19 Population and Human Health

19.1 Introduction

19.1.1 This chapter presents the Principal Assessment of the likely significant effects of the Proposed Order on population and human health. The assessment compares operational conditions under the 2029 Permitted Operation (32 mppa) with those under the 2029 Proposed Operation (40 mppa), in accordance with the project-wide assessment framework described in Chapter 5: Methodology.

19.1.2 As detailed in Chapter 4: Proposed Order, the Proposed Order seeks to amend the existing passenger capacity conditions of 32 mppa to 40 mppa and does not involve new physical infrastructure. Increased passenger numbers may affect population and health receptors through changes in aircraft activity and associated operational characteristics. Accordingly, this assessment considers the likely significant effects arising from the Proposed Order through comparison of the 2029 Permitted Operation and the 2029 Proposed Operation.

19.1.3 The assessment focuses on the following effects:

- Amenity and local communities: Effects of changes in airport operations and associated activity levels arising from the Proposed Order on amenity uses of sites, users of amenity spaces, and other areas within the Study Area.
- Human health and wellbeing (including quality of life): Effects of the Proposed Order on the health and wellbeing of communities, taking into account changes in environmental exposures and socio-economic conditions associated with increased airport operations.
- Employment, economic activity and tourism economy: Effects of the Proposed Order on the local and regional economy, including employment, economic activity, and tourism enabled by passenger growth, and the subsequent implications for human health and wellbeing.

19.1.4 The assessment has been undertaken in accordance with best practice guidance from the Institute of Environmental Management and Assessment (IEMA) for Determining Significance for Human Health in Environmental Impact Assessment[1] and Effective Scoping of Human Health in Environmental Impact Assessment[2].

19.1.5 This chapter has been prepared by Sean Leach, who works for AECOM and holds a BA in Economics and Geography from Lancaster University and an MSc in Urban Regeneration and Redevelopment from the University of Manchester. Sean has eight years' experience in socio-economic and health impact assessments. Sean has led population and human health impact assessments for infrastructure projects in Ireland and the UK, including Dublin Array Offshore Wind Farm.

19.1.6 The chapter has been reviewed by Dave Widger, who also works for AECOM and holds a BSc in Economics and an MSc in International Economics from the University of Birmingham. Dave has over 20 years' experience in economic and health impact assessments. Dave has significant experience in leading and reviewing population and human health impact assessments including for Luton Airport, High Speed Two and the A303 Stonehenge.

19.1.7 The assessment adopts a pathway-based approach, drawing on the findings of the relevant environmental topic assessments, including traffic and transport, air quality, noise and vibration and climate, to identify changes in environmental conditions attributable to the Proposed Order and to assess the resulting effects on population and human health receptors. Where relevant, the assessment takes account of mitigation and management measures identified within those technical assessments.

[1] IEMA, Guide to: Determining Significance for Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-determining-significance-for-human-health-nov-2022.pdf
[2] IEMA, Guide to: Effective Scoping of Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-effective-scoping-of-human-health-nov-2022.pdf

19.2 Legislation, Policy and Guidance

19.2.1 This section identifies the legislation, policy and guidance relevant to the population and human health assessment. General legislation, policy and guidance applicable to the EIAR as a whole are set out in Chapter 5: Methodology and are not repeated here.

Legislation

19.2.2 This section provides the relevant national legislation for the assessment of population and human health effects.

Noise

EU Commission Directive 2020/367

19.2.3 EU Commission Directive 2020/367[3], published in March 2020, amends Annex III of the Environmental Noise Directive (END) 2002/49/EC. It provides common methods for assessing the harmful effects of environmental noise and supports the interpretation of strategic noise mapping results for the purposes of noise management and action planning. These methods are used to estimate potential health outcomes, including annoyance and self-reported sleep disturbance, at a population level.

19.2.4 These approaches draw on established evidence, including World Health Organisation (WHO) guidance, and are used to estimate the likely effects of noise exposure on people, particularly in terms of annoyance, self-reported sleep disturbance and potential other health outcomes. The assessment is based on annual average noise indicators, L_{den} and L_{night}, which are used to evaluate effects at a population level. The associated estimates of the populations predicted to be Highly Annoyed (HA) and Highly Sleep Disturbed (HSD) are derived from external noise exposure levels in accordance with Directive (EU) 2020/367. These estimates do not take account of individual building characteristics, including whether a dwelling benefits from noise insulation or other sound attenuation measures.

19.2.5 Further detail on the noise modelling, assessment methodology and application of these indicators is provided in Chapter 8: Non-Aircraft Noise and Vibration and Chapter 9: Aircraft Noise and Vibration.

Air Quality

Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022)

19.2.6 The Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022)[4], establish the legislative framework for the assessment and management of ambient air quality in Ireland and implement Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe. The Regulations:

- establish limit values and, where appropriate, alert thresholds for concentrations of certain pollutants in ambient air intended to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- provide for the assessment of concentrations of certain pollutants in ambient air using methods and criteria common to Member States;
- provide for the collection and dissemination of information on ambient air pollutant concentrations and ensure that such information is made available to the public;
- provide for the maintenance of ambient air quality where it is good and the improvement of air quality in other cases; and
- establish the framework for the monitoring and management of ambient air quality in Ireland.

Directive (EU) 2024/2881 on Ambient Air Quality and Cleaner Air for Europe (Recast)

19.2.7 Directive (EU) 2024/2881[5] on Ambient Air Quality and Cleaner Air for Europe (recast) introduces more stringent limit values for key pollutants, including nitrogen dioxide (NO_2), particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), to be achieved by 2030. Ireland is required to transpose the Directive into national legislation by December 2026. The revised standards reflect the latest scientific evidence regarding the impacts of air pollution on human health and align more closely with World Health Organization Air Quality Guidelines.

[3] EC, (2020); Commission Directive (EU) 2020/367 of 4 March 2020 amending Annex III to Directive 2002/49/EC of the European Parliament and of the Council as regards the establishment of assessment methods for harmful effects of environmental noise. https://eur-lex.europa.eu/eli/dir/2020/367/oj
[4] Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022), Irish Statute Book.
[5] Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast), Official Journal of the European Union, OJ L 2024/2881, 20 November 2024.

Policy

19.2.8 This section lists the relevant national and regional policy, which has been considered as the most relevant strategic context for the assessment of population and human health effects. The following national, regional and local policies provide the strategic context relevant to the assessment of population and human health effects:

- Project Ireland 2040, National Planning Framework First Revision, April 2025[6];
- Healthy Ireland Framework 2013 – 2025[7], an updated Healthy Ireland Framework Public Consultation took place from February to April 2026[8];
- Health Services Healthy Ireland Implementation Plan 2023 – 2027[9];
- Healthy Ireland Strategic Action Plan 2021-2025[10];
- The Public Health Strategy 2025-2030[11];
- A New Era for Irish Tourism: National Tourism Policy Statement, December 2025[12];
- Fingal Development Plan 2023-2029[13], a variation to the Fingal Development Plan (2023–2029) is in progress to align with the revised National Planning Framework; and
- Fingal Climate Action Plan 2024 – 2029[14].

Guidance

19.2.9 This section provides the relevant guidance for assessing population and human health effects.

19.2.10 The WHO Regional Office for Europe published Environmental Noise Guidelines for the European Region[15] in 2018. The guidelines provide evidence-based recommendations for protecting human health from exposure to environmental noise originating from various sources including aircraft.

19.2.11 With regard to aircraft noise, the Environmental Noise Guidelines recommend:

- For average daytime noise exposure, it is strongly recommended[16] that daytime noise levels produced by aircraft are below 45dB L_{den};
- For average night noise exposure, it is strongly recommended that night noise levels produced by aircraft are below 40dB L_{night}; and
- To reduce health effects, policy makers should implement suitable measures to reduce noise exposure where the population is exposed to levels above the guideline values for average daytime and night noise exposure.

19.2.12 Institute of Sustainability and Environmental Professionals (ISEP)) published guidance on assessing human health as part of an Environmental Impact Assessment[17]. Previous to this, there was no consolidated methodology or practice for the assessment of effects on human health and wellbeing. This guidance provides a robust approach for assessing the significance of human health and wellbeing effects. The human health and wellbeing assessment has been conducted in accordance with this

[6] Government of Ireland, National Planning Framework, First Revision: Project Ireland 2040, 2025
[7] Department of Health, Healthy Ireland Framework 2013 – 2025, 2019, https://www.gov.ie/en/publication/e8f9b1-healthy-ireland-framework-2019-2025/
[8] Government of Ireland, Healthy Ireland Framework: Public Consultation, 2026
[9] Health Service Executive, Health Services Healthy Ireland Implementation Plan 2023-2027, 2023. Dublin: Health Service Executive.
[10] Government of Ireland, Healthy Ireland, Strategic Action Plan 2021-2025, 2021, https://www.gov.ie/en/publication/441c8-healthy-ireland-strategic-action-plan-2021-2025/
[11] Health Service Executive, Public Health Strategy 2025-2030, 2025, HSE Public Health Strategy 2025 -2030: Achieving the best possible health for everyone in Ireland
[12] Department of Enterprise, Tourism and Employment, A New Era for Irish Tourism: National Tourism Policy Statement, 2025 A New Era for Irish Tourism: National Tourism Policy Statement
[13] FCC, Fingal Development Plan 2023-2029, 2023, https://www.fingal.ie/development-plan-2023-2029
[14] FCC, Climate Action Plan 2024-2029, 2023, https://www.fingal.ie/ClimateAction/climate-action-plan-2024-2029
[15] WHO Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018, http://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf
[16] WHO defines a "strong recommendation" as one that can be adopted as policy in most situations, based on the assessment that the desirable effects of adherence outweigh the undesirable consequences. Strong recommendations are intended to inform policy and decision-making and should be implemented in most circumstances, taking account of local context, values, preferences and available resources. They do not constitute legally binding limit values.
[17] Institute of Environmental Management and Assessment (IEMA) (2022). Effective Scoping of Human Health in Environmental Impact Assessment and Determining Significance for Human Health in Environmental Impact Assessment. IEMA, November 2022. (PDF) IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment.

guidance. Wherever possible, the impacts identified in the assessment have been appraised against relevant national standards. Where relevant standards or established assessment criteria do not exist, professional judgement has been applied to determine the nature, magnitude and significance of potential effects. That judgement has been informed by the available evidence, the characteristics of the affected population or receptor, the scale and duration of the potential change, and the degree to which the Proposed Order could materially alter existing conditions. The application of professional judgement has been undertaken within the framework provided by the IEMA impact assessment guidance, as described in Section 19.3.

19.2.13 In addition, in 2025, ISEP published guidance on Social Impact Assessment in Environmental Impact Assessment in the UK and Ireland[18]. This guidance provides a framework for assessing the social aspects of population within EIA, including socio-economic conditions, communities and wellbeing outcomes, recognising that population and human health assessments may encompass both socio-economic and health-related considerations. The guidance emphasises a proportionate, evidence-based approach to identifying likely significant social effects, the use of appropriate baseline data and stakeholder engagement, and the importance of maximising positive outcomes while minimising adverse effects. The approach taken in this chapter is informed by these principles, recognising the interaction between socio-economic factors and health outcomes, and applying a proportionate assessment focused on likely significant effects associated with the operational socio-economic, community, population and human health effects of the Proposed Order.

19.2.14 The following guidance has also been considered, where relevant to the assessment:

National and EU EIA guidance

- Environmental Protection Agency (EPA) (2022) – Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as EPA Guidelines);
- Department of Housing, Planning and Local Government (2018) – Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment; and
- European Commission (2017) – Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report.

Human health / HIA best practice

- IAIA and EUPHA (2020) – Human health: Ensuring a high level of protection;
- Institute of Public Health (IPH) (2021) – Health Impact Assessment Guidance: A Manual;
- IEMA (2017) – Health in Environmental Impact Assessment – A Primer for a Proportionate Approach; and
- IEMA (2022) – Effective Scoping of Human Health in EIA and Determining Significance for Human Health in EIA.

WHO noise and health evidence base

- WHO (2018) – Environmental Noise Guidelines for the European Region;
- WHO (2009) – Night Noise Guidelines for Europe;
- WHO (1999) – Guidelines for Community Noise; and
- European Environment Agency (2025) – Environmental Noise in Europe 2025: Summary for Policymakers.

Wider Irish sectoral / topic-specific guidance

- EPA (2017) – Guidance Note for Noise (NG4) (Note: currently under review, draft update published 2024); and
- Fáilte Ireland (2011) – Guidelines for Treatment of Tourism in an Environmental Impact Statement (Note: this is dated but still used and is supplemented by EPA 2022 guidance).

[18] ISEP, Social Impact Assessment in Environmental Impact Assessment in the UK and Ireland, 2025. https://www.isepglobal.org/resources/blogs/2025/october/isep-launches-new-guide-on-social-impact-assessment/

Additional HIA tools and practitioner guidance

- NHS London Healthy Urban Development Unit (HUDU) (2019) – Rapid Health Impact Assessment Tool (4th Edition); and
- US EPA (2016) – Health Impact Assessment Resource and Tool Compilation.

Professional discourse / supplementary material (optional)

- IEMA (2020) – Impact Assessment Outlook Journal, Volume 8: Health Impact Assessment in Planning.

19.3 Assessment Methodology

19.3.1 This section sets out the methodology adopted to identify, describe and assess the likely significant effects of the Proposed Order on population and human health. The assessment has been undertaken in accordance with the EPA Guidelines and the relevant ISEP/IEMA guidance identified in Section 19.2, and comprises:

- establishment of the Current State of the Environment and the Future Receiving Environment for the 2029 assessment year, including identification of relevant receptors and their sensitivity;
- identification of changes in environmental and socio-economic conditions attributable to the Proposed Order through comparison of the 2029 Permitted Operation and the 2029 Proposed Operation;
- assessment of the magnitude of impact and the resulting significance of effects on population and human health receptors;
- consideration of relevant mitigation and management measures, including those identified within the technical assessments upon which this chapter relies; and
- assessment of residual effects.

19.3.2 The assessment considers all elements of the Proposed Order described in Chapter 4: Proposed Order that have the potential to give rise to effects on population and human health.

19.3.3 The significance of effects has been determined having regard to the sensitivity of the affected receptor and the magnitude of the impact attributable to the Proposed Order, applying the assessment criteria set out below. Where professional judgement is required, it is used to interpret those criteria having regard to the characteristics of the affected population or receptor, the scale, duration and reversibility of the potential change, and the extent to which existing conditions may be materially altered. The approach to determining likely significant effects is consistent with the project-wide methodology set out in Chapter 5: Methodology.

Study Area

19.3.4 There is no prescribed national methodology for defining a study area for the assessment of population and human health effects. The study areas have therefore been defined having regard to the nature and spatial extent of the potential effects attributable to the Proposed Order and the receptors and impact pathways relevant to each component of the assessment.

19.3.5 For amenity and local communities only, the study area comprises the Dublin Airport Site, as described in Chapter 2: Site and Surroundings and illustrated on Figure 2-1, together with a 500 m buffer around the Dublin Airport Site. This study area is appropriate for local community and amenity receptors because the potential effects considered under this assessment theme relate to localised changes in environmental conditions affecting the use and enjoyment of community, recreational and amenity facilities. The 500 m buffer does not define the wider study areas applied to aircraft noise, air quality, human health and socio-economic effects considered elsewhere in the assessment. Receptors beyond the 500 m study area have also been considered where a relevant effect pathway exists. The approach is consistent with that adopted in other comparable airport infrastructure assessments in Ireland, including the Dublin Airport Infrastructure Application.

19.3.6 Community facilities may serve populations extending beyond their immediate locality and their catchments do not necessarily correspond with defined administrative boundaries. Accordingly, community receptors beyond the 500 m study area have also been considered where, based on their

function, catchment or potential exposure to changes attributable to the Proposed Order, a relevant effect pathway has been identified.

19.3.7 For human health and wellbeing and employment, economic activity and tourism, a wider study area has been adopted to reflect the broader geographic scale over which environmental and socio-economic effects may influence population and human health receptors. The study area comprises the Airport and Dubber Electoral Divisions[19] (EDs), Fingal County and, where relevant to the effect being assessed, wider geographic areas. The extent of the study area has been informed by professional judgement, having regard to the nature and geographic reach of the potential effect, the distribution of relevant population and socio-economic receptors, the availability and relevance of supporting data, and experience from comparable airport and infrastructure assessments, including the Dublin Airport Infrastructure Application Population and Human Health Assessment. The following wider areas have also been used as comparators, where appropriate:

- Dublin Region;
- Eastern and Midland Regional Assembly area[20]; and
- Ireland.

19.3.8 For employment, economic activity and tourism, effects may extend beyond the local and regional study areas due to the role of Dublin Airport as an international gateway and the potential for additional passenger throughput enabled by the Proposed Order to influence economic and tourism activity more widely. The whole of Ireland has therefore been adopted as the maximum Zone of Influence (ZoI) for these effects.

Baseline and Receptor Identification

19.3.9 A community profile has been developed to establish the characteristics of the population potentially affected by the Proposed Order and to identify receptors, including population groups that may be particularly sensitive to changes in environmental or socio-economic conditions. The profile has been informed by a desktop review of available data relating to demographics, employment, health, deprivation and community and amenity facilities. Principal data sources include:

- Central Statistics Office (CSO);
- Fingal County Council (FCC); and
- the Pobal HP Deprivation Index for Small Areas (SA).

19.3.10 The identification of relevant population and human health receptors and impact pathways has also been informed by the findings of the technical assessments presented in Chapter 6: Material Assets (Traffic and Transport), Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration, Chapter 13: Climate, Chapter 15: Landscape and Visual and Chapter 18: Major Accidents and Disasters. These assessments identify changes in environmental conditions attributable to the Proposed Order which, where a relevant pathway to population or human health receptors exists, are considered within this chapter in determining the nature, magnitude and significance of the resulting population and human health effects.

Methodology for Determining Effects

19.3.11 Effects on amenity and local communities and human health are described using the criteria provided in IEMA Guidance[1,2], EU Guidance, and the HUDU Rapid Health Impact Assessment Tool[21], as detailed in the following sub-sections.

Amenity and Local Communities

19.3.12 The assessment of impacts on amenity and local communities is concerned with how the Proposed Order potentially impacts on the ability of residents and users of community and recreational facilities to achieve enjoyment and/or quality of life.

19.3.13 Assessing the impact of the Proposed Order on amenity and local communities has taken into account the relevant residual effects identified in other assessment topics (Chapter 6: Material Assets (Traffic

[19] Electoral Divisions (EDs) are the smallest administrative areas for which the Central Statistics Office (CSO) routinely publishes demographic and socio-economic statistics.
[20] This area comprises Dublin, Kildare, Meath, Wicklow, Laois, Longford, Louth, Offaly and Westmeath.
[21] London HUDU, HUDU Planning for Health: Rapid Health Impact Assessment Tool (fourth edition), 2019, https://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2019/10/HUDU-Rapid-HIA-Tool-October-2019.pdf

and Transport), Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration, Chapter 13: Climate, Chapter 15: Landscape and Visual and Chapter 18: Major Accidents and Disasters) which could affect people's enjoyment of a community facility, public space or residential property.

19.3.14 A descriptive approach has been used which gives an overall indication of the change, i.e., positive, negative/adverse or neutral, in the amenity of the receptor. As set out in Table 19-5 and Table 19-6 the assessment uses a four-point scale of high, medium, low and negligible in line with the EPA Guidelines as explained in Chapter 5: Methodology. Depending on the type of receptor being assessed, the magnitude of effect is based on the number of users and the extent to which these users experience impacts on their amenity.

19.3.15 The assessment aligns with the relevant aspects of the EPA Guidelines, as well as the EU Guidance.

Human Health and Wellbeing

19.3.16 The WHO Europe defines health as a *"state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity"* (WHO, 2022). Public health therefore encompasses general wellbeing, not just the absence of illness.

19.3.17 The health and wellbeing of individuals are determined by a broad range of individual constitutional and behavioural factors (or 'determinants'), as well as broader environmental, social and economic factors. Some factors are direct and obvious, whilst others are indirect. The determinants scoped into the assessment follow those detailed in the IEMA Guidance and are outlined in Table 19-1.

Table 19-1: EIA Wider Determinants of Health

Categories	Wider Determinants of Health	Scoped in?
Health related behaviours	Physical activity	No
	Risk taking behaviour	No
	Diet and nutrition	No
Social environment	Housing	No
	Relocation	No
	Open space, leisure and play	No
	Transport modes, access and connections	Yes
	Community safety	No
	Community identity, culture, resilience and influence	Yes
	Social participation, interaction and support	No
Economic environment	Education and training	No
	Employment and income	Yes
Bio-physical environment	Climate change mitigation and adaptation	Yes
	Air quality	Yes
	Water quality or availability	No
	Land quality	No
	Noise and vibration	Yes
	Radiation	No
Institutional and built environment	Health and social care services	No
	Built environment	No
	Wider societal infrastructure and resources	No

19.3.18 The assessment considers how changes in airport activity (e.g. aircraft movements and surface access) may influence environmental exposures (such as noise, air quality and traffic), which in turn affect population and human health outcomes. The following determinants have been scoped out as they are not deemed relevant to the effects resulting from the Proposed Order:

- Diet and nutrition: The Proposed Order will not affect access to food or suitable nutrition.
- Relocation: The Proposed Order will not lead to relocation of residents or lead to the loss of housing.
- Open space, leisure and play: The Proposed Order will not encroach on any existing open space or space used for recreational purposes. Potential effects on the enjoyment of such facilities arising from changes in environmental conditions, including noise, are considered through the relevant noise and amenity assessment pathways within this chapter.
- Social participation, interaction and support: Whilst the Proposed Order does assess amenity and local community effects, this effect is more closely associated with community engagement and local event participation, which the Proposed Order will not affect.
- Radiation: The Proposed Order does not result in any radiation effect.
- Risk taking behaviour: The Proposed Order does not introduce pathways that would influence individual behavioural risk factors, and this impact is therefore not relevant.
- Housing: The Proposed Order does not change land use or resident population levels and therefore does not affect housing demand or relocation.
- Education and training: The Proposed Order does not affect access to or provision of education and training services.
- Health and social care services: The Proposed Order does not result in population growth or changes in the resident population that would materially affect demand for health and social care services. While increased passenger throughput may result in a negligible increase in occasional use of emergency healthcare services, this is not considered to constitute a material effect on health and social care services and is therefore not scoped into the assessment.

19.3.19 The following determinants have been scoped out of further assessment, in accordance with IEMA guidance, as they are either addressed through the assessment of other relevant determinants or environmental topics, or there is no reasonable potential for the Proposed Order to give rise to a material effect on human health and wellbeing:

- Physical Activity: This effect relates most directly to open space and transport and is therefore captured within the assessment of those determinants, as suggested by IEMA Guidance.
- Community Safety: Potential safety risks associated with major accidents and disasters, including road traffic incidents, aircraft accidents, fire and emergency scenarios, are assessed within Chapter 18: Major Accidents and Disasters. No separate community safety effects on population and human health are anticipated as a result of the Proposed Order, and no specific pathway giving rise to likely significant health effects has been identified.
- Water quality or availability: Potential effects on surface water and groundwater are assessed in Chapter 11: Water. The Proposed Order does not involve physical development or changes to drainage infrastructure, and the water assessment concludes that it would not result in significant effects on surface water or groundwater quality or deterioration in the status of receiving water bodies. Accordingly, no likely significant effects on population and human health associated with water quality or water resources are anticipated and this determinant has been scoped out of further assessment.
- Land Quality: The effects on land quality are captured in Chapter 10: Land and Soils. No health effects are anticipated to occur from impacts on land quality as a result of the Proposed Order.
- Built environment: Considerations such as access to health, education and other community facilities are captured through the assessment of the ‘transport modes, access and connections’ determinant. No separate built environment effects on human health and wellbeing are anticipated as a result of the Proposed Order.
- Wider societal infrastructure and resources: These considerations such as wider contributions to economic development are already assessed under the ‘employment and income’ determinants.

19.3.20 In addition to the IEMA-based health determinants considered above, the effects of light pollution on population and human health have also been considered in response to the requirements of the An Coimisiún Pleanála Scoping Opinion. The Proposed Order would not involve physical development, changes to airport infrastructure or alterations to existing operational lighting. As such, no material change in lighting conditions is anticipated for surrounding communities and no likely significant effects

on population or human health arising from light pollution are expected. The effects of light pollution on population and human health have therefore been scoped out of further assessment.

19.3.21 IEMA Guidance[22],[23] developed by specialists in the human health field, provides a methodology for determining the significance of health effects. The IEMA Guidance therefore has been adopted to provide an assessment of significance for human health and wellbeing. As it provides best practice principles for assessing impacts on human health and wellbeing, the HUDU Toolkit 2019[24] is also used as guidance in the assessment of impacts on human health and wellbeing presented in this chapter.

19.3.22 To incorporate the recently released IEMA Guidance[2] within this chapter, this assessment follows IEMA Guidance to assign significance to health effects. The HUDU determinants relevant to the assessment have been reviewed against outlined wider determinants of health within the IEMA Guidance. This is considered to be an approach that encompasses both sets of HUDU and IEMA guidance. This comparison is set out in Table 19-2.

Table 19-2: Health Determinants Assessed

HUDU Assessment Determinants	IEMA Wider Determinants of Health
Access to work and training	Education and Training
	Employment and Income
	Housing
	Transport modes, access and connections
Climate change	Climate change mitigation and adaptation
Air quality, noise and neighbourhood amenity	Air quality
	Noise and vibration
	Community safety
	Community identity, culture, resilience and influence
	Health and social care services

19.3.23 A review of relevant scientific literature (Paragraphs 19.3.40 to 19.3.55) has been undertaken to identify the health determinants and impact pathways relevant to the Proposed Order and to provide an evidence base for assessing the potential effects of changes in environmental and socio-economic conditions on human health and wellbeing.

19.3.24 The assessment considers the potential direct, indirect and cumulative effects of the Proposed Order on human health and wellbeing. Particular consideration has been given to potentially vulnerable population groups, including children and older people, and to the potential for effects to influence existing health inequalities. Where relevant, mitigation and management measures identified within the technical assessments that inform the relevant health pathways have also been taken into account.

Annoyance and Sleep Disturbance

19.3.25 As stated in Chapter 9: Aircraft Noise and Vibration, the number of people 'highly sleep disturbed' and 'highly annoyed' has been predicted in accordance with the approach recommended by the WHO Environmental Noise Guidelines as endorsed by the EC through Directive 2020/367.

19.3.26 For the L_{den} and L_{night} noise indicators, the significance of effect has been determined by separately assessing the resultant absolute noise exposure level at a receptor and the change in noise exposure level relative to the baseline. The individual ratings are then combined to determine the significance of any effects.

19.3.27 The absolute noise values and associated impact criteria for residential receptors that have been developed are given in Table 19-3. They commence with a negligible band which applies to noise levels that lie below a low threshold, specifically 45dB L_{den} and 40dB L_{night}, as the WHO Regional Office for Europe states that aircraft noise above these levels can be associated with adverse health effects. The

[22]IEMA, Guide to: Determining Significance for Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-determining-significance-for-human-health-nov-2022.pdf
[23] IEMA, Guide to: Effective Scoping of Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-effective-scoping-of-human-health-nov-2022.pdf
[24] HUDU Rapid HIA Tool October 2019, Available at: https://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2019/10/HUDU-Rapid-HIA-Tool-October-2019.pdf

subsequent bands are defined by values that are required to be reported under Directive 2002/49/EC as amended.

Table 19-3: Noise Impact Criteria (absolute) – Residential

Scale Description	Annual dB L_{den}	Annual dB L_{night}
Negligible	<45	<40
Very Low	45 – 49.9	40 – 44.9
Low	50 – 54.9	45 – 49.9
Medium	55 – 64.9	50 – 54.9
High	65 – 69.9	55 – 59.9
Very High	≥70	≥60

19.3.28 The scale to be used to assess the change in noise level is shown in Table 19-4. The thresholds are derived from the different contour bands recommended in CAP1616a[25] (see Chapter 9: Aircraft Noise and Vibration for more information). A best practice, semantic scale of this type, following the format of examples given in the IEMA Guidance[26],[27] has been applied in previous aviation noise assessments and accepted in Oral Hearings and Public Inquiries for airport developments in Ireland and the UK. The ratings for the resultant absolute noise level and the change in noise level are then combined using the significance framework described in Chapter 9: Aircraft Noise and Vibration. Significant effects are identified where the combination of resultant noise exposure and change in noise level gives rise to an effect rated as Significant, Very Significant or Profound.

Table 19-4: Noise Impact Criteria (relative)

Scale Description	Change in Noise Level, dB(A)
Negligible	0 – 0.9
Very Low	1 – 1.9
Low	2 – 2.9
Medium	3 – 5.9
High	6 – 8.9
Very High	≥9

Employment, Economic Activity and Tourism

19.3.29 There is no single prescribed methodology for socio-economic assessment within EIAs. However, relevant guidance, including ISEP (2025) and IEMA guidance, provides principles for undertaking proportionate and evidence-based assessments of socio-economic effects. The methodology used in the assessment is generally accepted as industry good practice and has been employed in a number of infrastructure development projects throughout Ireland and the UK, including energy generation, transmission, and distribution projects.

19.3.30 The assessment of potential employment, economic activity and tourism effects uses policy thresholds and expert judgment to assess the scale and nature of the effects of the Proposed Order against baseline conditions. There is no accepted definition of what constitutes a significant (or not significant) socio-economic effect. It is however recognised that 'significance' reflects the relationship between the magnitude of the effect and the sensitivity of the affected resource or receptor.

19.3.31 As such, the socio-economic effects will be assessed based on the scale of effects which considers the size of the effect on people and/or local businesses in the context of the area in which the effect will be experienced. The assessment aims to be objective and quantifies effects as far as possible. However, some of the assessment may only be evaluated on a qualitative basis.

[25] Civil Aviation Authority, Airspace Change: Environmental requirements technical annex (CAP1616a), 2020, https://www.caa.co.uk/publication/download/16299
[26] IEMA, Guide to: Determining Significance for Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-determining-significance-for-human-health-nov-2022.pdf
[27] IEMA, Guide to: Effective Scoping of Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-effective-scoping-of-human-health-nov-2022.pdf

Classification of Effects and Significance Criteria

Amenity and Local Communities

19.3.32 For amenity and local communities, the classification of effects has been determined by considering the magnitude of impact together with the sensitivity of the affected resources and receptors. Receptor sensitivity has been assessed using the criteria set out in Table 19-5, which have been informed by relevant best practice. Where professional judgement is required, it is used to interpret those criteria having regard to the characteristics of the receptor, its susceptibility to the type of change being assessed, the existing context and the importance of the resource or receptor to the local community.

Table 19-5: Sensitivity Criteria for Amenity and Local Community Effects

Type of Effects	Description of Effect
High	Receptor has very limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact.
Medium	Receptor has limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact.
Low	Receptor has some tolerance to avoid, adapt to, accommodate, or recover from the anticipated impact.
Negligible	Receptor is generally tolerant of and can accommodate or recover from the anticipated impact, if applicable.

19.3.33 In addition, the assessment considers the magnitude of impacts using the criteria set out in Table 19-6, which have been informed by relevant best practice. Where professional judgement is required, it is used to interpret those criteria having regard to the scale, extent, duration, frequency and reversibility of the change and the degree to which existing conditions would be altered. The duration of the effect is also taken into account, with greater weight generally given to permanent changes than to temporary effects.

Table 19-6: Magnitude of Impact Criteria for Amenity and Local Community effects

Magnitude of Impact	Magnitude of Effect
High	An impact that is expected to have considerable adverse or beneficial effects on receptors. Such impacts will typically affect large numbers of residents, users, businesses or workers. High magnitude impacts will typically be long-term in nature, resulting in a substantial and permanent change to the Future Receiving Environment
Medium	An impact that is expected to result in a noticeable adverse or beneficial change affecting a limited number of residents, users, businesses or workers. Such impacts would typically result in a material, but not substantial, change relative to the Future Receiving Environment and may be long-term or permanent in nature.
Low	An impact that is expected to result in a small adverse or beneficial change affecting a limited number of residents, users, businesses or workers, or which may affect a larger number of receptors but without materially changing conditions relative to the Future Receiving Environment. Such impacts would typically be limited in extent and/or duration.
Negligible	An impact that is likely to be temporary in nature, or which is anticipated to have a slight effect on the residents, users, businesses or workers.

Employment, Economic Activity and Tourism

19.3.34 Sensitivity in the context of employment, economic activity and tourism reflects the capacity of the receptor to accommodate change, having regard to factors such as adaptability, exposure to change and the extent of other existing or anticipated change. In considering potential adverse effects, relevant characteristics include robustness, acceptability, tolerability, vulnerability, adaptability and capability. The sensitivity criteria are set out in Table 19-7 and have been informed by relevant best practice. Where professional judgement is required, it is used to interpret those criteria having regard to the characteristics of the receptor, its exposure and susceptibility to change, its ability to adapt or respond, and the extent to which existing conditions may affect its resilience.

Table 19-7: Sensitivity Criteria for Economic and Employment Effects

Type of Effects	Description of Effect
High	Receptor has very limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact.
Medium	Receptor has limited capacity to avoid, adapt to, accommodate, or recover from the anticipated impact.

Type of Effects	Description of Effect
Low	Receptor has some tolerance to avoid, adapt to, accommodate, or recover from the anticipated impact.
Negligible	Receptor is generally tolerant of and can accommodate or recover from the anticipated impact, if applicable.

19.3.35 The magnitude of impacts relating to employment, economic activity and tourism reflects the scale of change that may occur, having regard to both the geographic extent and intensity of the change. The magnitude criteria are set out in Table 19-8 and have been informed by relevant best practice. Where professional judgement is required, it is used to interpret those criteria having regard to the scale, extent, duration and intensity of the change, and whether the resulting effect would be adverse or beneficial.

Table 19-8: Magnitude Criteria for Economic and Employment Effects

Sensitivity of Receptors	Description of Sensitivity of Receptors
High	For negative impacts: Loss of resource but not affecting integrity of the resource; partial loss of or damage to key characteristics, features or elements (adverse). Permanent / irreplaceable change, which is likely to occur. For positive impacts: Improvement to, or addition of, key characteristics, features or elements of the resource; improvement of attribute quality (beneficial).
Medium	For negative impacts: Minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements; measurable change in attributes, quality, or vulnerability (adverse). Long-term though reversible change, which is likely to occur. For positive impacts: Minor improvement to, or addition of, one (maybe more) key characteristics, features or elements of the resource; a minor improvement to attribute quality (beneficial).
Low	For negative impacts: Very minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements; measurable change in attributes, quality, or vulnerability (adverse). Short to medium-term though reversible change, which is likely to occur. For positive impacts: Very minor improvement to, or addition of, one (maybe more) key characteristics, features or elements of the resource; very minor improvement to attribute quality (beneficial).
Negligible	For negative impacts: Temporary or intermittent very minor loss of, or alteration to, one (or maybe more) characteristic, feature, or element; possible change in attributes, quality or vulnerability (adverse). Short-term, intermittent, and reversible change, which is unlikely to occur. For positive impacts: Possible very minor improvement to, or addition of, one (maybe more) characteristic or element; possible improvement to attribute quality (beneficial).

Human Health and Wellbeing

19.3.36 Potential significant human health and wellbeing effects are considered within this chapter using IEMA Guidance. The significance is determined using criteria for the sensitivity of receptors and the magnitude of impact. The following criteria in Table 19-9 is outlined using IEMA Guidance and has been used to assess the sensitivity of human health receptors.

Table 19-9 Criteria for Human Health Effects[28]

Sensitivity of Receptors	Description of Sensitivity of Receptors
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared; existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and / or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and / or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and / or people with a high capacity to adapt.

[28] IEMA, Guide to: Determining Significance for Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-determining-significance-for-human-health-nov-2022.pdf

Sensitivity of Receptors	Description of Sensitivity of Receptors
Negligible	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and / or people with a very high capacity to adapt.

19.3.37 Table 19-10 identifies the magnitude of impact criteria for human health effects, which are also derived from IEMA Guidance.

Table 19-10: Magnitude Criteria for Human Health Effects[1]

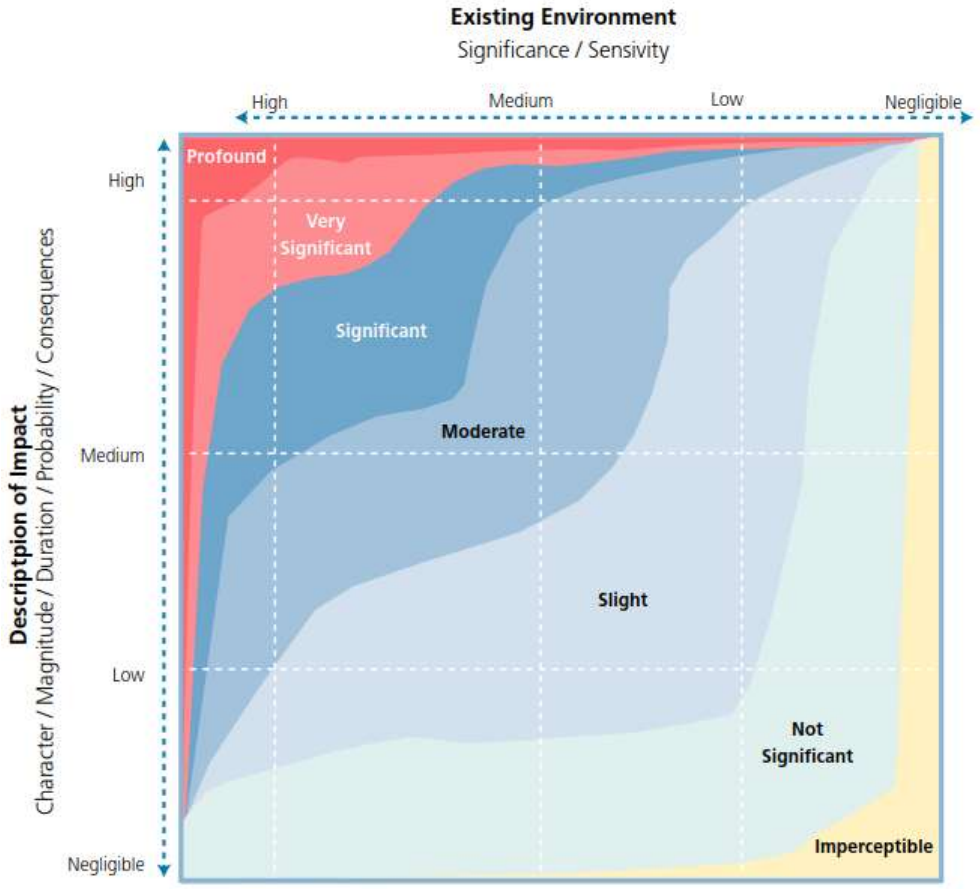
Sensitivity of Receptors	Description of Sensitivity of Receptors
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness / injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

19.3.38 Where relevant, mitigation, management and monitoring measures identified in the supporting technical assessments have been taken into account to avoid, reduce or manage adverse effects and, where appropriate, to enhance beneficial effects. These measures are described in Chapter 6: Material Assets (Traffic and Transport), Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration, Chapter 13: Climate, Chapter 15: Landscape and Visual and Chapter 18: Major Accidents and Disasters, where appropriate.

Significance of Effect

19.3.39 The significance of an effect is determined by considering the magnitude of the impact together with the sensitivity of the affected receptor, in accordance with the EPA Guidelines. The relationship between magnitude and receptor sensitivity used to determine the classification of effects is presented in Plate 19-1. Effects classified as Significant, Very Significant or Profound are considered significant for the purposes of the EIA, while all other effects are considered not significant. This approach is applied to the assessment of amenity and local communities, employment and economic activity, and human health and wellbeing effects.

Plate 19-1: Significance Criteria for Effects



Literature Review

19.3.40 As set out by the IPH in Ireland, "a literature review should be undertaken to find evidence that supports or refutes the assumptions made at the screening stage about the potential health impacts of the proposal"[29].

19.3.41 A literature review was undertaken to identify the health determinants most relevant to the Proposed Order. The review considered guidance from recognised organisations, including the WHO, ISEP, IPH and EEA, together with relevant peer-reviewed literature on airport operations, environmental exposures and health outcomes. The literature reviewed is referenced throughout this section and provides the evidence base for the health impact pathways and potential health impacts assessed. The potential effects on health determinants have been summarised in Table 19-11.

Table 19-11: Activities Associated with the Proposed Order on Health Determinants[30]

Activity Associated with the Proposed Order	Relevant Health Determinants and Potential Impact
Increased frequency of emissions from additional aircraft movements and associated operations	Air quality – the quality of the local environment can have a significant impact on physical and mental health. Pollution caused by traffic and commercial activity can result in poor air quality, noise nuisance and vibration. Poor air quality is linked to increased incidence of chronic lung disease (chronic bronchitis or emphysema), heart conditions and asthma levels of among children and young people.
Increased frequency of noise exposure from additional aircraft movements and associated operations	Noise and Vibration: The quality of the local environment can have a significant impact on physical health. Noise pollution can have a detrimental impact on health resulting in sleep disturbance, cardiovascular and psycho-physiological effects. Good design and the separation of land uses can lessen noise impacts.

[29] IPH Ireland, Health Impact Assessment Guidance, 2009
[30] IEMA, Guide to: Determining Significance for Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-determining-significance-for-human-health-nov-2022.pdf

Activity Associated with the Proposed Order	Relevant Health Determinants and Potential Impact
Increased frequency of emissions from additional aircraft movements and associated operations	Climate change – there is a clear link between climate change and health. Local areas should prioritise policies and interventions that *"reduce both health inequalities and mitigate climate change"* because of the likelihood that people with the poorest health would be hit hardest by the impacts of climate change.
Increased employment opportunities from additional operating hours	Employment and Income – Employment and income is a key determinant of health and wellbeing, as detailed by the WHO, which recognises income as a key determinant of health, stating that *"higher income and social status are linked to better health"*. Unemployment generally leads to poverty, illness, and a reduction in personal and social esteem. Work aids recovery from physical and mental illnesses.

19.3.42 Having identified the human health determinants which have the most potential to be impacted by the activities associated with the Proposed Order, this literature review now provides additional evidence for the topics of Air Quality, Noise and Vibration, and Climate Change, based on existing scientific literature, to reaffirm these potential health impacts.

Air Quality

19.3.43 Based on the scientific literature reviewed and referenced throughout this chapter, there is strong evidence that exposure to air pollution, particularly particulate matter (PM) and nitrogen dioxide (NO_2), can adversely affect human health. Exposure to air pollution, including emissions associated with aircraft operations, airside plant and equipment, and vehicle movements, over several years can reduce life-expectancy, mainly due to an increased risk of cardiovascular and respiratory illness such as chronic obstructive pulmonary disease[31] and lung cancer[32], while short-term exposure can aggravate respiratory and cardiovascular conditions, and trigger asthma attacks[33] and premature deaths. The evidence is strongest for cardiovascular and respiratory effects, particularly in children and young people[34] and older populations[35]. The evidence for population level changes in health outcomes due to concentrations of fine PM and NO_2 below current statutory air quality standards (see Chapter 7: Air Quality) is more limited, but there is a general association of sufficient strength to warrant consideration within the assessment, including in the context of measures being implemented to reduce emissions[36].

Noise and Vibration

19.3.44 Based on the scientific literature reviewed in this section, the strength of evidence is strong for a direct causal relationship between noise disturbance and health outcomes and quality of life effects, although this is dependent on the level of disturbance and other contextual and individual factors that may influence people's response to noise exposure. Emerging from the evidence base are a number of key health outcomes, including noise annoyance, sleep disturbance, cardiovascular health, mental health, and children's learning. The European Environment Agency's Environmental Noise in Europe 2025: Summary for Policymakers has also been reviewed as part of the evidence base for this assessment. The report provides a recent synthesis of evidence on environmental noise and health across Europe and identifies annoyance, sleep disturbance and wider health outcomes as key effects associated with environmental noise exposure. Its findings are consistent with the established evidence base underpinning the WHO Environmental Noise Guidelines and the approach adopted in this assessment. The evidence base has also been informed by the recent (2026) review prepared by Professor Charlotte Clark for the Aircraft Noise Competent Authority (ANCA)[37], hereafter referred to as the ANCA evidence review, which provides a comprehensive synthesis of current evidence on aviation noise and health outcomes, including annoyance, sleep disturbance, cardiovascular and metabolic disease, mental health and wellbeing, and children's learning. The review concludes that aviation noise is associated with a range of adverse health outcomes and identifies annoyance and sleep disturbance as key pathways through which wider health effects may arise. The review also highlights the importance of

[31] Liu, Y., Yan, S., Poh, K., *et al.,* Impact of air quality guidelines on COPD sufferers. Int J Chron Obstruct Pulmon Dis. 11. 839-872, 2016
[32] Loomis, D., Grosse, Y., *et al*., IARC evaluation of the carcinogenicity of outdoor air pollution. Lancet Oncol. 14. 1262–1263, 2013
[33] Orellano, P., Quaranta, N., Reynoso, J., *et al*., Effect of outdoor air pollution on asthma exacerbations in children and adults: Systematic review and multilevel meta-analysis. PLoS One, 12, 2017
[34] Bell, M. L., Zanobetti, A. and Dominici, F., (2013). Evidence on vulnerability and susceptibility to health risks associated with short-term exposure to particulate matter: a systematic review and meta-analysis. Am J Epidemiol, 178, 865-76.
[35] Braubach, M., Jacobs, D. E. and Ormandy, D. (eds.), (2011). Environmental burden of disease associated with inadequate housing. A method guide to the quantification of health effects of selected housing risks in the WHO European Region, Copenhagen, Denmark: World Health Organization Europe.
[36] Bell, M. L., Zanobetti, A. and Dominici, F., (2013). Evidence on vulnerability and susceptibility to health risks associated with short-term exposure to particulate matter: a systematic review and meta-analysis. Am J Epidemiol, 178, 865-76.
[37] Clark, C. (2026). State of the Evidence for Aviation Noise Effects on Health and Wellbeing. Prepared for the Aircraft Noise Competent Authority (ANCA), January 2026.

considering both acoustic and non-acoustic factors in understanding community responses to aviation noise.

19.3.45 Noise annoyance, commonly used within European policy to measure the quality-of-life impacts of noise exposure on communities around airports, is defined as disturbance, irritation, dissatisfaction and nuisance from environmental noise[38]. Noise is linked to health outcomes such as annoyance, sleep disturbance, cardiovascular and metabolic disease, and cognitive impairment in schoolchildren[45] while the broader relationship between transport and health has previously been reviewed in an Irish context by the Institute of Public Health Ireland (2005)[39],[40]. Physiologically, noise exposure can lead to oxidative stress, vascular dysfunction, autonomic imbalance, and metabolic abnormalities[41]. Existing evidence displays a variation in the strength of the relationship between aircraft noise and annoyance which may be associated with differences in methodologies, operational factors (i.e., runway operations and night-flight operations) and non-acoustic factors. Studies of change in aircraft noise exposure, including studies of newly affected communities, have found that there is a heightened response for those communities in relation to the change in noise exposure, both for decreased and for increased aircraft noise exposure[42,43]. Whilst there is a well-established relationship between aircraft noise exposure and annoyance, the extent to which changes in specific operational procedures influence annoyance is less clear and may depend on the nature of the intervention and local circumstances[44]. The ANCA evidence review also highlights the importance of non-acoustic factors, including perceived control, fairness, trust, expectations regarding future noise exposure and attitudes towards the airport, in influencing annoyance responses. The ANCA evidence review further identifies evidence for a "change effect", whereby communities experiencing changes in aircraft noise exposure may exhibit a stronger annoyance response than would be predicted by steady-state exposure-response relationships alone.

19.3.46 Sleep disturbance, potentially induced by aircraft noise, can, in the short-term, impair mood and cognitive performance[45,46]. The long-term effects of sleep disturbance can influence glucose metabolism, appetite regulation, memory immune response and endothelial dysfunction, which can act as precursors for high blood pressure, cardiovascular disease, diabetes[47]. A study on the effects of aircraft noise on macro and microstructure[48] found that when increasing the number of noise related events per night, there was an increase in awakenings, including changes to sleep stages, as a result. Noise is linked to health outcomes such as annoyance, sleep disturbance, cardiovascular and metabolic disease, and cognitive impairment in schoolchildren[49]. Physiologically, noise leads to oxidative stress, vascular dysfunction, autonomic imbalance, and metabolic abnormalities[26]. The ANCA evidence review concludes that both subjective sleep disturbance and objective sleep disturbance (including awakenings) are accepted public health outcomes associated with aviation noise exposure. The review also notes that residents do not fully habituate to aircraft noise during sleep and supports the continued use of established time-averaged metrics, such as L_{night} and %HSD, as robust indicators of population health impacts.

19.3.47 Another study utilised meta-analysis to estimate exposure-response functions for the probability of sleep change as a result of aircraft. The study derived exposure-response relationships for the probability of people being highly sleep disturbed by aircraft, road and rail noise and found a statistically significant association between increasing aircraft noise exposure (L_{night}) and self-reported sleep disturbance. In

[38] IPH, Health Impacts of Transport: A Review, 2005
[39] Peris, E. and Fenech, B., 2020. Associations and effect modification between transportation noise, self-reported response to noise and the wider determinants of health: A narrative synthesis of the literature. Sci Total Environ, Volume 748.
[40] IEMA, Guide to: Determining Significance for Human Health in Environmental Impact Assessment, 2022, iema-eia-guide-to-determining-significance-for-human-health-nov-2022.pdf
[41] Münzel, T. et al., 2018. The Adverse Effects of Environmental Noise Exposure on Oxidative Stress and Cardiovascular Risk. Antioxid Redox Signal, 28(9), pp. 873-908.
[42] Breugelmans, O., Houthuijs, D., van Kamp, I., Stellato, R., van Wiechen, C. and Doornbos, G., (2007). Longitudinal effects of a sudden change in aircraft noise exposure on annoyance and sleep disturbance around Amsterdam Airport. Paper presented at the International Congress on Acoustics, Madrid.
[43] Basner, M. & McGuire, S. (2018). WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Effects on Sleep.
[44] White, K., Arntzen, M., Walker, F., Waiyaki, F. M., Meeter, M., and Bronkhorst, A. W., (2017). Nosie annoyance caused by continuous descent approaches compared to regular descent procedures. Applied Acoustics, 125, 194-198.
[45] Basner, M., and McGuire, S., (2018). WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Effects on Sleep. Int J Environ Res Public Health. 14.
[46] IPH Ireland, (2005), Health Impacts of Transport: a review.
[47] Müller, U., Schreckenberg, D., Möehler, U., and Liepert, M., (2018). Maximum level as an additional criterion for the assessment of railway noise at night: derivation of a wake-up protection criterion for standards and regulations. Paper presented at the Euronoise, Crete
[48] Basner, M., Glatz, C., Griefahn, B., Penzel, T., and Samel, A. (2008). Aircraft noise: Effects on macro-and microstructure of sleep. Sleep medicine, 9(4), 382-387.
[49] WHO Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018, http://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf

this assessment, the variable for sleep disturbed (L_{night}) has been used as the industry standard for the description of the noise impact, and therefore the use of 'awakenings'[50] as a metric has not been used. This is due to multiple factors. Firstly, the awakenings metric would overlap with the assessment of sleep disturbance, as both metrics are concerned with the effects of aircraft noise on sleep. However, they are based on different assessment approaches and indicators, with L_{night} being derived from external annual average noise exposure and awakening metrics typically being based on internal event noise levels. Secondly, the measure of awakenings may not be an effective metric for scoring the quality of sleep, as a healthy adult typically briefly awakens around 20 times during an 8-hour bed period (most of these awakenings are too short to be remembered the next morning)[51]. In epidemiological studies, it is commonly accepted that the presence of nocturnal awakenings occurring at least three nights per week is sufficient to indicate an insomnia symptom[52]. However, as an awakening must be long enough to be memorised for it to affect sleep, recording all awakenings may overestimate the overall increase in sleep disturbance for a given individual. Thirdly, although awakening-based assessment methods have been proposed in the scientific literature, including criteria based on additional noise-induced awakenings, there is currently no widely adopted regulatory framework for determining the significance of environmental effects on the basis of awakenings alone. By contrast, L_{night} and the associated highly sleep disturbed (%HSD) metric are established and widely applied within the WHO and Environmental Noise Directive assessment frameworks. Fourthly, the assessment of additional awakenings is based on indoor noise exposure and sleep response relationships. As such, the results would be influenced by building characteristics and sound insulation performance. In contrast, the primary assessment metrics used in this assessment are based on external noise exposure. The use of awakening-based metrics would therefore introduce a different assessment basis and would require explicit consideration of sound insulation measures, which is not consistent with the approach adopted elsewhere in the assessment.

19.3.48 Cardiovascular Disease (CVD), a term used to describe an umbrella of health conditions such as Coronary Heart Disease (CHD), Ischaemic Heart Disease (IHD), angina, heart failure, stroke, and Acute Myocardial Infarction (AMI), has been widely studied in relation to environmental noise. Many studies have found that it is biologically plausible that long-term environmental noise exposure may contribute to the development of CVD [53,54,26]. It is hypothesised that heightened noise exposure can cause physiological stress reactions, which in turn can increase CVD risk factors[55]. With regard to studies that have specifically assessed long-term aircraft noise exposure and cardiovascular outcomes, a number of studies have reported small, but statistically significant associations with cardiovascular conditions, including AMI and CHD, and related risk factors such as hypertension and diabetes[56,57,58,59].The ANCA evidence review highlights an increasing body of evidence linking aviation noise exposure with cardiovascular and metabolic disease outcomes and notes that annoyance and sleep disturbance represent important pathways through which broader cardiometabolic effects may arise. The review also identifies evidence that environmental noise may contribute to cardiovascular disease through the body's physiological stress response, including changes in heart rate, blood pressure and stress hormone levels.

19.3.49 Mental health and wellbeing is defined by the WHO as a "state of wellbeing in which every individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community"[60]. Mental health and wellbeing is strongly influenced by socioeconomic status, age, gender, history of poor-mental health, and exposure to other life

[50] An awakening is the transition from sleep to wakefulness which typically last at least 30 seconds.
[51] Basner, M., and McGuire, S., (2018). WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Effects on Sleep. Int J Environ Res Public Health. 14.
[52] Ohayon MM, Krystal A, Roehrs TA, Roth T, Vitiello MV. Using difficulty resuming sleep to define nocturnal awakenings. Sleep Med. 2010 Mar;11(3):236-41. doi: 10.1016/j.sleep.2009.11.004. Epub 2010 Jan 13. PMID: 20075004; PMCID: PMC2830306.
[53] Babisch, W., (2014). Updated exposure-response relationship between road traffic noise and coronary heart diseases: A metaanalysis. Noise and Health, 16(68), 1-9
[54] Munzel, T., and Daiber, A., (2018). Environmental Stressors and Their Impact on Health and Disease with Focus on Oxidative Stress. Antioxid Redox Signal, 28(9), 735-740
[55] IPH in Ireland, (2005), Health Impacts of Transport: a review.
[56] Basner, M., Babisch, W., Davis, A., Brink, M., Clark, C., Janssen, S., and Stansfeld, S., (2014). Auditory and non-auditory effects of noise on health. Lancet, 383(9925), 1325-1332
[57] Kempen, E. V., Casas, M., Pershagen, G., and Foraster, M., (2018). WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Cardiovascular and Metabolic Effects: A Summary. International Journal of Environmental Research and Public Health, 15(2)
[58] Vienneau, D., Schindler, C., Perez, L., Probst-Hensch, N., and Roosli, M., (2015). The relationship between transportation noise exposure and ischemic heart disease: a meta-analysis. Environmental Research, 138, 372-380
[59] Institute of Acoustics, Research Links Plane Noise to Heart Health Hospitalisations, 2023, https://www.ioa.org.uk/news/research-links-plane-noise-heart-health-hospitalisations
[60] WHO, Health and Wellbeing, 2023, https://www.who.int/data/gho/data/major-themes/health-and-well-being#:~:text=Mental%20health%20is%20a%20state,to%20his%20or%20her%20community

stressors[61,62]. Given this, noise is thought to be an environmental stressor influencing mental health and wellbeing[63,64,65]. In regard to studies relating to aircraft noise, a number of studies have found evidence to suggest aircraft noise can be linked to a number of mental health and wellbeing outcomes including anxiety and depressive disorders. The ANCA evidence review also identifies moderate-quality evidence for an association between aviation noise exposure and depression in adults, while noting that evidence for other mental health and wellbeing outcomes remains more limited and uncertain.

19.3.50 In addition, there is a reasonable body of scientific evidence indicating that both actual and perceived neighbourhood amenity plays an important role in physical and mental health[66]. Broadly, the literature indicates that environmental features of a neighbourhood, such as its attractiveness or pollution levels, affect the socio-economic position of residents, which in turn affects health and health inequalities[67]. Recent evidence, including the ANCA evidence review, also identifies children's learning and cognition as accepted public health outcomes associated with aviation noise exposure, with the strongest evidence relating to reading comprehension, memory and educational attainment in school-aged children.

19.3.51 The findings of the literature reviewed for this assessment are consistent with those reported in the ANCA evidence review. In particular, both evidence bases identify strong evidence for effects on annoyance and sleep disturbance, evidence linking aviation noise exposure with wider health outcomes including cardiovascular and metabolic disease, depression, and children's learning, and increasing evidence that health effects may occur at lower levels of noise exposure than historically recognised. The review also highlights that annoyance, and sleep disturbance should be regarded not only as health outcomes in their own right but also as pathways through which broader health effects can arise.

Climate Change

19.3.52 There is an existing evidence base which suggests that climate change has a wide range of implications for human health, including increased mortality and morbidity from extreme weather events, infectious diseases (waterborne, foodborne and vector-borne), diseases resulting from degraded air pollution and mental health[68]. As climate change is multi-faceted, it is not possible for studies to attribute health outcomes to specific developments such as airports.

19.3.53 Various studies have assessed the likely future effects of climate change on various health outcomes induced by extreme weather events, including heat waves, storms, cyclone, fires and floods[69]. Evidence suggests that in temperate countries, as summers become increasingly hotter and heat waves more frequent and severe, additional heat-related deaths will increasingly overwhelm the number of deaths averted as a result of milder winters[70,71].

19.3.54 Evidence also suggests that rising temperatures also have implications on the formation and dispersal of various air pollutants. Ozone, a major urban pollutant, accumulates more readily from engine exhausts

[61] Gruebner, O., Rapp, M. A., Adli, M., Kluge, U., Galea, S., and Heinz, A., (2017). Cities and Mental Health. Dtsch Arztebl Int, 114(8), 121-127.
[62] Clark, C., Pike, C., McManus, S., Harris, J., Bebbington, P., Brugha, T., and Stansfeld, S. A., (2012). The contribution of work and non-work stressors to common mental disorders in the 2007 Adult Psychiatric Morbidity Survey. Psychological Medicine, 42(4), 829-842.
[63] Baudin, C., Lefevre, M., Champelovier, P., Lambert, J., Laumon, B., and Evrard, A. S. (2018). Aircraft Noise and Psychological Ill-Health: The Results of a Cross-Sectional Study in France. International Journal of Environmental Research and Public Health, 15(8)
[64] Beutel, M. E., Junger, C., Klein, E. M., Wild, P., Lackner, K., Blettner, M., and Munzel, T., (2016). Noise Annoyance Is Associated with Depression and Anxiety in the General Population- The Contribution of Aircraft Noise. PloS One, 11(5).
[65] Schreckenberg, D., Griefahn, B., and Meis, M., (2010). The associations between noise sensitivity, reported physical and mental health, perceived environmental quality, and noise annoyance. Noise and health, 12(46), 7-16
[66] Miller, W. D., Pollack, C. E. and Williams, D. R., (2011). Healthy homes and communities: putting the pieces together. Am J Prev Med, 40, S48-57.
[67] Egan, M., Tannahill, C., Petticrew, M., et al., (2008). Psychosocial risk factors in home and community settings and their associations with population health and health inequalities: a systematic meta-review. BMC Public Health, 8, 239.
[68] WHO, (2009). Protecting health from climate change: connecting science, policy and people. Geneva, World Health Organization.
[69] McMichael, A.J., and Lindgren, E., (2011). Climate change: present and future risks to health, and necessary responses. Journal of Internal Medicine. 270. (5).
[70] Knowlton. K., Lynn. B., and Goldberg. R.A., et al., (2007) Projecting heat-related mortality impacts under a changing climate in the New York City region. Am J Public Health; 97:2028-34.
[71] Bambrick. H., Dear. K., Woodruff. R., Hanigan. I., and McMichael. AJ., (2008) The impacts of climate change on three health outcomes: temperature-related mortality and hospitalisations, salmonellosis and other bacterial gastroenteritis, and population at risk from dengue. Garnaut Climate Change Review

at higher temperatures. Studies have found that the mortality rate caused by Europe's 2003 heat wave was exacerbated by high temperatures and ozone formation[72,73].

19.3.55 Furthermore, extensions in the geographic range of several vector-borne infectious diseases or their vectors have been linked to rising temperatures induced by climate change. Evidence suggests that temperature, rainfall and humidity can influence the replication and viability of pathogens and vectors[74].

Application of the Assessment Framework

19.3.56 As set out in Chapter 5: Methodology, the Principal Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa). Both operational conditions are assessed for the same future year and against the same Future Receiving Environment and other baseline assumptions. The comparison therefore identifies the change in population and human health effects associated with the Proposed Order relative to the Permitted Operation. This comparison provides the basis for identifying likely significant effects, determining any additional mitigation measures and reporting residual effects.

19.3.57 The Population and Human Health assessment adopts a pathway-based approach in accordance with IEMA guidance and draws on the findings of the relevant technical assessments, including Chapter 6: Material Assets (Traffic and Transport), Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration, Chapter 13: Climate and Chapter 18: Major Accidents and Disasters. These assessments identify changes in environmental conditions attributable to the Proposed Order. Where a relevant pathway exists, those changes are considered in terms of their potential effects on population and human health receptors, having regard to the relevant health determinants and receptor sensitivity. The environmental effect pathways considered in this assessment are therefore derived from the corresponding comparison of the 2029 Permitted Operation and 2029 Proposed Operation in the relevant technical chapters, while demographic, socio-economic and health information is used to characterise the affected receptors and their sensitivity to those changes.

19.3.58 Certain technical chapters also include Supporting Assessments to provide additional operational, planning or baseline context to assist interpretation of the Principal Assessment. The findings of relevant Supporting Assessments undertaken within other technical chapters have been considered in identifying potential pathways for effects on population and human health and, where professional judgement is required, in evaluating the nature, extent and significance of those pathways having regard to the evidence presented in the relevant technical assessment. However, the Supporting Assessments undertaken within other technical chapters do not provide the basis for determining the likely significant effects of the Proposed Order, which is established through the Principal Assessment.

19.3.59 Separate Supporting Assessments have not been undertaken for Population and Human Health because they would not materially alter the identification of relevant impact pathways, receptor sensitivity or the conclusions of the Principal Assessment. This is also proportionate to the nature of the Proposed Order, which comprises an amendment to the passenger capacity restriction and does not involve physical development, land take, changes in land use, demolition, displacement of communities or loss of community facilities that could introduce additional population or human health pathways requiring separate assessment.

19.3.60 This approach is consistent with the pathway-based and proportionate approach to the assessment of human health within EIA. The assessment considers the changes in environmental and socio-economic conditions attributable to the Proposed Order, relative to the Future Receiving Environment, and evaluates their effects on relevant population and human health receptors. The Principal Assessment therefore provides the appropriate basis for identifying and assessing the likely significant effects of the Proposed Order on population and human health.

[72] Babisch, W., (2014). Updated exposure-response relationship between road traffic noise and coronary heart diseases: A metaanalysis. Noise and Health, 16(68), 1-9
[73] Dear, K., Ranmuthugala, G., and Kjellström, T., et al. (2005). Effects of temperature and ozone on daily mortality during the August 2003 heat wave in France. Arch Environ Occup Health; 60: 205–12.
[74] Babisch, W., (2014). Updated exposure-response relationship between road traffic noise and coronary heart diseases: A metaanalysis. Noise and Health, 16(68), 1-9

Limitations and Assumptions

19.3.61 The population and human health assessment identifies both adverse and beneficial effects of the Proposed Order on relevant population and human health receptors. The assessment draws upon the findings of the following technical assessments within the EIAR:

- Chapter 6: Material Assets (Traffic and Transport);
- Chapter 7: Air Quality;
- Chapter 8: Non-Aircraft Noise and Vibration;
- Chapter 9: Aircraft Noise and Vibration;
- Chapter 13: Climate;
- Chapter 15: Landscape and Visual; and
- Chapter 18: Major Accidents and Disasters.

19.3.62 The assumptions, modelling approaches, limitations and uncertainties associated with those assessments are reported within the relevant technical chapters and have been taken into account when interpreting the significance of population and human health effects. Examples include forecast transport demand, air quality dispersion modelling and aircraft noise modelling assumptions. The assessment draws on available baseline and socio-economic evidence, applicable guidance and, where required, professional judgement. Professional judgement is used to evaluate the nature, extent and significance of potential effects, having regard to the characteristics and sensitivity of the affected receptors, the magnitude and duration of change, and the extent to which existing conditions may be altered. The assessment then provides a proportionate, high-level description of the resulting effects on people and local communities and their likely significance.

19.3.63 All community resources within 500 m of the Dublin Airport Site are identified in Section 19.4. Beyond this distance, community resources have been included where there is a credible potential for them to experience effects from the Proposed Order or where they are considered particularly sensitive to the type of change being assessed. Professional judgement has been applied in determining whether more distant community resources should be included, having regard to the type and function of the resource, its importance to the local community, its sensitivity to change, its proximity to Dublin Airport and the presence of a credible pathway for effect.

19.3.64 Information in the Current Receiving Environment section below related to demographics and the health profile of the population in the study area uses statistics from the latest census. The most recent Census was published in 2022. Where equivalent Census 2022 data is not available (for example income and disability data) for the geographic scale or level of detail required for the assessment, data from Census 2016 has been used to supplement the baseline and allows for comparisons between the local EDs and wider geographic areas.

19.3.65 Section 19.5 establishes the Future Receiving Environment, which is limited by the availability and accuracy of future socio-economic statistics, particularly at smaller geographic scales.

19.4 Current Receiving Environment

19.4.1 This section establishes a comprehensive and coherent socio-economic profile of the area, including consideration of the labour market and health indicators, which is used to identify the Current Receiving Environment. The Future Receiving Environment is described in Section 19.5.

19.4.2 Dependent on the availability of data from the CSO, this section presents analysis of the socio-economic indicators which provides the narrative and evidence base of the study area. Analysis in this section sets the context for the potential impacts of the Proposed Order. Dublin Airport intersects the two EDs of Airport and Dubber. Both EDs are located within the Fingal County, which itself is situated in the wider jurisdiction of the Eastern and Midland Regional Assembly.

19.4.3 This section presents analysis of the following indicators:

- Population
- Labour market indicators; including:

  Participation rate and unemployment

Income profile

- Human health
- Local community facilities and land uses

Population

Population and Demographics

19.4.4 In 2022, at the time of the latest Census, the population of Fingal County was 330,506, which accounted for approximately 23% of the population for the Dublin Region (1,458,154) and 6% of the population of Ireland (5,149,139), whereas in Meath County, the population was 220,826[75]. The resident population of the Airport ED was 6,152 whilst Dubber ED was 8,931.

19.4.5 As shown in Table 19-12, Airport ED and Dubber ED had a higher proportion of working age residents and lower proportion of retirement age residents (65+ years) in comparison to Fingal County, Meath County, Dublin Regional Authority, the Eastern and Midland Regional Assembly and the average for Ireland. In 2022, approximately 4,528 (74%) of the residents in the Airport ED were aged between 15 and 64 years. Dubber ED had approximately 6,520 (73%) residents aged between 15 and 64 years in 2022.

19.4.6 Airport ED had the same proportion of residents aged 14 years or under (20%) as Ireland and the Eastern and Midland Regional Assembly, however the proportion was lower in comparison to Dubber ED (23%), Fingal County (22%) and Meath County (23%). Conversely, Airport ED had a greater proportion of residents aged 14 years or under compared to the Dublin Regional Authority (18%). The proportion of residents aged 65 years or older in Airport ED (7%) and Dubber ED (4%) was smaller than the average for Fingal County (11%), Meath County (12%), Dublin Regional Authority (13%), the Eastern and Midland Regional Assembly (13%) and Ireland (15%).

Table 19-12: Proportion of Population by Age (2022)[76]

Age Group	Airport ED	Dubber ED	Meath County	Fingal County	Dublin Regional Authority	Eastern and Midland Regional Assembly	Ireland
Aged 14 or younger	20%	23%	23%	22%	18%	20%	20%
Aged 15-64	74%	73%	65%	67%	68%	67%	66%
Aged 65 or older	7%	4%	12%	11%	13%	13%	15%

Deprivation

19.4.7 Employment and socioeconomic status can have a material influence on health and wellbeing. The employment rate of an area has a relationship with life expectancy and healthy life expectancy. Places with higher levels of economic inactivity tend to have a population with lower healthy life expectancy. The type of work matters for health, as does having sufficient income and forming social connections. Research from the UK shows those with low job security or low job satisfaction are more than twice as likely to report poor health as the average employee. Unemployment is consistently associated with a negative impact on several health outcomes. Research has found links between unemployment and self-rated health. There is a similar relationship between unemployment and mental health, including depression, anxiety and levels of self-esteem (The Health Foundation 2024).

19.4.8 Deprivation data is available up to 2022 for ED level, and up to 2016 for county level data. In 2022, the Airport ED was considered 'affluent' (6th least deprived rank) with a relative score of 13.1[77]. North of Dublin Airport is the settlement of Swords which contains four small areas which are classified as 'marginally above average' and seventeen which are classified as 'marginally below average'. West of Dublin is the settlement of Malahide which is classified as 'affluent'.

[75] CSO, Census 2022, 2022, https://data.cso.ie/
[76] Kempen, E. V., Casas, M., Pershagen, G., and Foraster, M., (2018). WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Cardiovascular and Metabolic Effects: A Summary. International Journal of Environmental Research and Public Health, 15(2)
[77] Haase, T., and Pratschke, J., The 2022 Pobal HP Deprivation Index for Small Areas (SA)

19.4.9 According to the 2016 data from the Pobal HP Deprivation Index[78,79], Fingal County is classified as 'marginally above average' (fifth least deprived rank out of eight classifications) in 2016 with a relative score of 5.3.

Labour Market Indicators

Participation Rate and Unemployment

19.4.10 In 2016, according to the Census data of that year, the total size of the labour force across the Airport ED and Dubber ED in 2016 was 7,482[80]. Within the labour force in this area, 711 (7%) people were unemployed having lost or given up a previous job. A further 78 people were looking for their first regular job. Of the labour force within this area, 6,693 were in employment.

19.4.11 The labour force participation rate (for the economically active population, considered the age range 15-64 years) in the Airport ED (75%) and Dubber ED (79%) was significantly higher than the recorded rate in Meath County (64%), Fingal County (67%), Dublin Regional Authority (64%), the Eastern and Midland Regional Assembly (63%) and Ireland (61%) as a whole.

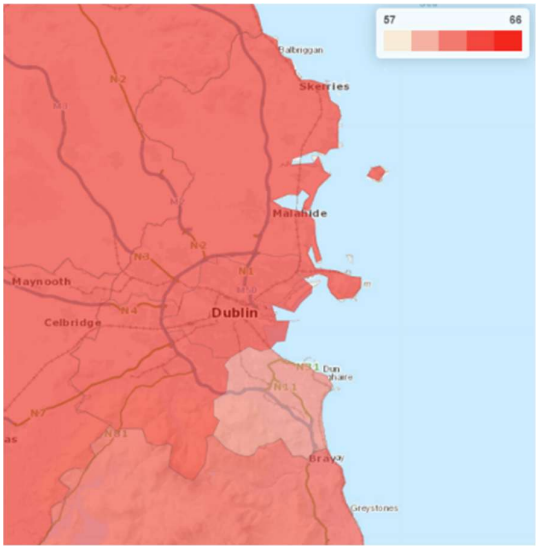
19.4.12 The unemployment rate (15-64 years) in the Airport ED (8%) was lower than the rate in the Dubber ED (12.2%), Meath County (11%), Fingal County (10%), Dublin Regional Authority (12%), the Eastern and Midland Regional Assembly (12%) and Ireland (13%) as a whole.

Table 19-11: Labour Force Participation Rate and Unemployment Rate, (2016)[80]

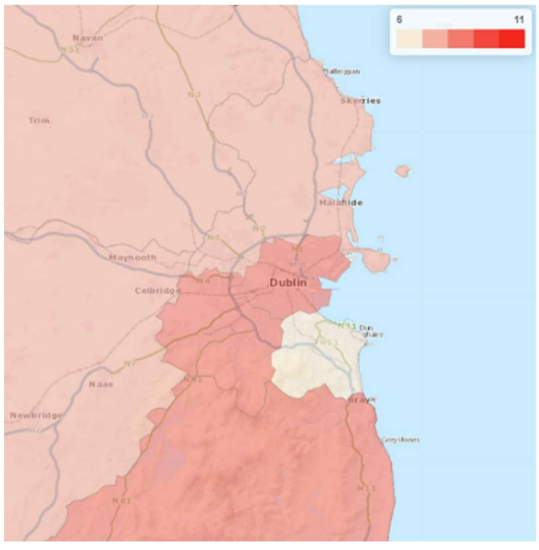
Indicator	Airport ED	Dubber ED	Meath County	Fingal County	Dublin Regional Authority	Eastern and Midland Regional Assembly	Ireland
Labour Force Participation Rate	75%	80%	64%	67%	64%	63%	61%
Unemployment Rate	8%	12%	11%	10%	12%	12%	13%

Plate 19-2: Labour Force and Unemployment Rate, %

Labour Force Participation Rate (2022, %)



Unemployment Rate (2022, %)



[78] Vienneau, D., Schindler, C., Perez, L., Probst-Hensch, N., and Roosli, M., (2015). The relationship between transportation noise exposure and ischemic heart disease: a meta-analysis. Environmental Research, 138, 372-380

[79] The Pobal HP Deprivation Index is the primary source for deprivation in Ireland by combining three dimensions of affluence or disadvantage (demographic profile, social class composition and labour market situation) to provide a relative index score for every small area in Ireland. The relative index scores are normally distributed around a bell-shaped curve to display the current levels of deprivation compared to other areas, with most areas clustered around the mean and comparatively fewer areas exhibiting extreme levels of affluence or deprivation. The eight classifications for deprivation range from extremely affluent to extremely disadvantaged.

[80] CSO, Census 2016, 2016, https://data.cso.ie/

19.4.13 Data on labour force participation and unemployment are available for 2022 and are presented below. The analysis that follows reflects the 2022 position.

19.4.14 In Fingal County, labour force participation rate has decreased from 67% in 2016 to 66% in 2022. In terms of unemployment rate, in Fingal County this has decreased from 10% to 8% between 2016 and 2022. In Meath County, the labour force participation rate remained the same between each census, however the unemployment rate fell from 11% to 7%. In Ireland, the labour force participation was 61% in both Census 2016 and Census 2022, but the unemployment rate has decreased from 13% in 2016 to 8% in 2022.

Table 19-12: Labour Force and Unemployment Rates[57,60]

Indicator	Fingal County		Meath County		Ireland	
	2016	2022	2016	2022	2016	2022
Labour Force Participation Rate	67%	66%	64%	64%	61%	61%
Unemployment Rate	10%	8%	11%	7%	13%	8%

Live Register

19.4.15 The Live Register is used to provide a monthly series of the numbers of people (with some exceptions) registering for Jobseekers Benefit (JB) or Jobseekers Allowance (JA) or for various other statutory entitlements at local offices of the Department of Social Protection.

19.4.16 Table 19-13 shows that the proportion of residents in Dublin and the Eastern and Midland Regional Assembly (both 37%) on the Live Register for twelve months or more is slightly higher than Ireland (36%) as a whole[81].

Table 19-13: Live Register, (May 2024)

Indicator	Dublin		Eastern and Midland Regional Assembly		Ireland	
	Claimants	%	Claimants	%	Claimants	%
Over 1 Year	15,913	37%	28,512	37%	61,355	36%
Under 1 Year	27,338	63%	49,217	63%	107,051	64%
Total	**43,251**	-	**77,729**	-	**168,406**	-

Income

19.4.17 More recent household income data is not currently available at ED level within the published Census 2022 Small Area Population Statistics. Accordingly, the Census 2016 income dataset is the most comprehensive and consistent source of small-area household income data for this assessment of the current state of the environment.

19.4.18 Average household annual income in Fingal County is substantially greater than the Ireland average, likely helped by the high-level occupations that the residents in Fingal County tend to hold. The median household annual income in Fingal County in 2016 was €58,795, which was higher than the median rate for Meath County (€52,156) and Ireland (€45,256)[82]. The median household weekly income within the Airport ED and Dubber ED is less than the average for Fingal County, but still greater than the average across Ireland as a whole – as displayed in Table 19-14.

Table 19-14: Household Income, (2016)[63]

Indicator	Airport ED	Dubber ED	Meath County	Fingal County	Ireland
Median household annual income (€)	52,482	52,108	52,156	58,795	45,256

Gross Value Added

19.4.19 Gross Value Added (GVA) data provides context on the estimated economic output for national and regional levels. In 2022, Ireland produced a GVA total of €482.0bn, which was approximately 35% more

[81] CSO, Live Register, 2023, https://www.cso.ie/en/statistics/labourmarket/liveregister/
[82] CSO, Geographical Profiles of Income in Ireland, 2016, https://www.cso.ie/en/methods/earnings/geographicalprofilesofincomeinireland2016/

than in the last recorded year of 2020 (€356.2bn)[83]. Tourism-related economic activity (proxied by Accommodation and Food Services) contributes approximately 1% of total national GVA. While this indicates a relatively small share of overall economic output, the sector is sensitive to changes in passenger throughput at Dublin Airport.

19.4.20 The economic importance of Dublin Airport extends beyond the direct aviation sector. An independent Economic Impact Study undertaken by InterVISTAS for daa[84] estimated that Dublin Airport supported or facilitated approximately 116,100 jobs across the Republic of Ireland in 2022 and contributed €9.6 billion in GVA to the national economy. The airport's economic contribution is generated through direct airport operations, supply chain activity, employee expenditure and the catalytic effects associated with tourism, trade, foreign direct investment and business productivity. The study highlights the airport's role as Ireland's principal international gateway and identifies connectivity as a key driver of tourism and wider economic activity across the country.

Human Health

19.4.21 The town of Swords is located approximately 5 km north of Dublin Airport. In Dublin North, the Local Health Office with administrative authority over health and wellbeing matters, there is an average of 594 patients per GP, which is below the national average of 861 patients per GP[85].[86].[87].

19.4.22 The life expectancies in Dublin and Ireland have been increasing in recent years, creating an ageing population, a trend that is currently being experienced across most developed countries. In 2016, male residents in the Dublin Regional Authority were expected to live to 80 years whilst female residents were expected to live to 83 years, compared to 78 years and 82 years respectively in 2011[88]. The life expectancies in 2016 are broadly in line with the Ireland level averages (79 years for males and 83 years for females).

19.4.23 Self-reported health status across Ireland is generally positive, although survey responses indicate lower levels of self-reported good health within the Airport ED and Dubber ED. In 2022, 84% of Fingal County and 87% of Meath County's population age 15 or above considered themselves to be in very good or good health, compared to Ireland's average of 83%[57]. In comparison, around 75% of residents in Dubber ED and 60% of residents in the Airport ED reported their health to be very good or good[89].

19.4.24 In Airport ED, under 2% of residents self-reported their health as bad or very bad, compared with 1% of residents in Dubber ED, 2% of residents in Meath County and 2% of residents in Fingal County, in line with the average for Ireland of 2%. Plate 19-3 presents the health conditions in all the geographic areas of the baseline study area.

[83] CSO, Output and Value Added by Activity 2022, 2022, https://www.cso.ie/en/releasesandpublications/ep/p-naova/outputandvalueaddedbyactivity2022/grossvalueaddedgva/#:~:text=GVA%20increased%20by%2018%25%20to%20%E2%82%AC482%20billion%20in%202022andtext=and%20deducting%20product%20subsidies%20while,information%20see%20the%20Background%20Notes

[84] InterVISTAS Consulting, Dublin Airport Economic Impact Study, 2023 https://www.dublinairport.com/docs/default-source/corporate/economic-impact-study-draft-3.pdf?Status=Temp&sfvrsn=cb3175b6_8

[85] Health and Service Executive, Find a GP, 2024, https://data.gov.ie/dataset/community-centres-fcc

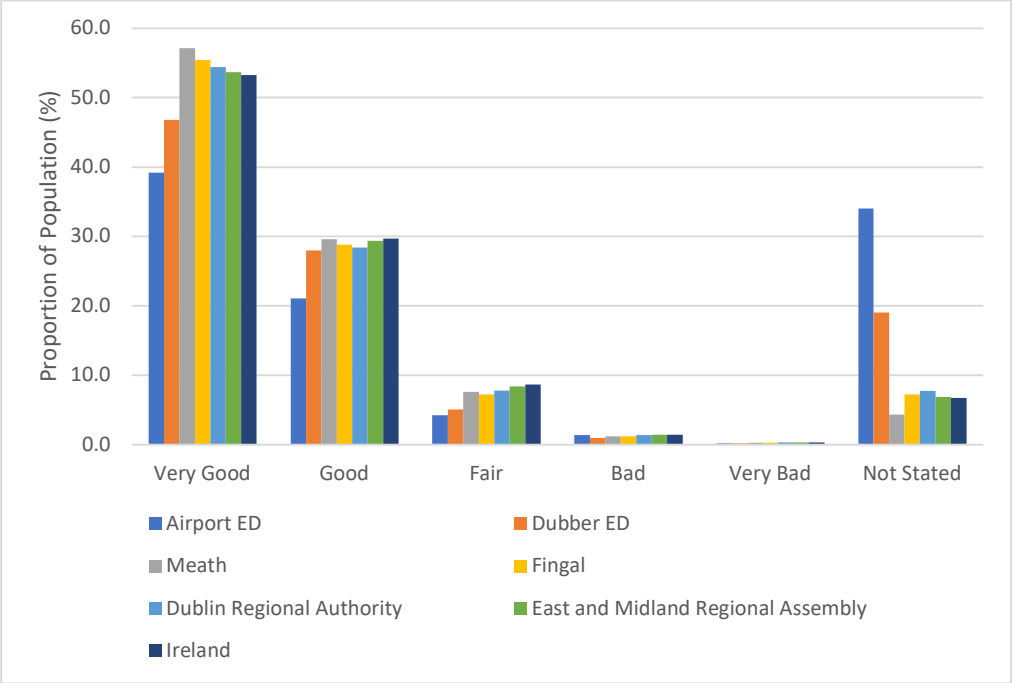
[86] Including communities such as Swords, Malahide, Donabate, Portmarnock, Balbriggan, Lusk, Rush and the Dublin Airport area.

[87] The Journal, Breakdown: Average number of public patients per GPs across the country, 2018, https://www.thejournal.ie/gp-breakdown-country-3971888-Apr2018/

[88] CSO, Irish Life Tables: Period Life Expectancy by Sex, Age, Region and Year, 2019.

[89] These statistics may not be wholly representative of the health conditions in the ED, particularly the Airport ED, as 34% of respondents in the Airport ED and 19.1% of respondents in Dubber ED did not state an answer (country's average of no response is 6.7%).

Plate 19-3: General Health conditions (2022)



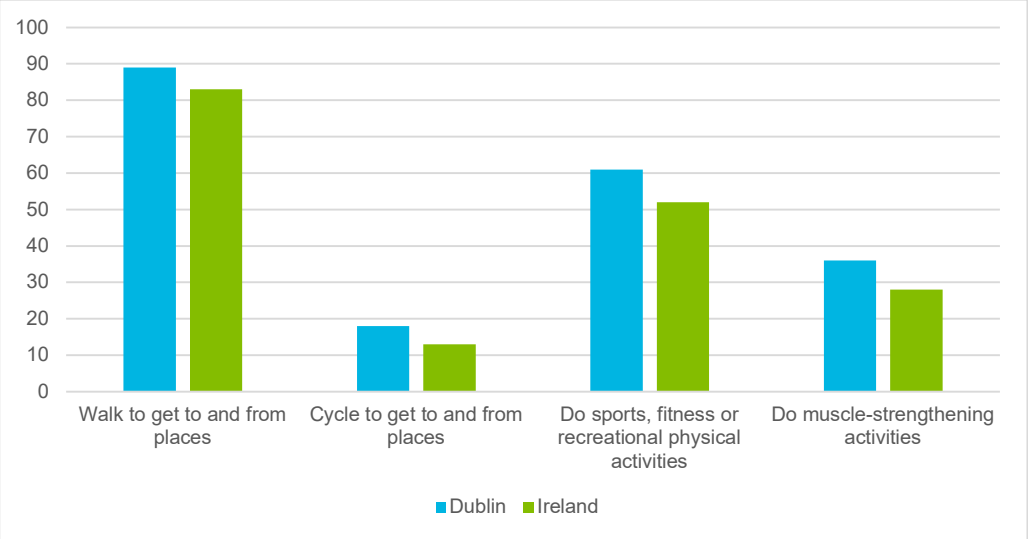
19.4.25 Fewer residents (as a percentage of total population) live with a disability in the Airport and Dubber EDs compared to Fingal County and Ireland as a whole. In the 2016 Census, of residents aged 15 and over, 8% stated they had a disability in the Airport ED and Dubber ED. These proportions are considerably lower than the averages for Fingal (11%) and Ireland (14%).

19.4.26 The Census does not provide further information on health limitations or physical activity data by local area. However, the Irish Health Survey provides further detail on health profiles at a regional level[90].

19.4.27 Most residents aged 15 and over in Dublin (85%) are not limited at all in their daily activities, with 12% limited slightly and only 3% considered to be severely limited[69]. This profile almost matches the national results exactly, where 82% are not limited at all, 13% are limited slightly and 5% are severely limited. However, the residents in the region of Dublin tend to engage in more physical activity than the country's average. Plate 19-4 displays the proportion of residents aged 15 and over undertaking physical activity in the Dublin Region and Ireland. This highlights that residents in Dublin are slightly more active across all metrics in comparison to the national averages.

[90] CSO, Irish Health Survey 2019, 2019.

Plate 19-4: Physical Activity Undertaken for all Persons aged 15 years and over in Dublin and Ireland (2019, %)[69]



19.4.28 The Irish Health Survey reports the mental health status of residents (aged 15 and over). In 2019, 86% of Dublin residents stated they experience no or minimal depression, which was the same figure as for Ireland. The full mental health statistics for Dublin and Ireland are shown in Table 19-15, which indicates that residents in Dublin experience similar levels of depression compared to national rates.

Table 19-15: Mental Health Status for all Persons aged 15 and over[69]

Mental Health Indicator	Dublin	Ireland
None to minimal depression	86%	86%
Mild depression	9%	9%
Moderate depression	3%	3%
Moderately severe or severe depression	2%	2%

19.4.29 There are several healthcare facilities in the area surrounding Dublin Airport. While Medmark Dublin Airport, located within the airport grounds, provides occupational healthcare services, local residents are primarily served by GP practices and healthcare facilities located in nearby settlements such as Swords. Beaumont Hospital Dublin is the closest major hospital facility, located around 6km south of the airport and easily accessible following the M1 South from the airport. The Beaumont Hospital is a large facility, with 669 available inpatient beds (the third most of any hospital in Ireland) and 159 available day beds (most of any hospital in Ireland)[91]. On average, across the Dublin Region (Dublin City, Fingal, South Dublin and Dún Laoghaire-Rathdown), there are six general practitioner consultations per person per year; this is the same as the country's average.

Land Uses and Local Community

Local Community Facilities

19.4.30 Within the study area there are several local communities, which include numerous residential areas and community and recreational facilities such as open spaces and parks. Community facilities located within the study area comprise the ALSAA Sports Centre, Swords Rugby Club, Kealy's public house and the Coachman's Inn; all of which are located along the R132. Approximately 500m to the south of these facilities is Dardistown Cemetery. North-west of the airport is the St Margaret's Golf and Country Club and the St Margaret's GAA Club. North-east of the airport, directly east of the R132, is the Halpenny Golf Driving Range. Immediately north of the airport is the Forrest Little Golf Club.

19.4.31 To the immediate west of the airport boundary, located on the R108, is the Boot Inn public house which was reported to have closed in April 2024. Directly to the south of the airport beyond the Blue Long Stay

[91] Department of Health, Open Beds Report – June 2019, 2019, https://www.gov.ie/en/publication/9df41b-department-of-health-open-beds-report-june-2019/

Car Park is the Silloge Park Golf Club, Na Fianna GAA Club, Ballymun Kickhams GAA Club and Starlights GFC.

Land Uses

19.4.32 There are a number of residential properties located to the west of the airport along Dunbro Lane. Beyond these is the settlement of Saint Margaret's. In addition to numerous dwellings, Saint Margaret's is home to St Margaret's Church and St Margaret's National Primary School.

19.4.33 The largest town within the surrounding area is Swords which is located around 5km north of Dublin Airport. Swords contains numerous community facilities, businesses, leisure and residential assets.

19.4.34 There are several settlements located further to the east of the airport towards the coast. This includes the suburbs of The Baskins (2.5km) and Kinsealy (3.5km). Further east towards the Irish Sea are the coastal towns of Malahide (5.5km) and Portmarnock (6.5km) which contain numerous community and recreational facilities. Several golf courses are located around Malahide and along the coastline, including Malahide Golf Club (6.0km) and Portmarnock Hotel and Golf Links (7.0km).

Dublin Airport Community Fund

19.4.35 Dublin Airport established the Dublin Airport Community Fund in 2017 to support local communities in the vicinity of the airport. The fund provides financial support for projects relating to sport and recreation, social inclusion and community development, health and wellbeing, culture and heritage, and environmental sustainability. The fund has a total value of €10 million, providing annual funding of approximately €400,000 over a 25-year period[92]. The fund supports community-led initiatives within designated communities surrounding Dublin Airport, including those located beneath flight paths[93]. The design of the fund, including both the eligible geographic areas and the types of projects supported, was developed following feedback received during the second public consultation on the North Runway project in 2016.

19.4.36 Since its establishment, the Dublin Airport Community Fund has allocated more than €2.3 million to local community initiatives. In 2025, the fund awarded €500,000 to 117 schools, clubs and community groups in neighbouring communities. Supported projects included sports, recreation, environmental, educational and community development initiatives. Funding applications are independently assessed based on the positive contribution of the proposed project to the local community. In 2023, for example, 111 local community projects received a share of €400,000 through the fund[94].

Current Design and Management Measures

19.4.37 Current design and management measures related to population and human health aspects are described in the relevant sections of Chapter 6: Material Assets (Traffic and Transport), Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration, Chapter 13: Climate, Chapter 15: Landscape and Visual and Chapter 18: Major Accidents and Disasters.

19.5 Future Receiving Environment

19.5.1 This section describes the socio-economic conditions anticipated within the Future Receiving Environment for the 2029 assessment year. As defined in Chapter 5: Methodology, the Future Receiving Environment represents the conditions expected to prevail in 2029 in the absence of the Proposed Order, taking account of relevant committed development, established trends and regulatory changes. It provides the future context against which the effects attributable to the Proposed Order are identified through the Principal Assessment.

19.5.2 Population projections are not available for all of the geographic areas considered in this assessment. The Central Statistics Office (CSO)[95] publishes regional and national population projections based on a range of assumptions, including alternative scenarios for internal migration between Dublin and other regions of Ireland. Table 19-16 presents the available mid-tier projections for Dublin and Ireland to 2036, including the Dublin inflow and outflow scenarios, together with the projected change from the 2016 baseline population, consistent with the CSO Regional Population Projections methodology.

[92] Dublin Airport, Dublin Airport's Community Fund Reopens for Applications, 2021, https://www.dublinairport.com/latest-news/2021/03/10/dublin-airport's-community-fund-reopens-for-applications
[93] Beutel, M. E., Junger, C., Klein, E. M., Wild, P., Lackner, K., Blettner, M., and Munzel, T., (2016). Noise Annoyance Is Associated with Depression and Anxiety in the General Population- The Contribution of Aircraft Noise. PloS One, 11(5).
[94] Dublin Airport Community Fund, 2023, https://www.dublinairport.com/corporate/corporate-social-responsibility/community-fund
[95] CSO, Regional Population Projections 2016 – 2036, 2023.

19.5.3 The assessment year for the Proposed Order is 2029; however, the CSO projections are published for defined future projection years rather than specifically for 2029. The 2036 projections have therefore been used to establish the anticipated direction and broad scale of demographic change relevant to the Future Receiving Environment. They are not intended to represent the population in 2029 directly but indicate the longer-term population trajectory within which the 2029 assessment year falls.

19.5.4 The projections indicate continued population growth within Dublin and Ireland. Between 2016 and 2036, Dublin's population is projected to increase by between 12% and 32% under the mid-tier scenarios, depending on assumptions regarding internal migration, while the population of Ireland is projected to increase by approximately 18%. Equivalent projections are not available for the smaller geographic areas considered in this assessment. The regional and national projections nevertheless indicate that population growth is expected to form part of the Future Receiving Environment for Airport ED, Dubber ED and Fingal County.

Table 19-16: Mid-tier Population Projections (Dublin Inflow and Outflow) [75]

Area	2016 Population	Mid-tier Population Projection 2036 (Dublin Outflow M2F2)	Population Change	Mid-tier Population Projection 2036 (Dublin Inflow M2F2)	Population Change
Dublin	1,335,900	1,491,500	+12%	1,762,400	+32%
Ireland	4,739,600	5,571,700	+18%	5,571,700	+18%

19.5.5 Future projections are not available for all of the socio-economic indicators described in Section 19.4: Current Receiving Environment. In the absence of robust projections, the current socio-economic profile has therefore been used as the basis for characterising those aspects of the Future Receiving Environment, supplemented by available evidence of relevant demographic, labour market and other established trends. This approach avoids assuming specific quantitative changes where these cannot be supported by available evidence, while allowing known trends relevant to receptor characteristics and sensitivity to be taken into account.

19.5.6 In relation to employment and the labour market, the European Centre for the Development of Vocational Training (Cedefop) skills forecasts for Ireland (2021-2035) identify a number of trends that are relevant to the future receiving environment in 2029[96]. These include:

- continued employment growth, with total employment forecast to exceed 3 million persons by 2035, representing an increase of approximately 650,000 jobs compared with 2021 levels;
- a concentration of employment opportunities within higher-skilled occupations, including professional and technical roles;
- strong employment growth in higher-skilled occupations, particularly professional occupations, technicians and associate professionals, and managerial occupations;
- employment growth across most occupational groups, although some occupations such as skilled agricultural and fishery workers and armed forces are forecast to decline;
- significant recruitment requirements arising not only from employment growth but also from workforce replacement, with approximately 1.5 million workers required to meet replacement demand between 2021 and 2035;
- increasing demand for highly qualified workers, with 515,000 of the additional jobs forecast by 2035 expected to be filled by individuals holding high-level qualifications, compared with an increase of 260,000 workers with medium qualifications; and
- a continued reduction in the number of workers with low qualifications in employment, reflecting the changing educational profile of the labour force and increasing qualification levels across the economy.

19.6 Assessment of Likely Significant Effects

19.6.1 This section presents the findings of the Principal Assessment of the likely significant effects of the Proposed Order on population and human health. As described in Section 19.3, the Principal

[96] SOLAS. Summer Skills Bulletin 2023: Using Cedefop Forecasts (2021-2035) to Inform Future Demand for Skills in Ireland. Skills and Labour Market Research Unit, SOLAS. 2023.

Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa), thereby identifying the effects attributable to the additional passenger throughput enabled by the Proposed Order. The assessment is presented under the following assessment themes:

- amenity and local communities;
- employment, economic activity and tourism; and
- human health and wellbeing.

19.6.2 The population and human health conclusions presented within this chapter reflect the cumulative environmental conditions assessed within the relevant technical chapters, including cumulative traffic and transport, air quality and noise effects.

Amenity and Local Communities

19.6.3 The assessment considers the potential effects of the Proposed Order on the amenity of community, recreational and sports facilities and residential receptors. The relevant impact pathways comprise changes in air quality, including odour, and noise and vibration arising from the additional airport activity attributable to the Proposed Order. The assessment draws on the findings of Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration and Chapter 9: Aircraft Noise and Vibration.

Air Quality

19.6.4 The air quality pathway considers the potential for changes in pollutant concentrations and odour attributable to the Proposed Order to affect the amenity of community, recreational and sports facilities and residential receptors. Community, recreational and sports facilities are considered to be of Medium sensitivity to changes affecting their amenity, reflecting their generally intermittent use and the ability of users to avoid or adapt to changes in environmental conditions. Residential receptors are considered to be of High sensitivity, reflecting continuous occupancy, prolonged exposure to environmental conditions and the limited ability of residents to avoid or adapt to adverse changes within the home environment.

19.6.5 Chapter 7: Air Quality assesses changes in emissions associated with aircraft operations, airside activities, airport energy plant and surface access traffic attributable to the additional passenger throughput enabled by the Proposed Order. The assessment identifies that concentrations of NO_2, PM_{10} and $PM_{2.5}$ within the Future Receiving Environment remain below the current National Air Quality Standards at all assessed receptors. However, a limited number of receptors are predicted to exceed the new EU Air Quality Directive (2024/2881) Limit Values for annual mean NO_2 and $PM_{2.5}$, primarily at locations close to the Airport boundary and major roads. The changes in pollutant concentrations between the 2029 Permitted Operation and the 2029 Proposed Operation are generally small, with the greatest changes associated with NO_2. Chapter 7 concludes that the resulting air quality effects are Not Significant.

19.6.6 Notwithstanding the exceedances identified at a limited number of receptors, the changes in pollutant concentrations attributable to the Proposed Order are generally small and affect a relatively limited geographical area. Having regard to the findings of Chapter 7, the magnitude of impact on the amenity of community, recreational and sports facilities and residential receptors is assessed as Negligible. Taking account of the Medium sensitivity of community, recreational and sports facilities and the High sensitivity of residential receptors, the resulting effect is assessed as Imperceptible to Slight Adverse and Not Significant.

19.6.7 Chapter 7: Air Quality also identifies no significant odour effects. Monitoring data indicate very low concentrations of aviation-related hydrocarbons and predicted concentrations associated with airport operations remain below levels likely to result in unacceptable amenity effects. No significant effects on amenity and local communities associated with odour are therefore identified.

Noise and Vibration

19.6.8 The assessment has regard to the findings of Chapter 9: Aircraft Noise and Vibration, including predicted changes in aircraft noise exposure and associated outcomes relevant to health and wellbeing. The significance of population and human health effects has been determined in accordance with the methodology set out in this chapter, taking account of the sensitivity of the affected population and the magnitude of the health impact.

19.6.9 The noise and vibration pathway considers the potential for changes in aircraft noise, non-aircraft noise and vibration attributable to the Proposed Order to affect the amenity of residential receptors and community, recreational and sports facilities, including through potential effects associated with

nighttime and evening noise and sleep disturbance. Community, recreational and sports facilities are considered to be of Medium sensitivity to changes affecting their amenity, while residential receptors are considered to be of High sensitivity, reflecting the importance of the residential environment for rest and wellbeing and the limited ability of residents to avoid prolonged exposure to noise. Particular consideration has been given to night-time noise due to the established relationship between night-time noise exposure, sleep disturbance and wider health outcomes identified in the literature review (paragraphs **Error! Reference source not found.** to 19.3.51). Chapter 9: Aircraft Noise and Vibration assesses night-time aircraft noise using the Lnight metric and associated measures of sleep disturbance, whilst Chapter 8: Non-Aircraft Noise considers changes in road traffic noise during the night-time period. Chapter 9: Aircraft Noise and Vibration assesses aircraft noise using the Lden metric, which applies additional weightings to evening and night-time aircraft operations to reflect the greater sensitivity of receptors during these periods. The metric is widely used in the assessment of environmental noise and has an established relationship with community annoyance.

19.6.10 Chapter 8: Non-Aircraft Noise assesses changes in road traffic noise between the 2029 Permitted Operation and the 2029 Proposed Operation. The assessment considered the local road network surrounding Dublin Airport and the communities most likely to experience changes in airport-related road traffic, including St. Margaret's, Cloghran, Corballis, Forrest Little, Stockhole, Turnapin and Swords. No areas are predicted to experience an increase in road traffic noise of 1 dB or more. The magnitude of impact is therefore assessed as Negligible and Chapter 8: Non-Aircraft Noise concludes that the resulting road traffic noise effects are Not Significant.

19.6.11 Chapter 9: Aircraft Noise and Vibration assesses aircraft air noise and ground noise by considering both the absolute noise level experienced by a receptor and the change in noise level between the 2029 Permitted Operation and the 2029 Proposed Operation. These are combined to determine the magnitude of effect at individual receptors. A Significant effect is identified where the resulting effect is rated Significant or above. The assessment considered communities surrounding Dublin Airport and beneath key flight paths, including Tyrellstown (Toberburr), Ridgewood, Swords, Malahide Castle, Portmarnock North, Portmarnock South, Malahide South, St Doolaghs, Darndale Park, The Baskins, Mayeston Hall, Kilshane Cross, St Margaret's, Ashbourne, Dunboyne, Ongar, Mount Garrett, Beaumont, Kilcoskan and Ratoath.

19.6.12 For aircraft noise, these changes result predominantly in Imperceptible, Not Significant and Slight Adverse effects. The assessment identifies Moderate Adverse effects for 13 people for the L_{den} assessment and 65 people for the Lnight assessment. However, no people are predicted to experience a Significant, Very Significant or Profound effect as a result of the Proposed Order. The assessment also predicts an increase in the number of people classified as highly annoyed and highly sleep disturbed by aircraft noise. Compared with the 2029 Permitted Operation, the 2029 Proposed Operation is forecast to increase the number of people highly annoyed by approximately 9% and the number of people highly sleep disturbed by approximately 8%.

19.6.13 Whilst the evidence base identifies established relationships between aircraft noise, annoyance, sleep disturbance and wider health outcomes, the occurrence of annoyance and sleep disturbance does not automatically imply a significant health effect. Consistent with the IEMA methodology described in Section 19.3, the assessment considers the scale of change attributable to the Proposed Order, the number of people affected and the sensitivity of the affected population. Although the Proposed Operation is predicted to increase the populations classified as highly annoyed and highly sleep disturbed, the magnitude of change is limited and no Significant, Very Significant or Profound aircraft noise effects are identified in Chapter 9: Aircraft Noise and Vibration. Taking these factors into account, the resulting health effect is not considered significant for both residential and non-residential receptors.

19.6.14 Ground noise associated principally with aircraft taxiing and the use of auxiliary power units has also been assessed. Changes attributable to the Proposed Order result in effects ranging from Imperceptible to Slight Adverse, with no Moderate or higher effects identified for the night-time assessment and no Significant, Very Significant or Profound effects identified for either the daytime or night-time assessments.

19.6.15 No dwellings are predicted to exceed the threshold for potential vibration effects associated with airborne aircraft noise. No significant vibration effects are therefore predicted as a result of the Proposed Order.

19.6.16 Taking account of the findings of Chapters 8 and 9, changes in noise and vibration attributable to the Proposed Order have the potential to result in some localised adverse changes in amenity. Chapter 9: Aircraft Noise and Vibration identifies Moderate Adverse aircraft noise effects for a small number of

people, but no Significant, Very Significant or Profound aircraft noise effects. It also identifies no significant effects for non-residential receptors, ground noise or vibration. Taking these findings into account, no significant effects on amenity and local communities as a result of noise and vibration are identified.

Cumulative Noise and Vibration

19.6.17 The cumulative noise environment has also been considered, taking account of aircraft air noise, aircraft ground noise and road traffic noise. As these sources differ in character, they are normally assessed separately and there are no established standards or guidance for assessing their combined effects. Nevertheless, Chapter 9: Aircraft Noise and Vibration presents combined noise levels at representative locations to provide an indication of their relative contribution to the overall noise environment.

19.6.18 The change in total noise between the 2029 Permitted Operation and the 2029 Proposed Operation is less than 1 dB at the representative locations assessed, with many changes being 0 or 0.1 dB. Applying criteria comparable to those used for the individual noise assessments, none of these changes would result in a significant effect. Whilst the literature review and ANCA evidence review identify established relationships between aircraft noise, annoyance, sleep disturbance and wider health outcomes, the cumulative change in noise exposure attributable to the Proposed Order is limited and therefore does not alter the significance conclusions reached for the individual noise assessments. This is consistent with the conclusions reached for the individual noise sources.

Amenity and Local Communities Assessment Summary

19.6.19 The assessment of amenity and local communities has considered the potential effects of changes in air quality, odour, aircraft noise, non-aircraft noise and vibration attributable to the Proposed Order on community, recreational and sports facilities and residential receptors.

19.6.20 Changes in pollutant concentrations attributable to the Proposed Order are very small and the resulting effects on amenity and local communities are assessed as Imperceptible to Slight Adverse and Not Significant. No significant odour effects are identified.

19.6.21 Road traffic noise changes are negligible and result in no significant effects. Aircraft noise changes give rise predominantly to Imperceptible, Not Significant and Slight Adverse effects, with Moderate Adverse effects identified for a small number of people; however, no Significant, Very Significant or Profound effects are identified. No significant effects are identified for ground noise, non-residential receptors or vibration.

19.6.22 The cumulative change in combined noise exposure between the 2029 Permitted Operation and the 2029 Proposed Operation is less than 1 dB at the representative locations assessed and would not give rise to a significant effect.

19.6.23 Overall, the Proposed Order is not expected to give rise to any significant adverse effects on amenity and local communities.

Employment, Economic Activity and Tourism

Employment and Economic Activity

19.6.24 The Proposed Order would enable an increase in passenger throughput from the 2029 Permitted Operation (32 mppa) to the 2029 Proposed Operation (40 mppa). This has the potential to support additional operational employment associated with airport activities, including airlines, ground handling, retail, security and logistics, together with indirect employment within associated supply chains. Additional employment would also contribute to economic activity. The Dublin Airport Economic Impact Study[84] estimates that Dublin Airport supported or facilitated approximately 116,100 jobs and €9.6 billion in GVA in 2022 and projects increases in employment and economic activity as passenger throughput increases, reaching approximately 151,000 jobs and €12.5 billion in GVA by 2030 under its unconstrained growth forecast. The study attributes this growth to increased airport operational activity, supply chain expenditure, employee spending and wider catalytic impacts associated with improved connectivity, including tourism, trade, investment and productivity growth.

19.6.25 The relevant receptors comprise the local and regional labour force and businesses associated directly and indirectly with airport operations. These receptors are considered to be of Low sensitivity to the incremental change in employment and economic activity attributable to the Proposed Order, reflecting the size and diversity of the labour market and its capacity to accommodate changes in employment demand.

19.6.26 The Dublin Airport Economic Impact Study[84] demonstrates that increased passenger throughput supports additional employment and economic activity. However, the effects assessed in this chapter relate only to the incremental change attributable to the Proposed Order rather than the broader growth scenarios considered within the study. The Proposed Order comprises an amendment to the existing passenger capacity restriction and does not involve the provision of new infrastructure. As such, any additional employment would arise through the intensification of existing airport operations and would represent a small proportion of the wider local and regional labour market. The magnitude of impact is therefore assessed as Negligible, reflecting the limited scale of additional employment relative to the wider labour market.

19.6.27 Taking account of the Low sensitivity of receptors and the Negligible magnitude of impact, the effect on employment and economic activity is assessed as Slight Beneficial and Not Significant.

Tourism Economy

19.6.28 The tourism economy assessment considers the potential for the additional passenger throughput enabled by the Proposed Order to support increased visitor activity and expenditure within Fingal County, the wider Dublin region and, where relevant, the national economy. The Principal Assessment considers this effect relative to the 2029 Future Receiving Environment by comparing the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa).

19.6.29 The relevant receptors comprise businesses and economic activity supported by tourism expenditure within Fingal County and the wider tourism economy. These receptors are considered to be of Medium sensitivity, reflecting the economic importance of tourism and connectivity, while recognising the diversity and adaptability of the wider regional and national economy.

19.6.30 The Proposed Order would enable passenger throughput of up to 40 mppa compared with 32 mppa under the 2029 Permitted Operation. This would enable greater utilisation of existing and permitted airport infrastructure and facilitate increased route capacity, frequency and connectivity. Increased passenger throughput has the potential to support additional inbound visitor activity and expenditure within Fingal County and the wider economy.

19.6.31 Evidence from the Dublin Airport Economic Impact Study[84] indicates that constraints on airport passenger throughput have the potential to constrain economic activity, while increased airport capacity can support employment, GVA and tourism activity. Increased connectivity may also support business travel, access to markets and wider economic activity. However, these effects are enabling in nature: the Proposed Order amends an operational constraint on passenger throughput rather than itself creating tourism demand or guaranteeing a corresponding increase in visitor numbers.

19.6.32 Taking account of the increase in passenger throughput that would be enabled by the Proposed Order and its potential to support additional visitor activity and expenditure, the magnitude of impact on the tourism economy is assessed as Medium. Combined with the Medium sensitivity of the tourism economy, the resulting effect is assessed as Moderate Beneficial and Not Significant.

Human Health and Wellbeing

19.6.33 The assessment considers the potential effects of the Proposed Order on the health and wellbeing of the population within the study area, including potentially vulnerable groups. Effects are assessed through the following health determinants and impact pathways:

- employment and income;
- transport modes, access and connections;
- climate change mitigation and adaptation;
- air quality;
- noise and vibration; and
- community identity, culture, resilience and influence.

19.6.34 The sensitivity of the relevant population receptors is considered separately for each determinant, reflecting their susceptibility to the particular environmental or socio-economic change being assessed.

Employment and Income

19.6.35 The relevant receptors comprise the local population and labour force, including population groups whose health and wellbeing may be influenced by changes in employment and income. Receptor

sensitivity is assessed as Low, reflecting the relatively strong and diverse local labour market and the limited influence that the incremental employment change attributable to the Proposed Order would have on overall employment and income conditions.

19.6.36 As identified in the employment and economic activity assessment above, the additional passenger throughput enabled by the Proposed Order has the potential to support incremental employment growth at Dublin Airport and within associated supply chains. Increased employment and income can positively influence health and wellbeing through increased household income, economic security and associated social determinants of health. However, the scale of additional employment attributable to the Proposed Order is expected to be limited in the context of the wider regional economy.

19.6.37 The magnitude of the resulting health impact is therefore assessed as Negligible. Taking account of the Low sensitivity of the affected population, the effect on human health and wellbeing through the employment and income pathway is assessed as Imperceptible Beneficial and Not Significant.

Transport Modes, Access and Connections

19.6.38 The transport pathway considers the potential for changes in surface access movements attributable to the Proposed Order to influence human health and wellbeing through changes in accessibility, journey conditions, active travel and connectivity. The relevant receptors comprise residents and users of the transport network within the study area, including population groups potentially more dependent on public transport, walking and cycling. Receptor sensitivity is assessed as Medium, having regard to slightly poorer general health outcomes within the local EDs compared with the national population and the potential importance of accessible and sustainable transport to vulnerable population groups.

19.6.39 The Proposed Order would result in additional surface access trips associated with the increase in passenger throughput from the 2029 Permitted Operation to the 2029 Proposed Operation. The resulting transport effects are assessed in Chapter 6: Material Assets (Traffic and Transport). That assessment considers existing baseline conditions (2023 and 2025) and future assessment scenarios (2029 and 2040), and takes account of the transport infrastructure and services forming part of the Future Receiving Environment, including committed and planned improvements that would occur independently of the Proposed Order.

19.6.40 Changes in traffic flows across the wider road network attributable to the Proposed Order are generally modest. However, a localised adverse effect is identified at the Airport Roundabout during the PM peak. As described in Chapter 6: Material Assets (Traffic and Transport), the airport's established Surface Access Monitoring Framework provides for monitoring of passenger and staff car mode share and traffic volumes, with demand management measures to be implemented where required to reduce PM peak-hour staff car trips and mitigate the forecast effect at the Airport Roundabout.

19.6.41 The Proposed Order does not itself provide new active travel or public transport infrastructure. However, the additional surface access demand attributable to the Proposed Order would occur within the transport network established as part of the Future Receiving Environment, including existing and committed public transport and active travel provision. Taking account of the scale and distribution of the additional surface access demand, and the management measures identified in Chapter 6: Material Assets (Traffic and Transport), the magnitude of the impact on health and wellbeing through the transport pathway is assessed as Low.

19.6.42 Taking account of the Medium sensitivity of the affected population and the Low magnitude of the adverse impact, the resulting effect on human health and wellbeing through the transport modes, access and connections pathway is assessed as Slight Adverse and Not Significant.

Climate Change Mitigation and Adaptation

19.6.43 The climate change pathway considers the potential for greenhouse gas emissions attributable to the Proposed Order to influence human health and wellbeing through their contribution to climate change and associated health outcomes. The relevant receptors comprise the population within the study area, including potentially vulnerable groups that may be more susceptible to climate-related effects such as increased temperatures, extreme weather events and changes in environmental quality.

19.6.44 Receptor sensitivity is assessed as Medium. This reflects the presence of population groups that may be more vulnerable to climate-related health effects, while recognising that the pathway between greenhouse gas emissions attributable to the Proposed Order and local health outcomes is indirect, long-term and influenced by wider national and international climate policy, adaptation measures and healthcare provision.

19.6.45 Chapter 13: Climate, assesses greenhouse gas emissions attributable to the Proposed Order through the Principal Assessment, comparing the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa). The Proposed Order would result in additional greenhouse gas emissions relative to the 2029 Permitted Operation. These additional emissions represent up to approximately 2% of Ireland's projected National Emissions Trajectory and up to approximately 9% of Ireland's projected Transport Emissions Trajectory. Chapter 13: Climate concludes that the resulting climate effect is Minor Adverse and Not Significant.

19.6.46 Given the indirect and geographically dispersed relationship between the additional greenhouse gas emissions attributable to the Proposed Order and health outcomes experienced by the study population, and noting that Chapter 13: Climate concludes that the climate effect is Minor Adverse and Not Significant, the magnitude of impact on human health and wellbeing is assessed as Low.

19.6.47 Taking account of the Medium sensitivity of the affected population and the Low magnitude of impact, the resulting effect on human health and wellbeing through the climate change pathway is assessed as Slight Adverse and Not Significant.

Air Quality

19.6.48 The air quality pathway considers the potential for changes in concentrations of air pollutants attributable to the Proposed Order to affect human health and wellbeing. The relevant receptors comprise the population exposed to changes in air quality within the study area, including potentially vulnerable groups such as children, older people and those more susceptible to the health effects of air pollution.

19.6.49 Receptor sensitivity is assessed as High, reflecting the potential for adverse health outcomes associated with air pollution to disproportionately affect vulnerable population groups and the limited ability of individuals to avoid exposure to changes in ambient air quality.

19.6.50 Chapter 7: Air Quality assesses changes in emissions associated with aircraft operations, airside activities, airport energy plant and surface access traffic attributable to the Proposed Order. The Principal Assessment identifies very small changes in annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ between the 2029 Permitted Operation and the 2029 Proposed Operation. Concentrations are predicted to remain below current National Air Quality Standards at all assessed receptors. However, a limited number of receptors are predicted to exceed the new EU Air Quality Directive (2024/2881) annual mean limit values for NO_2 and $PM_{2.5}$ under the Proposed Operation. Chapter 7 concludes that the resulting air quality effects are Not Significant.

19.6.51 Notwithstanding the exceedances identified at a limited number of receptors, the changes in pollutant concentrations attributable to the Proposed Order are generally small, with only limited changes in population exposure relative to the 2029 Permitted Operation. The exceedances identified in Chapter 7 are confined to a relatively small number of receptors and arise within areas already subject to existing airport and road traffic emissions. In this context, the Proposed Order is not predicted to materially alter health risk at a population level. Having regard to the findings of Chapter 7, the magnitude of impact on human health and wellbeing is therefore assessed as Negligible.

19.6.52 Taking account of the High sensitivity of the affected population and the Negligible magnitude of impact, the resulting effect on human health and wellbeing through the air quality pathway is assessed as Imperceptible to Slight Adverse and Not Significant.

Noise and Vibration

19.6.53 The noise and vibration pathway considers the potential for changes in aircraft noise, non-aircraft noise and vibration attributable to the Proposed Order to affect human health and wellbeing, including through annoyance and sleep disturbance. The relevant receptors comprise residents exposed to changes in noise within the study area, including potentially vulnerable population groups and the population in proximity to Dublin Airport and beneath flight paths who may be exposed to aircraft noise.

19.6.54 Residential receptors are considered to be of High sensitivity to changes in noise and vibration affecting health and wellbeing. This reflects the potential for prolonged exposure within the home environment, the limited ability of residents to avoid such exposure, and the established relationship between environmental noise, annoyance, sleep disturbance and health.

19.6.55 As described in the Amenity and Local Communities assessment, Chapter 8: Non-Aircraft Noise and Vibration identifies negligible changes in road traffic noise attributable to the Proposed Order and no significant non-aircraft noise or vibration effects. Chapter 9: Aircraft Noise and Vibration identifies

predominantly Imperceptible, Not Significant and Slight Adverse aircraft noise effects, together with a small number of Moderate Adverse effects, but no Significant, Very Significant or Profound effects.

19.6.56 Chapter 9: Aircraft Noise and Vibration also considers recognised health outcome metrics associated with aircraft noise, including the population predicted to be Highly Annoyed and Highly Sleep Disturbed. The 2029 Proposed Operation results in an increase in the population predicted to experience these outcomes compared with the 2029 Permitted Operation, as described in paragraph 19.6.12. These changes have been taken into account in assessing the potential health and wellbeing effect attributable to the Proposed Order.

19.6.57 The approximately 9% increase in the number of people predicted to be Highly Annoyed and 8% increase in those predicted to be Highly Sleep Disturbed represent adverse changes relative to the 2029 Permitted Operation. These are relative increases in modelled affected populations, rather than percentage-point increases in prevalence across the study population. Having regard to these changes, the overall levels of aircraft noise exposure and the long-term nature of the effects, the magnitude of impact is assessed as Low, reflecting the relatively small incremental changes in aircraft noise exposure and the resulting limited additional impact on population health and quality of life. This assessment acknowledges the adverse and long-term nature of the effects and considers their potential implications for human health, rather than relying solely on the significance conclusions of the Aircraft Noise chapter.

19.6.58 Taking account of the High sensitivity of residential receptors and the Low magnitude of impact, the resulting effect on human health and wellbeing through the noise and vibration pathway is assessed as Moderate Adverse. This classification reflects the High sensitivity of residential receptors, whilst the Low magnitude of impact indicates that the additional effects on people's health and quality of life are expected to be relatively limited, notwithstanding their adverse and long-term nature. Accordingly, the overall effect is assessed as Not Significant in accordance with the assessment criteria adopted in this chapter.

Community Identity, Culture, Resilience and Influence

19.6.59 The community identity, culture, resilience and influence pathway considers the potential for changes in environmental and socio-economic conditions attributable to the Proposed Order to affect people's sense of place, community cohesion, use and enjoyment of community facilities and their ability to maintain social and community connections. The relevant receptors comprise residents and communities within the study area.

19.6.60 Receptor sensitivity is assessed as Medium. Community identity and cohesion can be influenced by changes in the environmental and social conditions experienced by residents, while also being shaped by a wide range of wider social, economic and institutional factors. Communities therefore have some capacity to adapt to environmental change, although more substantial or prolonged changes have the potential to influence community wellbeing.

19.6.61 The Proposed Order does not involve physical development, land take, demolition or displacement of residents, severance of communities or loss of community facilities. There is therefore no direct pathway through which the Proposed Order would alter the physical or social structure of communities. Potential effects are instead indirect and relate principally to whether changes in environmental conditions attributable to the Proposed Order, including noise, air quality, amenity and accessibility, would materially affect the conditions in which communities live and interact.

19.6.62 As identified in the relevant technical assessments and the assessments presented above, the Proposed Order would not give rise to significant effects on air quality, community facilities or transport accessibility. Localised adverse aircraft noise effects are identified, including a small number of Moderate Adverse effects, but these would not result in the loss or severance of community resources or materially restrict the ability of residents to access facilities or maintain social and community connections.

19.6.63 The magnitude of impact on community identity, culture, resilience and influence is therefore assessed as Negligible.

19.6.64 Taking account of the Medium sensitivity of local communities and the Negligible magnitude of impact, the resulting effect on human health and wellbeing through the community identity, culture, resilience and influence pathway is assessed as Imperceptible and Not Significant.

Summary of Effects and Conclusion of Significance

19.6.65 This section summarises the likely effects of the Proposed Order on population and human health identified through the Principal Assessment. Table 19-17 identifies the relevant assessment themes and health determinants, the receptors affected, the principal impact pathways, the resulting effects and whether these are significant for the purposes of the EIA.

19.6.66 As the Proposed Order does not comprise construction activities or physical development works, no temporary effects have been identified. Similarly, no distinct short-term or medium-term significant effects have been identified, with potential effects generally arising over the longer term as a result of changes in operational activity associated with passenger growth. The assessment identifies both beneficial and adverse effects. Beneficial effects are associated principally with increased employment opportunities, economic activity and tourism expenditure supported by the Proposed Order, whilst adverse effects relate primarily to changes in environmental determinants of health, including noise, air quality and transport.

Table 19-17: Potential Effects

Assessment Theme / Health Determinant	Receptors	Impact Pathway	Effect	Significance
Amenity and Local Communities				
Air Quality	Community, Recreational and Sports Facilities	Changes in pollutant concentrations and odour affecting amenity	Imperceptible to Slight Adverse	Not Significant
	Residential Properties	Changes in pollutant concentrations and odour affecting residential amenity	Imperceptible to Slight Adverse	Not Significant
Noise and Vibration	Community, Recreational and Sports Facilities	Changes in aircraft noise, non-aircraft noise and vibration affecting amenity	Imperceptible to Slight Adverse	Not Significant
	Residential Properties	Changes in aircraft noise, non-aircraft noise and vibration affecting residential amenity	Imperceptible to Moderate Adverse	Not Significant
Employment, Economic Activity and Tourism				
Employment and Economic Activity	Local and regional labour force and businesses associated directly and indirectly with airport operations	Additional employment and economic activity supported by increased passenger throughput	Slight Beneficial	Not Significant
Tourism economy	Businesses and economic activity supported by tourism expenditure	Additional visitor activity and expenditure facilitated by increased passenger throughput and connectivity	Moderate Beneficial	Not Significant
Human Health and Wellbeing				
Employment and Income	Local population and labour force	Changes in employment and income influencing health and wellbeing	Imperceptible Beneficial	Not Significant
Transport modes, access and connections	Residents and users of the transport network, including potentially vulnerable groups	Additional surface access demand affecting accessibility, journey conditions, active travel and connectivity	Slight Adverse	Not Significant
Climate change mitigation and adaptation	Population, including potentially vulnerable groups	Additional GHG emissions contributing to climate change and associated health outcomes	Slight Adverse	Not Significant
Air quality	Population exposed to changes in air quality, including potentially vulnerable groups	Changes in pollutant concentrations affecting human health	Imperceptible to Slight Adverse	Not Significant
Noise and vibration	Residential population, including potentially vulnerable groups	Changes in noise exposure affecting annoyance, sleep disturbance and health	Moderate Adverse	Not Significant

Assessment Theme / Health Determinant	Receptors	Impact Pathway	Effect	Significance
Community identity, culture, resilience and influence	Residents and communities within the study area	Changes in environmental and socio-economic conditions affecting sense of place, community cohesion and social connections	Imperceptible	Not Significant

19.6.67 The Principal Assessment concludes that the Proposed Order would give rise to a range of beneficial and adverse effects on population and human health. Beneficial effects are identified in relation to employment, economic activity and tourism, while adverse effects principally arise through changes in transport, climate, air quality and noise. The greatest adverse effects identified are Moderate Adverse effects associated with aircraft noise and its potential influence on health and wellbeing. However, no effects are assessed as Significant, Very Significant or Profound. The Proposed Order would therefore not give rise to any likely significant effects on population and human health.

19.7 Mitigation and Monitoring

19.7.1 The Population and Human Health assessment draws on the findings of the relevant technical assessments and, where applicable, takes account of the mitigation, management and monitoring measures identified within those assessments. No additional mitigation measures specific to Population and Human Health are required beyond those already identified in the relevant technical chapters, as no likely significant adverse effects have been identified through the Principal Assessment.

19.7.2 In relation to surface access, Chapter 6: Material Assets (Traffic and Transport) identifies a localised adverse effect at the Airport Roundabout during the PM peak. The airport's established Surface Access Monitoring Framework, agreed with relevant stakeholders, provides for regular monitoring of passenger car mode share, staff car mode share and traffic volumes, enabling early intervention where relevant key performance indicators are not met. Demand management measures are available through the Framework to reduce PM peak-hour staff car trips and mitigate the forecast effect at the Airport Roundabout, where required. These measures have been taken into account in determining the residual Population and Human Health effect associated with the transport modes, access and connections pathway.

19.7.3 The assessments presented in Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration and Chapter 13: Climate, identify the mitigation, management and monitoring measures applicable to those environmental topics. Where relevant, the residual environmental effects reported by those chapters have been used to inform the assessment of the corresponding Population and Human Health pathways. No additional Population and Human Health mitigation or monitoring measures are required in relation to these pathways.

19.7.4 Chapter 9: Aircraft Noise and Vibration does not identify a requirement for additional mitigation in relation to the Principal Assessment, as no significant aircraft noise or vibration effects are predicted and the Noise Abatement Objective for Dublin Airport is forecast to be met. No additional mitigation or monitoring specific to Population and Human Health is therefore required in relation to the noise and vibration health pathway. However, daa commits to fund and implement the MO Sound Insulation Grant Scheme (MO SIGS) as part of the Proposed Order, should the Proposed Order be made. As described in Chapter 9: Aircraft Noise, the scheme will offer grants to eligible residential properties to improve internal acoustic conditions. The potential benefits of the scheme are additional to those considered in the assessment of likely significant effects presented in this Chapter. This approach is consistent with the findings of ANCA in its Draft Regulatory Decision Report, which recognises that an expanded noise insulation scheme would be effective in reducing adverse effects on health and quality of life associated with aircraft noise (Section 1.5, Reason 4)[97].

19.7.5 These potential improvements may provide additional qualitative benefits for residential amenity and wellbeing, particularly in relation to the annoyance and sleep disturbance pathways discussed in Sections 19.3.48–19.3.51. However, these benefits have not been quantified and do not form part of the assessment of likely significant Population and Human Health effects. The assessment conclusions presented in this Chapter have been reached without attributing any benefit to the MO SIGS. The scheme is not relied upon as mitigation in determining the significance of effects arising from the Proposed Order.

19.7.6 The assessment assumes implementation of the mitigation, management and monitoring measures identified within the relevant technical chapters. In a number of cases, these measures form part of existing operational management and monitoring arrangements at Dublin Airport. No additional mitigation or monitoring measures are required in relation to amenity and local communities,

[97] ANCA (2026), Draft Regulatory Decision Report, Section 1.5, Reason 4, page 8

employment, economic activity and tourism, or the remaining human health and wellbeing pathways, as no likely significant adverse effects have been identified.

19.8 Residual Effects

19.8.1 As set out in Section 19.7, no additional mitigation measures specific to population and human health are required. The residual effects therefore remain as reported in the Principal Assessment, taking account of the mitigation, management and monitoring measures identified in the relevant technical chapters. In relation to the transport modes, access and connections pathway, the residual effect takes account of the surface access management and demand management measures identified in Chapter 6: Material Assets (Traffic and Transport).

19.8.2 No significant residual effects on population and human health are identified. Residual adverse effects range from Imperceptible to Moderate Adverse and remain Not Significant, while beneficial residual effects associated with employment, economic activity and tourism range from Imperceptible to Moderate Beneficial and are also Not Significant.

19.8.3 The Proposed Order would therefore not give rise to any likely significant residual effects on population and human health.

19.9 Cumulative Effects

19.9.1 Cumulative effects on population and human health may arise where receptors are affected by more than one environmental or socio-economic change attributable to the Proposed Order, or where effects of the Proposed Order combine with those arising from other existing, permitted or reasonably foreseeable developments. The approach to the assessment of cumulative effects is set out in Chapter 5: Methodology.

19.9.2 The assessment of cumulative effects on Population and Human Health has been informed by the cumulative assessments undertaken within the relevant technical chapters, including Chapter 6: Material Assets (Traffic and Transport), Chapter 7: Air Quality, Chapter 8: Non-Aircraft Noise and Vibration, Chapter 9: Aircraft Noise and Vibration and Chapter 13: Climate. The findings of those assessments have been considered in terms of whether cumulative changes in environmental conditions could give rise to additional or greater effects on the population and human health receptors identified in this chapter.

19.9.3 For amenity and local communities, the principal potential for cumulative effects arises where residential receptors or users of community, recreational and sports facilities experience changes in more than one environmental condition, particularly air quality and noise. The individual technical assessments identify only limited changes attributable to the Proposed Order. While some receptors may experience more than one adverse change, the combined changes are not expected to materially alter the amenity of these receptors beyond the effects identified through the Principal Assessment. No significant cumulative effects on amenity and local communities are therefore identified.

19.9.4 For human health and wellbeing, cumulative effects have been considered across the relevant health determinants, including transport, climate change, air quality and noise and vibration. The assessment recognises that these determinants may interact and that some population groups may be affected through more than one pathway. However, the changes attributable to the Proposed Order are generally limited in magnitude. The greatest adverse effect identified through the assessment framework is Moderate Adverse and Not Significant in relation to the noise and vibration health pathway. Consideration of the combined pathways does not identify an additional or materially greater effect on human health and wellbeing, and no significant cumulative health effect is predicted.

19.9.5 Beneficial effects associated with employment, economic activity and tourism may also occur alongside the adverse environmental effects identified in the assessment. These beneficial and adverse effects have been considered as separate pathways and have not been offset against one another in determining significance. No significant cumulative socio-economic effect is identified.

19.9.6 Accordingly, no significant cumulative effects on population and human health are predicted as a result of the Proposed Order, either through the interaction of environmental and socio-economic effects

identified within this assessment or in combination with other existing, permitted or reasonably foreseeable developments.

19.10 Indirect, Secondary and Transboundary Effects

19.10.1 Indirect and secondary effects are described in the EPA Guidelines as effects on the environment that are not a direct result of a project and may occur away from the project site or through a complex impact pathway. The pathway-based approach adopted for the Population and Human Health assessment inherently considers indirect and secondary effects where changes attributable to the Proposed Order have the potential to influence population and human health receptors.

19.10.2 Indirect and secondary effects have therefore been considered throughout the Principal Assessment. These include, in particular, health and wellbeing effects arising through changes in environmental conditions such as air quality, noise and vibration, climate and transport, together with socio-economic pathways associated with employment, income, economic activity and tourism. No additional indirect or secondary effects are identified beyond those reported in Section 19.6 and no significant indirect or secondary effects are predicted.

19.10.3 The Proposed Order would enable increased passenger throughput and associated aviation activity at Dublin Airport. While some environmental and socio-economic consequences of aviation activity may extend beyond the study area, including greenhouse gas emissions and wider economic and tourism effects, these have been considered at the geographic scale appropriate to the relevant assessment pathway.

19.10.4 No significant transboundary effects on population and human health are identified. While greenhouse gas emissions associated with the Proposed Order contribute to global climate change, the assessment does not identify any significant transboundary effects on population or human health receptors in other jurisdictions.

19.11 Conclusions

19.11.1 This chapter has assessed the likely significant effects of the Proposed Order on population and human health. The Principal Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa), thereby identifying the effects attributable to the additional passenger throughput enabled by the Proposed Order.

19.11.2 The assessment has considered effects on amenity and local communities; employment, economic activity and tourism; and human health and wellbeing. A pathway-based approach has been applied to the assessment of human health and wellbeing, drawing on the findings of the relevant technical assessments and considering the sensitivity of the affected population to changes in the relevant environmental and socio-economic determinants.

19.11.3 The Proposed Order would give rise to both beneficial and adverse effects. Beneficial effects are identified in relation to employment, economic activity and tourism, with effects ranging from Imperceptible Beneficial to Moderate Beneficial. Adverse effects arise principally through changes in transport, climate, air quality and noise and vibration. These range from Imperceptible to Moderate Adverse, with the greatest adverse effects associated with aircraft noise and the associated human health and wellbeing pathway. None of these effects are assessed as Significant, Very Significant or Profound under the assessment framework and they are therefore Not Significant for the purposes of the EIA.

19.11.4 No additional mitigation measures specific to Population and Human Health are required. The assessment has taken account of relevant mitigation, management and monitoring measures identified within the supporting technical assessments, including the surface access management and demand management measures identified in Chapter 6: Material Assets (Traffic and Transport). No significant residual effects on population and human health are identified.

19.11.5 The assessment has also considered cumulative, indirect, secondary and transboundary effects. No additional likely significant effects on population and human health are identified through these pathways.

19.11.6 Overall, the Principal Assessment concludes that the Proposed Order would not give rise to likely significant effects on population and human health.