB L_{den})	Major Roads
55-59	21 (03)
60-64	07 (03)
65-69	10 (00)
70-74	06 (00)
>=75	01 (00)

Table 9: Number of People in Dwellings – L_{night}

Noise Exposure (dB L_{night})	Major Roads
50-54	12,300
55-59	6,200
60-64	3,900
65-69	2,000
>=70	300

*exposure statistics rounded to the nearest 100.

Table 10: Percentage of Total Population Exposed to the Noise Source – L_{night}

Noise Exposure (dB L_{night})	Major Roads
50-54	3 %
55-59	2 %
60-64	1 %
65-69	1 %
>=70	<1 %

Table 11: Number of School Buildings (& Hospital Buildings) – L_{night}

Noise Exposure (dB L_{night})	Major Roads
50-54	12 (03)
55-59	12 (00)
60-64	07 (00)
65-69	01 (00)
>=70	00 (00)

5.3.2 Harmful Effects Assessment

The European Communities (Environmental Noise) (Amendment) Regulations 2021 (S.I. 663/2021) sets out the assessment methods for harmful effects, which considers ischemic heart disease (IHD), high annoyance (HA) and high sleep disturbance (HSD).

Ischemic heart disease is calculated for road traffic noise only, whereas high annoyance and high sleep disturbance are calculated for road traffic, railway and aircraft noise.

The exposure of harmful effect is assessed independently for each source. Where the same people are simultaneously exposed to different noise sources, the harmful effects may not, in general, be cumulated, however can be compared to identify proportional significance.

The method determines harmful effects on population within an assessment area, rather than an accurate assessment of possible health effects at any specific building or location.

Whilst the Regulations set out the equations to be used for calculating harmful effects, it does not define noise thresholds above which health effects should be calculated for, nor does it stipulate the assessment bands that should be used (0.1 dB, 1 dB or 5 dB), these have been provided by the Agency, and are as follows:

- The calculations for harmful effects should be undertaken in 1 dB assessment bands

- The assessment of harmful effects should be undertaken above the following thresholds:
    - **Road traffic noise:** 53 dB L_{den}, 45 dB L_{night}

Harmful effects have therefore been calculated from population exposure statistics in 1 dB bands for the noise level thresholds set out above using the calculation methodology set out in the Regulations.

Table 12 presents the calculated harmful effects in the case of noise from major roads for Cork County. As railway noise and aircraft noise thresholds are not exceeded within Cork County, there is no associated assessment of harmful effects for railway and aircraft noise respectively.

Table 12: Health Effects (Major Road Noise)

Harmful Effect	Number of People	% of Population*
Ischemic Heart Disease (IHD)	7.73	<0.01%
Highly Annoyed (HA)	8,307.05	2.37%
Highly Sleep Disturbed (HSD)	2,551.74	0.73%

*Total population for Cork County outside the Agglomeration of Cork = 351,029

5.3.3 Strategic Noise Mapping Figures

The model calculations provide results outputs every 10 metres, which were used to produce the strategic noise maps.

The strategic noise maps are noise contour maps, a graphical representation illustrating the distribution of noise levels over a geographical area. The colours of the noise exposure bands are indicated in the legend, with darker colours representative of higher noise levels.

The Regulations do not set out noise limits which are permissible or impermissible in relation to environmental noise, however, do set the noise exposure bands to be reported, which are reflected in the strategic noise maps. In the absence of noise limits, it could be assumed that the closer the calculated noise level is to the highest noise exposure band set out in the Regulations the more undesirable it is.

The strategic noise maps are shown in the following figures for the two noise indicators specified in the Regulations, L_{den} and L_{night}.

- Figure 3: Strategic Noise Map – L_{den} – Road Traffic – Major Sources
- Figure 4: Strategic Noise Map – L_{night} – Road Traffic – Major Sources

5.4 Key Insights from Strategic Noise Mapping

5.4.1 Population Exposure to Noise

There are 38,900 people in dwellings exposed to noise from major roads greater than, or equal to, 55 dB L_{den}. This trend is also reflected for the total population exposed to levels greater than, or equal to, 50 dB $L_{night.}$ No rail or aircraft noise sources were assessed.

The percentage of the total population in dwellings within Cork County that are exposed to road traffic noise levels greater than, or equal to, 55 dB L_{den} is 11%.

The percentage of the total population in dwellings within Cork County that are exposed to road traffic noise levels greater than, or equal to, 50 dB L_{night} is 7%.

5.4.2 Harmful Effects

The calculation of number of people Highly Annoyed indicates that 8,307.05 people are at risk of high annoyance from major roads. This equates to 2.37% of the population at risk of high annoyance from major roads.

The calculation of number of people Highly Sleep Disturbed indicates that 2,551.74 people are at risk of high sleep disturbance from major roads. This equates to 0.73% of the population at risk of being high sleep disturbance from major roads.

The calculation of number of people experiencing Ischaemic Heart Disease (IHD) indicates that 7.73 people are at risk of IHD from major roads. This equates to <0.01% of the population at risk of IHD from major roads.

Figure 3: Strategic Noise Map – L_{den} – Road Traffic – Major Sources

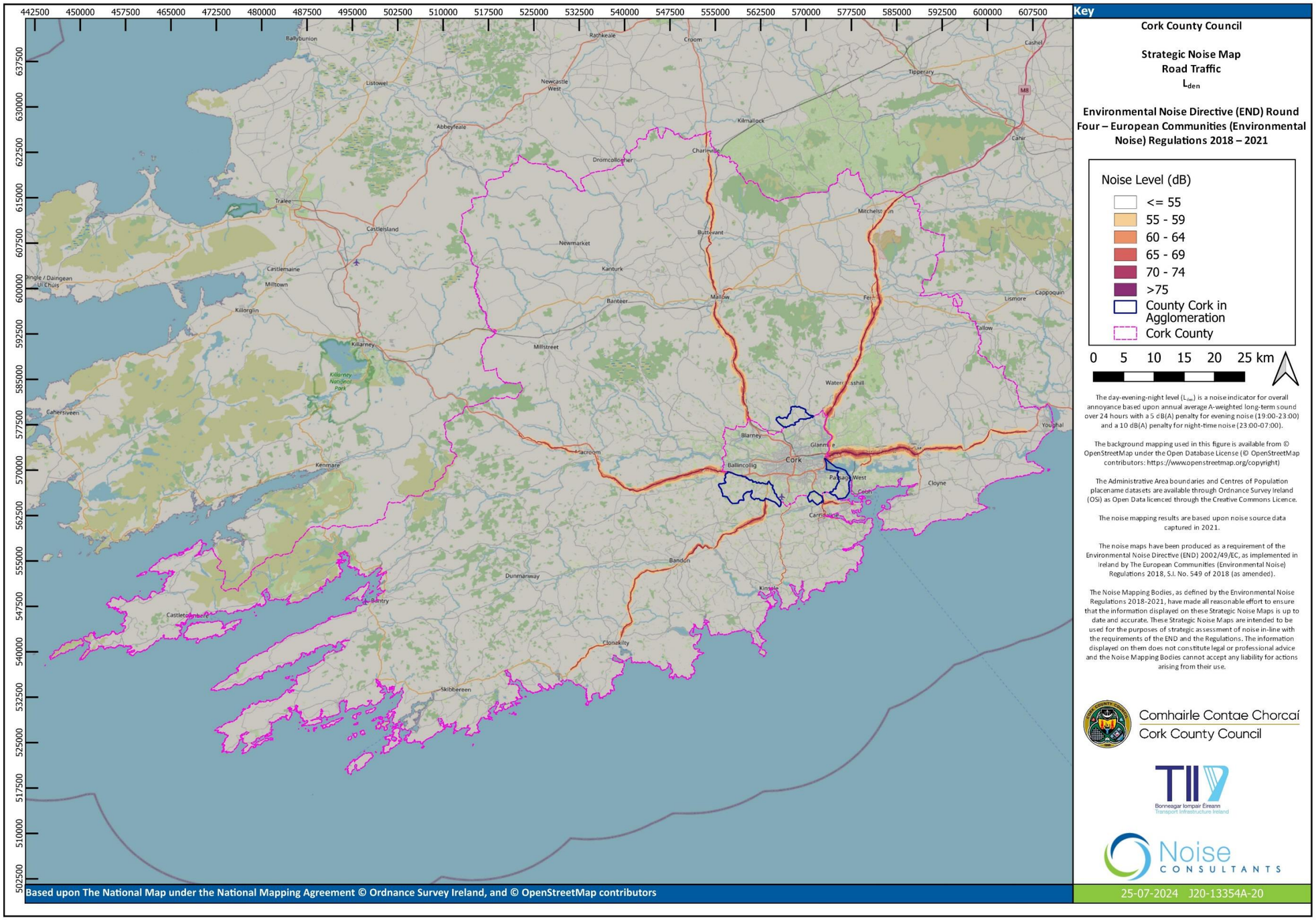
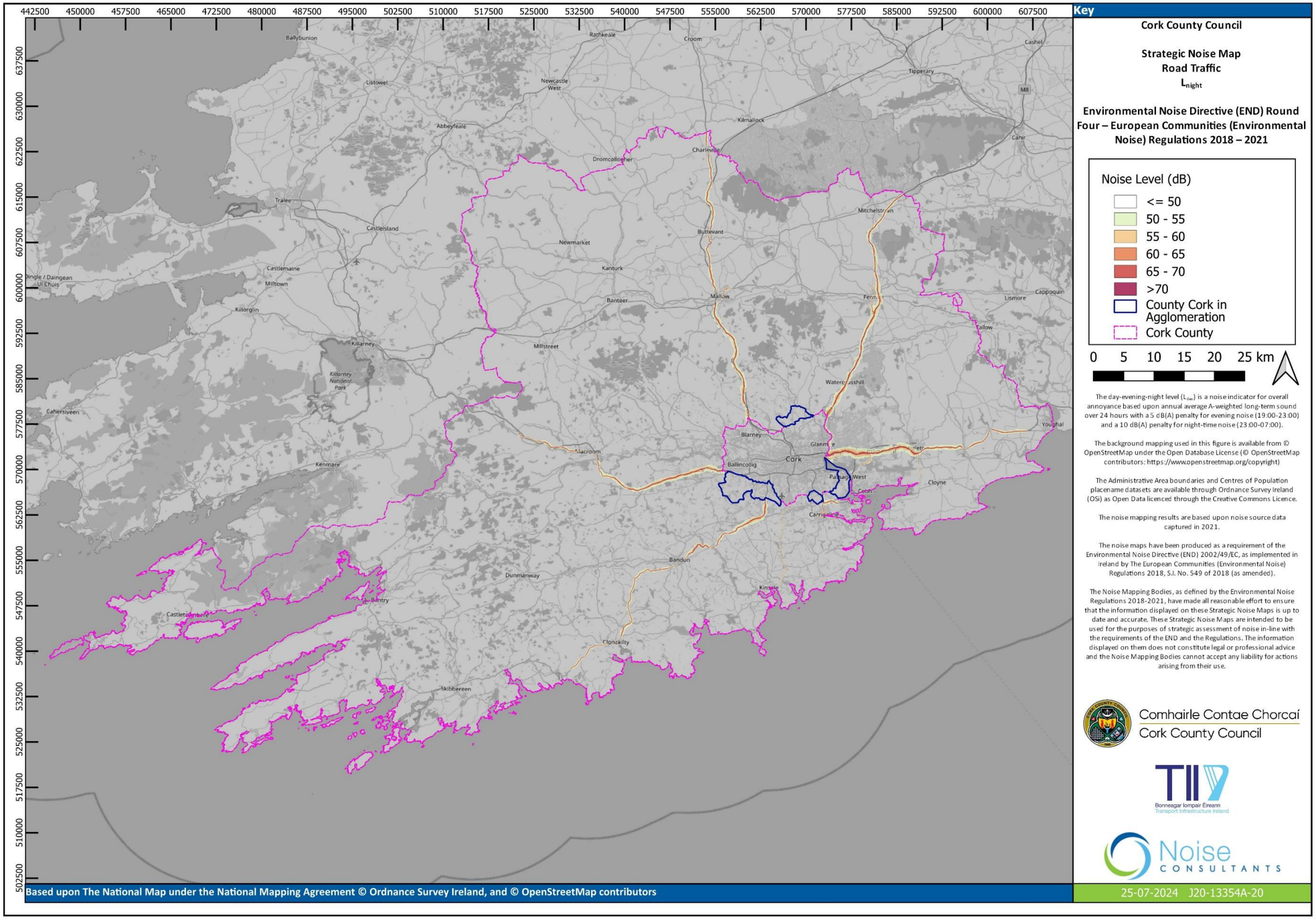


Figure 4: Strategic Noise Map – L_{night} – Road Traffic – Major Sources



6 Approach to Identification of Areas to be Subject to Noise Management Activities

6.1 Regulatory Background

The Regulations require that Action Planning Authorities 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 draft EPA Guidance provides further guidance on these concepts, and sets out a recommended approach to identifying priorities:

1. **Important Areas (IAs)** – these are locations exposed to environmental noise which may be harmful to human health, such as high annoyance, as indicated by WHO *Environmental Noise Guidelines for the European Region* (WHO ENG 2018)[29];
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 Noise Action Plan.

6.2 Scope

The Important Areas, Most Important Areas and Priority Important Areas within Cork County have been identified with respect to noise from major roads.

The identification of areas to be subject to noise management activities due to noise from railways, airports and industrial activities is outside the scope of this Noise Action Plan.

6.3 Overview of Process

The process of identifying Important Areas, Most Important Areas and Priority Important Areas within Cork County is Stage 1 of a two-stage process for the determination and implementation of noise management actions.

[29] Environmental noise guidelines for the European Region, WHO 2019. Available at: https://www.who.int/europe/publications/i/item/9789289053563 [Accessed October 2023]

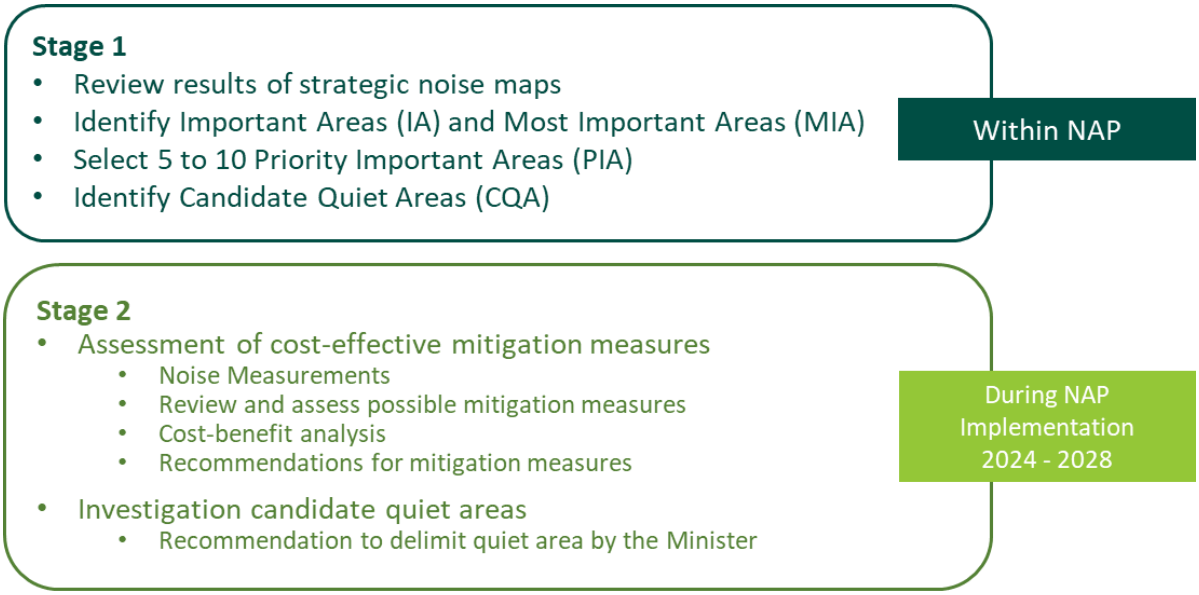
Stage 1 includes using the results of the strategic noise maps to identify the number of people and noise sensitive properties exposed to levels above the guideline values within WHO ENG 2018. These guideline values for road traffic noise are set out in **Section 6.4** below.

The findings of the Important Area process are then used to inform an automated process within Geographic Information System (GIS) software to generate raster heatmaps of the relative number of people highly annoyed due to noise in a given area, referred to as Most Important Areas. The Action Planning Authority, in consultation with the NMBs, prioritise the Most Important Areas to identify those which are to be addressed during the implementation of the Noise Action Plan, referred to as Priority Important Areas.

Stage 2 of the process takes place during the implementation of the Noise Action Plan, and focuses on undertaking an assessment of each of the identified Priority Important Areas including identification of appropriate noise mitigation measures.

An overview of the two-stage process is set out diagrammatically in **Figure 5**.

Figure 5: Overview of Recommended Approach to Determine Actions to be Undertaken, and Quiet Areas in Open Country to Delimit



6.4 Important Areas (IAs)

There are no statutory noise limits currently in place in Ireland. Under the Regulations, the EPA recommend other criteria used for the evaluation and implementation of noise management and reduction actions within the area covered by the Noise Action Plan, specifically the approach to identifying Important Areas, Most Important Areas, and Priority Important Areas.

The draft EPA Guidance references the WHO ENG 2018 guidelines in setting the "*other relevant criteria*" under Regulation 12(2) for identifying Important Areas. For major roads, which are within the scope of this Noise Action Plan, the criteria are: 53 dB L_{den} and 45 dB L_{night}.

The guideline values are relevant for the reduction of harmful effects from environmental noise on human health, and a summary of the number of people in Cork County which experience environmental noise above these levels is summarised in **Table 13**.

Table 13: Important Areas - Number of People in Dwellings

Noise Source	WHO Guideline Value	Number of People in Dwellings Exposed to Level Above WHO Guideline Value
Road Traffic	53 dB L_{den}	49,792.98
	45 dB L_{night}	46,713.03

6.5 Most Important Areas (MIAs)

The results of the Important Areas have been used to inform the identification of Most Important Areas. The process of identifying the Most Important Areas is set out in the draft 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 criteria.

The assignment of population to the calculated noise levels is set out within Annex II of the END (CNOSSOS-EU) and provides building level statistics across Cork County. Following the method in Annex II of the END, the harmful effects due to noise are statistically assessed and used to generate a gridded "heatmap" of values which represent (approximately) the number of people highly annoyed per 100m^2, which is in-line with the approach set out in the draft EPA Guidance.

Using the heatmap, the areas of higher concentrations of people highly annoyed (HA) are identified and delineated as a digital polygon. The draft EPA Guidance sets a density criterion of 15 or more people per 100m^2 as being the most appropriate for Most Important Areas in main urban areas, with lower criterions of 10 and 7.5 people per 100m^2 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 highly annoyed due to noise.

6.5.1 Most Important Areas Summary

A summary of the Most Important Areas identified within Cork County using the draft EPA Guidance density criterion of 15 or more people per 100m^2 is given in **Table 14.** Using this criterion, 21 Most Important Areas were identified within Cork County, as shown in **Figure 6**.

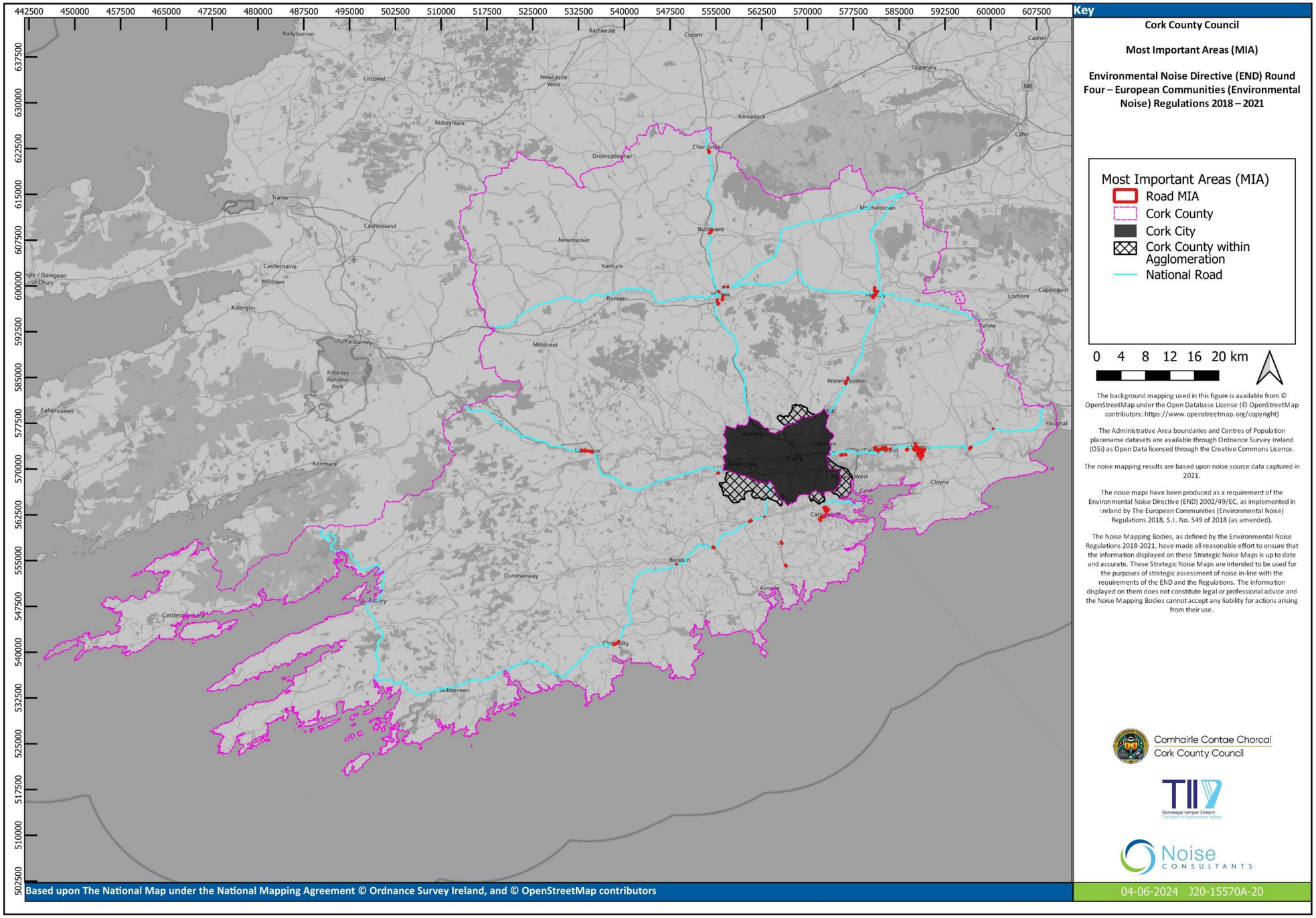
Table 14: Most Important Areas (MIAs) Summary

Action Planning Authority	No. of MIA*		Harmful Effects Statistics**		
	Major Roads	Total Population	HA	HSD	IHD
Cork County Council	21	2,371	587	195	1

*The total population inside all Most Important Areas (MIA)

** Total harmful effects inside all MIA (the harmful effects presented in this table are determined from a statistical approach across the whole population covered by the noise maps, and should not be considered to be an accurate assessment of the possible health effects at any specific building)

Figure 6: Most Important Areas (MIAs)



6.6 Priority Important Areas (PIAs)

The Most Important Areas established within Cork County are summarised in **Table 14.** Given the number of Most Important Areas identified, a process has been undertaken to identify which should be considered a priority (Priority Important Area), for which an assessment of noise mitigation measures will be undertaken within the life cycle of the Noise Action Plan and those deemed justified implemented subject to funding and resources.

The identification of the Priority Important Areas has been undertaken by Cork County Council in consultation with NMBs and relevant stakeholders. The draft EPA Guidance recommends that between 5 and 10 Priority Important Areas are selected.

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

- Noise source identifying the Most Important Area, i.e., major roads
- Area (m^2)
- Total population
- Number of people highly annoyed (HA)
- Number of people highly sleep disturbed (HSD)
- Population increased risk of ischemic heart disease (IHD)
- Number of dwellings
- Population noise exposure above END threshold values:
    - road traffic noise exposure in 5 dB bands (L_{den} 55 → 75 dB, L_{night} 50 → 70 dB)

The Priority Important Areas are summarised in **Table 15,** and were selected by Cork County Council based upon those Most Important Area or groups of Most Important Areas with the greatest number of people and consideration of other factors such as planned road maintenance works and traffic plans and projects.

The selected Priority Important Areas cover, statistically, 503 people highly annoyed (HA), 168 highly sleep disturbed (HSD) and one person at increased risk of ischemic heart disease (IHD), with the potential to benefit from consideration of noise management measures.

Table 15: Priority Important Areas (PIA) Summary

Action Planning Authority	No. of PIA		Harmful Effects Statistics**		
	Major Roads	Total Population*	HA	HSD	IHD
Cork County	10	2,007.48	502.76	168.3	0.6

*The total population inside all Most Important Areas (MIA) associated with the Priority Important Areas (PIA)

** Total harmful effects inside all MIA associated with the PIA (the harmful effects presented in this table are determined from a statistical approach across the whole population covered by the noise maps, and should not be considered to be an accurate assessment of the possible health effects at any specific building)

Figures of the Most Important Areas, and Priority Important Areas are included in **Appendix B**. Noise management measures to be considered in the assessment of noise mitigation for the identified Priority Important Areas are set out in **Section 8**.

The progress of investigating these measures will be reported to the Agency throughout the life cycle of the Noise Action Plan.

7 Approach to Identification of Areas to be Preserved for Environmental Noise Quality

7.1 Regulatory Background

The Fourth Schedule of the European Communities (Environmental Noise) Regulations 2018 (S.I. 549/2018) requires Action Planning Authorities to set out actions in relation to measures to preserve Quiet Areas. Under the Regulations, the scope of this Noise Action Plan for Cork County incudes consideration of delimiting Quiet Areas in open country. Currently, there is no universally accepted definition by EU Member States[30] of what constitutes a Quiet Area; however, they are generally considered as areas where environmental noise levels are deemed to be good, undisturbed by noise from traffic, industry or recreational activities, and therefore protection should be considered in the context of new development.

As required by the Regulations, the strategic noise mapping for Cork County considers noise from major roads, and does not include noise from lower-flow roads. The lack of data at lower noise levels is a limitation in identifying areas that are truly undisturbed and provide public amenity.

In developing this Noise Action Plan, Cork County has not identified any Quiet Areas in open country as candidates for delimitation. The focus during the implementation of the Noise Action Plan will be on the long-term strategy and associated policy and actions outlined in **Section 9**. These include a policy principle to protect desirably quiet areas, consultation with the Agency, and subsequent consideration of their formal designation as Quiet Areas in open country. Responsible Aim RA_4 aims to assess and, where appropriate, propose Candidate Quiet Areas in open country for designation, in consultation with the Agency.

The process of delimiting a Quiet Area in open country is informed by an investigation by the Action Planning Authority. If the investigation identifies a benefit in delimiting an area as a Quiet Area in open country, the evidence is submitted to the Agency for consideration in consultation with the Minister. Successful applications result in the official delimitation of the Quiet Area in open country.

[30] European Parliament, Towards a comprehensive noise strategy, Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy, 2012

7.2 Other Considerations

A desirable outcome of the Regulations is for further increases in environmental noise to be prevented, where practicable, to support the objectives of sustainable development.

Therefore, it is for responsible authorities, including Local Authorities and An Bord Pleanála, to consider appropriate noise management measures, beyond the consideration of noise mitigation for the areas identified through the processes described in **Section 6**. This is consistent with National Planning Policy Objective 65, which supports the aims of the Regulations through national planning guidance.

The appropriate use of the planning system can be used to help avoid, or minimise, the adverse impacts of noise without placing unreasonable restrictions on development. There are two main scenarios in development where noise could be viewed as a material consideration:

1. **Bringing people to noise**

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

2. **Bringing noise to people**

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

To effectively employ the planning process for consistent noise exposure avoidance or mitigation, it is deemed beneficial to incorporate guidelines on noise exposure levels during the initial proposal and design phase of planning applications. Descriptions of guidance adopted by Cork County Council are set out below.

7.2.1 ProPG: Planning & Noise - New Residential Development

The *Draft Interim National Guidance for the Consideration of Transportation Noise in the Design of New Residential Development* (2021) (described in **Section 2.3.12**), which the Local Authorities have cognisance of, recommends that consideration is given to the potential impact of transportation noise in line with Professional Planning Guidance (ProPG) on Planning & Noise: New Residential Development (ProPG, 2017).

ProPG was published in May 2017 by the Acoustics and Noise Consultants (ANC), Chartered Institute of Environmental Health and UK Institute of Acoustics (IOA). Its primary goal is to aid in planning to deliver sustainable development by promoting good health and well-being in relation to noise. It encourages the use of good acoustic design process in and around proposed new residential development, having regard to national policy.

Any issues related to noise should be given consideration at the earliest stages of the development process to facilitate streamlined decision making in planning. ProPG follows a systematic, proportionate, risk based, two-stage, approach.

Stage One is an Initial Site Noise Risk Assessment which should be conducted to establish the level of risk from noise, not including any mitigation measures. There are four noise risk categories (negligible, low, medium and high). The outcome of this assessment should not directly inform a decision, rather to allow for the consideration of good acoustic design.

Stage Two is a full noise assessment including four recommended key elements:

- Element 1 - demonstrating a "Good Acoustic Design Process" avoiding "unreasonable" and preventing "unacceptable" acoustic conditions;
- Element 2 - observing "Internal Noise Level Guidelines";
- Element 3 - undertaking an "External Amenity Area Noise Assessment";
- Element 4 - consideration of "Other Relevant Issues".

To support proposals for a development an Acoustic Design Statements should be produced which will aid recommendations formulated by the decision maker.

7.2.2 Acoustic Ventilation and Overheating, Residential Design Guide (AVO)

In 2020 the ANC and IOA jointly published the Acoustic Ventilation and Overheating, Residential Design Guide (AVO), which provides an approach as to how the competing aspects of thermal and acoustic comfort can be managed, which is particularly important in situations where acoustic requirement may call for closed windows.

It is recommended in guidance for action planning authorities prepared by the Agency that AVO guidance should be used after reasonably practicable attempts to use good acoustic design to achieve the internal target levels recommended by the ProPG have been exhausted.

7.2.3 BS 8233:2014: Guidance on sound Insulation and Noise Reduction for Buildings

BS 8233:2014 is intended to provide recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of external noise sources. The guidelines for noise levels in a residential property are generally in accordance with WHO Guidelines for Community Noise and Night Noise Guidelines.

The standard suggests suitable internal noise levels within different types of buildings including residential dwellings for steady external noise sources. BS 8233:2014 recommended maximum ambient noise levels, as summarised **Table 16**.

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Table 16: BS 8233 Recommended Internal L_{Aeq} Target Levels for Overall Noise in the Design of a Building

Location	$L_{Aeq, 16hr}$ (0700-2300 hrs)*	$L_{Aeq, 8hr}$ (2300-0700 hrs)*
Living Rooms	35 dB	-
Dining Rooms	40 dB	-
Bedrooms	35 dB	30 dB

*see BS 8233:2014 for caveats and notes

Regarding noise levels in external amenity areas, BS 8233:2014 states:

"it is desirable that the steady state noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ …it is also recognized that these guideline values are not achievable in all circumstances."

BS 8233:2014 also provides guidance on appropriate internal noise levels within different types of workplaces such as offices. In designing buildings to control noise levels internally, BS 8233:2014 suggests the following sequence:

a) assess the site, identify significant existing and potential noise sources,
b) measure or estimate noise levels and evaluate layout options;
c) determine design noise levels for spaces in and around the building(s);
d) determine sound insulation of the building envelope, including the ventilation strategy;
e) identify internal sound insulation requirements;
f) identify and design appropriate noise control measures;
g) establish quality control and ensure good quality workmanship.

8 Prevention, Protection and Mitigation Measures

8.1 Introduction

The management of noise within the Cork County Council administrative area adopts three approaches:

1. **Prevention** – measures which seek to avoid additional members of the community being exposed to undesirable noise conditions. Preventative measures consist of planning policy in respect of not locating residential developments and other noise sensitive buildings in potentially noisy environments and in particular adjacent to transportation infrastructure.
2. **Protection** – relates to the preservation of environmental noise quality through the identification of Candidate Quiet Areas in open country, and the processes of investigating for delimitation as Quiet Areas in open country; and
3. **Mitigation Measures** – relates to the identification and prioritisation of appropriate mitigation measures to reduce and/or mitigate noise levels in areas where they are potentially harmful to human health.

8.2 Prevention

8.2.1 Planning Guidance

Applications for new residential developments in the Cork County Council administrative area will be assessed in accordance with the policies and goals outlined in the relevant Development Plans. Where applicable, these include adoption of the principles of Professional Planning Guidance (ProPG) on *Planning & Noise: New Residential Development*, as described in **Section 7.2.1**.

Where the assessment outcome determines the likelihood of an adverse noise impact, planning applications should be supplemented by an Acoustic Design Statement carried out by appropriately qualified acousticians and competent persons[31]. The Acoustic Design Statement should demonstrate that all facets of ProPG have been followed.

8.2.2 Noise and the Public Realm

A healthy acoustic environment in public areas depends on environmental noise levels as well as a variety of subjective factors such as the intended use of space, the preferences of people, their expectations and their attitudes and sensitivity to the sounds they hear. The management of

[31] The Council's definition of competent persons is based on the EPA's interpretation in their Guidance Note for Noise in Relation to Scheduled Facilities.

environmental noise in the public realm should have a broad focus with a consideration of noise levels as well as the need to create the right acoustic environment for the right time and place.

There are synergies between the mitigation of traffic-related noise and air pollution because the source of emissions is often similar. Early input in the design of public spaces by considering air quality and the acoustic environment offers the opportunity to maximise the benefits of taking an integrated approach to design.

In designing public spaces to maximise the contribution in terms of maintaining good air quality, reducing environmental noise and improving the quality of sound then consideration should be given to measures including:

- Using novel environmentally friendly methods (e.g., Holistic and sustainable abatement of noise by optimized combinations of natural and artificial means (HOSANNA)[32], funded by the European Union Seventh Framework Programme, FP7/2007–2013[33]) such as barrier designs, the appropriate planting of trees, shrubs, or bushes, ground and road surface treatments, and greening of building façades and roofs;
- pedestrianising streets and the use of green infrastructure to reduce the likelihood of citizens being present in locations where air and noise pollution are highest, and creating attractive, accessible places where pollution levels are lower;
- providing options for active travel along routes other than beside busy roads, making walking and cycling increasingly attractive alternatives to private vehicle use. This will reduce citizens' exposure to air and noise pollution, and potentially vehicular emissions;
- providing and protecting tranquil outdoor environments and positive acoustic environments. This may reduce annoyance for citizens living near busy roads and ensure people have options other than being indoors when they want to enjoy respite from noise;
- encouraging exercise and other outdoor recreation to improve citizens health and well-being due to health risks posed by air and noise pollution; and
- providing alternative acoustic interventions to create new positive types of sounds that mask environmental noise.

[32] https://cordis.europa.eu/project/id/234306 [Accessed July 2024]
[33] https://eur-lex.europa.eu/EN/legal-content/summary/seventh-framework-programme-2007-to-2013.html [Accessed July 2024]

8.3 Protection: Areas to be Preserved for Environmental Noise Quality

Whilst no Candidate Quiet Areas in open country have been identified in this Noise Action Plan by Cork County as candidates for delimitation, the long-term strategy, policies and actions include a policy principle to protect desirably quiet areas and consider their formal designation as Quiet Areas in open country. Responsible Aim RA_4 aims to assess and, where appropriate, propose Candidate Quiet Areas in open country to the Environmental Protection Agency for designation. These are described in **Section 9**.

During the implementation of the Noise Action Plan, Cork County Council shall consider measures to ensure the environmental noise quality in Quiet Areas in open country are preserved, with careful management of activities that would impact the acoustic environment.

8.4 Mitigation: Areas to be Subject to Noise Management Activities

Priority Important Areas (see **Section 6.6**), have been identified within Cork County as those where noise management activities are to be considered during the implementation of the Noise Action Plan.

As noted in **Section 6**, the Priority Important Areas have been identified with respect to noise from major roads only, as the management of noise due to railways, airports and industrial activities are outside the scope of this Noise Action Plan and primarily with the associated authorities.

Considering the multitude and diversity of noise management options, choosing a noise mitigation measure necessitates evaluating its potential effectiveness in reducing noise exposure and adverse effects, while also considering its associated costs. The general steps in this process, which will be considered by the Action Planning Authority in consultation and collaboration with the NMBs during the implementation of the Noise Action Plan, are:

1. Noise measurements at Priority Important Areas.
2. Review of the assumptions used to identify the Priority Important Areas
3. Re-evaluation and confirmation of Priority Important Areas
4. Identification of practical noise mitigation measures
5. Appraisal of noise mitigation measures monetised benefits to health
6. Financial assessment of noise mitigation measures
7. Cost-benefit analysis
8. Recommendation of noise mitigation measure(s)

Each of these steps is further elaborated upon in the subsequent sections. The appraisal of the noise mitigation measures shall be undertaken during the implementation of the plan.

1. Noise measurements at Priority Important Areas

The assessment of Priority Important Areas is guided by an initial undertaking of noise measurements at locations representative of the area identified. The surveys will be conducted by the relevant Local Authority, and/ or other pertinent infrastructure owners.

The primary objective of the noise survey is to verify that the measured noise exposures accurately correspond to the results obtained from the strategic noise maps. The results of the noise measurements will service to authenticate the strategic noise models, providing a basis upon which the noise mitigation measures can be evaluated.

2. Review of the assumptions used to identify the Priority Important Areas

If disparities arise between the noise measurements and the results obtained from the strategic noise maps, investigations will be conducted into factors such as road surface, traffic speeds, traffic counts, presence of barriers etc, and these findings will be compared against the assumptions within the noise models utilised for development the strategic noise maps.

3. Re-evaluation of Priority Important Areas

A re-evaluation of the identified Priority Important Area to ensure the analysis is representative of the assessment year, and appropriate amendments to the model parameters have been incorporated. This is likely to be informed by consultation between the Action Planning Authority and NMBs, and may include re-running the adjusted noise model and/or a review of any noise measurements.

4. Identification of practical noise mitigation measures

Cork County Council, in consultation with NMBs will identify and agree on practical noise mitigation measures in relation to the Priority Important Areas that remain following steps 1-3 (above). The practicality of the measures will take into consideration its potential impact in terms of noise exposure and harmful effects reduction, planning, land-use, cost and available technology.

The noise mitigation measures are collectively described as a noise management framework, and can be considered both in isolation, and in combination. Consideration will also be given to measures that may result from existing road management projects and works programmes.

Examples of noise management frameworks for road traffic noise are displayed in the following figures: Figure 7: Road Traffic Noise Management Framework

5. Appraisal of noise mitigation measures monetised benefits to health

An assessment of the identified practical noise mitigation measures, which will likely include testing of the measures using the revised CNOSSOS-EU (or other appropriate methodology) detailed computational noise model to determine the noise exposure and health benefits of the measures.

In Ireland there is no recommended method for monetising the health benefits of noise mitigation measures. In the absence of an Irish method, the draft EPA Guidance recommends that appraisals use the UK environmental impact appraisal methodology within the English Department for Transport, Transport Analysis Guidance (WebTAG) to inform a cost benefit assessment.

WebTAG provides guidelines and tools for translating the expected benefits of road, rail and aviation mitigation measures into monetary terms. WebTAG is informed by noise calculation results for a year during the implementation of the plan (2024-2028) and a future year, (typically 15 years ahead), with

and without the noise mitigation measure(s) in place. The WebTAG noise workbook[34] calculates the monetary value of long-term effects on sleep disturbance, amenity (annoyance), AMI (acute myocardial infarction), stroke, and dementia during the daytime, and sleep disturbance at night.

The WebTAG outcomes provide the net present value of the noise level change resulting from the assessed mitigation scheme in Pounds Sterling. This value will require conversion to Euros using the prevailing exchange rate, enabling a comparison with the estimated implementation costs.

6. Financial assessment of noise mitigation measures

The estimated cost of implementing mitigation measure(s) will be determined, considering costs over the measure's lifetime, encompassing construction and maintenance expenses. The selection of specific mitigation measure(s) will result from an appraisal of their benefits to health, monetised accordingly. For example, road re-surfacing with respect to road traffic noise, whereby quiet road surfaces can be an effective way of reducing road traffic noise at receptors. The characteristics of a quiet road surface generally consist of its enhanced ability to absorb sound rather than reflect it, and a smoother surface so tyres encounter fewer irregularities.

The noise reduction of a quiet road surface can be between 1 – 5 dB[35] [36] when compared with a common dense asphalt concrete road surface type. Larger reductions are possible, particularly when replacing worn roads with optimised quiet road surfaces. The specific costs per square metre of a standard road surface compared with a quieter road surface can be commercially sensitive, however the Phenomena project (2021), discussed in **Section 2.2.5**, notes these cost increases can be 5-10%.

The financial assessment of noise mitigation would be developed through consultation between the Action Planning Authority, NMB and appropriate Local Authority departments.

7. Cost-benefit analysis

A comparison of benefits to health versus the cost of the noise mitigation measure. This is presented as a cost-benefit ratio (the ratio of costs over benefit). Cost-benefit ratios of less than 1.0 indicate the benefits to health outweigh the costs.

8. Recommendation of noise mitigation measure(s)

The final step in the process, which allows all of the noise mitigation scenarios to be compared through the outcomes of the cost-benefit analysis. The most cost-effective noise mitigation measures will be proposed in collaboration with NMBs and appropriate authorities, and will (subject to resources and funding) seek to be implemented.

[34] https://www.gov.uk/government/publications/tag-environmental-impacts-worksheets [Accessed July 2024]
[35] J. Sliggers: Road surface label, Push and Pull for Noise Emission Reduction from Road Traffic in the NLs and EU, Informal document GRB-65-27 (65th GRB, February 2017, agenda item 10)
[36] F. G. Praticò, F. Anfosso-Lédée, Trends And Issues In Mitigating Traffic Noise Through Quiet Pavements, Procedia - Social and Behavioral Sciences 53 (2012) 203 – 212

Figure 7: Road Traffic Noise Management Framework

9 Long-term Strategy

9.1 Noise Action Plan Implementation Commitments

This Noise Action Plan is supported by a four-year programme for implementation (2024-2028), with progress reported to the Agency on an annual basis.

The Noise Action Plan is underpinned by a set of overarching noise policy principles outlined in the **Noise Policy Statement**.

These noise policy principles are supported by general commitments (**Responsible Aims**) by Cork County Council.

9.1.1 Noise Policy Statement

Cork County Council will adopt a strategic approach to managing environmental noise from major roads with the following overarching policy principles:

- **Prevention** – manage the risk of additional members of the community being exposed to undesirable noise levels where it is likely to have significant adverse impact on health and quality of life.
- **Protection** - protect areas which are desirably quiet, or which offer a sense of tranquillity through a process of identification and validation followed by formal designation of 'Quiet Areas in open country'.
- **Mitigation Measures** – identify, and prioritise, appropriate mitigation measures to reduce noise levels where they are potentially harmful.

9.1.2 Responsible Aims

Responsible aims, which underpin the Noise Policy Statement:

- **RA_1 - Policy and Guidance Development** – Encourage the integration of noise considerations into the ongoing process of policy and guidance development, and actively promote existing policies and guidance related to noise.
- **RA_2 - Working Groups** – Participate in technical working groups pertinent to the implementation of the Environmental Noise Directive and with the assistance of the Environmental Protection Agency, a Round 4 Noise Action Plan Implementation Working Group shall be established.
- **RA_3 – Noise Mitigation** – In collaboration and consultation with relevant Noise Mapping Bodies, noise management interventions shall be applied on a priority basis during existing maintenance and improvement programs, where appropriate. This application will be based on a relevant evaluation of whole-life costs and benefits.
- **RA_4 – Protection** – Assess and, where appropriate, propose Candidate Quiet Areas to the Environmental Protection Agency for designation as Quiet Areas in open country by the Minister.

- **RA_5 – Prevention** – Evaluate and condition planning proposals for noise sensitive development near major noise sources.
- **RA_6 – Community Engagement** – Commit to proactive and inclusive engagement with communities and collaboratively address noise issues for the improvement of our shared living environment.
- **RA_7 – Manage Noise Complaints** – Review and respond to all environmental noise complaints in accordance with their Customer Charter.
- **RA_8 - Regulatory Engagement** – Report the progress on the implementation of Noise Action Plans, including the investigation and implementation of noise management measures in Priority Important Areas, and the assessment of Candidate Quiet Areas in open country for preservation of environmental noise quality, to the Environmental Protection Agency on an annual basis.

9.2 Key Round 5 Timetables

The Round 4 Noise Action Plan timetable is set out in **Section 1.5**, with the deadline for the submission of the Noise Action Plan to the European Environment Agency (EEA) on 18 January 2025.

Specific dates relating to Round 5 Noise Action Plans are to be determined, but are expected to be:

- 18 July 2028: Deadline for noise action plans
- 18 August 2028: Deadline for publishing noise action plans
- 18 August 2028: Summaries of noise action plans submitted to the Agency
- 18 January 2029: Noise actions plans to be reported to the EEA by the Agency

10 Round 4 Noise Action Plan Implementation

The implementation of the Noise Action Plan spans a four-year time frame, beginning in 2024. Key measures and actions associated with its implementation have been developed which reflect the policy principles set out in the **Noise Policy Statement** (**Section 9.1.1**) and in support of the **Responsible Aims** (**Section 9.1.2**), and with reference to key regulatory dates.

10.1 Key Mitigation and Protection Measures

An overview of the general prevention, protection and mitigation measures that could be considered for the management of noise from major roads within the Cork County Council administrative area is presented within **Section 8**.

This section considers those measures in a local context, together with key local noise management related policy guidelines and local and regional projects and set out the framework that Cork County Council intends to follow to help manage and mitigate the effects of exposure to environmental noise.

The environmental noise management measures within the framework are presented across the three policy principle categories covered by the **Noise Policy Statement**, together with a fourth supporting 'General' category as follows;

- General – Noise Management Measures
- Prevention – Noise Management Measures
- Protection – Noise Management Measures
- Mitigation – Noise Management Measures.

In some instances, measures do not necessarily stand in isolation and may be relevant for, or overlap, with other categories.

Furthermore, the measures collectively support the **Responsible Aims** which underpin the **Noise Policy Statement**.

When considering the broader framework of measures and actions aimed at mitigating exposure to environmental noise from the transport and industry sectors, it is important to emphasize that Cork County Council, in some instances, does not have exclusive ownership or influence over certain noise sources, areas, and the measures presented in this Noise Action Plan. Many of the measures and actions will require input, collaboration, and/or execution by other infrastructure owners, along with support from government departments and bodies through relevant legislation and funding.

In addition to third-party collaboration, the successful implementation of this Noise Action Plan will also depend on the availability of adequate resources to execute the proposed measures and actions.

The measures are described below across each of the four categories.

10.1.1 General – Noise Management Measures

General noise management measures cover a range of activities to support the implementation of the Noise Action Plan including other measures across the three policy principal categories.

Measure CCC_M1: Support the Development of National Noise and Other Related Policy and Guidance

At present there is no national policy relating specifically to noise other than specific objectives set out within a range of national plans and strategies such Policy Objective 65 from the National Planning Framework 2040. Furthermore, there is no adopted consistent approach for Local Authorities to apply in the evaluation of noise issues at the planning application stage. Some have developed their own guidelines, and many apply the ProPG approach which is used within the UK. Development of national policy and guidelines will be the responsibility of the Department of Environment, Climate and Communications (DECC).

In addition to specific national policy and guidance relating to noise, other national policy and guidance can have an indirect impact on noise related issues. An example includes the National Speed Limit Review lead by the Department of Transport and published in September 2023.

Cork County Council l will actively support and engage with the development of national policy and guidance dealing with environmental noise, planning and noise, and transportation noise, if and as proposed by the relevant national bodies, including the Department of Environment, Climate and Communications (DECC), Department of Housing, Local Government and Heritage (DHLGH) and Department of Transport (DoT).

Measure CCC_M2: Noise Action Plan Working Group(s)

Cork County Council will support the establishment of relevant noise working groups both within Cork County Council to co-ordinate the activities and actions from the Noise Action Plan, and with Cork City Council as part of the wider Cork Agglomeration to co-ordinate and collaborate with the relevant NMBs in respect of noise management issues in general and mitigation measures at a Priority Important Area level.

Measure CCC_M3: Annual Report to Environment Protection Agency (EPA)

Cork County Council will prepare an annual report for the Agency setting out progress made in respect of the implementation of the Noise Action Plan. Cork County Council will liaise with relevant third-party infrastructure owners in respect of progress made by them with implementing actions that may be relevant for them and their infrastructure.

Measure CCC_M4: Continued Investigation and Management of Noise Complaints

Cork County Council's Environment Section investigates complaints under the provisions of the Environmental Protection Agency Act 1992 (Noise) Regulations 1994. The Unit has regard to best international best practice guidelines and standards.

Measure CCC_M5: Stakeholder Collaboration

Cork County Council's Environment Section actively collaborates with a number of stakeholders in relation to potential and existing air and noise nuisances:

- **EPA - IPC Licences** - The Environmental Section collaborates with the Agency in the investigation of noise complaints.
- **Irish Rail** - The Environment Section liaises with Irish Rail as required in relation to complaints, night time works, and infrastructure projects which may increase noise levels.
- **TII & National Roads Office** – The Environment Section liaises with TII and the National Roads Office in relation to noise complaints within the county boundary.

Measure CCC_M6: Ongoing Community Engagement

A key requirement in the development of the strategic noise maps and Noise Action Plan is that the information is made available to the public in a clear, comprehensible, and accessible manner. Furthermore, the public should be consulted on the preparation of the Noise Action Plan, provided with the opportunity to participate and comment on the *draft* Noise Action Plan, and the feedback from public engagement should be considered when finalising the Noise Action Plan.

The strategic noise maps, together with background information, will be published on the Cork County Council website and a period of formal public consultation held on the *draft* Noise Action Plan. Furthermore, engagement will be on-going through the elected representatives of Cork County Council through the relevant Strategic Policy Committee and Local Area Committee meetings.

As part of the implementation of the Noise Action Plan, it is proposed to continue with, and build on this public engagement as part of the evaluation of the Priority Important Areas and also through engagement on relevant existing Plans and Projects.

10.1.2 Prevention – Noise Management Measures

Measure CCC_M7: Planning Application Advice, Conditioning and Enforcement

Cork County Council's Environment Section consults directly with the Planning Department advising on planning applications and enforcement of planning conditions in relation to noise emissions and have standard planning conditions in relation to the construction and operation stages of development for this purpose.

In reviewing and advising on planning applications the Environment Section will give due consideration to the existing strategic noise maps and this Noise Action Plan and in particular any Candidate Quiet Areas in open country.

10.1.3 Mitigation – Noise Management Measures

<u>Existing Plans, Projects and Strategies</u>

Measure CCC_M8: Support the Implementation of Other Relevant Plans, Projects and Strategies

There are a number of existing plans, projects and strategies which aim to deliver more sustainable infrastructure and services for the County of Cork and its surrounding areas. The successful implementation of these will bring indirect benefits for noise reduction through encouraging more sustainable modes of transport in combination with reduced traffic volumes. Key examples with noise benefit synergies include;

- the Cork Metropolitan Area Transport Strategy 2040 (CMATS)
- the Cork County Climate Action Plan 2024-2029

This measure aims to work collaboratively with each of these to support their implementation and engage on aspects for noise management and benefits.

10.2 Noise Management Framework – Summary of Actions

A summary of the proposed noise management measures is set out in **Table 17** below together with details of the proposed action(s) for each.

The table also sets out the **Responsible Aims** that each measure helps to support through the implementation of the Plan.

Table 17: Noise Management Framework – Summary of Actions

Measure	Responsible Aim (RA)	Measure Description	Action
General – Noise Management Measures			
CCC_M1	1 & 5	Support the Development of National Noise and Other Related Policy and Guidance	Support the Department of Environment, Climate and Communications (DECC), Department of Housing, Local Government and Heritage (DHLGH) and Department of Transport (DoT), and other government departments and bodies, in the development of national policy and guidance related to environmental noise, planning and noise, and transportation noise, and assist in their implementation once in place.
CCC_M2	2, 3, 4 & 5	Noise Action Plan Working Group(s)	Support the establishment of and participate in relevant Noise Working Groups established to deliver the Noise Action Plan
CCC_M3	8	Annual Report to Environment Protection Agency (EPA)	Prepare an annual progress report regarding the implementation of the Noise Action Plan and submit it to the EPA.
CCC_M4	5 & 7	Continued Investigation and Management of Noise Complaints	Review and investigate all noise complaints received in a timely manner and in accordance with national and international best practice.
CCC_M5	3, 4 & 5	Stakeholder Collaboration	Continue liaison and collaboration with a range of key stakeholders to address noise-related issues and complaints to ensure the effective management of noise from related industry and infrastructure sites.

CCC_M6	3, 4, 5 & 6	Ongoing Community Engagement	Publish the final Noise Action Plan and provide updates on the progress made with its implementation.
Prevention – Noise Management Measures			
CCC_M7	5	Planning Application Advice, Conditioning and Enforcement	Review relevant planning applications for noise related issues in the context of existing strategic noise maps, this Noise Action Plan and existing or Candidate Quiet Areas in open country and condition developments as appropriate to manage impacts on ambient noise levels.
Mitigation – Noise Management Measures			
Existing Plans, Projects and Strategies			
CCC_M8	3 & 5	Support Implementation of Other Relevant Plans, Projects & Strategies	Collaborate with relevant Cork County Council sections and 3rd Party organisations to support the implementation of the following; • the Cork Metropolitan Area Transport Strategy 2040 • the Cork County Council Climate Action Plan 2024-2029

10.3 Programme of Works

A summary of the proposed noise management measures is set out in **Table 17** together with details of the proposed action(s) for each. The table also sets out the **Responsible Aims** that each measure helps to support through the implementation of the Plan.

Table 18 provides a summary of the Cork County Council measures in respect of their timescale for implementation over the period of the Plan and beyond, and the **Responsible Aims** which the measure supports, as set out in **Section 9.1.2**.

The timescales presented relate to the period of the Noise Action Plan, 2024 - 2028, and beyond, with the following definitions assumed;

- "Short term" indicates implementation by 2026
- "Medium-term" indicates implementation by 2030
- "Long-term" indicates implementation beyond 2030.

The establishment of the Cork County Council and Noise Action Plan working groups will significantly improve the co-ordination and collaboration across all parties and will be essential to ensure successful implementation of the measures within and beyond the life of the Noise Action Plan.

Implementation is subject to resources, appropriate funding being made available and collaboration with relevant key stakeholders and infrastructure owners.

As part of the Round 5 noise action planning process, the progress of Round 4 will be evaluated.

Table 18: Noise Action Plan Implementation

Measure	Responsible Aim (RA)	Measure Description	Timescale	Implementation Period
General – Noise Management Measures				
CCC_M1	1 & 5	Support the Development of National Noise and Other Related Policy and Guidance	Short- Long-term	2024-2028
CCC_M2	2, 3, 4 & 5	Noise Action Plan Working Group(s)	Bi-annual	2024-2028
CCC_M3	8	Annual Report to Environment Protection Agency (EPA)	Annual	2024-2028
CCC_M4	5 & 7	Continued Investigation and Management of Noise Complaints	On-going	2024-
CCC_M5	3, 4 & 5	Stakeholder Collaboration	On-going	2024-
CCC_M6	3, 4, 5 & 6	Ongoing Community Engagement	As required	2024-2028
Prevention – Noise Management Measures				
CCC_M7	5	Planning Application Advice, Conditioning and Enforcement	On-going	2024-
Mitigation – Noise Management Measures				
Existing Plans, Projects and Strategies				
CCC_M8	3 & 5	Support Implementation of Other Relevant Plans, Projects & Strategies	On-going	2024-

11 Consultation Responses

Cork County Council prepared the *Cork County Council: Draft Noise Action Plan 2024-2028 (15570A-20-R01-05-F03, 5 December 2024)*, which was issue for public consultation 6 December 2024, with submissions accepted until 5pm, Friday 17 January 2025.

Below is a summary of the public submission and response, including those associated with external sources.

11.1 Public Submissions

During the period of public consultation, no public consultation responses were received.

11.2 External Submissions

In addition to the public consultation, external sources were contacted by Cork County Council inviting submissions on the *Cork County Council: Draft Noise Action Plan 2024-2028.*

Two submissions were received, and the responses to them are set out in **Table 19**.

Table 19: Consultation Responses: External Sources

External Source	Summary of Submission	APA Response	Action
Transport Infrastructure Ireland (TII)	Transport Infrastructure Ireland made two observations in relation to the implementation of the Noise Action Plan, the execution of any related mitigation measures and the responsibility for same.	The observations are noted and it is noted that there are ongoing engagements at national level in relation to same.	Amendments to the NAP

Appendix A: Glossary of Acoustic and Technical Terms

Noise is defined as unwanted sound. Human hearing is able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner than approximates the response of the human ear, a weighting mechanism is used, which reduces the importance of lower and higher frequencies in a similar manner to human hearing.

The weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) according to the parameter being measured. The glossary explains the acoustic terminology that is used in this Report. The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels found commonly in the environment is given in **Table A.1**

Table A.1 - Typical sound levels found in the environment.

Sound Pressure Level, dB(A)	Location
0	Threshold of hearing
20 to 30	Quiet bedroom at night
30 to 40	Living room during the day
40 to 50	Typical office
50 to 60	Inside a car
60 to 70	Typical high street
70 to 90	Inside factory
100 to 110	Burglar alarm at 1m away
110 to 130	Jet aircraft on take off
140	Threshold of pain

The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations. The indices and parameters used in this report are defined below:

A-weighting	A frequency weighting applied to measured or predicted sound levels in order to compensate for the non-linearity of human hearing.
Acoustic environment	Sound at the receiver from all sources of sound as modified by the environment, as defined in ISO 12913-1:2014.
CNOSSOS-EU: 2020	The common noise assessment method according to the END.
CRTN 1988	The noise calculation method Calculation of Road Traffic Noise 1988.
dB (decibel)	The unit of sound pressure level, calculated as a logarithm of the intensity of sound. 0 dB is the threshold of hearing, 120 dB is the threshold of pain. Under normal circumstances, a change in sound level of 3 dB is just perceptible. A change of 1 or 2 dB is detectable only under laboratory conditions. A change of 10 dB corresponds approximately to halving or doubling the loudness of sound.
Design Goal	A target limit for noise or vibration adopted during the early design stages of a project, not necessarily having a statutory basis but based on current best practice and the particular circumstances of a given scheme.
Do Minimum	Describes a scenario under which a road scheme that is under consideration does not proceed (sometimes referred to as "Do Nothing").
Do Something	Describes a scenario under which a road scheme that is under consideration proceeds.
EEA	European Environment Agency.
END	Environmental Noise Directive.
EPA	Environmental Protection Agency. .
Free Field	Free field noise levels are measured or predicted such that there is no contribution made up of reflections from nearby building façades.
$L_{eq,T}$	The equivalent continuous sound level - the sound level of a steady sound having the same energy as a fluctuating sound over a specified measuring period T.
L_{den}	The day-evening-night composite noise indicator adopted by the EU for the purposes of assessing overall annoyance. Equation below.
L_{day}	The A-weighted long term average sound level as defined in ISO1996-2: 2017, determined over the day periods over a long-term period (e.g. a year).

$$L_{den} = 10\lg\frac{1}{24}\left(12*10^{\frac{L_{day}}{10}} + 4*10^{\frac{L_{evening}+5}{10}} + 8*10^{\frac{L_{night}+10}{10}}\right)$$

$L_{evening}$	The A-weighted long term average sound level as defined in ISO1996-2: 2017, determined over all the evening periods over a long-term period (e.g. a year).
L_{night}	The A-weighted long term average sound level as defined in ISO1996-2: 2017, determined over all the night periods over a long-term period (e.g. a year).
NAP	Noise Action Plan.
NPO	National Policy Objective in the National Development Plan.
NRA	National Roads Authority.
NTA	National Transport Authority.
PCQA	Potential Candidate Quiet Area.
Soundscape	The acoustic environment as perceived or experienced and/or understood by a person or people, in context, as defined in ISO 12913-1:2014.
Soundwalk	A walk with a focus on the listening environment.
TII	Transport Infrastructure Ireland.
WebTAG	Transport analysis guidance tool for the proposal of policies and interventions to ensure a consistent approach in transport appraisal

Appendix B: Most Important Areas, and Priority Important Areas

Figure 8: Most Important Areas (MIAs)

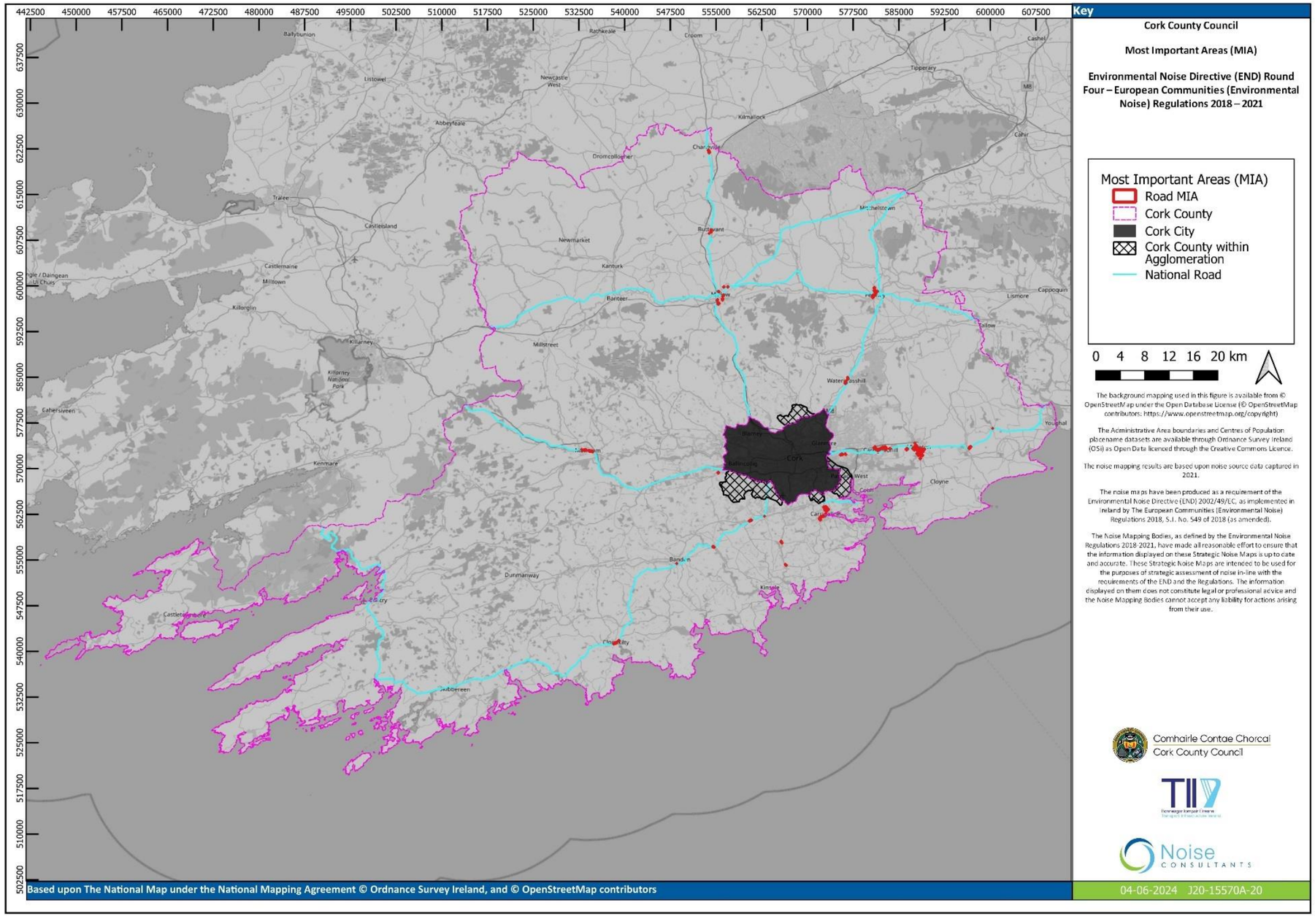


Figure 9: Priority Important Areas (PIAs)

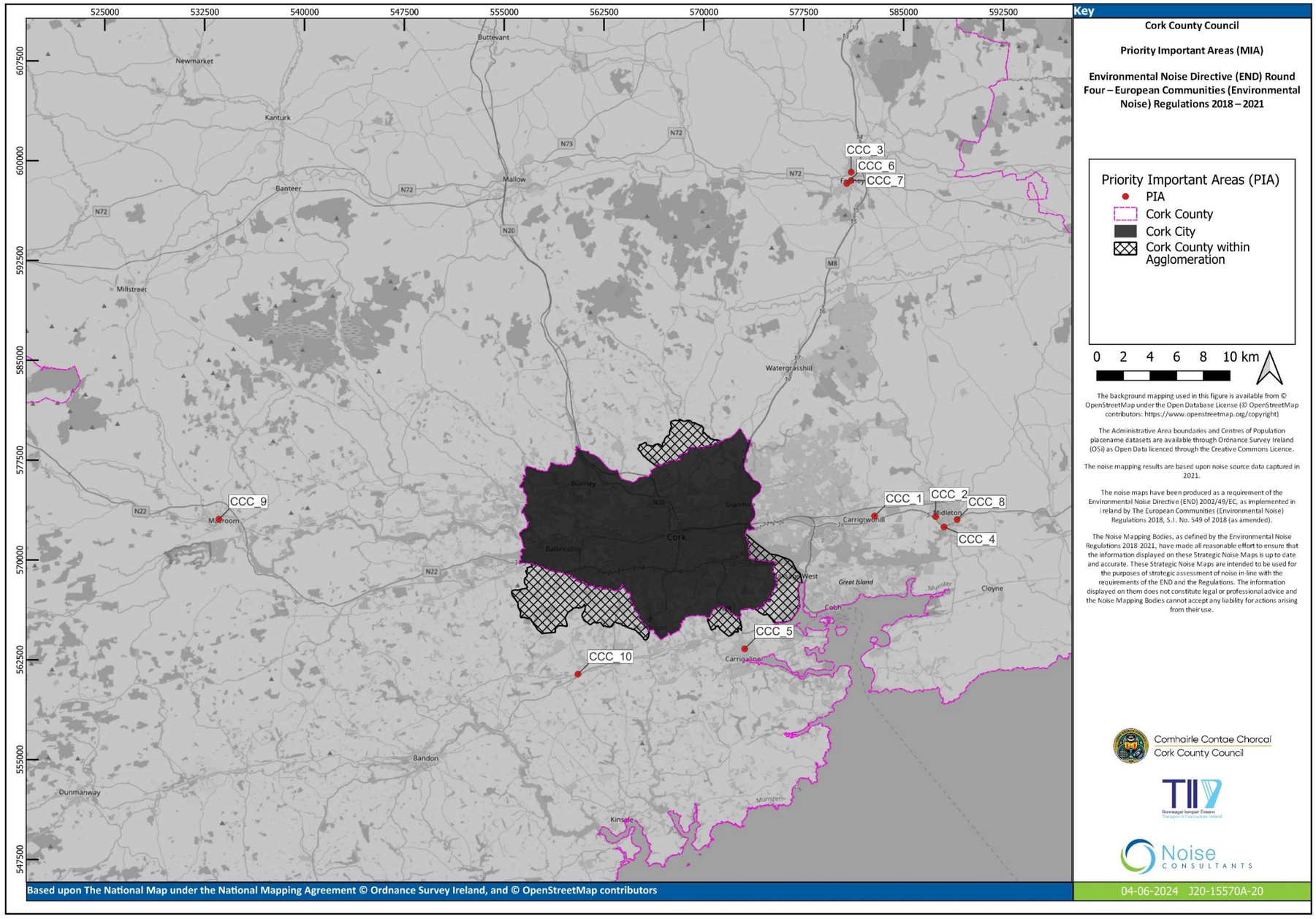


Table 20: CCC Priority Important Area (PIA) Summary

PIA	Source	MIA Criterion (People HA per 100m²)	Area (m²)	Total Population*	Harmful Effects Statistics**			Number of People Above Important Areas Guideline Value***	
					HA	HSD	IHD	Major Road 53dB L_{den}	Major Road 45dB L_{night}
CCC_1	MAJOR ROAD	15	59,500	652.87	137.57	45.77	0.16	652.87	652.87
CCC_2	MAJOR ROAD	15	27,200	241.92	61.82	20.5	0.08	241.92	241.92
CCC_3	MAJOR ROAD	15	19,900	183.96	55.61	18.83	0.07	182.46	181.46
CCC_4	MAJOR ROAD	15	10,000	130.42	32.49	10.8	0.04	130.42	130.42
CCC_5****	MAJOR ROAD	15	7,600	312.89	78.70	26.07	0.09	309.49	309.49
CCC_6	MAJOR ROAD	15	10,800	113.21	34.99	12.02	0.04	113.21	113.21
CCC_7	MAJOR ROAD	15	13,900	105.35	20.72	6.8	0.02	103.53	103.53
CCC_8	MAJOR ROAD	15	14,800	100.27	29.49	9.92	0.04	97.03	97.03
CCC_9	MAJOR ROAD	15	5,900	85.81	33.13	11.62	0.04	85.81	85.81
CCC_10	MAJOR ROAD	15	11,200	80.78	18.24	5.97	0.02	80.78	80.78

* Total population inside all Most Important Areas (MIAs) associated with the Priority Important Area (PIA)

** The harmful effects presented in this table are determined from a statistical approach across the whole population covered by the noise maps, and should not be considered to be an accurate assessment of the possible health effects at any specific building

*** The total population that are exposed to noise levels above the Important Areas guideline value within the MIA(s) associated with the PIA

**** CCC_5 consists of three identified MIA in close proximity combined

Figure 10: Priority Important Areas (PIAs)

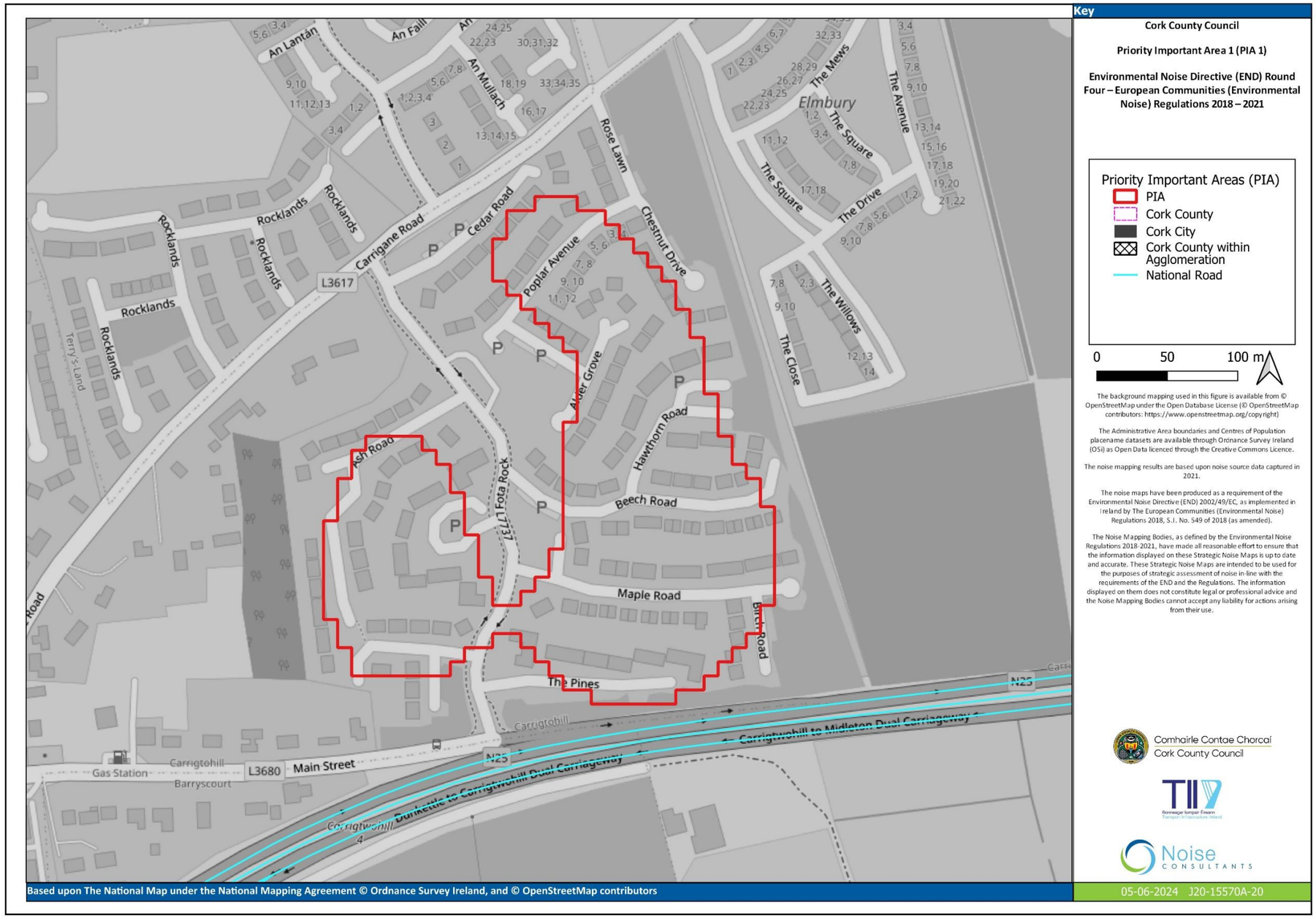


Figure 11: Priority Important Areas (PIAs)

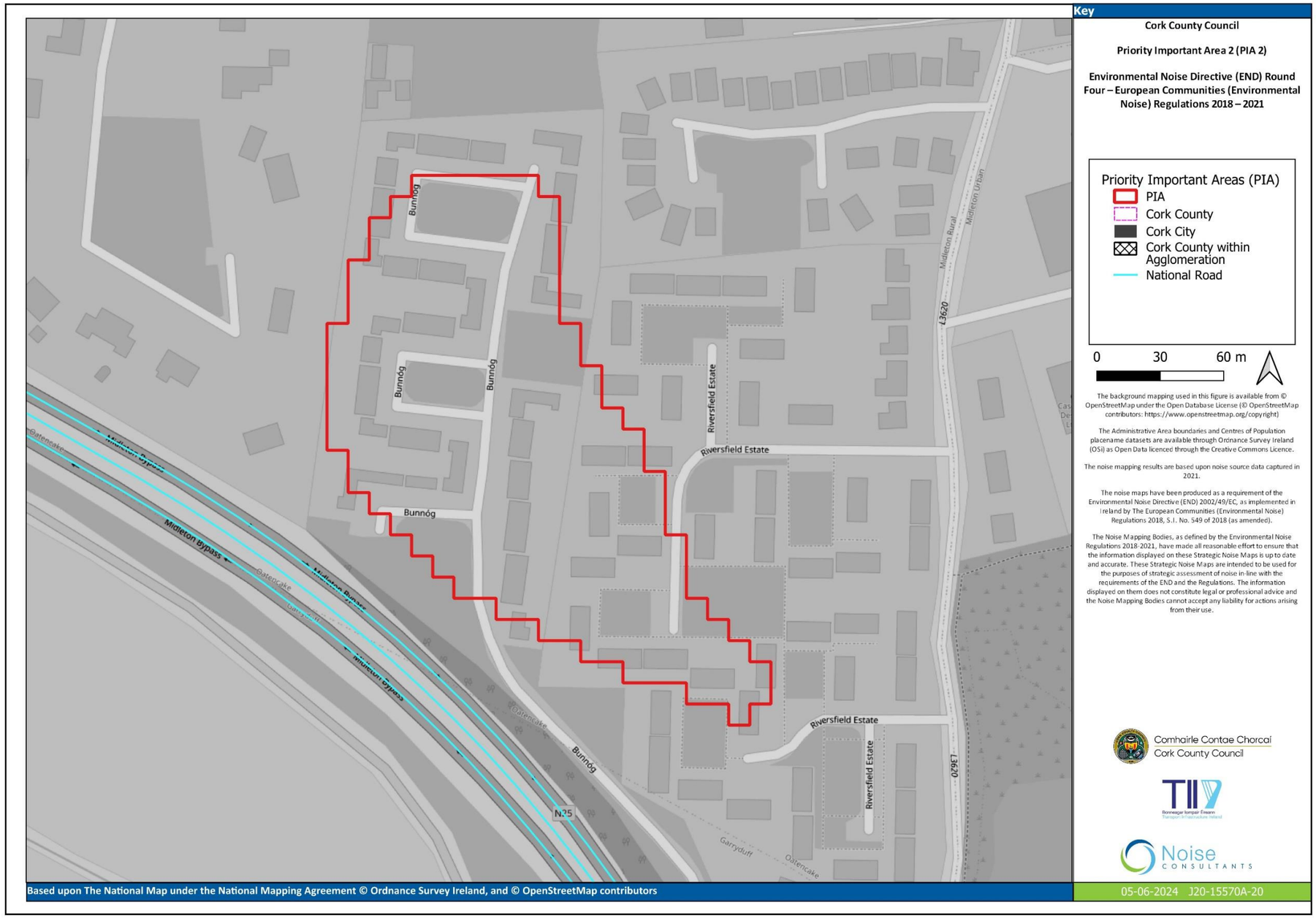


Figure 12: Priority Important Areas (PIAs)

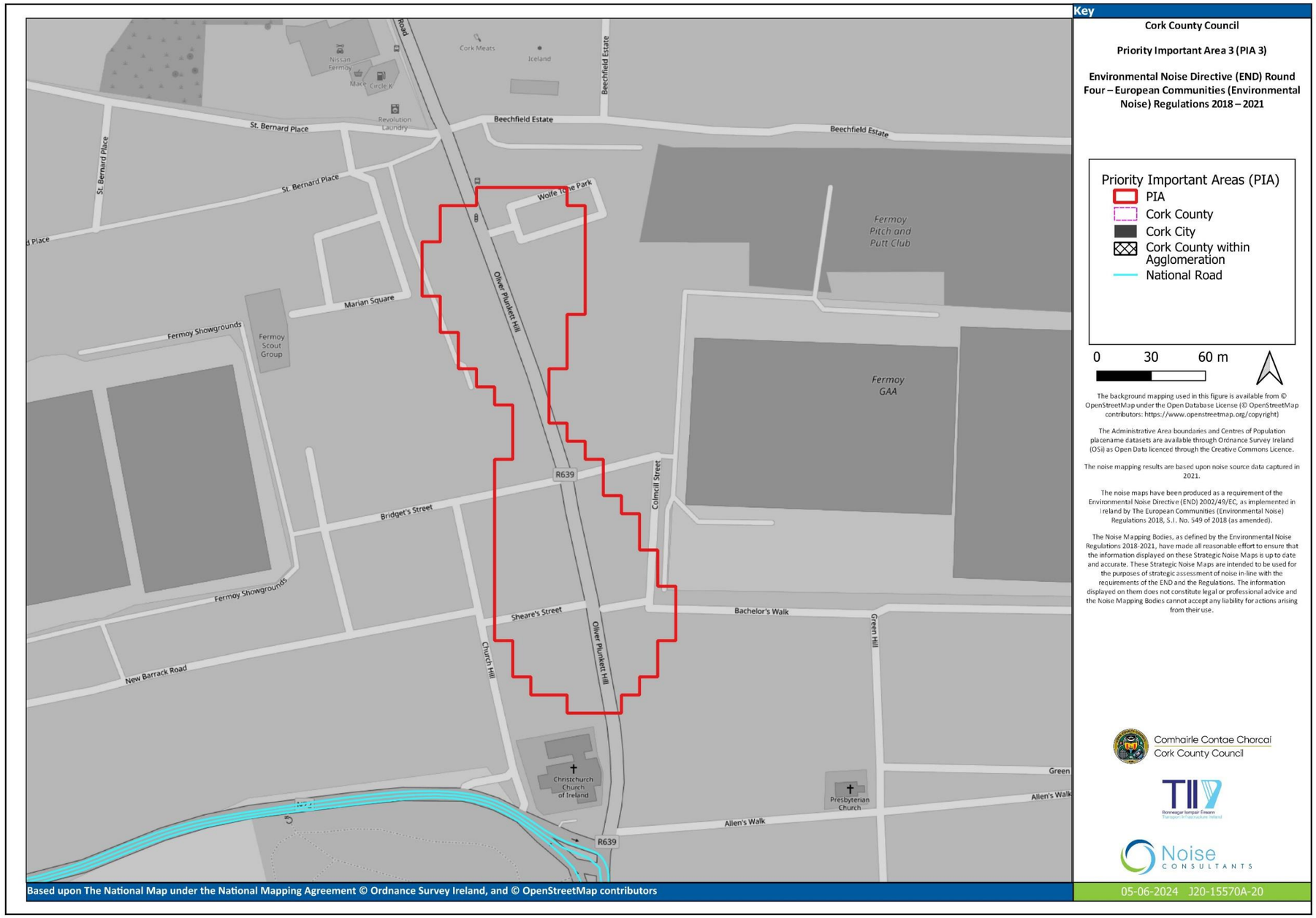


Figure 13: Priority Important Areas (PIAs)

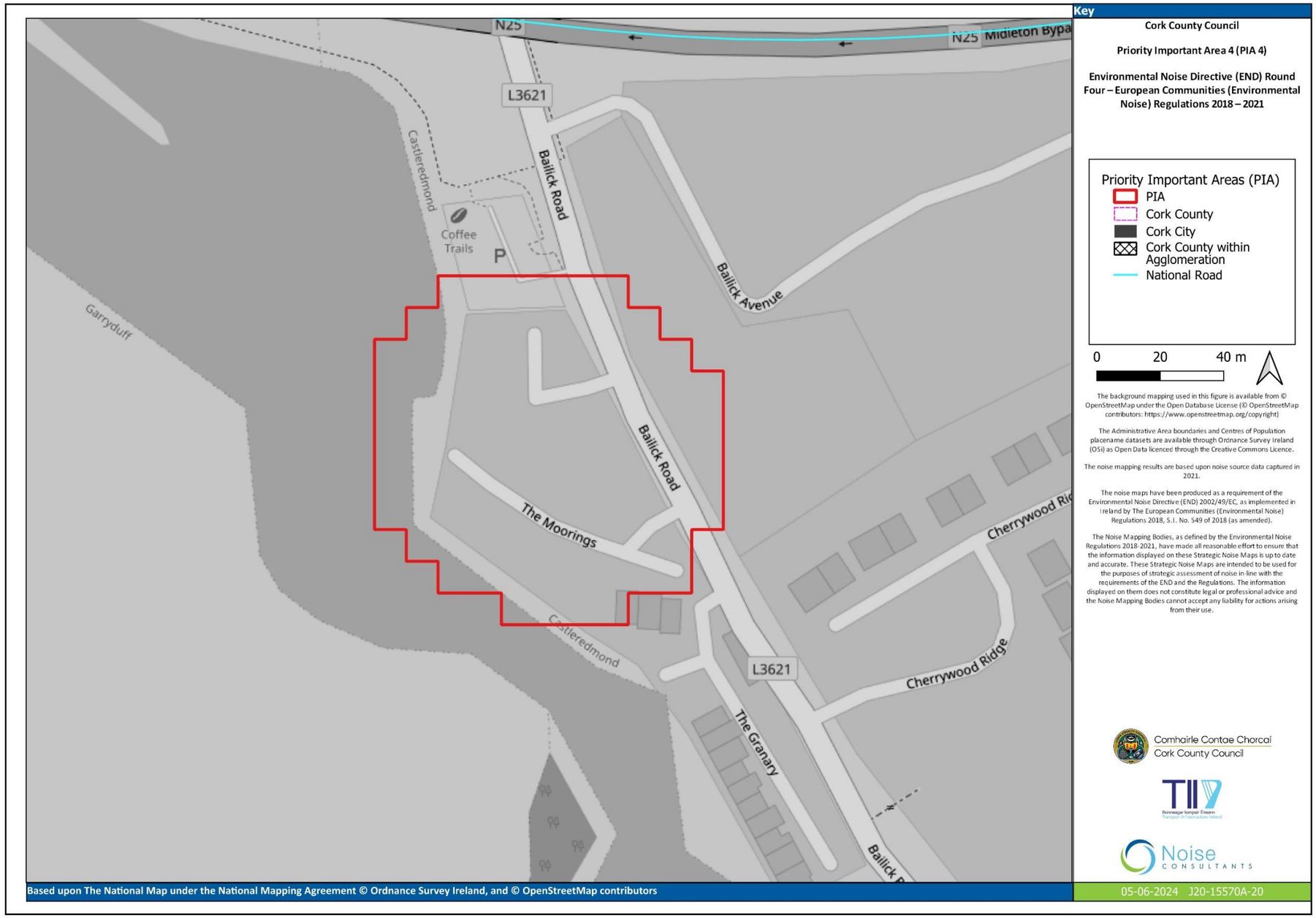


Figure 14: Priority Important Areas (PIAs)

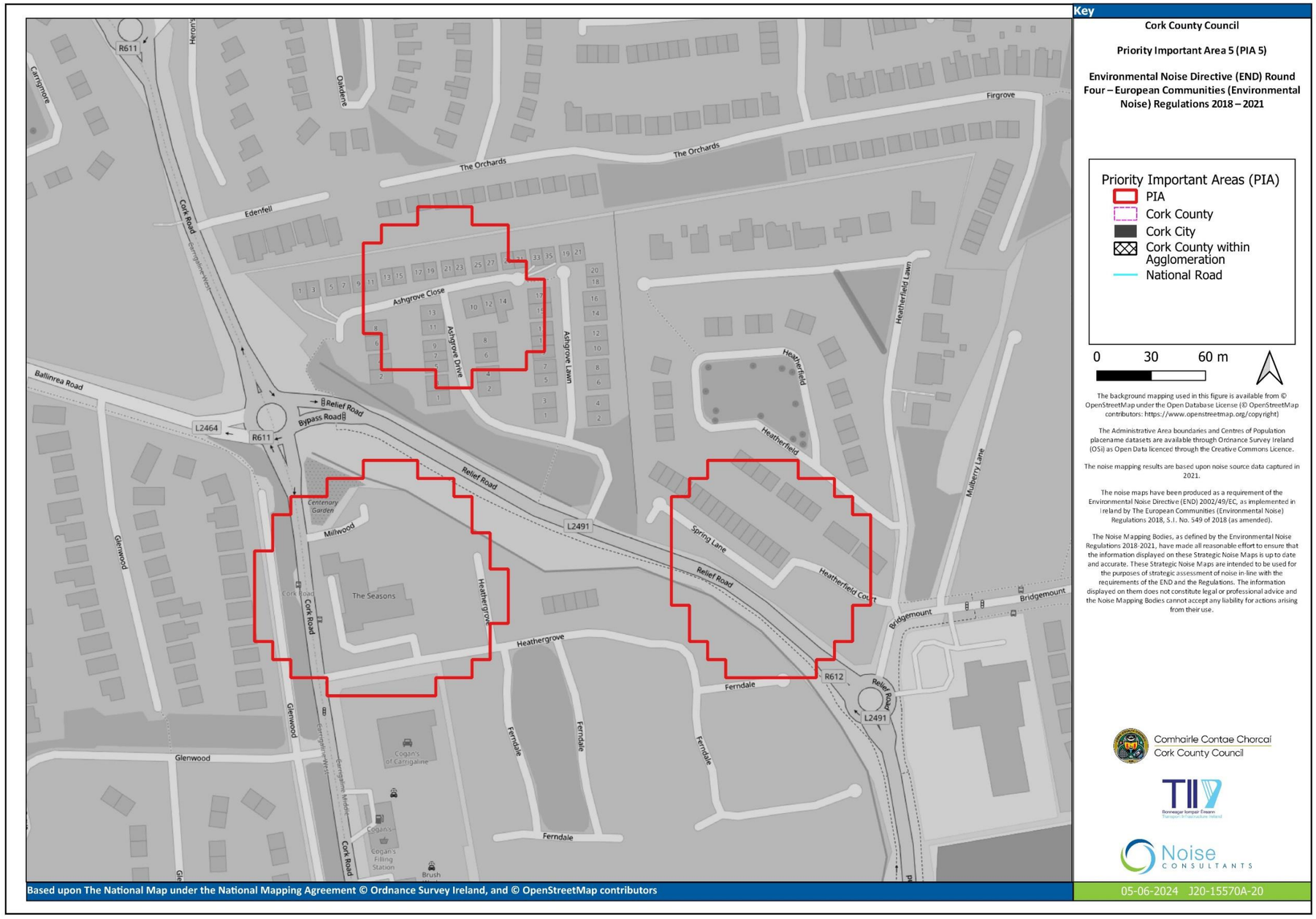


Figure 15: Priority Important Areas (PIAs)

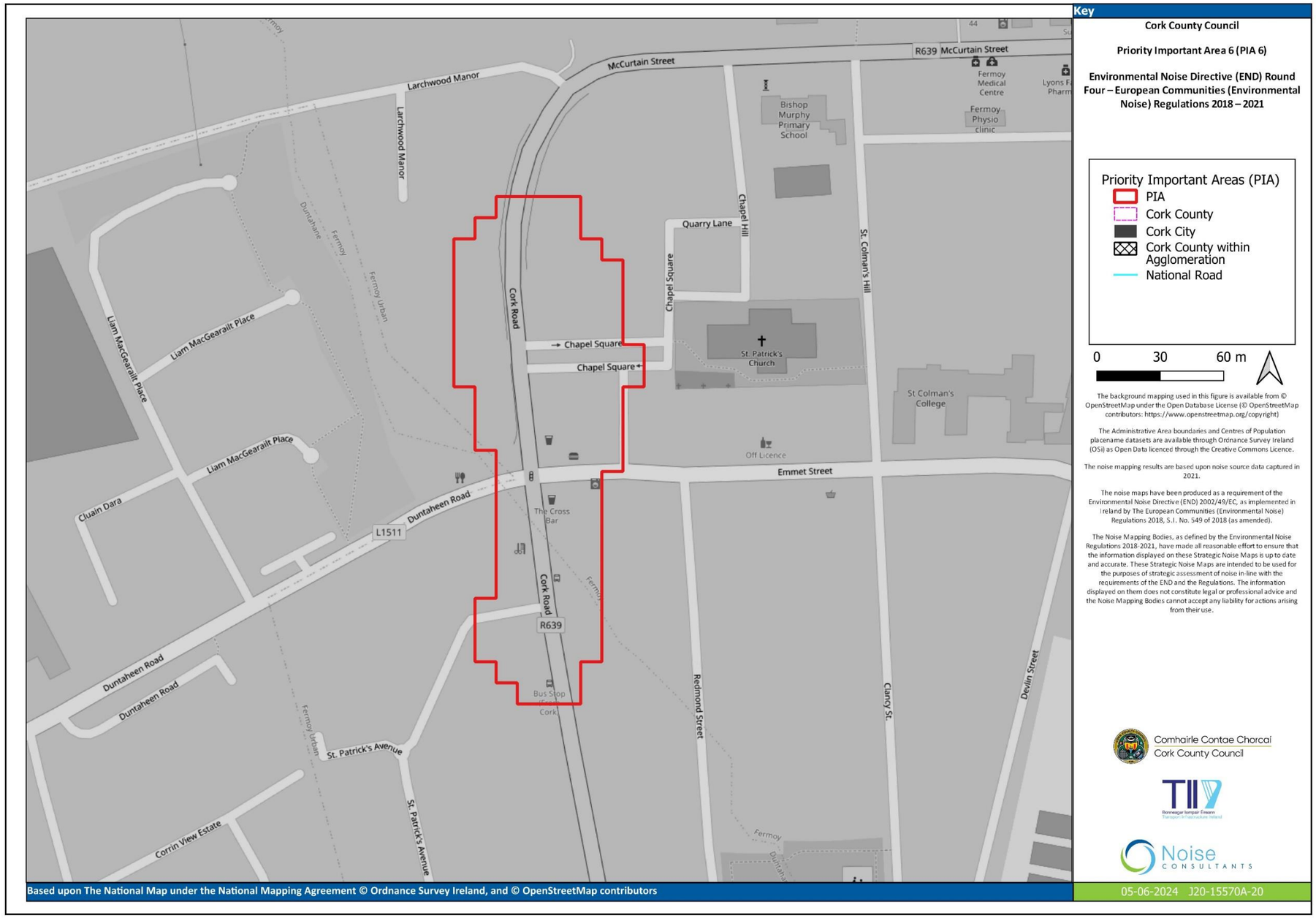


Figure 16: Priority Important Areas (PIAs)

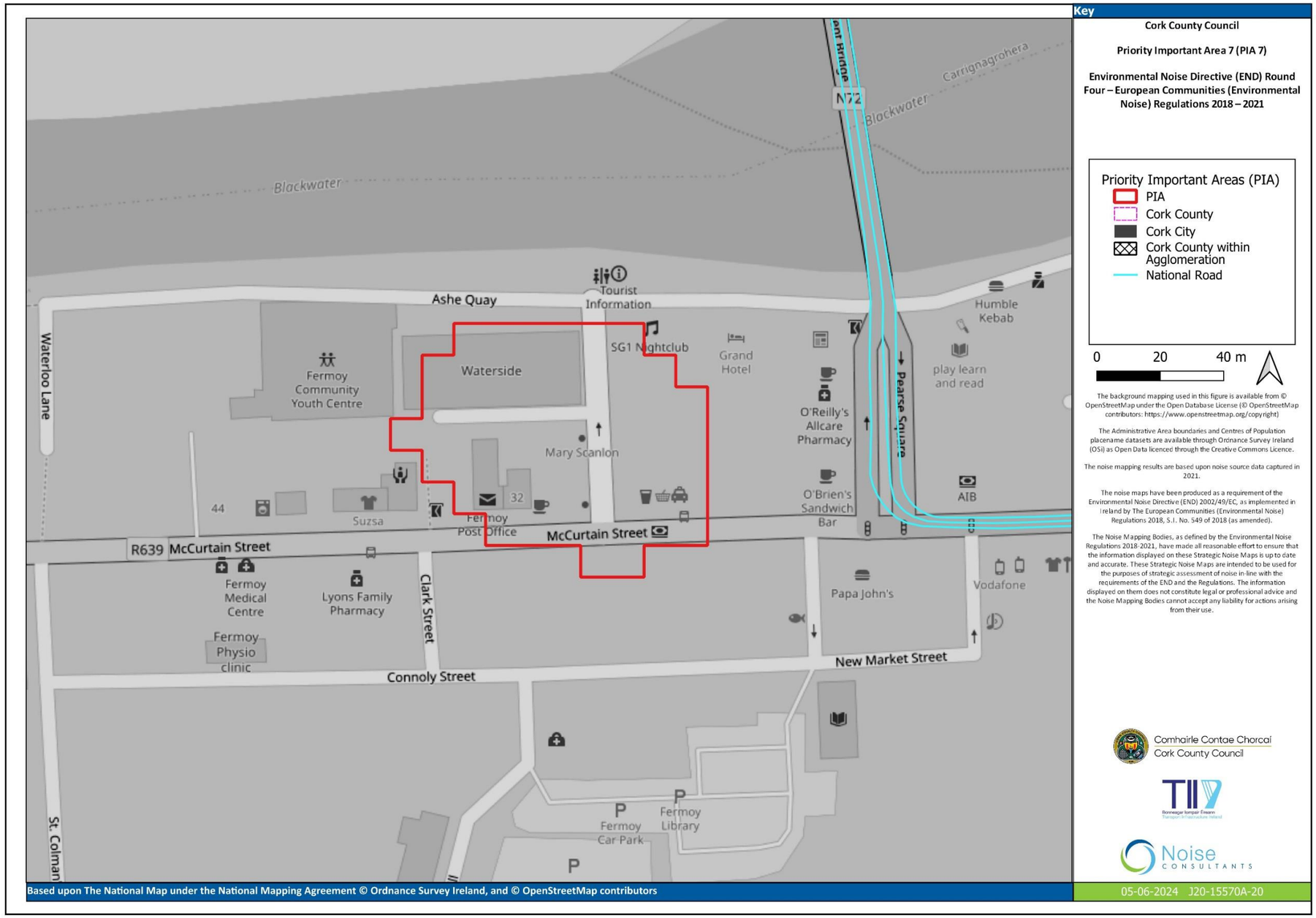


Figure 17: Priority Important Areas (PIAs)

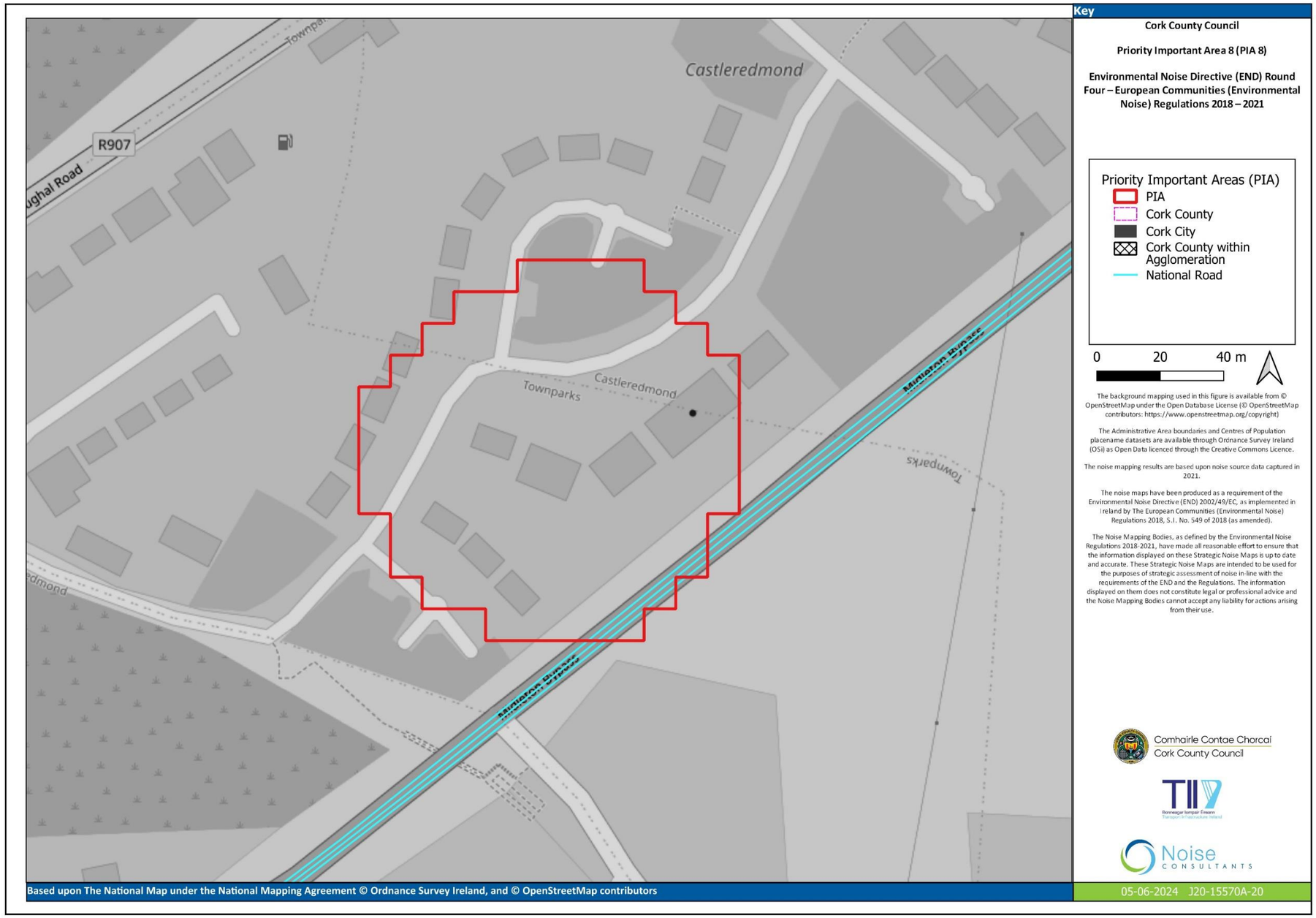


Figure 18: Priority Important Areas (PIAs)

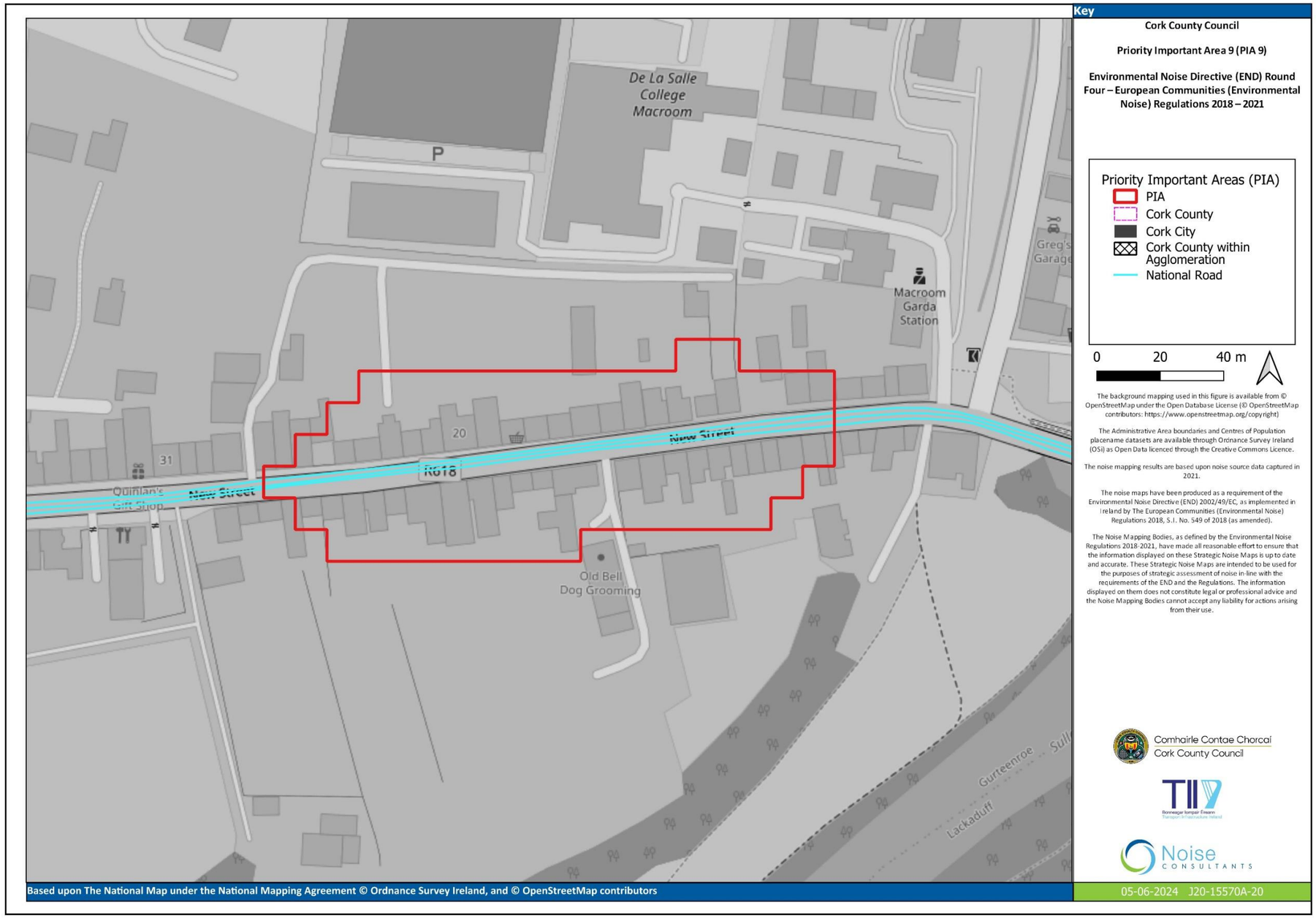
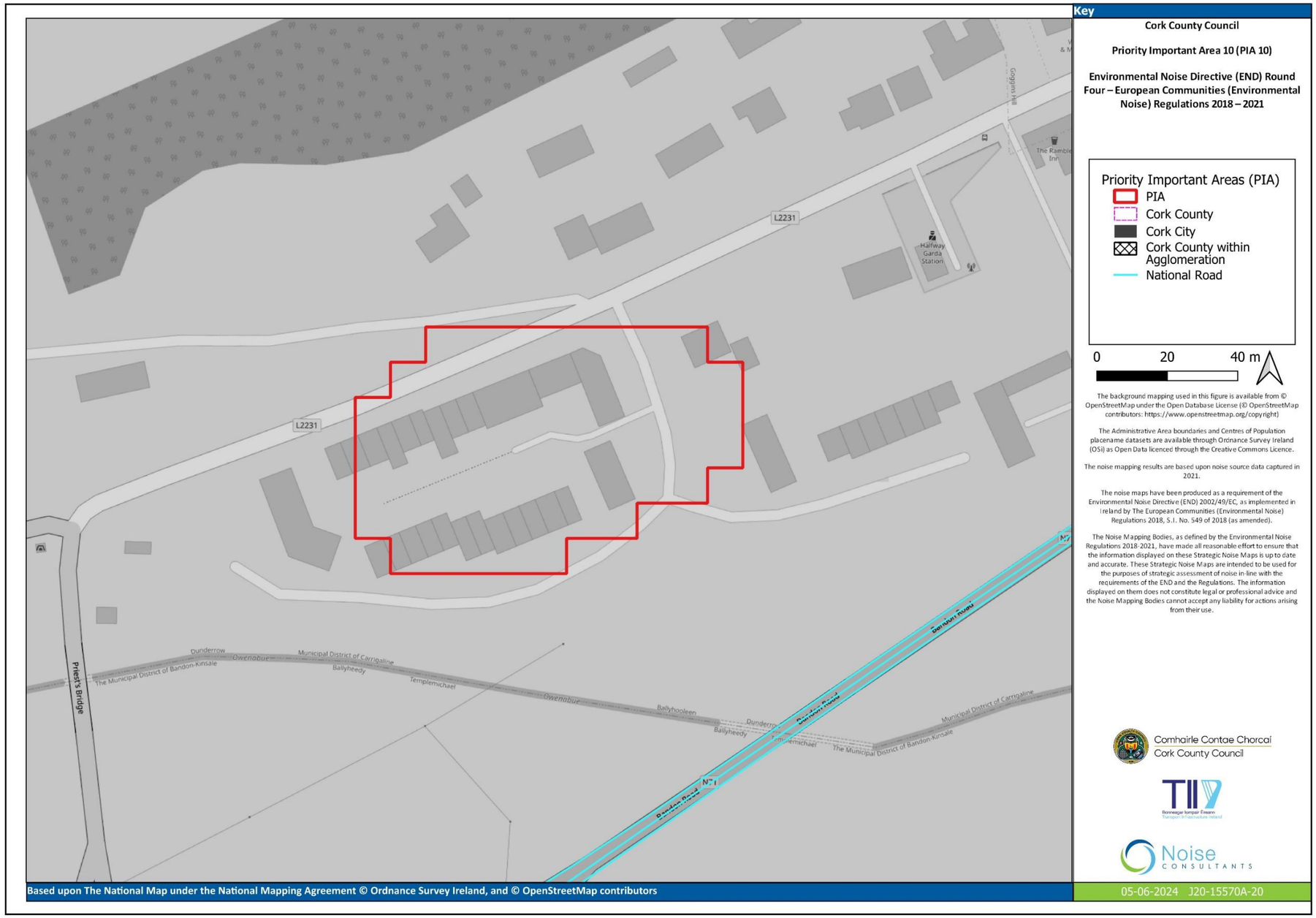


Figure 19: Priority Important Areas (PIAs)



Appendix C: EPA Noise Action Plan Checklist

Table C.1 EPA Noise Action Plan Checklist

No.	Draft EPA Guidance Page No.	Description	END/ EPA Requirement	NAP Reference	Notes
1	P10 - 15	Effects of noise on health outlined	Recommended	**Section 2.1**	Environmental Noise Guidelines (WHO, 2018), and noise metrics and associated health effects
2	P15	Wider context of local and national policy considered	Recommended	**Section 2.2**	European Union Legislation and Regulations
3	P18	Timetable – is timetable proposed which enables Action Plan to be reported on time	Recommended	**Section 1.5**	Timetable for Round 4 Noise Action Plan enabling Noise Action Plan and associated summary to be reported by the EPA to the EEA before January 2025
4	P18	Are internal resources used to make and implement noise action plan outlined	Recommended	**Section 1.1.3 and 4**	Roles and responsibilities, and responsible authorities for action planning
5	P37	Statement re policy regarding aims & objectives of using EPA Act	Recommended	**Section 2.3.3**	Environmental Protection Agency Act, 1992
6	P39	Review of relevant Regional and Local policy or guidance on the management of environmental noise	Recommended	**Section 3**	Regional noise management policy and guidance
7	P41	Agglomeration APAs coordinate to develop consistent approach	Recommended	**Section 1.1.3, 1.2 and 4**	Details on the roles and responsibilities of all parties in respect of their obligations under the Regulations, and the collaboration required to deliver the Noise Action Plan. While the Noise Action Plan is a separate document from the Noise Action Plan for the Agglomeration of Cork, they have been developed collaboratively and complement one another.
8	P41	Agglomeration LAs coordinate to avoid overlaps	Recommended	**Section 1.1.3, 1.2 and 4**	Details on the roles and responsibilities of all parties in respect of their obligations under the Regulations, and the collaboration required to deliver the Noise Action Plan. While the Noise Action Plan is a separate document from the Noise Action Plan for the Agglomeration of Cork, they have been developed collaboratively and complement one another.
9	P41	FCC consultation with adjacent affected APAs when drawing up major airport NAP	Recommended	**N/A**	No Major Airport in the administrative area of Cork County Council
10	P41 & 42	ICAO balanced approach element on land use management and planning considered with NAPs which include airport noise	Recommended	**N/A**	No Major Airport in the administrative area of Cork County Council
11	P42	Coordination with neighbouring APAs where noise from mapped sources crosses over County boundaries	Recommended	**Section 5.2**	The model, and calculations for the strategic noise mapping in areas outside the Agglomerations were undertaken by TII, adopting the draft EPA Guidance (Part 2: Calculation Methodology & Noise Modelling).
12	P42	Consultation with EPA	Mandatory	**Section 1.6**	Consultation has been undertaken with the EPA
13	P42	Consultation with relevant NMBs	Mandatory	**Section 1.6**	Consultation has been undertaken with the relevant Noise Mapping Bodies

14	P42	Review previous noise action plan – including reason for review	Mandatory	**Section 5.1**	Review of Round 3 Noise Action Plan (2018-2023)
15	P42	Co-operate with counterparts in neighbouring States, if applicable	Mandatory, if applicable	**N/A**	N/A
16	P42	Measures determined to be included in NAP	Mandatory	**Section 10.1**	Key mitigation and protection measures
17	P43	Quiet areas delimited	Optional	**Section 7.1**	No areas identified as candidates for delimitation.
18	P43	Public have been consulted	Mandatory	**Section 1.6**	Consultation has been undertaken with the public
19	P43	Public were given early and effective opportunities to participate	Mandatory	**Section 1.6**	Completed
20	P42	Result of public consultation were taken into consideration	Mandatory	**Section 1.6**	Completed
21	P43	Reasonable time-frames were adopted for public consultation	Mandatory	**Section 1.6**	Time-frame
22	P43	Summary of NAP to be, or has been, submitted to EPA within 1 month	Mandatory	**Section 1.5**	Round 4 timetable, including provision for reporting Noise Action Plan summarises to the Agency
23	P43	Annual reports have been, or shall be, submitted to EPA	Mandatory	**Section 9.1**	Noise Action Plan implementation commitments including provision to report progress to the Agency on an annual basis.
24	P43	NAP includes priorities to be addressed	Mandatory	**Section 6.6**	A summary of the Priority Important Areas
25	P43	NAP includes all minimum requirements from Fourth Schedule of Regulations	Mandatory	**Multiple**	Sections below
26	P43	Objective to protect quiet areas in agglomerations	Mandatory, if applicable	**Section 7 and 9.1**	N/A
27	P43	Objective to protect quiet areas in open countryside	Mandatory, if applicable	**Section 7 and 9.1**	No areas identified as candidates for delimitation, however a policy principle is set out for the protection of areas which are desirably quiet.
28	P43	Estimated reduction in harmful effects due to mitigation measures in the NAP	Mandatory, if applicable	**Section 6.5.1 and 6.6**	The estimated number of people at increased risk of harmful effects, with the potential to benefit from the consideration of noise management measures.
29	P44	Review of implementation of the previous NAP	Mandatory, if applicable	**Section 5.1**	A review of the Round 3 Noise Action Plan (2018-2023)

30	P44	Description of the agglomeration, the major roads, the major railways or major airports and other noise sources taken into account	Mandatory	**Section 1.3**	Description of the noise sources within Cork County
31	P44	The authority responsible	Mandatory	**Section 4 and the Signature Page**	Responsible authorities for the Action Planning, and the name and contact details of the Action Planning Authority
32	P44	The legal context	Mandatory	**Section 2**	Legal context
33	P44	Any statutory limit values in place	Mandatory	**Section 5**	There are no statutory limit values in place in Ireland
34	P45	Summary of the results of the noise mapping	Mandatory	**Section 6**	An evaluation of the estimated number of people exposed to noise and identification of problems to be improved, however the evaluation and implementation of noise management measures is informed by the IA, MIA and PIA process.
35	P45	Evaluation of the estimated number of people exposed to noise, identification of problems, and situations that need to be improved	Mandatory	**Section 5 and 6**	A summary of the total number of people in dwellings exposed to noise, and those with the potential to benefit from the consideration of noise management measures.
36	P45	Record of the public consultations organised	Mandatory	**Section 1.6, Section 11**	Record has been made
37	P45	Any noise-reduction measures already in force and any projects in preparation	Mandatory	**Section 3**	Sets out regional noise management policy and guidance, including relevant plans, projects and studies.
38	P46	Actions which the APAs intend to take in the next five years, including any measures to preserve quiet areas	Mandatory	**Section 10**	A summary of the key mitigation and protection measures, and the programme of works for the implementation
39	P46	Long-term strategy	Mandatory	**Section 9**	The implementation commitments, including overarching noise policy principles and responsible aims.
40	P46	Financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment	Mandatory	**Section 8.4**	Methodology for the financial assessment of noise mitigation measures, including cost-benefit assessment.
41	P46	Provisions envisaged for evaluating the implementation and the results of the action plan	Mandatory	**Section 10.2**	As part of the Round 5 noise action planning process the progress of Round 4 will be evaluated.
42	P47	The actions which the action planning authorities intend to take in the fields within their competence	Mandatory	**Section 10 and 10.2**	Proposed noise management measures with details of the proposed actions

43	P47	Estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed, or other)	Mandatory	**Section 6.5.1 and 6.6**	The estimated number of people at increased risk of harmful effects, with the potential to benefit from the consideration of noise management measures.
44	P47	Completed review checklist (Appendix D) included in NAP	Recommended	**Appendix C**	Appendix C
45	P48	Review of previous NAP: Has there been a material change in environmental noise since the previous NAP?	Recommended	**Section 5.1**	Review of Round 3 Noise Action Plan (2018-2023)
46	P49	Review of previous NAP includes how undertaken, conclusions drawn and subsequent action?	Recommended	**Section 5.1**	Review of Round 3 Noise Action Plan (2018-2023)
47	P49	Does review of previous NAP include: - progress against timetable, - changes in noise situation and exposures, - details of actions undertaken, - costs, - dates, - numbers of people affected or benefited?	Recommended	**Section 5.1**	Review of Round 3 Noise Action Plan (2018-2023)
48	P49	Appendix D review checklist utilised?	Recommended	**Section 5.1**	Review of Round 3 Noise Action Plan (2018-2023)
49	P50	Three step approach adopted to identify IAs, MIAs and PIAs	Recommended	**Section 6**	Approach to the identification of areas to be subject to noise management activities
50	P52	Confirm levels used to identify IAs	Recommended	**Section 6.4**	Important Areas
51	P55	Confirm population density used to identify MIAs	Recommended	**Section 6.5.1**	A density criterion of 15 or more people per 100m^2 was used for the identification of Most Important Areas
52	P55	Evidence based alternative method used to identify MIAs?	Recommended	**N/A**	MIA process as described the draft EPA Guidance used.
53	P56	Aspects considered when selecting PIAs	Recommended	**Section 6.6**	Identified based upon a Most Important Area or groups of Most Important Areas with the greatest number of people, and consideration of other factors such as planned road maintenance works and traffic plans and projects.

54	P56	Number of PIAs identified in NAP	Recommended	**Section 6.6, Table 16**	10 Priority Important Areas selected
55	P56	Rationale for each PIA included	Recommended	**Section 6.6**	Identified based upon a Most Important Area or groups of Most Important Areas with the greatest number of people, and consideration of other factors such as planned road maintenance works and traffic plans and projects.
56	P57	Approach to long term monitoring described	Recommended	**Section 10.1 and 10.2**	Measure CCC_M3 a commitment to prepare an annual report for the Agency setting out progress made in respect of the implementation of the Noise Action Plan. As part of the Round 5 noise action planning process the progress of Round 4 will be evaluated.
57	P57	Approach to validating noise calculation model described	Recommended	**Section 8.4**	Noise management activities to be considered during the implementation of the Noise Action Plan, including noise measurements at the Priority Important Areas
58	P61	Review of noise mitigation measures: - within responsibility of APAs - within responsibility of NMBs or other third-parties	Recommended	**Section 8.4**	A summary of the noise management activities to be considered during the implementation of the Noise Action Plan
59	P61	Record of consultation with NMBs and third-parties when selecting feasible noise mitigation measures	Recommended	**Section 8.4**	A summary of the noise management activities to be considered during the implementation of the Noise Action Plan
60	P61	Approach to assessing noise mitigation measures described	Recommended	**Section 8.4**	A summary of the noise management activities to be considered during the implementation of the Noise Action Plan
61	P62	Approach to cost benefit analysis described	Recommended	**Section 8.4**	A summary of the noise management activities to be considered during the implementation of the Noise Action Plan
62	P72	Approach to identify CQAs adopted	Recommended	**Section 7.1**	Summary of the regulatory background. No CQAs identified.
63	P73	PCQAs identified	Recommended	**Section 7.1**	Summary of the regulatory background. No PCQAs identified.
64	P75	CQAs identified	Recommended	**Section 7.1**	Summary of the regulatory background. No CQAs identified.
65	P75	Approach to delimiting QAs from CQAs described	Recommended	**Section 7.1**	Summary of the regulatory background.
66	P76	CQAs in open countryside identified	Recommended	**Section 7.1**	Summary of the regulatory background.
67	P79	Effectiveness of local planning policies or guidance on the management of environmental noise is discussed	Recommended	**Section 3 and 7.5**	Summary of regional noise management policy and guidance, and other considerations.
68	P83	SEA pre-screening undertaken	Recommended	**Section 1.1.1**	Summary of the SEA screening process

69	P83	SEA screening undertaking	Recommended	**Section 1.1.1**	Summary of the SEA screening process
70	P83	SEA undertaken	Recommended if necessary	**Section 1.1.1**	Summary of the SEA screening process
71	P84	AA screening undertaken	Recommended	**Section 1.1.2**	Summary of the AA screening process
72	P84	AA undertaken	Recommended if necessary	**Section 1.1.2**	Summary of the AA screening process
73	P86	Consultation process has regard for DPER guidance	Recommended	**Section 1.6**	Consultation was undertaken in accordance with DPER guidance
74	P86	Length of public consultation period documented	Recommended	**Section 1.6**	Length documented
75	P86	Consultation stakeholders listed	Recommended	**Section 1.6**	List provided
76	P86	Consultation responses summarised	Recommended	**Section 1.6**	Summary provided
77	P86	Amendments to NAP following consultation documented	Recommended	**Section 1.6, Section 11**	Section 11 including amendments
78	P86	Finalised NAP approval documented	Recommended	**Section 1.6**	Section to be completed following consultation
79	P87	Approach to approved NAP dissemination described	Recommended	**Section 1.6**	Section to be completed following consultation
80	P87	Summary NAP clear and comprehensible, and include a summary setting out the most important points	Mandatory	-	Noise Action Plan summaries provided to the Agency through a separate reporting process
81	P87	Approved NAP made available within 1 month of being made	Mandatory	-	To be completed following finalisation of the Noise Action Plan
82	P87	Dissemination uses available information technologies	Mandatory	-	Noise Action Plan summaries provided to the Agency through a separate reporting process
83	P87	Publication and dissemination follows AIE Regulations and DECC guidance	Mandatory	-	To be completed following finalisation of the Noise Action Plan