7 Air Quality

7.1 Introduction

7.1.1 This chapter presents the assessment of the effects of the Proposed Order on local air quality. As detailed in Chapter 4: Proposed Order, the Proposed Order does not involve new physical infrastructure. However, it has the potential to affect local air quality through changes in aircraft movements and associated ground operations, and changes in traffic flows on the local road network.

7.1.2 The Principal Assessment comprises a comparison of the 2029 Permitted Operation (32 mppa) and the 2029 Proposed Operation (40 mppa) to identify the environmental effects of the Proposed Order, in accordance with the project-wide assessment framework described in Chapter 5: Assessment Methodology. Supporting Assessments are presented in Section 7.3.

7.1.3 This chapter was authored by Olivia Wilkin, a consultant with AECOM. Olivia is an Associate Member of the Institute of Air Quality Management and the Institution of Environmental Sciences and holds an MSc in Meteorology. Olivia has four years of experience with AECOM and previously authored the EIAR Air Quality Chapters for the Dublin Airport Infrastructure Application[1] and the EIAR for the Dublin Airport Operational Application. She is experienced in air quality dispersion modelling of road, energy centre and aircraft emissions sources.

7.1.4 This chapter was verified by Gareth Hodgkiss, an Associate Director with AECOM. Gareth is a Full Member of the Institute of Air Quality Management and the Institution of Environmental Sciences and holds an MSc in Environmental Management. Gareth has over 19 years of experience in environmental consultancy and air quality assessments. He has managed the air quality assessment of large development and infrastructure schemes across Ireland and the UK and has acted as expert witness for air quality at public inquiry. He is an authorised Air Quality Lead Verifier at AECOM, with responsibility for ensuring high technical standards.

7.1.5 The assessment considers relevant national policies and statutory guidance, which are outlined in section 7.2 of this Chapter. Where guidance and/or data required to inform the assessment is not available in Ireland, representative data sources and guidance published within the UK have been used and referred to.

7.2 Legislation, Policy and Guidance

7.2.1 This section sets out the legislation, policy and guidance sources which have informed the scope and methodology for the assessment of impacts on local air quality. Where guidance and/or data required to inform the assessment is not available in Ireland, representative data sources and guidance published within the UK have been used and referred to. More general sources of legislation and guidance applicable to the methodology for the EIAR are provided in Chapter 5: Methodology. The following legislation, policy, and guidance relating to air quality have been used to inform the assessment:

- Dublin Airport (Passenger Capacity) Act 2026[2] – empowers the Minister for Transport to make an order amending or revoking a passenger capacity condition attached to a relevant permission.
- Air Quality Standards Regulations 2022 (S.I. No. 739/2022) – implements the European Union Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe and provides limit values for concentrations of several pollutants in ambient air.
- EU Air Quality Directive (2024/2881), which has superseded the previous EU Air Quality Directive (2008/50/EC), to bring the EU more in line with World Health Organisation Air Quality Guidelines[3]
- Air Pollution Act 1987 (Number 6 of 1987) - provides local authorities with the primary responsibility for monitoring air quality, including the nature, extent, and effects of emissions within their administrative area.

[1] Dublin Airport Authority. (2023). Infrastructure Application EIAR Chapter 7: Air Quality.
[2] Government of Ireland. (2026). Dublin Airport (Passenger Capacity) Act 2026.
[3] World Health Organisation. (2021). WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide.

- Environmental Protection Agency Act 1992 (Number 7 of 1992) - established the remit of the environmental regulator in Ireland to make further and better provision for the protection of the environment and the control of pollution.
- Protection of the Environment Act 2003 (Number 27 of 2003) - was implemented to account for the European Union Directive 96/61/EC, of 24 September 1996, concerning Integrated Pollution Prevention and Control (and amendments); this amends the Environmental Protection Agency Act 1992.
- National Aviation Policy[4] – sets out the Government's goals and commitments to the aviation industry in Ireland. The Policy emphasises a commitment to mitigate the impacts of aviation on the environment and encourages research into clean engine technologies and sustainable fuels.
- Project Ireland 2040[5] – is the Government's long-term overarching strategy for future development and infrastructure in Ireland. The strategy stresses the importance of improving ambient air quality.
- Clean Air Quality Strategy for Ireland[6] – a framework to promote integrated measures in Government policy to reduce air pollution. The Strategy also sets out the Government's ambitions and actions on air quality. An update to the Strategy is currently being consulted on.
- Dublin Region Air Quality Plan[7] – is referred to in both the Development Plan and the Dublin Airport Local Area Plan 2020.
- Dublin Airport Local Area Plan[8] – sets out how growth at Dublin Airport can be achieved sustainably. The plan includes objectives with regard to the monitoring of existing air quality.
- Fingal Development Plan 2023-2029[9] and the Dublin City Development Plan 2022-2028[10] – both documents outline local policies to improve air quality within Fingal and the Dublin local area.
- International Civil Aviation Authority's (ICAO) Airport Air Quality Manual[11] – internationally recognised guidance outlining the methodologies used for emissions dispersion of airport sources.
- Transport Infrastructure Ireland's (TII) Guidance on Air Quality Assessment of Specified Infrastructure Projects[12] – guidance outlining how the contribution of road traffic emissions can be quantified and assessed.
- The Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (LAQM.TG22)[13] – guidance to assist UK local authorities with local air quality management (LAQM) duties, including with regard to air quality monitoring.
- Institute of Air Quality Management's (IAQM) Land-Use Planning and Development Control[14] – guidance which sets out a means of describing air quality impacts based on the relationship between the magnitude of change and total pollutant concentration experienced, relative to the air quality standards.

Legislation and National Planning Policy

7.2.2 This section provides further details on the key legislation, policy and guidance listed above.

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

7.2.3 The Air Quality Standards Regulations 2022 (S.I. No. 739/2022) implement the European Union Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (CAFE) and designate the Environmental Protection Agency (EPA) as the competent authority responsible for assessing ambient air quality in the

[4] Department of Transport. (2023). National Aviation Policy.
[5] Government of Ireland. (2025). Project Ireland 2040 - National Planning Framework.
[6] Department of Climate, Energy and the Environment. (2025). Clean Air Strategy.
[7] Dublin City Council. (2021). Dublin Region Air Quality Plan
[8] Fingal County Council. (2020). Dublin Airport Local Area Plan.
[9] Fingal County Council. (2023). Fingal Development Plan 2023-2029.
[10] Dublin City Council. (2022). Dublin City Development Plan 2022-2028.
[11] International Civil Aviation Organisation. (2023). Airport Air Quality Manual (Doc 9889) 3rd Edition.
[12] Transport Infrastructure Ireland. (2025). Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document
[13] UK Department for Environment, Food & Rural Affairs. (2025). Local Air Quality Management Technical Guidance (TG22).
[14] Institute of Air Quality Management. (2017). Land-Use Planning & Development Control: Planning For Air Quality.

territory of the State. The standards also establish Limit Values for concentrations of certain pollutants in ambient air, to prevent or reduce harmful effects on human health and the environment.

7.2.4 The Air Quality Standards as set out in the current regulations are provided in Table 7-1 for the key pollutants of concern: nitrogen oxides (total NO_X and nitrogen dioxide (NO_2)), particulate matter (particles with an aerodynamic diameter of less than 10 microns and 2.5 microns (PM_{10} and $PM_{2.5}$)). The Air Quality Standards for carbon monoxide, benzene, or sulphur dioxide are not provided in Table 7-1, as the air quality assessment reported in this chapter does not consider the impact of the Proposed Order on any other air quality regulated pollutants for the protection of human health. Other pollutants could include carbon monoxide, sulphur dioxide, and volatile organic compounds (VOCs) such as benzene.

7.2.5 Existing baseline contributions of these pollutants are well below their respective current National Air Quality Standards and new EU Limit Values, as demonstrated in Section 7.4, and any additional contributions to these pollutants from the 2029 Proposed Operation will not be of a magnitude that would put them at risk of an exceedance. Published information demonstrates that the proportional contribution of these pollutants from both airside and landside emissions is very low (European Environment Agency, 2019[15]; National Atmospheric Emissions Inventory, 2026[16]). Table 3.4 of the EMEP/EEA air pollutant emission inventory guidebook 2019 provides examples of aircraft types and emission values for LTO cycles. Of total emissions reported, SO_X, CO and hydrocarbon (including benzene) emissions each account for less than 0.2% of total emissions. Annex I: Sectoral UK Emissions for 1990-2024 of the NAEI reports that in 2024, the most recent year presented, Nonmethane hydrocarbons account for just 7% of total vehicle emissions and SO_X less than 1%. NO_X and CO account for 35% and 43%, respectively. Therefore, relative to the proportional contribution of NO_X emissions from these sources, the contribution of carbon monoxide, sulphur dioxide, and volatile organic compounds (VOCs) such as benzene is of an extent that poses no risk of contributing to an exceedance of a current National Air Quality Standard or new EU Limit Value.

7.2.6 On December 10, 2024, the EU revised the Ambient Air Quality Directive. The revised Directive, EU Air Quality Directive (2024/2881), includes updated Air Quality Limit Values that more closely align with the recommendations of the current World Health Organization Air Quality Guidelines. The new EU Limit Values are also summarised in Table 7-1. The Government has until the end of 2026 to transpose these Limit Values into national legislation. The EU Air Quality Directive requires these Limit Values to be met at locations with relevant sensitive exposure before the end of 2030.

7.2.7 As shown in Table 7-1, the new EU Limit Values (2024/2881) are considerably more stringent than the superseded Limit Values (2008/50/EC) transposed in the National Air Quality Standards (S.I. No. 739/2022). The Limit Values for annual mean NO_2 and PM_{10} have been reduced by 50%, and the Limit Value for $PM_{2.5}$ has been reduced by 60%. There are now only three allowable exceedances per calendar year of the 200 µg/m^3 Limit Value for hourly mean NO_2, instead of 18 allowable exceedances, and the Limit Value for daily mean PM_{10} has been reduced to 45 µg/m^3 from 50 µg/m^3, with 18 allowable exceedances in a calendar year instead of 35 allowable exceedances. New averaging periods have also been introduced with new daily mean Limit Values for NO_2 and $PM_{2.5}$ of 50 µg/m^3 and 25 µg/m^3, respectively, not to be exceeded more than 18 times in a calendar year.

[15] European Environment Agency, 2019. EMEP/EEA air pollutant emission inventory guidebook 2019
[16] UK Government, 2024. Annex I: Sectoral UK Emissions for 1990-2024..

Table 7-1: National Air Quality Standards (S.I. No. 739/2022) and EU Limit values (Directive 2024/2881)

		Air Quality Standards Regulations (S.I. No. 739/2022)		EU Limit values (Directive 2024/2881)	
Pollutant	**Averaging Period**	**Concentration (µg/m³)**	**Permitted Exceedances**	**Limit Value to be achieved by 2030 (µg/m³)**	**Permitted Exceedances**
Nitrogen Dioxide (NO_2)	Annual mean	40	None	20	None
	24-hour mean	n/a	n/a	50	Not to be exceeded more than 18 times a year
	1-hour mean	200	Not to be exceeded more than 18 times a year	200	Not to be exceeded more than 3 times in a year
Particulate Matter, 10 micron diameter (PM_{10})	Annual mean	40	None	20	None
	24-hour mean	50	Not to be exceeded more than 35 times a year	45	Not to be exceeded more than 18 times a year
Particulate Matter, 2.5 micron or less diameter ($PM_{2.5}$)	Annual Mean	25 / 20[1]	None	10	None
	24-hour mean	n/a	n/a	25	Not to be exceeded more than 18 times a year

[1] Stage 1 standard / Stage 2 standard

7.2.8 TII guidance provides proxy annual mean concentrations that can be used to suggest whether the hourly mean and daily mean Limit Values are at risk of an exceedance. According to section 4.6.2 of the TII guidance:

- The hourly NO_2 Limit Value should not be exceeded where annual mean concentrations are less than 30 µg/m³
- The daily NO_2 Limit Value should not be exceeded where annual mean concentrations are less than 25 µg/m³
- The daily PM_{10} Limit Value should not be exceeded where annual mean concentrations are less than 22.8 µg/m³
- The daily $PM_{2.5}$ Limit Value should not be exceeded where annual mean concentrations are less than 10.4 µg/m³

Convention on Long-Range Transboundary Air Pollution

7.2.9 The assessment also considers the pollutants ammonia (NH_3) and deposition rates of nutrient nitrogen. Both pollutants are considered with regard to impacts on sensitive habitats. These pollutants are not included in the National Air Quality Standards but have been assigned Assessment Levels by the United Nations Economic Commission for Europe (UNECE) via the Convention on Long-Range Transboundary Air Pollution (CLRTAP). The Critical Level for NH_3 ranges from 1 µg/m³ to 3 µg/m³, subject to the presence of bryophytes and lichens. Critical Loads for nitrogen deposition vary by the type of habitat, typically ranging from 5 kgN/ha/yr to 20 kg/N/ha/yr.

Odour Emissions Guidance Note (AG9)

7.2.10 Some airside emissions also have the potential to increase odour concentrations at locations close to the source. Airport odour is commonly associated with the storage and handling of aviation fuel. Levels against which odour impacts are assessed are set by EPA guidance (AG9)[17].

Air Pollution Act 1987 (Number 6 of 1987) and Amendments (1992 and 2003)

7.2.11 The Air Pollution Act 1987, as amended, provides local authorities with the primary responsibility for monitoring air quality, including the nature, extent, and effects of emissions within their administrative area.

7.2.12 Local authorities are also given powers under the Act to take measures to prevent or limit air pollution in their administrative area. Owners of certain industrial activities must have an air pollution licence from either the local authority or the EPA, to run industries that are responsible for emissions.

Environmental Protection Agency Act 1992 (Number 7 of 1992)

7.2.13 The Environmental Protection Agency Act 1992 and subsequent associated Acts establish the remit of the environmental regulator in Ireland to make further and better provision for the protection of the environment and the control of pollution.

7.2.14 Amongst the many duties of the EPA is the monitoring of local air quality across the country, including multiple locations in the Dublin region, and the regulation of licenced activities with emissions to air.

Protection of the Environment Act 2003 (Number 27 of 2003)

7.2.15 The Protection of the Environment Act 2003 was implemented to account for the European Union Directive 96/61/EC, of 24 September 1996, concerning Integrated Pollution Prevention and Control (and amendments); this amends the Environmental Protection Agency Act 1992.

The Environment (Miscellaneous Provisions) Act 2026 (Number 5 of 2026)

7.2.16 The Environment (Miscellaneous Provisions) Act 2026 reforms Ireland's EPA licensing framework to reduce industrial delays by establishing ministerial decision-making timelines and creating a "partial review" track for minor modifications. Key changes also allow for Environmental Impact Assessment (EIA) exemptions during emergencies.

7.2.17 Plant within the Airport's Energy Centres are subject to licence by the EPA under the requirements of the EU's Medium Combustion Plant Directive (Directive 2015/2193).

National Aviation Policy (2015)

7.2.18 The National Aviation Policysets out the Government's goals and commitments to the aviation industry in Ireland. Whereas the focus of this Policy is on the reduction of Greenhouse Gases (GHGs), the following points are of relevance to this assessment:

> *"Ireland is committed to working with its EU and international partners to mitigate the impacts of aviation on the environment and facilitate the sustainable growth of the sector:*
>
> *…*
>
> *2.3.1 Ireland will work with European partners to achieve the development of global international standards for market-based measures on aircraft emissions.*
>
> *2.3.2 Ireland will develop its aviation emissions reporting capability in support of ICAO's evolving environmental policies.*
>
> *…*
>
> *2.3.4 Ireland will encourage research and development in Ireland of clean engine technologies and sustainable fuels."*

[17] Environmental Protection Agency (EPA). (2019). Odour Emissions Guidance Note (Air Guidance Note AG9), Version 1, September 2019.

Project Ireland 2040

7.2.19 Project Ireland 2040 is the Government's long-term overarching strategy for future development and infrastructure in Ireland. It consists of several documents, including the National Planning Framework, which is the Government's high-level strategic Plan for shaping the future growth and development of Ireland up to 2040.

7.2.20 The National Planning Framework includes National Policy Objective 64, which stresses the importance of improving ambient air quality:

"Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, the promotion of energy efficient buildings and homes, heating systems with zero local emissions, green and blue infrastructure planning and innovative design solutions."

7.2.21 Project Ireland 2040 also includes the Government's National Development Plan. This document is focused on Ireland's long-term economic, environmental and social progress up to 2027, and references improvements in air quality as an additional benefit to improving energy efficiency for the primary purpose of reducing carbon emissions.

Clean Air Strategy for Ireland (2023)

7.2.22 The Government of Ireland published the Clean Air Quality Strategy for Ireland on 26th April 2023. The Strategy aims to provide the high-level strategic policy framework necessary to identify and promote the integrated measures across Government policy that are required to reduce air pollution and promote cleaner ambient air, while also delivering on wider national objectives.

7.2.23 The Strategy also refers to the World Health Organisation's (WHO) Air Quality Guidelines (AQG), published in 2021.

Local Planning Policy

Fingal Development Plan 2023-2029

7.2.24 The Fingal Development Plan 2023-2029 sets out Fingal County Council's (FCC) proposed policies and objectives for the development of the County over the period of 2023 to 2029. The Development Plan seeks to develop and improve, in a sustainable manner, the social, economic, environmental and cultural assets of the county.

7.2.25 Policy DAP1 – Align with Local Area Plan Objectives refers to the Dublin Airport Local Area Plan (LAP).

7.2.26 Chapter 11 is focused on policy relating to Infrastructure and Utilities. Those relevant to air quality are summarised below.

7.2.27 IUP38 EPA and Air Quality: "*Continue to work proactively with the EPA to monitor and improve air quality in Fingal*".

7.2.28 Objective IUO57 Air Quality Monitoring: "*Monitor, pro-actively manage and improve air quality in the County through integrated land use and spatial planning measures to avoid, mitigate and minimise unacceptable levels of air pollution in accordance with national and EU policy Directives on air quality and, where appropriate, promote compliance with established targets*".

7.2.29 Objective IUO58 Air Quality Monitoring Network: "*Continue to work with the Dublin Local Authorities and relevant agencies in the collection of local air quality data through the EPA's air quality monitoring network, to maintain good air quality in the County*".

7.2.30 Objective IUO59 Dublin Regional Air Quality Management Plan: "*Implement the recommendations of the Dublin Regional Air Quality Management Plan (and any subsequent Plan) and to implement the relevant spatial planning recommendations and actions of the Dublin Agglomeration Environmental Noise Action Plan 2018-2023 or any superseding action plan*".

7.2.31 Chapter 14 is focused on policy relating to development management standards. That chapter states that "*All developments during construction and operational stage shall ensure that the air quality of the surrounding area is not affected*".

Dublin Region Air Quality Plan 2021

7.2.32 The Dublin Region Air Quality Plan is referred to in both the Development Plan and the LAP. The DRAQMP acknowledges that NO_2 is the pollutant of most concern in the Dublin region, which covers the areas of Dublin City, Dun Laoghaire / Rathdown, Fingal County, Dublin City and South Dublin.

7.2.33 It lists several measures which are required to reduce NO_2 concentrations within the Dublin Region. Measures include:

- Enhanced Air Quality Monitoring and Modelling – additional monitoring sites to be added
- Public Parking Controls – local authorities to incorporate air quality into their development plans with regard to Public Parking
- Publication of National Air Quality Strategy
- Introduction of Clean Air Zones (CAZs) and Low Emission Zones (LEZs) – appraisals and possible feasibility studies to be carried out regarding the introduction of CAZs/LEZs across the Dublin region

Dublin Airport Local Area Plan 2020

7.2.34 The Dublin Airport Local Area Plan (LAP) sets out how growth at Dublin Airport can be achieved sustainably.

7.2.35 The LAP includes the following objective relating to air quality, not including those already listed within the Development Plan:

> *"**Objective AQ05** - Undertake a review of existing air quality monitoring (and associated appropriate remedial action in the case of breaches) within and surrounding the Airport (including changes in Particulate Matter (PM) at relevant locations). Where relevant, such a review should identify additional monitoring proposals, remedial actions and implementation systems – such needs shall be provided for by Fingal County Council and/or daa."*

7.2.36 The LAP also acknowledges that the airport impacts on air quality from emissions associated with ongoing operations of the airport, such as aircraft and support services, and emissions from surrounding areas, as a result of traffic accessing the airport.

Other Relevant Policy, Standards & Guidance

Airport Air Quality Manual 2023

7.2.37 Published by the ICAO, the Airport Air Quality Manual provides internationally recognised guidance on how to compile emissions inventories associated with airport sources and how to use dispersion modelling to estimate the contribution of these emissions to local ambient concentrations.

7.2.38 This guidance has been used both for the compilation of the emissions inventory and to inform the dispersion modelling method, as set out in this Chapter.

Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document 2025

7.2.39 The TII guidance on the Air Quality Assessment of Specified Infrastructure Projects for specified infrastructure provides a recognised means by which the contribution of road traffic emissions can be quantified and assessed and has therefore been utilised to inform the assessment described in this chapter.

7.2.40 The TII air quality guidance was published alongside the TII Road Emissions Model (REM), which has also been utilised in this assessment as the source of vehicle emissions data.

Local Air Quality Management Technical Guidance 2022

7.2.41 DEFRA UK published their Local Air Quality Management Technical Guidance to assist local authorities in the UK with their responsibilities to review and assess local air quality in their administrative areas. The DEFRA guidance is referenced several times in the TII guidance. It includes methodologies on the annualization of air quality monitoring data, the verification of road traffic emissions model outputs, and the modelling of car parks. The assessment has been carried out in accordance with these methodologies.

Land-Use Planning & Development Control: Planning for Air Quality 2017

7.2.42 Section 4.10 of the TII air quality guidance referred to above also references the IAQM and EPUK guidance for the consideration of air quality within the land-use planning and development control process. Both the TII air quality guidance and the IAQM and EPUK guidance that informs it set out a means of describing air quality impacts based on the relationship between the magnitude of change and total pollutant concentration experienced, relative to the air quality standards. Therefore, a smaller magnitude of change could potentially have a greater impact, where total concentrations are close to or above an air quality standard, when compared to a larger magnitude of change, where total concentrations are below and not at risk of exceeding the standard.

7.3 Assessment Methodology

Introduction

7.3.1 As described in Chapter 5: Methodology, the assessment has been carried out following the methodology below and the EPA EIAR Guidance[18]:

- Establishment of the baseline conditions, including identification and assessment of the receiving environment and receptor sensitivity
- Identification of the potential impacts, and assessment of the magnitude of potential effects, and their significance
- Consideration of mitigation measures
- Assessment of residual effects
- Consideration of cumulative effects

7.3.2 The following sources of information have been reviewed in relation to the Proposed Order and form the basis of the assessment of likely significant effects on air quality:

- Detailed plans and airport building elevations
- Online aerial photography and base-mapping
- Baseline air quality monitoring data (project-specific survey data and publicly available secondary data made available by daa and the EPA)
- Current and forecast future aircraft data was supplied by daa and their consultants
- Current and forecast future road traffic data was supplied by daa and the Project Transport consultant
- Dublin Airport Energy centre consumption data
- Hourly sequential meteorological data sourced from the meteorological monitoring station at Dublin Airport.

Scope of the Assessment

7.3.3 This assessment focuses on the impact of emissions to air from increased aircraft and road traffic movements, as well as increased energy demand, and increased use of airport car parks as a result of the Proposed Order. Such emissions have the potential to change long-term and short-term concentrations of the pollutants that can harm human health, with NO_2, PM_{10} and $PM_{2.5}$, considered those

[18] Environmental Protection Agency. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR).

of greatest concern from aircraft emissions and road traffic emissions, at locations of sensitive exposure. Such emissions have the potential to also change long-term concentrations of NO_X and NH_3 and nitrogen deposition rates at air quality sensitive, designated habitats. The assessment also considers the potential for increased aircraft activity to change the concentration of odour, due to the storage and handling of aviation fuel, at locations of sensitive exposure.

7.3.4 The air quality assessment has been undertaken in line with the ICAO's Airport Air Quality Manual guidance, TII's guidance on the Air Quality Assessment of Specified Infrastructure Projects and the IAQM Land-Use Planning & Development Control guidance, as outlined in Section 7.2 of this Chapter.

7.3.5 The Current Receiving Environment has been established using air quality monitoring data obtained from primary and secondary sources, supplemented by air quality modelling using data representative of the 2025 Current Operation. The following data have been used to inform the Current Receiving Environment:

- Current Operation 2025 aircraft movement data, which details actual aircraft movements on 22nd August 2025 and is considered to be representative of a 'busy day', as provided by Mott MacDonald on behalf of daa
- Current Operation 2025 road traffic movements, as provided by daa and the Project Transport consultant
- Air quality concentration data for NOx, PM_{10}, and $PM_{2.5}$ from nearby EPA background monitoring locations for 2025
- Hourly sequential meteorological data sourced from the meteorological monitoring station at Dublin Airport for 2025
- Emission factors for NOx, PM_{10}, and $PM_{2.5}$ calculated using the most recent version of the TII Road Emissions Model (REM). Emission factors for NH_3 have been calculated using the most recent version of the Calculator for Road Emissions of Ammonia (CREAM) tool published by Air Quality Consultants

7.3.6 The Principal Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa). The Principal Assessment is informed by the following forecasts and data:

- Permitted Operation 2029 aircraft forecast data, representative of a 'busy day' in 2029, as provided by Mott MacDonald on behalf of daa
- Proposed Operation 2029 aircraft forecast data, representative of a 'busy day' in 2029, as provided by Mott MacDonald on behalf of daa
- Permitted Operation 2029 road traffic movements, as provided by daa and the Project Transport consultant
- Proposed Operation 2029 road traffic movements in 2029, as provided by daa and the Project Transport consultant
- 2025 air quality concentration data for NOx, PM_{10}, and $PM_{2.5}$ from nearby EPA background monitoring locations for 2025. These concentrations have been projected forward to 2029 using methodology and projection factors outlined in Appendix C of TII guidance
- Hourly sequential meteorological data sourced from the meteorological monitoring station at Dublin Airport for 2025
- Emission factors for NOx, PM_{10}, and $PM_{2.5}$ calculated using the most recent version of the TII Road Emissions Model (REM). Emission factors for NH_3 have been calculated using the most recent version of the CREAM tool published by Air Quality Consultants

7.3.7 The Principal Assessment uses detailed dispersion modelling to quantify total pollutant concentrations at sensitive receptors for the 2029 Permitted Operation and the 2029 Proposed Operation.

7.3.8 The EIAR also includes three Supporting Assessments, which provide additional context where relevant to the air quality assessment. These comprise:

- Supporting Assessment 1 – 2023 Baseline Operation (32 mppa) vs 2029 Proposed Operation (40 mppa)

- Supporting Assessment 2 – 2025 Current Operation (36.4 mppa) vs 2029 Proposed Operation (40 mppa)
- Supporting Assessment 3 – 2025 Current Operation (36.4 mppa) vs 2029 Permitted Operation (32 mppa)

7.3.9 The Supporting Assessments are considered qualitatively and provide context on how the effects under each scenario are likely to differ from those identified in the Principal Assessment.

7.3.10 This chapter is intended to be read in conjunction with the following documents:

- Appendix 7-1 –Landside Air Quality Modelling Methodology
- Appendix 7-2 –Airside Modelling Methodology
- Appendix 7-3 – Modelled Results
- Appendix 7-4 – Sensitivity Testing
- Figure 7-1 – Air Quality Monitoring Locations
- Figure 7-2 (a-f) – Air Quality Sensitive Receptors

Sensitive Receptors and Study Area

7.3.11 The air quality receptors selected for the assessment are those considered sensitive to air quality effects and most likely to experience impacts as a result of the Proposed Order. TII and IAQM guidance state that sensitive receptors are those in which members of the public are likely to be exposed to a pollutant for a duration of time comparable to the averaging period of a relevant Air Quality Standard or EU Limit Value (as outlined in Table 7-1 of this Chapter)

7.3.12 Sensitive receptors have been selected in accordance with TII and IAQM guidance and include residential properties, schools and hospitals. Worst-case receptor locations have been selected, including those closest to the Airport's runways and the public road network where traffic flows are affected as a result of the Proposed Order.

7.3.13 TII's air quality guidance states that *"air quality practitioners should model specific worse-case receptors"*. Modelled receptors have been chosen at locations closest to modelled emissions sources where changes in emissions as a result of the 2029 Proposed Operation will have the greatest impact. This includes locations close to the Airport runways and adjacent to local roads which are expected to experience an increase in traffic flows. Where a modelled receptor is located close to other comparable receptors that have not been assessed individually, it is considered representative of those nearby sensitive locations.

7.3.14 Receptor sensitivity to pollutants with the potential to affect human health is determined in accordance with relevant guidance. For pollutants subject to the Air Quality Standards and new EU Limit Values (see Table 7-1) all receptors with relevant exposure are considered to be of high sensitivity, taking account of the duration of exposure associated with the relevant land use.

7.3.15 Regarding aircraft emissions, the ICAO's Airport Air Quality Manual states that: "…*the impact of an aircraft's emissions plume, at or above 3,000 ft, on NO_2 ground-level concentrations is very small even in a very conservative analysis, and 1,000 ft is the typical limiting altitude for ground-level NO_2 concerns*". The assessment of aircraft emissions therefore considers ground-level air quality effects associated with aircraft operating below 3,000 ft (approximately 900 m).

7.3.16 For road traffic emissions, sensitive receptors within 200 m of a road expected to exceed the traffic impact screening criteria have been identified in accordance with TII guidance.

7.3.17 In line with TII air quality guidance, nature conservation receptors have been modelled at 10 m intervals, extending from the point within the receptor closest to the relevant road to a distance of 200 m from the road. The results of the modelling of nature conservation receptors are reported in Chapter 12: Biodiversity.

7.3.18 The study area is defined by the spatial extent of the air quality sensitive receptors shown in Figure 7-2. These receptors have been selected in accordance with the relevant guidance for each emission source considered in the assessment. A table of air quality sensitive receptors is provided in Appendix 7-1: Landside Air Quality Modelling Methodology.

Assessment of Road Traffic Emissions

7.3.19 The assessment considers emissions from traffic on the public road network and within airport car parks. The pollutants assessed are nitrogen oxides (NOx), as a precursor to NO_2 and nitrogen deposition; ammonia (NH_3), as a precursor to nitrogen deposition; and particulate matter (PM_{10} and $PM_{2·5}$).

7.3.20 Daily average flows on the local road network have been screened against criteria published in TII guidance. The TII guidance suggests that a detailed assessment of local air quality is likely to be required where:

- Road alignment will change by 5 metres (m) or more, or
- Annual average daily traffic (AADT) flows will change by 1,000 or more, or
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more, or
- Daily average speed change by 10kph or more, or
- Peak hour speed will change by 20kph or more

7.3.21 Where a road link exceeds the traffic impact screening criteria set out in TII guidance and an air quality sensitive receptor is located within 200 m of that link, detailed modelling of road traffic emissions has been undertaken in accordance with the methodology set out in Appendix 7-1: Landside Air Quality Modelling Methodology. The screening criteria are exceeded on the R132 to the north and south of the Airport, the R108 and Old Airport Road, the M1 Airport Link Road, sections of the M1 to the north and south of the M1 Airport Link Road, and the M50 to the west of the M1.

7.3.22 Road traffic data used to inform the assessment have been provided by daa and the Project Transport consultant. The data are based on project-specific traffic counts and TII traffic counts on the strategic road network undertaken in 2025. The traffic count data have been converted to 24-hour annual average daily traffic flows and factored to represent the relevant assessment years and scenarios.

7.3.23 The road traffic emissions model has been verified using the approach set out in Section 4.6.2 of the TII air quality guidance. Verification is the process of adjusting model outputs to align with actual air quality monitoring data gathered in the study area.

Assessment of Energy Plant Emissions

7.3.24 Dublin Airport is served by two energy centres containing Combined Heat and Power (CHP) units and boilers. The assessment considers emissions from plant within the energy centres that are regulated under the EU Medium Combustion Plant Directive (i.e. plant with a thermal capacity of ≥1 MW to 50 MW). The plant included in the assessment is gas-fired and is therefore a source of NOx emissions, a precursor to NO_2 and nitrogen deposition.

7.3.25 The assessment does not consider emissions from plant with a thermal capacity of less than 1 MW or plant that operates for fewer than 500 hours per year. Emissions from plant with a thermal capacity of <1MW (such as standard commercial or domestic boilers) are not regulated by the EPA (European Union (Medium Combustion Plants) Regulations 2017 (S.I. No. 595/2017)). This is due in part to the low emissions from plant with limited thermal capacity and because such plant is subject to the EU Ecodesign Directive (2009/125/EC), which targets the manufacture and sale of appliances, rather than the environmental licencing of emissions. Plant operating for fewer than 500 hours per year is installed for backup purposes and, under normal operation, contributes to Airport emissions only during routine testing. Such testing is expected to occur for no more than one hour per week and, given the infrequency of these emissions, is expected to have a negligible effect on local air quality.

7.3.26 Emissions from the energy centre stacks (i.e. the means by which energy plant emissions are released to air) have been modelled for the 2029 Permitted Operation and the 2029 Proposed Operation in order to assess the change in emissions using data made available by daa and, where required, assumptions informed by professional judgement and based on EMEP (Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe) and European Environment Agency (EEA) guidance (EMEP/EEA air pollutant emission inventory guidebook, Small Combustion Plant, 2023).

7.3.27 A detailed description of the energy plant emissions modelling methodology, including model inputs, is provided in Appendix 7-1: Landside Air Quality Modelling Methodology.

Assessment of Airside Emissions

7.3.28 The assessment of airside emission sources focuses on nitrogen oxides (NOx), as a precursor to NO_2 and nitrogen deposition, and particulate matter (PM_{10} and $PM_{2.5}$). Other regulated air pollutants associated with airside operations are not assessed, for the reasons set out in paragraph 7.2.4.

7.3.29 Section 3.4 of the ICAO guidance identifies emission sources typically associated with airports (International Civil Aviation Organisation, 2023). Of those emission sources, the following have been included in the assessment:

- Aircraft main engines operating within the Landing and Take-off (LTO) Cycle
- Ground Support Equipment (GSE) including airside vehicles and Mobile Ground Power Units
- Auxiliary Power Units (APUs)
- Airport energy plant
- Brake and tyre wear and tear
- Refuelling of aircraft

7.3.30 Aircraft and airport maintenance, fire training and de-icing are also identified in ICAO guidance as sources of volatile organic compound (VOC) emissions[19]. These sources have not been assessed in relation to regulated air pollutants for human health, for the reasons set out in paragraph 7.2.4.

7.3.31 Use of APUs and their emissions have been included in the assessment based on APU usage data provided by daa for 2025. daa's Annual Report[20] and Accounts 2025 states that *"All contact stands at Dublin and Cork airports are also enabled for Fixed Electric Ground Power (FEGP) through grid or renewable electricity sources"*. This is in accordance with Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure. It is therefore likely that usage of APUs will reduce in time following the installation of FEGP.

7.3.32 The approach to quantifying emissions from the Airside sources follows, as far as practicable, the "*sophisticated or advanced approach*" recommended by the International Civil Aviation Organization ICAO in its Airport Air Quality Manual. Whilst it should be noted that the ICAO manual is intended for the assessment of existing airport operations, the same methodology can be applied to future airport operations, providing sufficient data is available on those operations.

7.3.33 Detailed modelling of aircraft emissions has been undertaken using the United States (US) Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) (version 4a). AEDT is a software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences. The air quality element of the software is based on the US EPA's AERMOD dispersion model, which is approved for use in Ireland by the EPA.

7.3.34 A detailed description of the airside emissions modelling methodology is provided in Appendix 7-2: Airside Modelling Methodology.

Assessment of Odour Emissions

7.3.35 Odours are highly subjective. The perception of odours, whether they are pleasant or offensive, and to what extent, is partly determined through the life experiences of the individual. Odour perception is subjective and influenced by individual experience. However, odour associated with aviation fuel can be perceived as offensive (IAQM, 2026).

7.3.36 Before an adverse effect (such as harm to amenity) can occur, there must be odour exposure. For odour exposure to occur, all three links in the source-pathway-receptor chain must be present, which is described in Figure 3.6 of the EPA AG9 guidance (Environmental Protection Agency, 2019):

[19] Volatile Organic Compounds (VOCs) are a collection of organic compounds which have a high vapour pressure at room temperature. They represent a suite of carbon-based compounds, including benzene.
[20] Dublin Airport Authority. (2025). Dublin Airport Air Quality Monitoring – Annual Report 2024.

- An emission source - a means for the odour to get into the atmosphere
- A pathway - for the odour to travel through the air to locations offsite, noting that:
    - Anything that increases dilution and dispersion of an odorous pollutant plume as it travels from source to receptor will reduce the concentration at the receptor, and hence reduce exposure
    - Increasing the length of the pathway (e.g., by moving odour sources as far away from receptors as possible) will, all other things being equal, increase the dilution and dispersion
- The presence of receptors (such as residential properties or places where people would expect a certain level of amenity) that could experience an adverse effect, noting that people vary in their sensitivities to odour, determined by the level of amenity associated with the land use and the typical duration of exposure

7.3.37 There is no standard assessment approach for quantifying potential odour effects associated with airport operations. There is also no published evidence to suggest that offsite exposure to VOCs from the handling and use of aircraft fuels at concentrations at which airport odours are detectable results in physiological health effects. The principal concern is therefore the potential for effects on amenity.

7.3.38 One approach applied in previous airport assessments (i.e. the Farnborough Airport Odour Assessment[21] and Manston Airport Development Consent Order[22]) has been to base the odour assessment on changes in aircraft-related VOC emissions. However, this approach is limited because odour thresholds vary considerably between individual VOCs and there is no established correlation between total aircraft-related VOC concentrations and human perception of odour. Specific compounds, or combinations of compounds, may nevertheless be perceptibly odorous where released in sufficient quantities.

7.3.39 A variation on this general odour modelling approach was undertaken at Copenhagen Airport in 2002[23]. This study quantified odour emissions from aircraft engines using actual fuel flow and emission measurements, odour panel results, engine specific data and aircraft operational data, to predict odour concentrations. Important outcomes from the study were a calculated odour emission factor from the aircraft engines of 57 Odour Units (OU_E) per mg of hydrocarbon (HC) with lower and upper estimates of 23 and 110 OU_E/mgHC respectively, and the identification that the majority of the odorous emissions (97%) occurred whilst aircraft engines were running at idle.

7.3.40 To provide a precautionary estimate of odour impacts, HC emissions have been modelled for all aircraft operating modes, including refuelling. Predicted HC concentrations have then been converted to odour concentrations using both the recommended factor of 57 OUE/mgHC and the precautionary upper factor of 110 OUE/mgHC identified by the Copenhagen Airport study. This approach is precautionary as the study attributed 97% of odorous emissions to aircraft idling and only 3% to other operating modes. The recommended odour emission rate has been applied to all aircraft operating modes.

Determination of Significance

7.3.41 The significance of effects has been determined with reference to the EPA Guidelines (Environmental Protection Agency, 2022), taking account of the quality, extent, context, probability, duration and frequency of effects.

Landside and Airside Emissions Harmful to Human Health and Ecology

7.3.42 The assessment has been undertaken in accordance with TII guidance, which refers to guidance published by the IAQM and EPUK (Institute of Air Quality Management, 2017). This provides a method for describing air quality impacts at individual receptors based on dispersion modelling results. An 'impact' describes the change in pollutant concentration at a receptor, taking account of the total predicted concentration and its relationship to the relevant Air Quality Standard or EU Limit Value. An 'effect' describes the environmental response resulting from that impact.

[21] Rushmoor Borough Council. (2009). Farnborough Airport Odour Assessment.
[22] RiverOak Strategic Partners. (2018). Manston Airport Development Consent Order.
[23] Winther, M., Kousgaard, U. and Oxbøl, A. (2006). Calculation of odour emissions from aircraft engines at Copenhagen Airport. Science of the total environment, 366(1), pp.218-232.

7.3.43 The TII approach to determining significance applies to human health receptors, as listed in Appendix 7-1. The significance of effects arising from air quality impacts on sensitive nature conservation receptors is determined by the competent expert in ecology, as described in Chapter 12: Biodiversity.

7.3.44 The TII air quality guidance describes the magnitude of impact at individual receptors by considering the change in pollutant concentration as a proportion of the relevant Air Quality Standard or EU Limit Value, together with the total predicted pollutant concentration as a proportion of that Standard or Limit Value. This approach gives greater weight to changes occurring where total concentrations are close to or exceed the relevant Air Quality Standard or EU Limit Value. The approach is summarised in Table 7-2. For the Principal Assessment, this methodology is applied to the change between the 2029 Permitted Operation and the 2029 Proposed Operation.

Table 7-2: Air Quality Impact Descriptors at Individual Receptors

Long-term Average Concentration	% Change in Concentration Relative to Air Quality Assessment Level				
	<1[1]	1 – 2[2]	2 – 5[3]	6 – 10[4]	>10[5]
75% or less of Limit Value	Negligible	Negligible	Negligible	Slight	Moderate
76% - 94% of Limit Value	Negligible	Negligible	Slight	Moderate	Moderate
95% - 102% of Limit Value	Negligible	Slight	Moderate	Moderate	Substantial
103% - 109% of Limit Value	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more of Limit Value	Negligible	Moderate	Substantial	Substantial	Substantial

[1] Imperceptible; [2] Very low; [3] Low; [4] Medium; [5] High.
Source: (Institute of Air Quality Management, 2017)

7.3.45 A change in predicted annual mean concentrations of NO_2 or PM_{10} of less than 0.5% of the relevant Air Quality Standard or EU Limit Value is considered imperceptible. A change of this magnitude, within reasonable bounds of variation, would not be capable of having a direct effect on local air quality that could be considered significant. The same approach is applied to predicted annual mean concentrations of $PM_{2.5}$.

7.3.46 Changes in pollutant concentration of between 2% and 5% of the relevant Air Quality Standard or EU Limit Value have the potential to result in slight air quality impacts. Changes towards the lower end of this range may be difficult to distinguish through post-operational monitoring due to the influence of other pollutant sources and interannual variation in meteorological conditions. This is taken into account in the overall evaluation of significance.

7.3.47 Changes in pollutant concentration of more than 5%, corresponding to moderate and substantial impact categories, are more likely to be discernible and therefore carry greater weight in the overall evaluation of significance.

7.3.48 The significance of the overall effect arising from the impacts identified at individual receptors is determined using professional judgement. The TII guidance provides the following instruction: *"Whilst the outcome of…* [refer Table 7-2] *…may determine that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors the overall effect may not necessarily be judged as being significant in some circumstances. It is the factors set out* [7.3.49]*… that should be used to determine an overall judgement of whether the proposed scheme is 'significant' or 'not significant' in terms of air quality"*. The overall significance of effects is determined using professional judgement, taking the factors (refer 7.3.49) into account and the EPA EIAR Guidelines.

7.3.49 The "factors" that TII refer to are set out as follows:

- The number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance
- The number of people predicted to be exposed to levels above 2030 Limit Values. Whether or not the exceedance of the 2030 Limit Value is predicted to arise in the study area where none existed before, or the size of an exceedance area is predicted to be substantially increased
- Whether or not the study area exceeds a 2030 standard and this exceedance is predicted to be removed, or the size of the exceedance area is predicted to be reduced
- Uncertainty, including the extent to which worst-case assumptions have been made

- The extent to which the 2030 standard is predicted to be exceeded e.g. an annual mean NO_2 of 21 µg/m^3 should attract less weight in the determination of significance than an annual mean of 31 µg/m^3

Airside and Fuel Farm Odour Emissions

7.3.50 The significance of odour effects has been determined in accordance with IAQM guidance (IAQM, 2026), taking account of the potential odour impact and the sensitivity of the receptor.

7.3.51 EPA Odour Emissions Guidance (AG9) provides the following benchmark criteria with regard to considering odour emissions, based on the 98th percentile of hourly average concentrations over a modelled year. Odour concentrations above these values may indicate the likelihood of unacceptable odour pollution relative to perceived offensiveness:

- 1.5 OU_E/m^3 for the most offensive of odours (examples given are decaying animal or fish remains, septic effluent or sludge, and biological landfill odours)
- 3 OU_E/m^3 for moderately offensive odours (examples given are intensive livestock rearing, fat frying (food processing), sugar beet processing, and well-aerated green waste composting odours)
- 6 OU_E/m^3 for less offensive odours (examples given are brewery, confectionery, coffee roasting, and bakery odours)

7.3.52 1 odour unit (OU_E/m^3) equates to the point of detection, irrespective of how offensive the odour is.

7.3.53 On this basis, aviation fuel odour is considered to have the potential to be unacceptable at concentrations above 3 OUE/m³, depending on receptor sensitivity, and is considered unacceptable at concentrations of 6 OUE/m³ or above. Concentrations below 3 OUE/m³ are considered unlikely to result in unacceptable odour effects. A perceptible odour impact of 1 OUE/m³ has the potential to result in a significant effect on amenity where it results in a total odour concentration exceeding 3 OUE/m³.

Application of the Assessment Framework

7.3.54 As set out in Chapter 5: Methodology, the Principal Assessment compares the 2029 Permitted Operation with the 2029 Proposed Operation. 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 air quality effects associated with the Proposed Order relative to the 2029 Permitted Operation. This comparison provides the basis for identifying likely significant effects, determining any additional mitigation measures and reporting residual effects.

7.3.55 The three Supporting Assessments described in Paragraph 7.3.11 provide additional context for interpreting the findings of the Principal Assessment. They consider the 2029 Proposed Operation in relation to the 2023 Baseline Operation and 2025 Current Operation, and the 2029 Permitted Operation in relation to the 2025 Current Operation. The Supporting Assessments are considered qualitatively, with their likely effects described in relation to those identified through the Principal Assessment.

Assumptions and Limitations

7.3.56 The assumptions and limitations identified below reflect instances where project- or assessment-specific data or information are unavailable or limited. Where assumptions have been required, a conservative approach has been adopted, including reasonable worst-case assumptions where appropriate. These assumptions and limitations have not affected the comprehensiveness of the assessment or prevented reasoned conclusions on the significance of effects from being reached. Further details are provided in Appendix 7-1: Landside Air Quality Modelling Methodology and Appendix 7-2: Airside Modelling Methodology.

7.3.57 Dispersion modelling has been undertaken for the 2025 Current Operation (36.4 mppa) to characterise the Current Receiving Environment, and for the 2029 Permitted Operation (32 mppa) and 2029 Proposed Operation (40 mppa) for the Principal Assessment. Supporting Assessments 1, 2 and 3 have been considered qualitatively. The dispersion modelling is limited by the quality (i.e. subject to the limitations of forecasting) of the aircraft data provided and conservatively assumes the busy day profile for each day of the week.

7.3.58 Dispersion modelling in general can be subject to systematic and random uncertainty arising from factors including uncertainty in input data, such as future traffic and aircraft forecasts, and the representativeness of meteorological data from a single location across the study area and for future years. To minimise these uncertainties, the assessment has followed the best-practice methods set out in the guidance referenced in this chapter, and the dispersion model has been verified against monitoring data collected within the air quality study area.

7.3.59 The dispersion modelling of road traffic emissions is based on traffic flow, composition and speed data for the local road network in the vicinity of the Airport and relevant sections of the strategic road network. The assessment is therefore subject to the assumptions and limitations associated with the traffic assessment, which are provided in Chapter 6: Material Assets (Traffic and Transport).

7.3.60 Road traffic emissions of NOx, PM_{10} and $PM_{2.5}$ have been derived using the TII Road Emissions Model (REM). The REM converts traffic flow, composition and speed data into pollutant emission rates using emission factors representative of the vehicle fleet projected for the Dublin area in each assessment year. The assessment is therefore subject to the uncertainties inherent in these future fleet and emission factor projections.

7.3.61 The dispersion modelling of ammonia (NH_3) emissions from road traffic has been informed by emissions rate data made available in the AQC published CREAM tool, in line with TII guidance. The CREAM tool's guidance states that the emission factors within the tool remain uncertain, but that the use of the CREAM emission factors is better than not considering ammonia emissions at all. In AECOM's experience, the NH_3 emission rate factors used in the tool are precautionary and likely overestimate NH_3 contributions.

7.3.62 In line with TII air quality guidance, the NO_X to NO_2 conversion calculator published by Defra as part of their Local Air Quality Management guidance has been used to inform the assessment of road source contributions. In line with the assumption made by TII in their air quality guidance (Transport Infrastructure Ireland, 2025), the regional NO_X, NO_2 and ozone (O_3) concentrations reported in that calculator for the Armagh, Banbridge, and Craigavon authority area in Northern Ireland in 2029 (the latest year available) represent conditions in the study area for the relevant years of the assessment.

7.3.63 It has also been assumed that 15% of airside NO_X emissions are emitted as primary NO_2, with reference to guidance published by the UK National Atmospheric Emissions Inventory (2012). This approach is also consistent with the air quality assessment that informed the Infrastructure Application EIAR.

7.3.64 The busy day schedule is assumed to occur all year round. The busy day schedule represents a typical peak day of airside activity and emissions, not an average day.

7.3.65 Whilst the type of aircraft is accurately represented in the airside modelling, the exact engine on each aircraft varies, and it is impracticable to be accurate on engine mix to inform the modelling. The assessment has therefore assumed the engine with the worst-case NO_X emissions factors for each class of aircraft.

7.3.66 The dispersion modelling of aircraft emissions and emissions from other airside sources is informed by the Base of Aircraft Data published by EUROCONTROL, which is built into the AEDT modelling software. The Base of Aircraft Data includes estimates of aircraft emissions, emissions characteristics, Ground Support Equipment (GSE) usage, and emissions assumptions. The model software uses this data to convert the aircraft forecasts into representative emission rates for each assessment year.

7.3.67 Detailed information on airside GSE at Dublin Airport is not available for inclusion in the airside dispersion modelling. In the absence of airport-specific data, GSE requirements for each aircraft arrival and departure have been represented using the AEDT default assignments for the relevant aircraft type. The US FAA describes these default assignments as "adequately conservative" to avoid under-reporting[24]. This assumption is therefore likely to overestimate emissions from GSE. It has also been assumed that all GSE operating at the Airport is diesel-powered. As a proportion of the existing GSE fleet uses alternative power sources, this assumption will further overestimate GSE emissions.

7.3.68 The aircraft forecast identifies the terminal used by each arriving and departing aircraft but does not identify individual gates. As gate location can influence aircraft taxi routes, assumptions have therefore been required regarding taxi routes between the runways and terminals. To provide a reasonably

[24] Federal Aviation Administration. (2026). Aviation Environmental Design Tool (AEDT). Technical Manual. Version 4b.

conservative assessment, the shortest possible taxi routes have not been assumed, as these may not always be available due to operational conditions such as the presence of other aircraft or support equipment. It has been assumed that all taxi routes begin or stop at the start and end of each runway.

7.3.69 The airside modelling also includes the following reasonable assumptions:

- The model has enabled AEDT to generate a schedule of operations as opposed to manually assigning runway ends and tracks to each ATM. This is because runway operation is subject to meteorological conditions at the time and the model uses the wind speed and wind direction data contained within the meteorological dataset to inform this schedule
- It has been precautionarily assumed that cargo ATMs operate as per the busy day schedule throughout the year, which is likely to overestimate airside emissions
- The use of the Crosswind Runway (16-34) has not been considered. This Runway is only used when essential for safety reasons and accounts for less than 1% of annual ATMs. Given its limited use, the Crosswind Runway would have a negligible impact on air quality
- AEDT defaults have been used for the procedural flight profiles for all ATMs. These profiles assume a power setting of 100% during take-off, 85% during climb-out, 30% during approach and 7% while idling. AEDT model defaults are described by the US FAA as being "*adequately conservative*"
- No upper-air sounding data is available for Dublin Airport. Data from the nearest upper-air sounding monitoring station, Castor Bay, was used in the absence of site-specific data to produce upper-air meteorological data files for input into the model

7.3.70 For the odour assessment, all HC emissions from modelled sources have been assumed to be equally and consistently odorous, using the precautionary emission factor of 110 OUE/mgHC identified in published research (Winther et al., 2006). A recent literature review has identified no subsequent research providing updated aircraft odour emission factors. The same study found that 97% of aircraft odour emissions occur during idling. Applying the emission factor uniformly to all modelled HC sources is therefore precautionary and is likely to overestimate odour concentrations.

7.3.71 Energy centre emissions have been modelled using emission factors sourced from the European Environment Agency's Air Pollutant Emissions Inventory Guidebook, based on the energy consumption and operational profile of the energy plant. Where emissions data required for the modelling were not available, assumptions were developed using the available plant information, relevant published emission factors and the air quality specialists' experience of comparable plant and similar projects. Professional judgement was applied to select assumptions considered representative of the likely operation of the energy centre, with conservative assumptions adopted where appropriate.

7.3.72 Background pollutant concentration data used in the assessment are sourced from EPA monitoring undertaken in 2025 at background locations across Dublin and Fingal. The monitoring data used to represent background conditions were collected using EU reference-method chemiluminescence analysers.

7.4 Current Receiving Environment

Introduction

7.4.1 Existing monitoring data from daa and the EPA, together with monitoring undertaken by AECOM for the Infrastructure Application[25], have been used to inform the Current Receiving Environment, as discussed in this section. While the Infrastructure Application relates to a separate project and application, the monitoring data collected for it are relevant to baseline air quality conditions within the study area. Review of this and recent historical data allows us to determine whether air quality has been an issue at sensitive locations close to Dublin Airport in the past. It also gives the opportunity to review recent trends in air quality due to interannual variation.

7.4.2 The Current Receiving Environment for air quality has been characterised through a review of monitoring data obtained from primary and secondary sources, together with dispersion modelling of the 2025

[25] Fingal County Council Planning Reg. Ref. F23A/0781.

Current Operation (36.4 mppa). The data sources used to inform the modelling are described in paragraph 7.3.6.

AECOM Baseline Air Quality Survey

7.4.3 A baseline air quality survey has been undertaken to inform the air quality assessment for the Infrastructure Application. The results of the monitoring survey have been used to inform baseline conditions for the 2029 Proposed Operation. NO_2 diffusion tubes were located at a number of roadside and background locations in the vicinity of the Airport and local road network between June 2023 and January 2024. The data has been annualised using the approach set out in TII air quality guidance to represent annual mean conditions for calendar year 2025. 2025 is used to represent current receiving environment conditions in order to match the base year of the surface access traffic data. This data is used to inform the verification of the road traffic emissions model, as discussed in Appendix 7-1. The annualisation process is also summarised in Appendix 7-1, and the annualised 2025 NO_2 concentration data are provided in Table 7-3. The location of air quality monitoring sites is shown on Figure 7-1.

7.4.4 The data demonstrates that annual mean NO_2 concentrations are more elevated closer to the busier roads within the study area, and nearer to background conditions at locations set back from the busier roads. The data also demonstrates that in 2025, annual mean concentrations of NO_2 are well below the current Air Quality Standard for that pollutant (40 µg/m^3) at all locations monitored but exceeded the new EU Air Quality Limit Value (20 µg/m^3) at 13 of the 17 locations monitored.

7.4.5 The revised Limit Values established by the EU Air Quality Directive (2024/2881) are required to be achieved by 1 January 2030. The concentrations presented in Table 7-3 represent conditions in 2025 and should therefore not be interpreted as representative of conditions in 2030. NO_2 concentrations are expected to reduce over this period, reflecting ongoing decarbonisation of the transport and energy sectors, as discussed further in Section 7.5.

7.4.6 TII air quality guidance provides projections for future reductions in background NO_2 concentrations, reflecting the anticipated trend of improving air quality. For EPA Zone A (the Dublin area), the guidance projects a 'realistic worst-case' reduction in background NO_2 concentrations of 11.1% by 2029 and 13.7% by 2030. Applying these factors to the 2025 monitoring data presented in Table 7-3 indicates that 11 of the 17 monitoring locations would exceed the new EU Limit Value for annual mean NO_2 in 2029, reducing to eight locations in 2030. The locations predicted to remain above the 20 µg/m³ Limit Value are situated close to the M1 and M50 motorways, where road traffic emissions make a greater contribution to NO_2 concentrations than airside emissions.

Table 7-3: Annualised and Bias Adjusted 2025 Project Specific NO_2 Monitoring Data

Site	Location	Description	Bias-Adjusted and Annualised NO_2 Concentration ($\mu g/m^3$)[1]
NO_2 (1)	Meakstown Cottages, close to M50	Roadside	24.8
NO_2 (2)	Creston Avenue, close to M50	Roadside	24.9
NO_2 (3)	Mayeston Lawn, close to M50	Roadside	26.9
NO_2 (4)	Santry Park	Background	14.9
NO_2 (5)	Bothar Shoird (Swords Road), close to N1	Roadside	27.3
NO_2 (6)	Oak Avenue, close to M50 (approach to tunnel)	Roadside	22.7
NO_2 (7)	Aulden Grange, close to M50 (approach to tunnel)	Roadside	25.2
NO_2 (8)	Aulden Grange, close to M50 (approach to tunnel)	Roadside	26.9
NO_2 (9)	Turnapin Lane, close to M50	Roadside	22.7
NO_2 (10)	Turnapin Cottages, close to M50	Roadside	17.7
NO_2 (11)	Stockhole Lane	Background	21.8
NO_2 (12)	R139, near to Cara Park	Roadside	25.2
NO_2 (13)	R139, Mayne River Way	Roadside	30.1
NO_2 (14)	Holywell Meadow, Swords, close to M1	Roadside	22.7
NO_2 (15)	Holywell Way, Swords, close to M1	Roadside	18.5
NO_2 (16)	The Rise, Swords, close to M1	Roadside	21.6
NO_2 (17)	Estuary Road, Swords, close to M1	Roadside	16.4

[1] Bias-adjustment refers to a correction factor that is applied to passive diffusion data to account for sampling bias. The adjustment factor is calculated by comparing measured diffusion data to data gathered by an EU reference analyser at the same location. This is described in more detail in Appendix 7-1.

7.4.7 In addition to NO_2, NH_3 was monitored at selected locations between June 2023 and January 2024. The data have been averaged across the monitoring period and are summarised in Table 7-4. Unlike the NO_2 monitoring data, the NH_3 data have not been adjusted to 2025, as an equivalent established methodology for adjustment to a different reference year is not available.

7.4.8 The Critical Level for annual mean NH_3 concentrations for the protection of sensitive vegetation ranges from 1 µg/m³ to 3 µg/m³, depending on the sensitivity of the habitat and the presence of bryophytes and lichens. The applicability of the relevant Critical Level to individual nature conservation receptors is considered in Chapter 12: Biodiversity. The monitoring data presented in Table 7-4 show that mean NH_3 concentrations over the six-month monitoring period were above 1 µg/m³ at all monitored locations but below 3 µg/m³.

Table 7-4: Mean June 2023-January 2024 Project Specific NH3 Monitoring Data

Site	Location	Description	Mean NH_3 Concentration ($\mu g/m^3$)
NH3 (1)	Estuary Road, Swords, close to M1	Roadside	2.4
NH3 (2)	Estuary Road, Swords, close to M1	Roadside	2.4
NH3 (3)	Golf Links Road	Background	1.8
NH3 (4)	R106 Coast Road	Roadside	2.2
NH3 (5)	R123 Moyne Road	Roadside	2.3
NH3 (6)	R807 James Larking Road	Roadside	2.2

daa Monitoring Data

Pollutant Concentration Data

7.4.9 daa has undertaken monitoring of a range of air pollutants at and in the vicinity of the Airport for a number of years, using both continuous and passive monitoring methods. These data have been used to inform the Current Receiving Environment and provide information on interannual variation in pollutant concentrations.

7.4.10 Continuous monitoring is undertaken using an EU reference-method analyser for NOx, PM_{10} and $PM_{2.5}$. The monitoring station is located approximately 500 m east of the North Runway and predominantly downwind of airside emission sources. Annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations recorded at the station over the past six years are presented in Table 7-5. The location of the monitoring station is shown in Figures 7-1 and 7-2.

7.4.11 The data collected at the monitor since 2020 demonstrate that annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations close to, and predominantly downwind of, existing airside emission sources remain below the current Air Quality Standards. Annual mean PM_{10} and $PM_{2.5}$ concentrations are also below the relevant new EU Limit Values. Annual mean NO_2 concentrations have, however, been close to or above the new EU Limit Value of 20 µg/m³ in recent years. Applying the future NO_2 reduction factors set out in TII air quality guidance indicates that concentrations at this location would be below the new EU Limit Value by 2029.

7.4.12 Data capture was limited for some analysers in 2024 and 2025 and the annual mean concentrations for those years should therefore be interpreted with caution. The monitoring station is located immediately east of the North Runway and is not representative of sensitive human exposure, as there are no air quality sensitive receptors in its immediate vicinity. It nevertheless provides useful information on air quality close to the Dublin Airport Site boundary.

Table 7-5: Continuous NO_2, PM_{10}¬, and PM2.5 Monitoring Data Provided by daa

Pollutant	Annual Mean Concentration (µg/m³)						Current Air Quality Standard (µg/m³)	New EU Air Quality Limit Value (µg/m³)
	2020	2021	2022	2023	2024	2025		
NO_2	22	19	19	21	-[2]	-[2]	40	20
PM_{10}	16	11	12	12	-[2]	12	40	20
$PM_{2.5}$	-[1]	-[1]	-[1]	6	-[2]	7	20	10

Notes:

[1] Pollutant not monitored in this year

[2] Limited data capture (<60% in 2024 and <68% in 2025)

Source: daa

In addition to continuous monitoring, daa undertakes passive diffusion tube monitoring at a number of on-site and off-site locations for pollutants including NO_2 and benzene (C_6H_6). Monitoring data for NO_2 and C_6H_6 over the past six years are presented in Table 7-6 and

7.4.13 Table 7-7, and the monitoring locations are shown in Figure 7-1. The monitoring sites are located at roadside or Dublin Airport Site boundary locations and are generally closer to emission sources, such as Airport runways and roads, than sensitive receptors. Concentrations at sensitive receptors located further from these sources would therefore generally be expected to be lower.

Table 7-6: Passive Annual Mean NO_2 Monitoring Data

Monitoring Site	Annual Mean Concentration (µg/m³)[1]					
	2020	2021	2022	2023	2024	2025
A1 - Forrest Little Golf Club	16.9	17.1	17.1	20.0	18.8	19.1
A2 - Kilreesk Lane, St. Margaret's	12.5	12.4	13.9	12.5	11.9	12.0
A3 - Ridgewood Estate West, Swords	13.4	12.4	13.9	14.2	12.9	13.4
A4 - St. Margaret's School and Parish House	13.1	13.9	15.3	14.6	13.7	15.3
A5 - Fire Station, Huntstown, Dublin Airport	16.5	19.0	19.8	21.2	18.8	19.8
A6 - Southern Boundary Fence, Dublin Airport	22.8	22.5	25.6	26.4	25.2	23.4
A7 - Western Boundary Fence, Dublin Airport	23.4	25.0	25.8	25.0	23.6	22.9
A8 - St. Nicholas of Myra School, Malahide Road	15.7	16.1	16.4	15.8	14.7	14.6
A9 - Naomh Mearnóg GAA Club Portmarnock	14.7	12.7	13.7	12.8	11.9	9.6
A10 - Oscar Papa Site, Portmarnock	12.3	17.4	14.5	12.9	11.5	11.6
A11 - Airport Bus Depot	29.7	28.9	39.5	39.3	33.1	33.8
A12 - Portmellick House, Dunbro Lane	21.4	N/A	N/A	N/A	N/A	N/A
Current Air Quality Standard	40 µg/m³					
New EU Air Quality Limit Value	20 µg/m³					

Notes:
[1] Data provided by daa has not been adjusted for diffusion tube bias. Bias adjustment factors are normally applied to diffusion tube data to account for laboratory bias. Typically, diffusion tubes over-estimate NO_2 concentrations when compared to reference monitoring data.
Source: daa (Dublin Airport Authority, 2025)

7.4.14 Passive monitoring indicates that annual mean NO_2 concentrations were below the current Air Quality Standard of 40 µg/m³ at all monitoring locations. The highest concentrations were recorded at site A11, the Airport Bus Station, where annual mean concentrations of 39.5 µg/m³ and 39.3 µg/m³ were recorded in 2022 and 2023, respectively. Concentrations at this location are likely to be influenced by emissions from nearby slow-moving and idling buses. The Airport Bus Station does not represent a location of relevant annual mean exposure for the purposes of comparison with the annual mean Air Quality Standard as members of the public would not be at this location for extended periods of time.

7.4.15 Annual mean NO_2 concentrations at A11 and at the Dublin Airport Site boundary locations A6 and A7 were above the new EU Limit Value of 20 µg/m³. The diffusion tube data provided by daa have not been adjusted for diffusion tube bias and should therefore be interpreted with this limitation in mind. Diffusion tubes typically overestimate NO_2 concentrations when compared with EU reference-method monitoring undertaken over the same period.

7.4.16 Monitoring indicates that annual mean C_6H_6 concentrations have consistently been well below the relevant Limit Value of 5 µg/m³, with a maximum annual mean concentration of 0.7 µg/m³ recorded over the six-year monitoring period. While C_6H_6 concentrations do not provide a direct measure of odour conditions, benzene is a hydrocarbon, and the monitoring data provide an indication of hydrocarbon concentrations in the vicinity of the Airport. The maximum measured concentration is well below the reported odour detection threshold for benzene of approximately 1.5–2.7 ppm (approximately 5–8 mg/m³ or 5,000-8,000 µg/m³).

Table 7-7: Passive Annual Mean C6H6 Monitoring Data

Monitoring Site	Annual Mean Concentration (µg/m³)					
	2020	2021	2022	2023	2024	2025
A1 - Forrest Little Golf Club	0.5	0.5	0.4	0.5	0.4	0.4
A2 - Kilreesk Lane, St. Margaret's	0.4	0.4	0.4	0.3	0.4	0.7
A3 - Ridgewood Estate West, Swords	0.4	0.4	0.5	0.4	0.4	0.4
A4 - St. Margaret's School and Parish House	0.5	0.3	0.4	0.3	0.4	0.4
A5 - Fire Station, Huntstown, Dublin Airport	0.4	0.4	0.4	0.5	0.4	0.4
A6 - Southern Boundary Fence, Dublin Airport	0.4	0.4	0.4	0.7	0.4	0.4
A7 - Western Boundary Fence, Dublin Airport	0.3	0.4	0.3	0.7	0.4	0.4
A8 - St. Nicholas of Myra School, Malahide Road	0.4	0.4	0.3	0.4	0.4	0.4
A9 - Naomh Mearnóg GAA Club Portmarnock	0.4	0.4	0.4	0.4	0.4	0.3
A10 - Oscar Papa Site, Portmarnock	0.4	0.4	0.4	0.4	0.4	0.4
A11 - Airport Bus Depot	0.4	0.4	0.5	0.6	0.5	0.4
A12 - Portmellick House, Dunbro Lane	0.5	N/A	N/A	N/A	N/A	N/A
Air Quality Limit Value	5 µg/m³					

Source: daa (Dublin Airport Authority, 2025)

Odour Monitoring Data

7.4.17 With relevance to the assessment of odour impacts, daa commissioned a series of odour surveys in 2023 and 2024. The surveys comprised sniff testing undertaken in accordance with EPA guidance (AG5)[26] at a number of locations in the vicinity of the Airport, including sites adjacent to the Dublin Airport Site boundary, and sites more distant, including some within Swords. The surveys were undertaken to characterise existing odour conditions at locations near to the Dublin Airport Site boundary.

7.4.18 There are several potential sources of odour within the Dublin Airport Site and surrounding areas, including fuel storage and handling activities at the Airport and activities at other facilities in the surrounding area. During the surveys, a range of odours were identified, including some considered by the surveyors to be potentially associated with fuel vapours.

Environmental Protection Agency Monitoring Data

7.4.19 The EPA undertakes continuous air quality monitoring across Ireland, including at a number of locations in and around Dublin, which is classified as Zone A for air quality monitoring purposes. These data provide information on air quality conditions across the Dublin region and have been used to inform the Current Receiving Environment. The historical monitoring data also provide information on interannual variation in pollutant concentrations.

The most recent EPA monitoring report available at the time of assessment presents data for 2024; monitoring data for 2025 have not yet been published. Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ for the period 2020 to 2024 are presented in

[26] Environmental Protection Agency (2021). Air Guidance Note on Odour Assessment (AG5). Environmental Protection Agency, Wexford, Ireland.

7.4.20 Table 7-8 to Table 7-10 respectively.

7.4.21 Annual mean NO_2 concentrations were below the current Air Quality Standard of 40 µg/m³ at all EPA monitoring locations for the years presented. In 2024, concentrations were above the new EU Limit Value of 20 µg/m³ at four monitoring locations: St. Johns Road, Blanchardstown, Dublin Port and Pearse Street.

Table 7-8: Environmental Protection Agency Continuous NO_2 Monitoring Data

Site	Annual Mean NO_2 Concentration (µg/m^3)				
	2020[1,2]	2021[3]	2022	2023	2024
Winetavern Street	15	18.0	18.8	19.3	15.1
Davitt Road	14	15.2	16.5	17.3	15.8
St. Johns Road	30	33.2	32.5	32.1	31.1
Rathmines	13	14.4	14.2	14.8	12.8
Dun Laoghaire	14	15.5	15.6	13.4	10.7
Ballyfermot	12	13.2	12.7	13.4	13.1
Blanchardstown	12	30.6	23.9	25.4	28.6
Swords	11	11.4	12.3	10.3	9.5
Dublin Port	23	26.9	27.3	23.1	23.8
Pearse Street	27	36.1	37.5	38.8	38.2
Tallaght	14	12.6	13.5	13.8	12.1
Ringsend	18	19.2	19.1	19.2	17.5
Current Air Quality Standard	40 µg/m^3				
New EU Air Quality Limit Value	20 µg/m^3				

[1] Data only presented as whole numbers. [2] Data affected by Covid-19 pandemic. [3] Data at some locations still likely to be affected by the Covid-19 pandemic, but to a lesser degree when compared with 2020.

Table 7-9: Environmental Protection Agency Continuous PM_{10} Monitoring Data

Site	Annual Mean PM_{10} Concentration (µg/m^3)				
	2020[1,2]	2021[3]	2022	2023	2024
Winetavern Street	13	12.4	13.6	12.9	11.6
Rathmines	11	12.4	14.7	15.1	13.1
Phoenix Park	10	9.6	10.9	9.1	9.5
Blanchardstown	15	14.1	15.1	13.3	12.8
Dun Laoghaire	12	11.3	12.3	11.6	11.8
Ballyfermot	12	11.8	12.6	11.1	11.5
Tallaght	10	9.8	11.1	11.5	10.4
Ringsend	17	15.7	15.9	13.8	15.5
St. John's Road	13	13	14.6	11.9	13.2
St. Anne's Park	11	10.8	12.9	10.9	10.5
Davitt Road	15	14.0	13.4	13.3	16.8
Dublin Port	20	20.0	18.1	15.4	14.8
Finglas	12	11.8	11.7	12.3	12.4
Marino	13	12.2	13.6	11.6	12.2
Clonskeagh	N/A	10.7	11.3	10.3	11.4
Current Air Quality Standard	40 µg/m^3				
New EU Air Quality Limit Value	20 µg/m^3				

[1] Data only presented as whole numbers. [2] Data affected by Covid-19 pandemic. N/A indicates that no data is available. [3] Data at some locations still likely to be affected by the Covid-19 pandemic, but to a lesser degree when compared with 2020.

Table 7-10: Environmental Protection Agency Continuous $PM_{2.5}$ Monitoring Data

Site	Annual Mean $PM_{2.5}$ Concentration (µg/m^3)				
	2020[1,2]	2021[3]	2022	2023	2024
Rathmines	8	9.3	7.5	7.2	7.6
Phoenix Park	7	6.4	6.3	5.6	7.5
Blanchardstown	7	7.7	7.8	7.1	7.3
Dun Laoghaire	8	7.5	7.8	7.4	7.5
Ballyfermot	8	7.8	7.5	6.9	7.3
Tallaght	7	6.4	6.2	5.9	6.2
Ringsend	8	8.2	7.7	6.6	7.1
Pearse Street	8	8.4	7.8	7.4	7.9
St. John's Road	7	7.6	8.1	7.1	7.8
St. Anne's Park	7	6.9	7.8	6.5	6.4
Davitt Road	9	8.5	8.6	7.0	7.8
Dublin Port	9	8.8	8.3	7.8	7.4
Finglas	7	7.5	7.3	6.6	7.0
Marino	8	7.9	8.9	7.2	7.6
Clonskeagh	N/A	6.9	7.0	6.4	7.2
Current Air Quality Standard	20 µg/m^3				
New EU Air Quality Limit Value	10 µg/m^3				

[1] Data only presented as whole numbers. [2] Data affected by Covid-19 pandemic. N/A indicates that no data is available. [3] Data at some locations are still likely to be affected by the Covid-19 pandemic, but to a lesser degree when compared with 2020.

7.4.22 Annual mean PM_{10} and $PM_{2.5}$ concentrations across EPA monitoring locations in Zone A were below both the respective current Air Quality Standards and new EU Limit Values for the three most recent years for which data are available.

In addition to the continuous monitoring, the EPA has also undertaken passive monitoring of annual mean NO_2 concentrations at a number of roadside locations across Dublin. The most recent published data from this monitoring programme are for 2019.

7.4.23 Table 7-11 presents data for monitoring locations within or close to the air quality study area. Given the age of these data, concentrations have also been projected to 2025 using the approach set out in TII air quality guidance, to provide an indication of conditions in the Current Receiving Environment.

Table 7-11: Selected Environmental Protection Agency Passive NO_2 Monitoring Data

Site	Description	Annual Mean NO_2 Concentration ($\mu g/m^3$)	
		2019[1]	2025[2]
Coolock, Newtown	Roadside, adjacent to R139	20.9	14.4
Aulden Grange, Santry	Roadside, adjacent to M50 and R104	33.2	22.9
Clonturk Avenue	Roadside, adjacent to Drumcondra Road Upper	49.8	34.4
Creston Avenue, Ballymun	Roadside, adjacent to M50	30.7	21.2
Beachpark Avenue, Castleknock	Background, close to M50	29.8	20.6

[1] Data as presented on EPA website (https://www.epa.ie/environment-and-you/air/diffusion-tube-results).[2] 2019 data projected to 2025 using the approach set out in TII guidance, based on 2019 and 2025 annual mean data gathered at EPA continuous monitoring locations Rathmines and Swords.

7.4.24 The EPA passive monitoring data show that annual mean NO_2 concentrations in 2019 exceeded the current Air Quality Standard of 40 µg/m³ at one location, adjacent to Drumcondra Road, approximately 5 km south of the Airport. Concentrations were also above the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³ at this location and at three other locations close to the M50. When projected to represent conditions in 2025, concentrations are below the current Air Quality Standard at all five locations, although four remain above the new EU Air Quality Directive (2024/2881) Limit Value. The EPA passive monitoring sites are located immediately adjacent to busy and, in some cases, congested sections of road, with the nearest residential receptors generally set further back from these roads.

Environmental Protection Agency Licensed Facilities

7.4.25 Sites permitted to operate under licence by the EPA in the vicinity of Dublin Airport (within 5 km) are listed as follows:

- P0480-02 – Dublin Aerospace Limited, Dublin Airport, Dublin
- P0921-01 – International Aerospace Coatings Limited, Hangar 3, Dublin Airport, Dublin
- P0014-04 – Sk Biotek Ireland Limited, Watery Lane, Swords, Dublin – 3.5km to the north-northeast
- P0060-01 – Arch Chemicals BV, Watery Lane, Swords, Dublin – 3.5km to the north-northeast
- P0075-03 – Burgess Galvin and Company Limited, Jamestown Road, Finglas, Dublin – 2.5km to the south-southwest
- P0306-04 – Forest Laboratories Ireland Limited, Clonshaugh Industrial Estate, Coolock, Dublin 17, Dublin – 2km to the southeast
- P0483-04 and P1194-01 – Huntstown Power Company Limited, Huntstown, Finglas, Dublin 11, Dublin, 2km to the west
- P1106-01 – MSD Ireland (Biotech Dublin), Cruiserath Road, Mulhuddart, Dublin 15, Dublin – 5km to the west
- P0777-01 – Viridian Power Limited, Huntstown, Finglas, Dublin 11, Dublin – 2km to the west
- P0809-01 – Mondelez Ireland Production Limited, Malahide Road, Coolock, Dublin 5, Dublin – 4km to the southeast
- P0993-01 – Huntstown Bioenergy Limited, Huntstown, North Road, Finglas, Dublin 11, Dublin – 5km to the southeast
- W0039-02 – Starrus Eco Holdings Limited, Cappagh Road, Finglas, Dublin 11, Dublin, 3km to the southwest

7.4.26 These facilities have the potential to contribute to pollutant concentrations at sensitive receptors within the study area. Their emissions have not been explicitly included in the dispersion modelling; rather, their contribution to ambient air quality is assumed to be represented within the background concentration data derived from EPA monitoring[Error! Bookmark not defined.]. This is a standard assessment approach for considering additional emissions sources which are not directly associated with the Principal Assessment.

Modelled Current Receiving Environment – Local Air Quality

7.4.27 In addition to the monitoring data described above, dispersion modelling has been used to inform the Current Receiving Environment at specific receptor locations. The modelling represents the 2025 Current Operation (36.4 mppa) and is informed by the data outlined in Section 7.3.6 of this chapter.

7.4.28 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ for the Current Receiving Environment are presented in Appendix 7-3. Pollutant concentrations and deposition rates have also been predicted at sensitive nature conservation receptors within the study area. These results are also presented in Appendix 7-3 and are considered further in Chapter 12: Biodiversity.

7.4.29 Appendix 7-3 shows that all receptors considered in the assessment experience annual mean NO_2 concentrations that are well below the current National Air Quality Standard for that pollutant (40 µg/m^3). The maximum concentration predicted for this scenario amounts to 81% of that standard.

7.4.30 There are, however, 34 modelled receptors at which annual mean NO_2 concentrations are predicted to exceed the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³. The highest concentration predicted for the existing baseline is 32.5 µg/m³ at receptor R078, located close to the M50, approximately 8 km southwest of the Airport. All receptors at which annual mean NO_2 concentrations are predicted to exceed the new EU Air Quality Directive (2024/2881) Limit Value are located close to the Dublin Airport Site boundary or adjacent to motorways and regional roads experiencing high traffic flow.

7.4.31 For annual mean PM_{10}, the highest predicted concentration is 18.2 µg/m³ at receptor R011, located closest to the northern Dublin Airport Site boundary. This is below both the current National Air Quality Standard of 40 µg/m³ and the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³. The highest predicted annual mean $PM_{2.5}$ concentration, also at receptor R011, is 11.9 µg/m³. This is below the current National Air Quality Standard of 20 µg/m³ but exceeds the new EU Air Quality Directive (2024/2881) Limit Value of 10 µg/m³.

Predicted Odour Conditions

7.4.32 Odour conditions in the Current Receiving Environment have been predicted by modelling total HC emissions from airside sources and applying odour emission factors of 57 OUE/mgHC and 110 OUE/mgHC, based on published research undertaken at Copenhagen Airport. The predicted odour concentrations for the Current Receiving Environment are presented in Appendix 7-3: Modelled Results.

7.4.33 The highest predicted odour concentration at a residential receptor in the Current Receiving Environment occurs at receptor R006, the residential property closest to the North Runway and Airport terminal areas. The predicted concentration is 1.6 OUE/m³ using the recommended odour emission factor and 3.1 OUE/m³ using the precautionary odour emission factor. The former is below the 3 OUE/m³ criterion used to indicate when aviation fuel odour may become offensive, while the latter is marginally above this criterion.

Existing Environmental Design and Management

7.4.34 Existing environmental design and management measures relevant to air quality are incorporated within the traffic management and climate change measures described in Chapter 6: Material Assets (Traffic and Transport) and Chapter 13: Climate.

7.4.35 Measures that reduce traffic flows on the local road network can benefit air quality through reduced vehicle emissions. Measures that reduce greenhouse gas emissions can also benefit air quality where they result in reduced combustion emissions of pollutants relevant to human health and nature conservation.

7.5 Future Receiving Environment

7.5.1 This section describes the anticipated evolution of the air quality environment from the Current Receiving Environment to the 2029 Future Receiving Environment, taking account of changes expected to occur irrespective of the Proposed Order. This includes the projected 2029 background air quality conditions used consistently in the modelling of the 2029 Permitted and Proposed Operations.

2029 Background Air Quality Concentrations

7.5.2 Predicted future pollutant concentrations comprise contributions from the modelled sources, including airside activities, surface access transport, car parks and the energy centre, together with background contributions from other local and more distant sources.

7.5.3 Background pollutant concentrations are used to represent emission sources which are not included within the dispersion model but contribute to ambient air quality within the study area. Background pollutant concentrations from the Swords continuous monitoring station have been used within the assessment. This continuous monitoring station is located approximately 3 km north of the Dublin Airport Site and is therefore unlikely to be influenced by emission sources relating to Dublin Airport. Therefore, the future pollutant concentrations are not influenced by the current operating conditions at the Dublin Airport Site, as all emission sources relating to Dublin Airport have been explicitly modelled, with background concentrations only accounting for emission sources unrelated to Dublin Airport.

7.5.4 Background pollutant concentrations are expected to reduce over time as a result of factors including decarbonisation of the transport and energy sectors and changes in the vehicle fleet as older vehicles are replaced by newer, less polluting vehicles.

7.5.5 To account for these anticipated reductions, TII air quality guidance provides projection factors based on a realistic worst-case scenario for use in deriving future background concentrations. From the Current Receiving Environment year of 2025 to the Principal Assessment year of 2029, the projection factor for annual mean NO_2 is 0.889, representing a reduction of 11.1%. The corresponding factors for PM_{10} and $PM_{2.5}$ are 0.968 and 0.951, representing reductions of 3.2% and 4.9%, respectively.

7.5.6 Annual mean NO_2 concentrations monitored at the nearest EPA continuous background monitoring station, at Swords, decreased by 0.5 µg/m³ between 2020 and 2025, although concentrations increased by 1.0 µg/m³ between 2024 and 2025. PM_{10} and $PM_{2.5}$ monitoring data at Swords are available only for 2024 and 2025. Over this period, annual mean PM_{10} and $PM_{2.5}$ concentrations increased by 0.98 µg/m³ and 0.42 µg/m³, respectively.

7.5.7 In light of the anticipated reductions in background concentrations projected by TII guidance, and the overall reduction in monitored NO_2 concentrations at the nearest EPA background monitoring station at Swords, the annual mean concentration measured at that site in the Current Receiving Environment year of 2025 has been projected to 2029 using the TII projection factors. The 2025 annual mean NO_2 concentration of 10.5 µg/m³ is projected to reduce to 9.3 µg/m³ in 2029. The 2025 annual mean PM_{10} and $PM_{2.5}$ concentrations of 11.2 µg/m³ and 6.8 µg/m³ are projected to reduce to 10.9 µg/m³ and 6.4 µg/m³, respectively.

7.5.8 The use of the most recent available background monitoring data is considered more appropriate than adopting 2023 concentrations because these data are used to represent background contributions from sources that are not explicitly modelled and therefore provide the best available representation of current background air quality. Airport-related emissions, including those from aircraft and other airside sources, surface-access traffic, car parks and the energy centre, are modelled separately for the 2029 Permitted Operation and 2029 Proposed Operation and are therefore not carried into the assessment through the background concentration. The EPA monitoring station at Swords is sufficiently removed from the Airport and major airport-related emission sources that it is not materially influenced by airport operations, including surface-access traffic.

2029 Permitted Operation - Predicted Local Air Quality

7.5.9 This section describes predicted air quality conditions at modelled sensitive receptors for the 2029 Permitted Operation (32 mppa). The modelling combines the operational source inputs for the 2029 Permitted Operation with the 2029 future background air quality conditions described above. Modelled predictions are informed by the data outlined in paragraph 7.3.6 of this chapter.

7.5.10 Air quality conditions have also been predicted at sensitive nature conservation receptors within the study area. These results are presented in Appendix 7-3: Modelled Results and considered further in Chapter 12: Biodiversity.

7.5.11 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ for the Future Receiving Environment are presented in Appendix 7-3: Modelled Results and summarised in the following paragraphs.

7.5.12 Annual mean NO_2 concentrations at all receptors considered in the assessment are predicted to be below the current National Air Quality Standard of 40 µg/m³, as presented in Table 7-1. The highest predicted concentration is equivalent to 58% of the current Air Quality Standard.

7.5.13 There are, however, 12 modelled receptors at which annual mean NO_2 concentrations are predicted to exceed the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³. These receptors comprise properties close to the Dublin Airport Site boundary and a limited number of properties in close proximity to the M50 motorway.

7.5.14 At Forest Little and Forest Great, immediately north of the Airport's North Runway, annual mean NO_2 concentrations are predicted to peak at 23.2 µg/m³ at the properties closest to the Dublin Airport Site boundary (R010 and R011). At receptors set further back from the Dublin Airport Site boundary (R012, R014 and R018), predicted concentrations reduce to below the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³, at 19.4 µg/m³ or less.

7.5.15 At locations east of the Airport, adjacent to the R132 Swords Road and its junction with Corballis Road South (R001, R002 and R004), annual mean NO_2 concentrations are predicted to reach 23.1 µg/m³. Concentrations at these locations reflect the combined contribution of airside sources, including the nearby Airport cargo terminal, and landside sources associated with the R132 and Airport car parks.

7.5.16 Annual mean NO_2 concentrations above the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³ are also predicted at receptors further south on the R132, south of the junction with Old Airport Road (R003), and further north on the R132, near the junction with the L2300 on the approach to Swords (R047 and R048). Concentrations above the Limit Value are also predicted at receptors on Old Airport Road (R008 and R009), near its junction with the R108.

7.5.17 Receptors more distant from the Airport but in close proximity to the M50 (R070 and R078) are also predicted to experience annual mean NO_2 concentrations above the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³, with concentrations of up to 22.6 µg/m³. At locations further from the M50, predicted concentrations reduce to below the Limit Value, at 19.4 µg/m³ or less.

7.5.18 At all other receptors, annual mean NO_2 concentrations are predicted to be below the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³. This includes isolated properties immediately west of the Airport, between the two runways, properties at St Margaret's, and receptors adjacent to the M1 and M50 motorways, with the exception of R070 and R078 immediately adjacent to the M50.

7.5.19 Annual mean PM_{10} and $PM_{2.5}$ concentrations in the Future Receiving Environment are predicted to be below the current National Air Quality Standards of 40 µg/m³ and 20 µg/m³, respectively, at all receptors. Predicted annual mean PM_{10} concentrations are also below the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³, with a maximum concentration of 18.2 µg/m³ at receptor R078, adjacent to the M50. However, the predicted annual mean $PM_{2.5}$ concentration at R078 is 10.6 µg/m³, exceeding the new EU Air Quality Directive (2024/2881) Limit Value of 10 µg/m³.

7.5.20 With reference to the annual mean proxy concentrations set out in TII air quality guidance to identify the potential for exceedances of the new short-term EU Air Quality Directive (2024/2881) Limit Values (i.e. those with an averaging period of 24 hours or less), only the 24-hour mean $PM_{2.5}$ Limit Value is identified as being at risk of exceedance in the Future Receiving Environment. This occurs at receptor R078 adjacent to the M50, where the predicted annual mean $PM_{2.5}$ concentration is slightly above the 10.4 µg/m³ proxy concentration specified in the guidance.

2029 Predicted Odour Conditions

7.5.21 Odour conditions in the Future Receiving Environment have been predicted by modelling total HC emissions from airside sources and applying odour emission factors of 57 OUE/mgHC and 110

OUE/mgHC, based on published research undertaken at Copenhagen Airport. The predicted odour concentrations for the Future Receiving Environment are presented in Appendix 7-3: Modelled Results.

7.5.22 The highest predicted odour concentration at a residential receptor in the Future Receiving Environment occurs at receptor R006, the residential property closest to the North Runway and Airport terminal areas. The predicted concentration is 1.7 OUE/m³ using the recommended odour emission factor and 3.2 OUE/m³ using the precautionary odour emission factor. The former is below the 3 OUE/m³ criterion used to indicate when aviation fuel odour may become offensive, while the latter is marginally above this criterion.

7.5.23 At all other residential receptors, predicted odour concentrations are below 3 OUE/m³, including with the application of the precautionary odour emission factor.

7.6 Assessment of Likely Significant Effects

Predicted Local Air Quality

7.6.1 This section describes predicted air quality conditions at modelled sensitive receptors for the 2029 Proposed Operation (40 mppa). The modelling combines the operational source inputs for the Proposed Operation with the same 2029 future background air quality conditions used for the 2029 Permitted Operation. Modelled predictions are informed by the data outlined in paragraph 7.3.6 of this chapter.

7.6.2 Air quality effects have been assessed at sensitive nature conservation receptors within the study area. These results are presented in Appendix 7-3: Modelled Results and considered further in Chapter 12: Biodiversity. Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ at human health receptors for the 2029 Proposed Operation are also presented in Appendix 7-3: Modelled Results and summarised in the following paragraphs.

7.6.3 Annual mean NO_2 concentrations at all receptors considered in the assessment are predicted to be below the current National Air Quality Standard of 40 µg/m³ for the 2029 Proposed Operation. The highest predicted concentration is equivalent to 64% of the current Air Quality Standard.

7.6.4 There are, however, 17 modelled receptors at which annual mean NO_2 concentrations are predicted to exceed the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³ for the 2029 Proposed Operation. These receptors comprise properties close to the Dublin Airport Site boundary and a limited number of properties in close proximity to the M50 motorway. Of these 17 receptors, 12 are already predicted to exceed the Limit Value for the 2029 Permitted Operation.

7.6.5 At Forest Little and Forest Great, the community located immediately to the north of the Airport's North Runway, predicted annual mean NO_2 concentrations peak at 25.5 µg/m^3 at the property closest to the Dublin Airport Site boundary (R010), with the Proposed Order in place. This represents an increase of 2.3 µg/m^3 when comparing the 2029 Proposed Operation with the 2029 Permitted Operation. Other receptors (R011 and R012) within this community are also predicted to experience concentrations which exceed the new EU Air Quality Directive (2024/2881) Limit Value for the 2029 Permitted Operation, with predicted concentrations of 22.2 µg/m^3 and 21.2 µg/m^3, respectively. At receptor R011, predicted concentrations do not also exceed the new EU Air Quality Directive (2024/2881) Limit Value for the 2029 Permitted Operation. At the receptors in that community which are set further back from the Dublin Airport Site boundary (R014 and R018), concentrations are predicted to be below the Limit Value (18.3 µg/m^3 or less).

7.6.6 At receptors east of the Airport, adjacent to the R132 Swords Road and its junction with Corballis Road South (R001, R002, R004 and R006), annual mean NO_2 concentrations are predicted to range from 20.3 µg/m³ to 24.6 µg/m³, representing increases of between 1.2 µg/m³ and 1.5 µg/m³ as a result of the Proposed Order. Concentrations at these locations reflect the combined contribution of airside sources, including the nearby Airport cargo terminal, and landside sources associated with the R132 and Airport car parks.

7.6.7 Annual mean NO_2 concentrations above the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³ are also predicted at receptors further south on the R132, south of the junction with Old Airport Road (R003), further north on the R132 near the junction with the L2300 on the approach to Swords (R047 and R048), and on Old Airport Road near its junction with the R108 (R008 and R009). At these locations,

predicted concentrations range from 21.8 µg/m³ to 24.1 µg/m³, representing increases of between 0.8 µg/m³ and 1.8 µg/m³ as a result of the Proposed Order.

7.6.8 Receptors in close proximity to the M50 motorway (R070 and R078) and M1 motorway (R050 and R083) are predicted to experience annual mean NO_2 concentrations of up to 22.9 µg/m³, representing increases of between 0.3 µg/m³ and 0.9 µg/m³ as a result of the Proposed Order.

7.6.9 The Proposed Order results in five additional receptors exceeding the new EU Air Quality Directive (2024/2881) Limit Value for annual mean NO_2: one receptor on Old Stockhole Lane (R006), two receptors adjacent to the M1 (R050 and R083), and two receptors close to the Dublin Airport Site boundary (R012 and R023). At these receptors, annual mean NO_2 concentrations for the 2029 Proposed Operation range from 20.3 µg/m³ to 21.2 µg/m³, representing increases of up to 1.8 µg/m³ compared with the 2029 Permitted Operation.

7.6.10 At all other receptors, annual mean NO_2 concentrations are predicted to be below the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³. This includes isolated properties immediately west of the Airport, between the two runways, properties at St Margaret's, and most receptors adjacent to the M1 and M50 motorways. At some locations, including receptors close to the Dublin Airport Site boundary and along the M1 and M50, predicted concentrations are within 10% of the Limit Value.

7.6.11 Annual mean PM_{10} and $PM_{2.5}$ concentrations for the 2029 Proposed Operation are predicted to be below the current National Air Quality Standards of 40 µg/m³ and 20 µg/m³, respectively, at all receptors. Predicted annual mean PM_{10} concentrations are also below the new EU Air Quality Directive (2024/2881) Limit Value of 20 µg/m³, with a maximum concentration of 18.3 µg/m³ at receptor R078, adjacent to the M50. At the same receptor, the predicted annual mean $PM_{2.5}$ concentration is 10.7 µg/m³, exceeding the new EU Air Quality Directive (2024/2881) Limit Value of 10 µg/m³ and representing an increase of 0.1 µg/m³ compared with the 2029 Permitted Operation.

7.6.12 With reference to the annual mean proxy concentrations set out in TII air quality guidance to identify the potential for exceedances of the new short-term EU Air Quality Directive (2024/2881) Limit Values (i.e. those with an averaging period of 24 hours or less), receptors at Forest Little and Forest Great are identified as being at risk of exceeding the 24-hour mean NO_2 Limit Value, with a predicted annual mean concentration just above the 25 µg/m³ proxy concentration. Receptor R078, adjacent to the M50, is identified as being at risk of exceeding the 24-hour mean $PM_{2.5}$ Limit Value, with a predicted annual mean $PM_{2.5}$ concentration just above the 10.4 µg/m³ proxy concentration.

Odour Impacts

7.6.13 Odour conditions for the 2029 Proposed Operation have been predicted by modelling total HC emissions from airside sources and applying odour emission factors of 57 OUE/mgHC and 110 OUE/mgHC, based on published research undertaken at Copenhagen Airport. Predicted odour concentrations are presented in Appendix 7-3: Modelled Results.

7.6.14 The highest predicted odour concentration at a residential receptor for the 2029 Proposed Operation occurs at receptor R006, the residential property closest to the North Runway and Airport terminal areas. The predicted concentration is 1.9 OUE/m³ using the recommended odour emission factor and 3.6 OUE/m³ using the precautionary odour emission factor. These represent increases of 0.2 OUE/m³ and 0.4 OUE/m³, respectively, compared with the 2029 Permitted Operation. Using the recommended odour emission factor, the predicted concentration remains below the 3 OUE/m³ criterion used to indicate when aviation fuel odour may become offensive.

7.6.15 Using the precautionary odour emission factor, predicted odour concentrations exceed the 3 OUE/m³ criterion at six modelled receptors (R001, R002, R006, R007, R010 and R026), compared to one receptor (R006) in the 2029 Permitted Operation. All six receptors are located close to the Dublin Airport Site boundary and/or the Airport fuel farm.

7.6.16 At all other residential receptors, predicted odour concentrations are below 3 OUE/m³, including with the application of the precautionary odour emission factor.

Assessment of Significance

7.6.17 With reference to the current National Air Quality Standards, the impact of the Proposed Order on annual mean NO_2 concentrations ranges from neutral to slight adverse at the receptors considered in the assessment, while the impact on annual mean PM_{10} and $PM_{2.5}$ concentrations is neutral. In accordance with TII guidance, the highest total concentrations are less than 75% of the relevant Air Quality Standard and the change in concentration from the 2029 Permitted Operation as a result of the 2029 Proposed Operation is less than 10% of the relevant Standard. The resulting effect is therefore Slight Adverse and Not Significant at most.

7.6.18 With reference to the new EU Air Quality Directive (2024/2881) Limit Value for annual mean NO_2 of 20 µg/m³, the impact of the Proposed Order ranges from neutral to substantial adverse. The assessment identifies 12 discrete receptor locations at which the impact is substantial adverse and 18 discrete receptor locations at which the impact is moderate adverse. These impact classifications reflect the magnitude of the change in pollutant concentration from the 2029 Permitted Operation as a result of the Proposed Order and the total predicted concentration relative to the new Limit Value.

7.6.19 The receptors experiencing these levels of impact are predominantly properties close to the Airport, where the contribution from airside emission sources is dominant either alone or in combination with adjacent landside sources, including the nearby public road network. The change in concentration at these locations is predominantly attributable to additional airside emissions associated with the Proposed Order. A receptor close to the M50 and remote from the Airport experiences a similar level of impact, principally due to high traffic volumes and its proximity to road traffic emissions.

7.6.20 All 12 receptors predicted to experience a substantial adverse impact are also predicted to exceed the new EU Air Quality Directive (2024/2881) Limit Value for annual mean NO_2 of 20 µg/m³ under the 2029 Proposed Operation. A further 18 receptors are predicted to experience a moderate adverse impact. At two of these receptors (R006 and R083), the increase in concentration as a result of the Proposed Order results in an exceedance of the new Limit Value.

7.6.21 With reference to the new EU Air Quality Directive (2024/2881) Limit Values for annual mean PM_{10} and $PM_{2.5}$, the impact of the Proposed Order ranges from neutral to slight adverse. In accordance with TII guidance (Transport Infrastructure Ireland, 2025), the highest total concentrations are less than 95% of the relevant Limit Values, and the change in concentration is less than 6% of the relevant Limit Value. This equates to a slight adverse impact at most.

7.6.22 TII air quality guidance states that the determination of whether an effect is significant is a matter of professional judgement. While an assessment may identify moderate or substantial adverse impacts at one or more receptors, this does not necessarily mean that the overall effect is significant, having regard to the circumstances of the assessment and other relevant factors.

7.6.23 On the basis of professional judgement and having regard to the factors set out below, the air quality effects of the Proposed Order are considered to be Not Significant. This determination is based on a number of factors that are likely to overestimate future concentrations and the impact of the Proposed Order.

7.6.24 The assessment of significance is in part based on the change in concentration at receptor locations between the 2029 Permitted Order (32 mppa) and the 2029 Proposed Order (40 mppa). It is important to note that the Permitted Order modelled in this assessment is not based on simply carrying forward the higher level of airport activity already experienced after 2023, noting the 2025 current receiving environment (36.4 mppa). The 32 mppa Permitted and 40 mppa Proposed cases are modelled separately using their respective future operational inputs, while the same future background conditions are applied to both. The resulting difference therefore reflects the change attributable to the Proposed Order rather than embedding post-2023 airport growth within the Permitted case. The chapter also adopts a number of precautionary assumptions intended to avoid underestimation, as listed below.

- The busy day schedule is assumed to occur all year round. The busy day schedule represents a typical peak day of airside activity and emissions, not an average day. The Department for Transport outlines the number of commercial flights at Dublin Airport in the State Airport Aviation Statistics[27]. A comparison of the number of commercial ATMs assumed using a busy day

[27] Department for Transport. (2023). State Airport Aviation Statistics.

schedule compared to the reported number of commercial ATMs in the same year indicates that the use of the busy day schedule overestimates the number of commercial ATMs by ~14%. The number of cargo ATMs is not provided by the Department of Transport; therefore, a comparison of these flights cannot be made.

- Whilst the type of aircraft is accurately represented in the airside modelling, the exact engine on each aircraft varies, and it is impracticable to be accurate on engine mix to inform the modelling. The assessment has therefore assumed the engine with the worst-case NO_X emissions factors for each class of aircraft. On average, the worst-case NOx emission factor is ~38% higher than the average NO_x emission factor for the same engine. Therefore, in reality, the majority of aircraft will have engines with lower NO_X emission factors than those assumed.
- The database of aircraft emissions factors available and used to inform the assessment is based on the current aircraft fleet and associated engines and emissions. The assessment of future years does not account for any future evolution of the aircraft fleet, which will see a reduction in emissions as emissions technology improves and newer aircraft enter the fleet.
- The usage of GSE and APU is based on existing usage reported by daa. NO_X emissions factors for these sources are based on precautionary defaults provided by the AEDT modelling software. APU usage is expected to reduce substantially in future years as the Airport expands its use of Fixed Electrical Ground Power. NOx emissions from GSE are also expected to reduce as the GSE fleet is progressively decarbonised. If the GSE fleet is fully decarbonised and the use of APUs is phased out by the year of opening, the NOx emissions from these sources would be significantly reduced.

7.6.25 The determination of effects being Not Significant is also informed by the following factors:

- With reference to the current National Air Quality Standards, impacts on annual mean PM_{10} and $PM_{2.5}$ concentrations are neutral at all sensitive receptor locations considered in the assessment, while impacts on annual mean NO_2 concentrations range from neutral to slight adverse. These effects are Not Significant.
- With reference to the new EU Air Quality Directive (2024/2881) Limit Values, impacts on annual mean PM_{10} and $PM_{2.5}$ concentrations range from neutral to slight adverse and are Not Significant.
- There is no identified risk of exceedance of the new EU hourly mean NO_2 Limit Value, and only a limited risk of exceedance of the 24-hour mean NO_2 and $PM_{2.5}$ Limit Values as a result of the Proposed Order.
- Moderate to substantial adverse impacts in relation to the new EU Air Quality Directive (2024/2881) annual mean NO_2 Limit Value are limited to a relatively small number of receptors, predominantly close to the Airport and the R132, or adjacent to the M50.
- Of these receptors, 12 are already predicted to exceed the new annual mean NO_2 Limit Value in the 2029 Permitted Operation, prior to the effect of the Proposed Order.
- Background NO_2 concentrations are projected by TII guidance to continue to decrease beyond 2029, with a projected reduction of approximately 20% between 2029 and 2040.
- Although concentrations at a limited number of receptors are predicted to exceed the new EU Air Quality Directive (2024/2881) annual mean NO_2 Limit Value, predicted concentrations for the 2029 Proposed Operation are lower than those in the Current Receiving Environment and remain below the current National Air Quality Standard, with all predicted concentrations below 26 µg/m³.
- The impacts reported for this assessment, when considered against current National Air Quality Standards for annual mean PM_{10} and annual mean $PM_{2.5}$, are neutral at all sensitive locations represented by the receptors considered. When considered against current National Air Quality Standards for annual mean NO_2, the impact ranges from neutral to slight adverse. The effect of these impacts would not be significant.

7.6.26 The points above, particularly those regarding the precautionary assumptions on airside emissions, have caused the over-estimation of total pollutant concentrations in the 2029 Permitted Operation and 2029 Proposed Operation scenarios and the change in concentration due to the 2029 Proposed Operation.

7.6.27 The effect of the Proposed Order on odour is considered to be Not Significant. Using the recommended odour emission factor identified in the published research, no residential receptor is predicted to

experience an odour concentration above the 3 OUE/m³ criterion used to indicate when aviation fuel odour may become offensive, and the maximum increase in odour concentration as a result of the Proposed Order is 0.2 OUE/m³. Using the precautionary odour emission factor, six receptors are predicted to experience concentrations above 3 OUE/m³, three of which are already predicted to exceed this criterion in the 2029 Permitted Operation. The maximum increase in odour concentration as a result of the Proposed Order using the precautionary emission factor is 0.4 OUE/m³.

7.7 Mitigation and Monitoring

7.7.1 No specific mitigation is required in relation to the Proposed Order, as the air quality effects identified in Section 7.6 are Not Significant. Notwithstanding this and as introduced in Paragraph 7.4.34 and Paragraph 7.4.35, daa is implementing measures to reduce combustion emissions as part of its wider decarbonisation programme, which will also reduce emissions of air pollutants. These measures include the continued reduction in APU usage through increased use of Fixed Electrical Ground Power, electrification of the GSE fleet and measures to reduce emissions from the Airport's energy centres through increased use of renewable energy.

7.7.2 These measures are expected to reduce emissions of NOx, PM_{10} and $PM_{2.5}$ and, in turn, reduce the Airport's contribution to ambient concentrations of NO_2, PM_{10} and $PM_{2.5}$, particularly at receptors closest to the Dublin Airport Site boundary. The extent of the reduction cannot, however, be reliably quantified. Aircraft emissions remain the principal contributor to airside emissions, with emissions from APUs and GSE representing a considerably smaller proportion.

7.7.3 Opportunities to reduce aircraft emissions include technological improvements in engine efficiency and modernisation of the aircraft fleet, which are outside daa's direct control. Measures within the Airport's influence include maximising the efficiency of aircraft ground movements, minimising idling and taxiing times, and reducing congestion.

7.7.4 daa currently undertakes a comprehensive air quality monitoring programme, including on-site EU reference-method monitoring of NO_2, PM_{10} and $PM_{2.5}$, and on-site and off-site passive monitoring of NO_2 and C_6H_6. This monitoring programme will continue and will be used to compare measured concentrations against the relevant air quality standards.

7.7.5 With regard to odour, daa will continue to undertake the storage and handling of aviation fuel in accordance with best practice to minimise the potential for odour emissions.

7.8 Residual Effects

Residual Effects on Local Air Quality

7.8.1 The measures described in Section 7.7 are not relied upon as mitigation in determining the significance of the effects of the Proposed Order. Their effect on predicted air quality concentrations has therefore not been quantified.

7.8.2 The residual effects of the Proposed Order are therefore the same as those reported in Section 7.6.

7.8.3 The Proposed Order is predicted to contribute to exceedances of the new EU Air Quality Directive (2024/2881) Limit Value for annual mean NO_2 at a limited number of receptors, including five additional receptors at which an exceedance is not predicted for the 2029 Permitted Operation. For the reasons set out in Section 7.6, the residual air quality effects of the Proposed Order are considered to be Not Significant.

Residual Effects on Odour

7.8.4 No specific mitigation measures are required in relation to odour, as the effects of the Proposed Order on odour are considered to be Not Significant.

7.8.5 daa will continue to undertake the storage and handling of aviation fuel in accordance with best practice to minimise the potential for odour emissions.

7.8.6 The residual effects of the Proposed Order on odour are therefore considered to be Not Significant.

7.9 Cumulative Effects

7.9.1 This section assesses the potential effects of the Proposed Order in combination with the potential effects of other proposed and committed plans and projects (referred to as 'cumulative schemes') within the Dublin Airport Site and the surrounding area. The cumulative schemes which have been considered in combination with the Proposed Order are listed in Chapter 20: In-combination and Cumulative Effects.

7.9.2 Cumulative effects on air quality have the potential to arise from emissions associated with other developments that are reasonably foreseeable and would be present in the Future Receiving Environment alongside the Proposed Order.

7.9.3 Cumulative effects could arise where the construction or operation of another development introduces a new source of emissions or results in changes to traffic flows on the local road network, affecting sensitive receptors also affected by the Proposed Order. Where other developments are unlikely to introduce notable on-site emissions or result in notable changes in traffic flows, their contribution to cumulative effects would be negligible.

7.9.4 Other developments within or close to the Airport are likely to have the greatest potential to contribute to cumulative effects, due to their proximity to the emissions sources associated with the Proposed Order and to the most affected air quality sensitive receptors. The relevant other developments within, intersecting or close to the Airport are listed below:

- F24A/0309E: Development of two landside sites (Site A (c. 1.36ha) (including part of the existing Ground Transportation Centre, Atrium Road 1, and Terminal 1 Multi-Storey Car Park (MSCP)) and Site B (c. 1.64ha) (part of the existing Express Red Long-Term Car Park)), in the townlands of Collinstown, Corballis, Rock, Stockhole, and Toberbunny, Dublin Airport, Co. Dublin – Permission has been granted for this application.
- F20A/0668: Development comprising the taking of a ‘relevant action’ relating to the night-time use of the runway system at Dublin Airport – Permission has been granted for this application.
- F23A/0781: The project comprises 11 elements including junction improvements, new surface car park north, extension of existing long term red car park, reconfiguration of the existing ground transportation centre hub, upgrades to the existing airfield drainage project, new apron 7 and associated works, extension of existing terminal 1 level 30 mezzanine, South Apron and associated works, North Apron and associated works.
- ACP – 314724: Metrolink Railway Project - Estuary to Charlemont via Dublin Airport.
- ACP – 312131: Greater Dublin Drainage Project consisting of a new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility – Permission has been granted for this application.
- ACP – 318677: SID - 110kV Air Insulated Switchgear (AIS) tail-fed substation compound, combined with a 110kV underground cable connection to Finglas.
- ACP – 317121: Swords to City Centre Core Bus Corridor Scheme.
- FW25A/0055E: The construction of 5 no. light industrial / warehouse (including wholesale use) / logistics units at Horizon Logistics Park.
- FW23A/0067: Further development of land at Horizon Logistics Park for light industrial / warehouse / logistics use.
- FW23A/0278: Further development of land at Horizon Logistics Park for light industrial / warehouse / logistics use.
- FW21A/0180: Further development of land at Horizon Logistics Park for light industrial / warehouse / logistics use - Permission has been granted for this application.

7.9.5 Other more distant developments are less likely to contribute to cumulative effects, although changes in traffic flows associated with these developments have the potential to affect air quality at receptors on the local road network.

7.9.6 The review of the developments listed above, together with the more distant developments, indicates that their potential contribution to cumulative air quality effects during construction, where applicable, and

operation would principally arise through changes in traffic flows on the local road network. The exception is application F20A/0668, which relates to the night-time use of the runway system at Dublin Airport. This application does not seek to increase the Airport's existing passenger throughput limit but is anticipated to increase the number of annual ATMs by up to 5%[28]. This is expected to have a limited effect on local air quality.

7.9.7 For other developments with the potential to affect traffic flows on the local road network, the traffic data used to inform the air quality assessment account for forecast traffic growth between the Current Receiving Environment year of 2025 and the Future Receiving Environment year of 2029, including traffic associated with cumulative developments. The predicted pollutant concentrations for the 2029 Permitted Operation and the 2029 Proposed Operation therefore inherently account for these cumulative traffic effects.

7.10 Indirect, Secondary and Transboundary Effects

7.10.1 Indirect and secondary effects are described in the EPA Guidelines as "effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway". Transboundary effects are those affecting another state or jurisdiction. The potential for indirect, secondary and transboundary air quality effects has been considered in this assessment, and no significant effects have been identified. The effects identified in this chapter are direct effects and are not considered to have the potential to result in significant indirect or secondary effects. The study area described in Section 7.3: Methodology does not extend to another state or jurisdiction and, therefore, no significant transboundary effects are predicted.

7.11 Supporting Assessments and Interpretation

7.11.1 Three Supporting Assessments have been considered for air quality to provide additional context to assist interpretation of the Principal Assessment. The Supporting Assessments do not determine likely significant effects, identify additional mitigation measures or alter the residual effects reported for the Principal Assessment.

Supporting Assessment 1: 2023 Baseline Operation (32.0 mppa) vs 2029 Proposed Operation (40.0 mppa)

7.11.2 Supporting Assessment 1 provides context on the overall change in air quality between the 2023 Baseline Operation (32.0 mppa) and the 2029 Proposed Operation (40.0 mppa).

7.11.3 Pollutant concentrations for the 2023 Baseline Operation (32.0 mppa) are likely to be higher than those predicted for the 2029 Permitted Operation (32.0 mppa), for the following reasons:

- Available EPA monitoring data for 2023 and 2024 indicate that concentrations have generally remained stable or decreased, providing broad support for the projected longer-term reduction in background concentrations. TII air quality guidance indicates reductions over this period of 15.5% for background NOx concentrations, 5.6% for PM_{10} and 9.1% for $PM_{2.5}$.
- Vehicle emission factors are expected to decrease between 2023 and 2029 as older, more polluting vehicles are progressively replaced by newer, less polluting vehicles.
- The aircraft schedule for the 2023 Baseline Operation reflects the 2023 aircraft fleet, whereas the 2029 Permitted Operation reflects the forecast 2029 aircraft fleet. Fleet evolution between 2023 and 2029 is expected to result in newer, less polluting aircraft replacing some older, more polluting aircraft.

7.11.4 The change in pollutant concentrations between the 2023 Baseline Operation and the 2029 Proposed Operation is therefore expected to be lower than the change identified through the Principal Assessment. This is because pollutant concentrations for the 2023 Baseline Operation are expected to be higher than those predicted for the 2029 Permitted Operation, while concentrations for the 2029 Proposed Operation

[28] daa. (2021). Dublin Airport North Runway Relevant Action Application – Environmental Impact Assessment Report Volume 2 – Main Report.

remain unchanged. Supporting Assessment 1 therefore provides additional context to the findings of the Principal Assessment.

Supporting Assessment 2: 2025 Current Operation (36.4 mppa) vs 2029 Proposed Operation (40.0 mppa)

7.11.5 Supporting Assessment 2 provides context on the change in air quality between the 2025 Current Operation (36.4 mppa) and the 2029 Proposed Operation (40.0 mppa).

7.11.6 The impact of Supporting Assessment 2 will be lower than that of the Principal Assessment for the following reasons:

- Supporting Assessment 2 is based on an increase in passenger throughput of 3.6 mppa compared to an increase of 8 mppa for the Principal Assessment. The number of additional ATMs and surface access traffic movements generated by the increase in passenger throughput in Supporting Assessment 2 will be less than that generated by the increase in passenger throughput in the Principal Assessment
- The increase in mass emissions due to Supporting Assessment 2 will be lower than that of the Principal Assessment, due to the former having a smaller increase in the number of sources of emissions to air (i.e. fewer ATMs and traffic movements)
- The Principal Assessment considers the 2029 Permitted Operation (32.0 mppa) and 2029 Proposed Operation (40 mppa) both in 2029. Supporting Assessment 2 considers the Current Operation (36.4 mppa) and Proposed Operation (40 mppa) in 2025 and 2029, respectively. As such, the impact of Supporting Assessment 2 also must account for improving aircraft and traffic fleets between 2025 and 2029, which will see a reduction in emissions per ATM and per vehicle, offsetting, to some extent, the increase in emissions sources associated with the increase in passenger throughput.

7.11.7 The change in pollutant concentrations between the 2025 Current Operation and the 2029 Proposed Operation will be smaller than the change identified through the Principal Assessment. This reflects the smaller difference in Airport activity between the 2025 Current Operation and the 2029 Proposed Operation, together with anticipated improvements in background pollutant concentrations and emissions between 2025 and 2029.

7.11.8 Supporting Assessment 2 therefore provides context on the additional change in air quality between current Airport operations and the future operation under the Proposed Order.

Supporting Assessment 3: 2025 Current Operation (36.4 mppa) vs 2029 Permitted Operation (32.0 mppa)

7.11.9 Supporting Assessment 3 provides context on the change in air quality between the 2025 Current Operation (36.4 mppa) and the 2029 Permitted Operation (32.0 mppa). It illustrates the change that would occur if the Proposed Order were not made and Airport operations returned to the currently permitted passenger throughput in 2029.

7.11.10 As described for Supporting Assessment 2, the reduction in Airport activity between the 2025 Current Operation and the 2029 Permitted Operation would occur alongside anticipated reductions in background pollutant concentrations and road vehicle emission factors, and improvements in aircraft fleet emissions, between 2025 and 2029.

7.11.11 The reduction in passenger throughput from 36.4 mppa in the 2025 Current Operation to 32.0 mppa in the 2029 Permitted Operation would result in fewer Airport-related vehicle movements and ATMs. Together with anticipated improvements in background pollutant concentrations and emissions between 2025 and 2029, this would be expected to result in lower pollutant concentrations under the 2029 Permitted Operation than under the 2025 Current Operation.

7.11.12 Supporting Assessment 3 therefore provides context on the potential change in air quality between current Airport operations and the future operation that would occur if the Proposed Order were not made.

7.12 Conclusions

7.12.1 This chapter has assessed the likely significant effects of the Proposed Order on air quality and odour. The Principal Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa), using dispersion modelling of emissions from aircraft and other airside sources, Airport energy plant, surface access traffic and car park use. The assessment has been informed by the data sources outlined in paragraph 7.3.5 and paragraph 7.3.6.

7.12.2 With reference to the current National Air Quality Standards, the Principal Assessment identifies impacts ranging from neutral to slight adverse for annual mean NO_2 and neutral for annual mean PM_{10} and $PM_{2.5}$. The resulting effects are Not Significant.

7.12.3 With reference to the new EU Air Quality Directive (2024/2881) Limit Values, impacts on annual mean PM_{10} and $PM_{2.5}$ range from neutral to slight adverse and are Not Significant. For annual mean NO_2, impacts range from neutral to substantial adverse, with moderate to substantial adverse impacts predicted at a limited number of receptors, predominantly close to the Airport and adjacent road network. Of the 17 receptors predicted to exceed the new annual mean NO_2 Limit Value under the 2029 Proposed Operation, 12 are already predicted to exceed that Limit Value for the 2029 Permitted Operation, therefore the Proposed Order resulting in five additional receptors exceeding the Limit Value. The conclusion identifies the Moderate to Substantial Adverse NO_2 impacts and their limited geographical distribution.

7.12.4 Having regard to the magnitude and geographical extent of these impacts, the precautionary assumptions incorporated within the dispersion modelling and the anticipated improvement in background air quality and emissions over future years, the effect of the Proposed Order on local air quality is considered to be Not Significant. This reflects the significance determination set out in the assessment.

7.12.5 The effect of the Proposed Order on odour is also considered to be Not Significant. Using the recommended odour emission factor, no residential receptor is predicted to experience an odour concentration above the 3 OUE/m³ criterion used in the assessment. Using the precautionary odour emission factor, six receptors are predicted to experience concentrations above this criterion, three of which are already predicted to do so for the 2029 Permitted Operation. The maximum increase in odour concentration as a result of the Proposed Order is 0.4 OUE/m³.

7.12.6 The measures described in Section 7.7, including increased use of Fixed Electrical Ground Power, progressive decarbonisation of the GSE fleet and measures to reduce emissions from the Airport's energy centres, are expected to further reduce airside emissions but are not relied upon in determining the significance of the effects of the Proposed Order. daa will continue its existing air quality monitoring programme. The conclusion similarly identifies these measures as additional reductions not accounted for in the modelling.

7.12.7 The Supporting Assessments provide additional context to the Principal Assessment. They indicate that changes in pollutant concentrations associated with the alternative comparisons are generally lower than those identified through the Principal Assessment, while Supporting Assessment 3 indicates a reduction in pollutant concentrations between the 2025 Current Operation and the 2029 Permitted Operation. The Supporting Assessments do not alter the conclusions of the Principal Assessment.

7.12.8 No significant cumulative, indirect, secondary or transboundary air quality effects have been identified.

7.12.9 Overall, the Proposed Order is not likely to give rise to significant effects on air quality or odour.