16. Air Quality

16.1 Introduction

As set out in Chapter 1 of this updated EIAR, this is an update to Chapter 16 of the EIAR submitted to An Bord Pleanála in October 2018 as part of the application for approval of the proposed N6 GCRR pursuant to Section 51 of the Roads Act 1993 (as amended). It forms part of the response to the request by ABP for further information in December 2023 where they requested GCC to "*Update the Environmental Impact Assessment Report".* Chapter 16 previously included climate, however this has now been assessed separately in Chapter 17 of this updated EIAR. This updated chapter provides an appraisal of the Project under the heading of air quality. A comparison of the methodology applied in the air quality appraisal presented in the 2018 EIAR compared to the air quality appraisal undertaken for this updated EIAR is included in Section 16.2.9.

This chapter initially sets out the methodology followed (Section 16.2), describes the receiving environment (Section 16.3), and summarises the main characteristics of the Project which are of relevance to air quality (Section 16.4). The evaluation of effects of the Project on air quality are described (Section 16.5), measures are to be implemented to mitigate these effects (Section 16.6), residual effects are described (Section 16.7) and cumulative effects are described (Section 16.8). The chapter concludes with a summary (Section 16.9) and an update to the references section (Section 16.10).

The key changes to the chapter since the 2018 EIAR involve updating:

- the description of the receiving environment and impact assessments to take account of changes, new developments, updated traffic surveys and traffic modelling outputs, etc.
- updated assessment through the application of the new TII Air Quality Standard
- new software to calculate transport emissions – REM tool
- Appendices 16.1, 16.2 and 16.3 and Figures 16.1 series to take account of new monitoring, new developments, updated modelling results etc.
- to take account of points raised from the Brief of Evidence presented to An Bord Pleanála (ABP) at the oral hearing in 2020 and from the ABP Inspector's Report dated June 2021

This chapter has utilised the information gathered during the constraints and route selections studies for the proposed N6 GCRR, the studies to inform the 2018 EIAR, for the 2019 Response to Request for Further Information and for the oral hearing in 2020 plus data gathered during to inform the air quality impact appraisal for this updated EIAR.

As this chapter is a completely new assessment based on new methodology, any errata or corrigenda identified during the oral hearing in 2020 for the proposed N6 GCRR are no longer relevant to the updated chapter.

16.2 Methodology

16.2.1 Introduction

This chapter has been prepared in accordance with the Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022). Potential impacts have been described with regard to Table 3.4 of these EIAR guidelines[1].

The statutory ambient air quality standards in Ireland are outlined in Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) (hereafter referred to as the Air Quality Regulations), which

[1] EPA (2022), Guidelines on the information to be contained in Environmental Impact Statements – 2022

incorporate the ambient air quality limits set out in Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (hereafter referred to as the CAFE Directive), for a range of air pollutants. The statutory ambient air quality guidelines are discussed in greater detail in Section 16.2.2.

In addition to the specific statutory air quality standards, the assessment has made reference to national guidelines, where available, in addition to international standards and guidelines relating to the assessment of ambient air quality impact from road schemes (all of which remain relevant today to this updated assessment) including new guidance published since the 2018 EIAR as mentioned above. These are summarised below:

- The TII Air Quality Assessment of Proposed National Roads – Standard (TII PE-ENV-01107) (TII 2022) referred to as the TII Standard hereafter in this chapter
- Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction (IAQM 2024)
- A guide to the assessment of air quality impacts on designated nature conservation sites (IAQM 2019)
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes (TII 2009)
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission 2013)
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017)
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) – LA 105 Air Quality (hereafter referred to as LA 105 Air Quality Guidance) (UKHA 2019)
- World Health Organization (WHO) Global Air Quality Guidelines (2021)
- Clean Air Strategy (Government of Ireland) (2023)
- Verein Deutscher Ingenieure (VDI) German Technical Instructions on Air Quality Control - TA Luft standard for dust deposition (VDI 2002)

16.2.2 Air quality standards and limit values

In December 2022, the Ambient Air Quality Standards Regulations 2022 came into force and transposed EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe into Irish law. The purpose of the Air Quality Regulations is to:

- Establish limit values and alert thresholds for concentrations of certain pollutants
- Provide for the assessment of certain pollutants using methods and criteria common to other European member states
- Ensure that adequate information on certain pollutant concentrations is obtained and made publicly available
- Provide for the maintenance and improvement of ambient air quality where necessary

The limit values established under the Air Quality Regulations relevant to this assessment (pollutants of concern) are included in Table 16.1.

Table 16.1 Limit Values in the Air Quality Regulations (*Source: Ambient Air Quality Standards Regulations 2022)*

Pollutant	Limit Value for the Protection of:	Averaging Period	Limit value (µg/m3)	Basis of Application of Limit Value
NO_2 (Nitrogen Dioxide)	Human Health	1-hour	200	⩽ 18 exceedances p.a. (99.79%ile)
		Calendar year	40	Annual mean
NOx (Oxides of Nitrogen)	Vegetation	Calendar year	30	Annual mean
PM_{10} (Particulate Matter)	Human Health	24-hours	50	⩽ 35 exceedances p.a. (90%ile)
		Calendar year	40	Annual mean
$PM_{2.5}$ (Particulate Matter)	Human Health	Calendar year	25	Annual mean

On the 10 of December 2024, the EU Directive 2024/2881/EC came into force on ambient air quality and cleaner air for Europe. This Directive (2024/2881/EC) is an amendment and replacement of the preceding Directives 2004/107/EC and 2008/50/EC and must be implemented into law by each member state within two years. The 2024/2881/EC Directive sets new limit values for pollutants that EU Member States must comply with by 2026 and 2030. These limits are listed in Table 16.2. However, as the Government of Ireland is yet to transpose this into Irish Law, the current limit values as per the Air Quality Regulations 2022 apply to the air quality assessment of the Project.

Table 16.2 Limit Values set by the EU Directive 2024/2881/EC which have yet to be transposed into Irish Law

Pollutant	Limit Value for the Protection of:	Averaging Period	Limit Value (µg/m^3) by 2026	Basis of Application of Limit Value	Limit Value (µg/m^3) by 2030	Basis of Application of Limit Value
NO_2 (Nitrogen Dioxide)	Human Health	1-hour	200	⩽ 18 exceedances p.a.	200	⩽ 3 exceedances p.a.
		Calendar year	40	Annual mean	20	Annual mean
NO_x (Oxides of Nitrogen)	Vegetation	Calendar year	30	Annual mean	30	Annual mean
PM_{10} (Particulate Matter)	Human Health	24-hours	50	⩽ 35 exceedances p.a.	45	⩽ 18 exceedances p.a.
		Calendar year	40	Annual mean	20	Annual mean
$PM_{2.5}$ (Particulate Matter)	Human Health	Calendar year	25	Annual mean	10	Annual mean

In April 2023, the Government of Ireland published the National Clean Air Strategy, a strategic policy framework to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines[2] (WHO 2021) Interim Target IT3 by 2026, IT4 targets by 2030 and the final targets by 2040 (shown in Table 16.3). The strategy acknowledges that *"meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Table 16.3 WHO Air Quality Guidelines Levels *(Source: WHO 2021)*

Pollutant	Averaging Time		Interim Targets (µg/m³)			Final Target
		IT1	IT2	IT3	IT4	AQG Level
NO_2	24-hour limit for protection of human health	120	50	-	-	25
	Annual limit for protection of human health	40	30	20	-	10
PM (as PM_{10})	24-hour limit for protection of human health	150	100	75	50	45
	Annual limit for protection of human health	70	50	30	20	15
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	75	50	37.5	25	15
	Annual limit for protection of human health	35	25	15	10	5

The Ambient Air Quality Standards Regulations outline an annual critical level for NO_x for the protection of vegetation and natural ecosystems in general. The CAFE Directive defines 'Critical Levels' as:

> *'a level fixed on the basis of scientific knowledge, above which direct adverse effects may occur on some receptors, such as trees, other plants or natural ecosystems but not on humans'.*

Critical load is defined by IAQM (2019) as:

> *Deposition flux of an air pollutant below which significant harmful effects on sensitive ecosystems do not occur, according to present knowledge. Usually measured in units of kilograms per hectare per year (kg/ha/yr)*

The critical loads are obtained from the Air Pollution Information System (APIS) website (Centre for Ecology and Hydrology), refer to Table 16.4.

Table 16.4 Critical Loads / Levels at Sensitive Designated Habitats (APIS 2022)

	Nitrogen Deposition Critical Load (kgN/ha/yr)	Ammonia Critical Level (µg/m³)
Maximum	30	3
Minimum	5	1

In accordance with TII Standard, sensitive designated habitats within 200m of the affected road network and all European sites within a 2km buffer of the Project are considered. There are three sensitive designated habitats located within 2km: Lough Corrib SAC, Galway Bay Complex SAC and Moycullen Bogs NHA. The Lough Corrib SAC is located immediately adjacent to the Project. The Moycullen Bogs NHA is located within 40m of the Project.

The Galway Bay Complex SAC is located more than 200m from the Project, however, it is located in proximity to a number of links where reductions in traffic volumes are predicted. Therefore an assessment of the positive impact of such traffic reductions is presented, refer to Table 16.35.

[2] WHO (2021) WHO Global Air Quality Guidelines. Available at: WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines, at European or national level, regarding the maximum dust deposition levels, that may be generated during construction activities. However, Verein Deutscher Ingenieure (VDI) German Technical Instructions on Air Quality Control - TA Luft standard for dust deposition (VDI 2002) (non-hazardous dust) provides a guideline for the rate of dust deposition of 350 mg/m^2/day averaged over one year. The EPA concurs that this guideline may be applied, although the EPA typically applies the guideline limit as a 30-day average.

This guidance value is applied to monitor dust impacts from the construction of the Project.

16.2.3 National Air Emission Targets

Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC (hereafter referred to as the National Emissions Reduction Directive) was published in December 2016. The National Emissions Reduction Directive applied the limits set out in Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants (hereafter referred to as the National Emission Ceiling (NEC) Directive) until 2030 and established new national emission reduction commitments for various pollutants. The pollutants relevant to this assessment are NO_x and $PM_{2.5}$. The emission reduction commitment for Ireland for 2020 and 2030 are set as percentage reductions on 2005 emission levels. Additionally, emissions in 2025 follow a linear reduction trajectory between the levels defined by the emission reduction commitments in 2020 and 2030, refer to Table 16.5.

Table 16.5 National Air Emission Targets (Ireland's Air Pollutant Emissions 2020 to 2030) ***Source: EPA Ireland's Air Pollutant Emissions, Table 3 of May 2024***

Pollutant	2020 to 2029 Reduction Commitments (kilotonnes) (and % Reduction Compared to 2005 Levels)	2030 Reduction Commitments (kilotonnes) (and % Reduction Compared to 2005 Levels)
NOx	68.2	41.5
	-49%	-69%
$PM_{2.5}$	15.3	11.0
	-18%	-41%

16.2.4 Transport Infrastructure Ireland (TII) and Institute of Air Quality Management (IAQM) Guidelines

This assessment has been undertaken with regard to the TII Standard (2022) and IAQM Guidance (2024). These guidelines provide a methodology for the assessment, management and mitigation of air quality which can be adapted accordingly depending on the nature of the works.

The TII standard states that the change in Average Daily Traffic (AADT) flows of less than 1,000 or heavy-duty vehicle (HDV) flow change of less than 200 AADT during the operational and construction phases are unlikely to result in significant air quality effects. Likely significant effects on air quality are therefore assessed when the AADT flows are projected to increase above these thresholds due to the construction and/or operation of the Project.

The TII Road Emissions Model (REM) tool has been used to predict the potential changes in air quality due to projected AADT variations, on the link roads which are predicted to experience an increase in traffic (as AADT) greater than 1,000 or HGV increase of greater than 200 AADT. The tool allows for the calculation of vehicle emissions using emission factors from the European Environment Agency (EEA) Air Pollutant Emission Inventory Guidebook. The two air quality parameters considered relevant to traffic emissions are NO_2 and PM_{10} for human health and NO_x, nitrogen deposition and Ammonia for the assessment of ecological impacts.

16.2.5 Data Collection and Collation

A desk-based study of the baseline environment of the study area was undertaken in order to inform this updated assessment. The following Environmental Protection Agency (EPA) Air Quality Reports were referred to:

- Environmental Protection Agency (2024). Air Quality in Ireland 2023- Indicators of Air Quality
- Environmental Protection Agency (2023). Air Quality in Ireland 2022- Indicators of Air Quality
- Environmental Protection Agency (2022). Air Quality in Ireland 2021- Indicators of Air Quality
- Environmental Protection Agency (2021). Air Quality in Ireland 2020- Indicators of Air Quality

In addition, nitrogen dioxide monitoring has been undertaken by the EPA in Galway under the 'Clean Air Together (Galway City) programme for a period of four weeks in October/November 2023. The monitoring results are provided in the vicinity of the Project for information.

NO_2 monitoring was also carried out at four locations: Ard an Locha, St. James National School, Castlegar National School and Blackrock Health clinic from October 2023 to January 2024 to determine the existing air quality in the vicinity of the Project. In addition, PM_{10} and $PM_{2.5}$ monitoring was carried out at one location in Ard an Locha. Refer to Appendix A.16.1 for the survey results.

No further consultation over and above the review of publicly available documents was considered necessary.

16.2.6 Construction Phase Activities Assessment Methodology

For the construction phase activities assessment, the focus is on air quality ecological receptors adjacent to the proposed works that are susceptible to dust impacts. As such, the greatest potential impact on air quality during the construction phase is from construction dust emissions, PM_{10}/$PM_{2.5}$ emissions and the potential for nuisance dust.

The construction effects have been assessed using the qualitative approach described in the 2024 IAQM guidance, as advised by the TII Standard (2022). The guidance applies to the assessment of dust from construction and demolition activities.

An 'impact' is described as a change in pollutants concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during construction of the Project are:

- Dust deposition, resulting in the soiling of surfaces
- Visible dust plumes
- Elevated PM_{10} concentrations as a result of dust generating activities on site
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery (NRMM) and vehicles accessing the site

The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as earthworks, construction of new structures and track-out. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while track-out is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

For each of these dust-generating activities, the guidance considers three separate effects: annoyance due to dust soiling; harm to ecological receptors; and the risk of health effects due to a significant increase in PM_{10} exposure. The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure.

The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures will be implemented to reduce the risk of the site.

Plate 16.1 outlines the steps to be undertaken, as per the IAQM guidance.

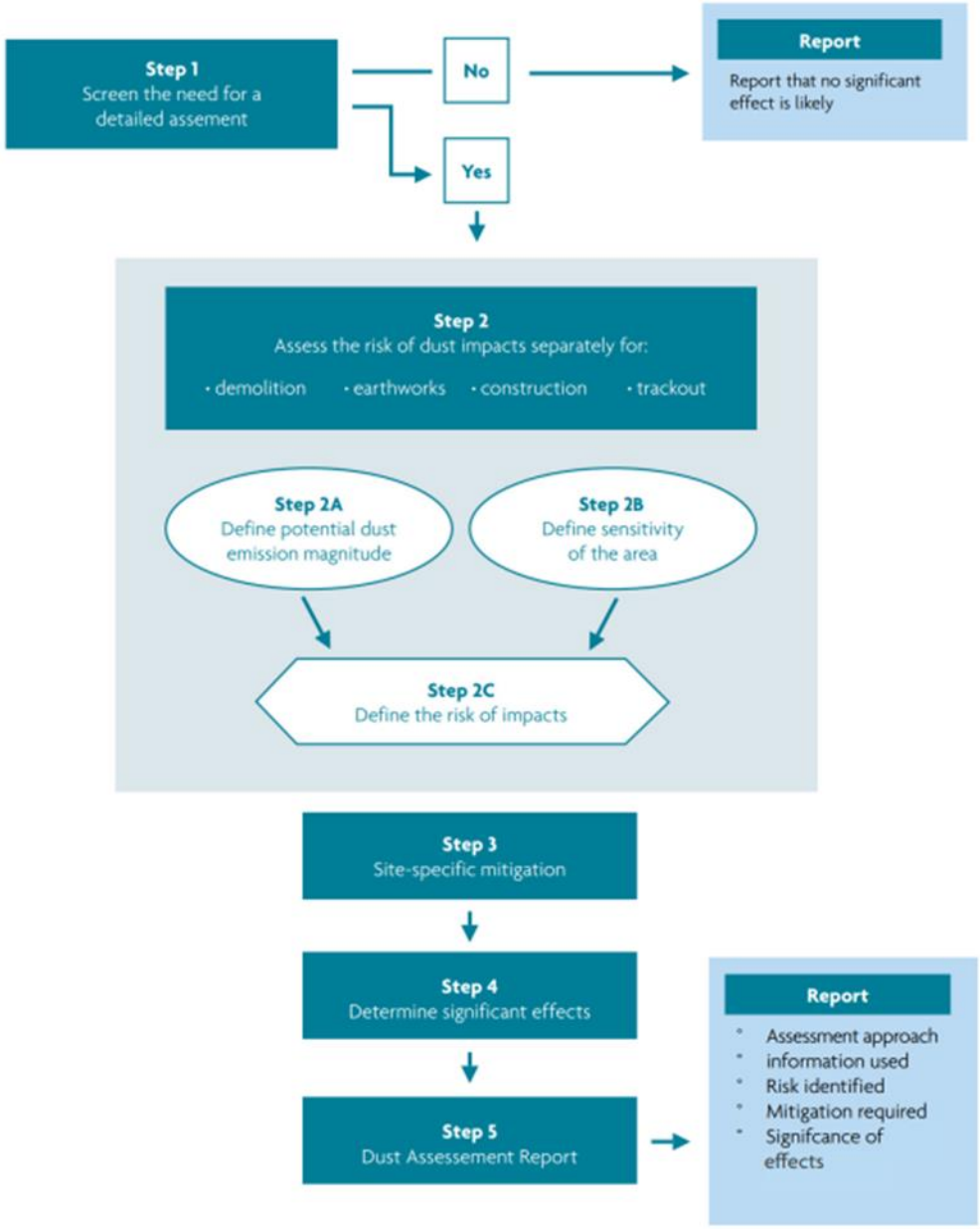

Plate 16.1 Steps to undertaking dust assessment *(Source: IAQM Guidance 2024)*

Step 1 Screen need for assessment:

The first step is the initial screening to determine whether a detailed assessment is required. According to the IAQM guidance, an assessment is normally required where there is:

- A 'human receptor' within:
  - 250m of the boundary of the site
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)

- An ‘ecological receptor’ within:
  - 50m of the boundary of the site
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)

As there are human receptors and two sensitive designated habitats are located within 50m of the Assessment Boundary, therefore a detailed assessment is required.

Step 2 Assess the risk of dust impacts:

This step is split into three sections as follows:

A - Define the potential dust emission magnitude

B - Define the sensitivity of the area

C - Define the risk of impacts

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (Step 2A) based on the criteria shown in Table 16.6.

Table 16.6 Categorisation of Dust Emission Magnitude *(Source: IAQM Guidance, 2024)*

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months.	Total building volume 12,000m^3 – 75,00m^3, potentially dusty construction material, demolition activities 6 - 12m above ground level.	Total building volume >75,000m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12m above ground level.
Earthworks		
total site area <18,000m^2, soil type with large grain size (e.g., sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3m in height.	total site area 18,000m^2 - 10,000m^2 moderately dusty soil type (e.g., silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 3 - 6m in height.	total site area >110,000m^2, potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height.
Construction		
total building volume <12,000m^3, construction material with low potential for dust release (e.g., metal cladding or timber).	total building volume 12,000 - 75,000m^3, potentially dusty construction material (e.g., concrete), on-site concrete batching.	total building volume >75,000m^3, on-site concrete batching, Sandblasting.
Trackout		
<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.	20 – 50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g., high clay content), unpaved road length 50 – 100m.	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g., high clay content), unpaved road length >100m.

The sensitivity of the surrounding area is determined (Step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors.

Sensitivities of People to Dust Soiling Effects:

<u>High sensitivity receptor – surrounding land where:</u>

- Users can reasonably expect enjoyment of a high level of amenity
- The appearance, aesthetics or value of their property would be diminished by soiling
- The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land
- Indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks and car showrooms

<u>Medium sensitivity receptor:</u>

- Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home
- The appearance, aesthetics or value of their property could be diminished by soiling
- The people or property would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land
- Indicative examples include parks and places of work

<u>Low sensitivity receptor:</u>

- The enjoyment of amenity would not reasonably be expected
- Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling
- There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land
- Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads

Sensitivities of People to the Health Effects of PM10:

<u>High sensitivity receptor:</u>

- Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)
- Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment

<u>Medium sensitivity receptor:</u>

- Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)
- Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation

<u>Low sensitivity receptor:</u>

- Locations where human exposure is transient

- Indicative examples include public footpaths, playing fields, parks and shopping streets

Table 16.7, Table 16.8 and Table 16.9 show the criteria for defining the sensitivity of the area to soiling, health and ecological effects respectively.

Table 16.7 Sensitivity of the Area to Dust Soiling effects on People and Property *(Source: IAQM Guidance)*

Receptor Sensitivity	Number of Receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1- 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table 16.8 Sensitivity of the Area to Human Health Impacts *(Source: IAQM Guidance)*

Background PM Concentrations (annual mean)	Number of Receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
High receptor sensitivity					
> 32µg/m^3	> 100	High	High	High	Medium
	10 – 100			Medium	Low
	< 10		Medium	Low	
28 – 32µg/m^3	> 100	High	High	Medium	Low
	10 – 100		Medium	Low	
	< 10				
24 – 28µg/m^3	> 100	High	Medium	Low	Low
	10 – 100				
	< 10	Medium	Low		
< 24µg/m^3	> 100	Medium	Low	Low	Low
	10 – 100	Low			
	< 10				
Medium receptor sensitivity					
> 32µg/m^3	> 10	High	Medium	Low	Low
	1 – 10	Medium	Low		
28 – 32µg/m^3	> 10	Medium	Low	Low	Low
	1 – 10	Low			
24 – 28µg/m^3	> 10	Low	Low	Low	Low

Background PM Concentrations (annual mean)	Number of Receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
	1 – 10				
< 24 µg/m^3	> 10	Low	Low	Low	Low
	1 – 10				
Low receptor sensitivity					
< 24µg/m^3	> 1	Low	Low	Low	Low

Table 16.9 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The overall risk of the impacts for each activity is then determined (Step 2C) prior to the application of any mitigation measures and an overall risk for the site is derived, refer to Table 16.10.

Table 16.10 Risk of dust impacts *(Source: IAQM Guidance)*

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolitions			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

In order to determine the level of dust mitigation required during the construction phase, the potential dust emission magnitude for each dust generating activity needs to be taken into account, along with the already established sensitivity of the area.

16.2.7 Traffic Emissions Assessment Methodology

The air quality assessment has been carried out following the Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022) and using the methodology outlined in the TII Standard (TII 2022).

The TII Standard advises using a tool such as TII REM or detailed dispersion modelling software such as ADMS-Roads (CERC, 2022). The decision on the most appropriate modelling software to use is based on existing air quality and the complexity of the Project. Due to the complex nature of the proposed Project and its proximity to sensitive designated habitats, ADMS-Roads modelling is undertaken at certain locations in addition to the TII REM tool.

The TII REM provides a spatial and temporal estimate of carbon dioxide equivalent emissions and the pollutant concentrations resulting from vehicular use on the National Roads Network. The REM integrates:

- Traffic information from the TII National Transport Model which provides validated estimates of the volumes of light and heavy vehicles, and the speed at which they travel, on the National Roads Network
- A Fleet Mix database developed by researchers in the Energy Policy and Modelling Group at University College Cork (UCC) for cars based on economic projections, and for other light and heavy vehicles by AECOM. The Fleet Mix database is underpinned by the Central Statistics Office's goods vehicles registration data (both heavy and light goods vehicles)
- Emission Rate Database derived from the European Environment Agency's (EEA) COPERT Emissions Tool - the EU industry standard vehicle emissions calculator – published in the EMEP/EEA air pollutant emission inventory guidebook. These data were adjusted further using data published in the UK by DEFRA
- An Ambient Air Quality Model module, which calculates pollutants (NO_x, NO_2, PM_{10} and $PM_{2.5}$) released from each individual road link, using predictions of atmospheric pollutants concentration and dispersion, scaled up to an annual average concentration

TII's REM calculates road transport emissions integrating traffic volumes/speeds for light and heavy vehicles on the Irish National Roads Network with Irish fleet composition information

The projected stock models for non-goods vehicles (i.e. cars) are extrapolated from the UCC stock model for:

- Business as Usual (BaU) scenario; i.e. excluding strategic policy interventions for reduction of CO_2, etc. and based on existing trends in vehicle purchasing and turnover of vehicles out of the vehicle fleet
- Climate Action Plan (CAP) based on achieving increases in EVs including 151,000 passenger car EV and PHEVs by 2025 and 840,000 passenger car electric vehicle (EV) and plug-in hybrid (PH) EVs by 2030
- An intermediate case calculated by AECOM using linear extrapolation to a central value between BaU and CAP for each vehicle sub-classification

For the purposes of the calculations, an intermediate case was used in the assessment. Non-exhaust Emissions (NEE) are calculated by the TII REM tool so that particulate emissions arising from tyre and brake wear and road abrasion are considered in the assessment.

The TII Standard advises on the use of the Calculator for Road Emissions of Ammonia (CREAM) Tool developed by Air Quality Consultants in 2020 for the assessment of Ammonia emissions GetFile.aspx (aqconsultants.co.uk).

ADMS-Roads is more advanced than the TII REM tool as it incorporates the latest understanding of the boundary layer structure, and goes beyond the simplistic Pasquill-Gifford stability categories method with explicit calculation of important parameters. The model uses advanced algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions.

Based upon traffic data, areas for assessment can be screened against the following criteria. The screening criteria are based on the changes between the Do-Something (DS) traffic (i.e., with construction/operation) compared to the Do-Minimum (DM) traffic under the following criteria:

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

If the criteria are not met, then a quantitative assessment of traffic can be scoped out and the effects are considered to be not significant. If the criteria are met, a local air quality assessment is required.

The air quality assessment utilises the traffic data provided in Chapter 6, Traffic Assessment and Route Cross-section.to assess the likely significant effects of construction and operational phase traffic changes on air quality.

Significance criteria have been adopted from the TII Standard and are presented in Table 16.11. These criteria provide a basis for assessing the level of effects due to the additional traffic present during construction and operation. The Air Quality Limit Values (AQLVs) are legally binding for Ireland and have been set with the aim of avoiding, preventing, or reducing harmful effects on human health and on the environment.

Table 16.11 Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations *(Source: TII Standard)*

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Limit Value (AQLV)			
	1	2-5	6-10	>10
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

In accordance with the TII Standard (TII, 2022), any assessment of air quality impacts on sensitive designated habitats is to be discussed and agreed with the project biodiversity practitioner which has taken place in 2024 and 2025 for this Project. The standard advises the use of TII REM or detailed modelling, to predict concentrations of NO_x and ammonia. Following this, nitrogen deposition is to be calculated and evaluated. Table 16.12 describes the process to determine if the results of the assessment are significant or not.

Table 16.12 Significance of Effects at Sensitive Designated Habitats *(Source TII Standard)*

Description of Results	Significance
Total N deposition and acid deposition are more than 1% of the critical load.	Discuss further with project biodiversity practitioners (see below).
The total N deposition and acid deposition are less than 1% of the critical load.	Not significant

To determine if the air quality impacts at a sensitive designated habitat are significant, the project biodiversity practitioner shall consider:

- Factors such as the nature of site management
- Other factors such as regular flooding in maintaining a suitable habitat
- The degree of sensitivity of fauna to relatively subtle changes in botanical composition
- Whether nitrogen or phosphorus is the key limiting nutrient
- The extent of the sensitive designated site that is negatively affected shall be taken into consideration

Where significant effects are determined, site survey information is required to determine if the sensitive habitat of relevance is actually present in the affected area and to inform potential mitigation measures that may be required.

16.2.8 Monitoring Methodology

Air quality monitoring of NO_2 was undertaken at four locations: Ard An Locha in Bushypark, St. James National School, Castlegar National School and Blackrock Clinic, from 28 October 2023 to 16 January 2024.

Two parameters were identified for monitoring: particulate fractions and nitrogen dioxide. Refer to Table 16.13.

Table 16.13 Air Quality Monitoring Methods

Parameter	Method
Particulate Fractions	AQ Mesh Particulate analyse
Nitrogen Dioxide	SP10 ion chromatography, Passam ag, Schellenstrasse 44, 8708 Männedorf, Switzerland, accredited laboratory for air analysis by diffusive samplers according to ISO/IEC 17025

A description of the equipment used in the monitoring is provided Table 16.14.

Table 16.14 Equipment used for Air Quality Monitoring

Item	ID Number	Calibration Status
Particulate Fractions	2451005	The equipment was installed calibrated and holds valid calibration certificates for the period of monitoring
Nitrogen Dioxide	Diffusion tubes	No calibration required

16.2.9 Comparison of methodology to 2018 EIAR

The 2018 EIAR and documentation previously submitted to An Bord Pleanala during the approval process were published prior to the publication of the updated (2022) TII Standard and associated REM tool. Those previous assessments relied upon the 2011 TII 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' and the UK DMRB spreadsheet for the purposes of assessing air quality and quantifying emissions at a local and regional scale.

The 2018 EIAR applied the TII 2011 guidance for the assessment of construction dust and refers to *Control of dust from construction and demolition activities* (BRE, 2003) for appropriate mitigation measures. In accordance with the 2022 TII Standard, the 2024 IAQM guidance is applied in the revised assessment. The 2024 IAQM guidance also contains a detailed list of mitigation measures that should be employed at different phases of works. These measures are proposed, where applicable.

The TII REM tool was used in this updated EIAR in 2025 to compute local operational phase pollutant concentrations (at human and ecological receptors). The REM tool has been developed for the Irish context with Irish emission factors and vehicle type projections so is considered more robust than the UK DMRB spreadsheet which is UK based and was developed in 2011. Ammonia concentrations were not calculated as part of the 2018 EIAR in the absence of a tool for calculation. The 2020 CREAM tool has been applied in this assessment of Ammonia emissions. In 2023, the APIS GIS tool was extended to include the Republic of Ireland, providing critical loads and levels for relevant pollutants as well as background values at ecological sensitive designated habitats.

The NTA ENEVAL model was used to compute operational phase regional emissions. This model includes for changes in traffic on a regional basis and is considered more robust than the DMRB spreadsheet used in the 2018 assessment which only considers changes in traffic at a local level. The ENEVAL model also uses up-to-date emission factors which have been developed in the Irish context, generating a more accurate output when compared to DMRB.

As all of the above tools were not available in the 2018 modelling, the reporting of this air assessment does not replicate the 2018 EIAR but provides a more robust and accurate assessment than the 2018 assessment.

16.2.10 Study Area

As outlined in Section 16.2.6, for the purposes of the construction dust impact assessment, human receptors are located within 250m of the Project boundary so therefore an assessment of the air quality effects is required.

As outlined in Section 16.2.7, should the criteria outlined in the TII Standard relating to construction and operational phase traffic be met, then an assessment of air quality impacts is completed at the nearest affected sensitive designated habitats.

In accordance with the TII Standard, sensitive designated habitats within 200m of the affected road network and all European sites within 2km should be identified. Two European sensitive designated habitat sites are located within 2km of the affected road network: Lough Corrib SAC and Galway Bay Complex SAC and one national designated site NHA: Moycullen Bogs NHA, is located within 200m.

16.3 Receiving Environment

16.3.1 Introduction

As discussed in Section 16.2.2, the EU Directive 2024/2881/EC was officially entered into force in December 2024. This Directive includes new air pollutant limit values however, this Directive has yet to be transposed into Irish law and as such, the limit values set by the Air Quality Regulations 2022 were used for the air quality assessment.

The EU Directive 2024/2881/EC outlines the European Commission's commitment to reduce the ambient pollutant concentrations in the Member States in order achieve the objective of the Zero Pollution Action Plan which sets out a vision for 2050, where air pollution is reduced to levels no longer considered harmful to health and natural ecosystems. Policies such as the European Green Deal, the Clean Air Strategy and the Climate Action Plan are some policies in place to assist with the reduction of the air pollutant background

concentrations directly or indirectly. Through compliance with these policies, it is expected that background concentrations will continue to decline to allow Ireland to comply with limits prescribed in the Directive. For the purposes of the assessment, background concentrations are based on historical baseline data. It is expected that these background concentrations will decline in response to government and EU policy resulting so that future air quality standards in Ireland can be complied with.

16.3.2 Human Environment

The Environmental Protection Agency (EPA) Air Quality in Ireland Reports describes the air quality zoning adopted in Ireland as follows:

- Zone A (Dublin conurbation)
- Zone B (Cork conurbation)
- Zone C (24 Cities and towns)
- Zone D (Rural Ireland: areas not in Zones A, B and C)

The site falls within Zone C. Background pollutant levels from 2023, 2022, 2021, 2020, 2019 and 2018 air quality monitoring of NO_2, $PM_{2.5}$ and PM_{10} are listed for Zone C, as provided by the EPA, and are presented in Table 16.15.

A desk study of the EPA air quality monitoring programs has been undertaken. Concentrations of each pollutant recorded in Zone C are averaged to represent typical background levels. Average concentrations were obtained from all stations where 90% data capture was achieved. This is in accordance with Directive 2008/50/EC which specifies that any site used for assessment purposes must comply with 90% data capture.

Background concentrations used in the 2018 EIAR were based on EPA monitoring from 2014 to 2018 and onsite monitoring from 2017. The latest EPA monitoring data for 2018 to 2023 plus the data collected in 2023 and 2024 is used in this updated assessment. Background concentrations remain broadly the same over the intervening period.

The continuous monitoring data from EPA monitoring stations in Zone C is outlined in Table 16.15 presents a six-year maximum of background pollutant concentration values for NO_2, $PM_{2.5}$ and PM_{10}.

Table 16.15 Annual Mean Background Pollutant Concentrations for Zone C

Year	Annual Average NO_2 (µg/m³)	Annual Average PM_{10} (µg/m³)	Annual Average $PM_{2.5}$ (µg/m³)
Limit	40 µg/m³	40 µg/m³	25 µg/m³
2018	10.3	14.0	8.3
2019	12.0	16.3	12.2
2020	11.4	14.4	9.5
2021	11.6	13.1	8.8
2022	11.9	13.3	9.5
2023	12	12	7.7
Maximum	12	16.3	12.2

The background concentrations are well within the air quality standards for all pollutants in Zone C as reported by the EPA in their annual monitoring reports.

Nitrogen dioxide monitoring was undertaken over a three-month period (October 2023 to January 2024) to inform the baseline air quality in four locations (refer to Appendix A.16.1 for further details):

- Ard An Locha, Bushypark
- St. James' National School
- Castlegar National School
- Blackrock Clinic

These locations have been selected to represent, as much as possible, the baseline air quality in proximity to the Project whilst availing of a nearby power supply.

Three diffusion tubes were tested at each location for each monitoring period, results are provided for the maximum measured concentration. Note, measured concentrations are adjusted for bias with the EPA analyser located in Eyre Square, Galway. Monitoring results are shown below; NO_2 is shown in Table 16.16.

Table 16.16 On-site Monitoring Results NO_2

Period	NO_2 Concentration (µg/m³)			
	Residential Dwelling in Ard An Locha, Bushypark	St. James' National School, Bushypark	Castlegar National School, Castlegar	Blackrock Clinic, Galway
Limit	40	40	40	40
28 October 2023 to 25 November 2023	-*	7.2	9.2	14.3
25 November 2023 to 19 December 2023	4.2	6.6	8.5	10.9
19 December 2023 to 16 January 2024	2.8	4.2	5.4	9.8
Maximum	4.2	7.2	9.2	14.3

Note: * There are no results for the private residence as the diffusion tubes were removed from their location by the resident for house repairs and could not be located on arrival for collection.

The maximum concentration of NO_2 was measured at Blackrock Clinic. The higher concentrations are expected to be experienced at this location due to the traffic volumes in the immediate vicinity. Monitoring results of PM_{10} are presented in Table 16.17 and $PM_{2.5}$ in Table 16.18 recorded at the residential dwelling in Ard An Locha, Bushypark.

Table 16.17 On-site Monitoring Results PM_{10}

Period	PM_{10} Concentration (µg/m³)
Limit	**50[3]**
28/10/2023	9.75
29/10/2023	6.18
30/10/2023	8.38
31/10/2023	7.3
01/11/2023	8.23
02/11/2023	5.98

[3] Daily limit - not to be exceeded more than 35 times in a calendar year.

Period	PM_{10} Concentration (µg/m³)
03/11/2023	14.98
04/11/2023	6.6
06/11/2023	5.8
07/11/2023	5.58
Maximum	14.98

The maximum concentration of PM_{10} measured over a 24 hour period was 14.98 µg/m³.

Table 16.18 On-site Monitoring Results $PM_{2.5}$

Period	$PM_{2.5}$ Concentration (µg/m³)
Limit	**25**[4]
28/10/2023	5.53
29/10/2023	3.65
30/10/2023	6.16
31/10/2023	5.03
01/11/2023	3.88
02/11/2023	2
03/11/2023	11.32
04/11/2023	3.52
06/11/2023	1.91
07/11/2023	2.06
Maximum	11.32

The maximum concentration of $PM_{2.5}$ measured over a 24-hour period was 11.32 µg/m³.

Table 16.19 provides the maximum measured pollutants based on on-site and longer-term EPA monitoring.

Table 16.19 Maximum Measured Concentrations for all Pollutants

Pollutant	Maximum Measured Concentrations (µg/m³)
NO_2	14.3
PM_{10}	16.3
$PM_{2.5}$	12.2

[4] Annual average – no daily limit for $PM_{2.5}$

As existing pollutant concentrations are less than 90% of the thresholds, no detailed air modelling is required and the TII REM Tool is used to calculate road traffic emission impacts for the assessment of human receptors.

Nitrogen dioxide monitoring has been undertaken by the EPA in Galway under the 'Clean Air Together" (Galway City) programme for a period of four weeks in October/November 2023.

The programme concluded that higher levels of nitrogen dioxide were found along busy roads and in the city centre, such as Dock Road, Merchants Road, Eglinton Street, Mary Street, along Eyre Square and Briarhill/N6. Dock Road experienced concentrations greater than the limit of 40µg/m^3 with further studies to be undertaken at this location. The programme concludes that the more traffic present, the higher the levels of NO_2.

16.3.3 Ecological Environment

In accordance with the TII Standard, sensitive designated habitats within 200m of the affected road network and all European sites within 2km of the Project were considered.

Pollutant concentrations of NO_x and Ammonia were obtained from the APIS website at the ecological sensitive designated habitats of concern. The grid average background data for Lough Corrib SAC and Moycullen Bogs NHA is provided in Table 16.20.

Background nitrogen deposition rate is obtained from APIS at the ecological sensitive designated habitats of concern. These background levels are added to predicted nitrogen deposition to determine the cumulative level. Background data for 2018 is provided on the APIS website for Ireland.

Table 16.20 Maximum Concentration / Deposition Levels at Ecological Sensitive Designated Habitats *(Source APIS)*

Ecological Receptors	Pollutant	Highest Pollutant Concentration / Deposition Levels
Lough Corrib SAC	NOx	6.3 µg/m³
	Ammonia	1.3 µg/m³
	Nitrogen deposition	4.9 kgN/ha/yr
Moycullen Bogs NHA	NOx	1.9 µg/m³
	Ammonia	1.1 µg/m³
	Nitrogen deposition	4.3 kgN/ha/yr

Air quality monitoring for ammonia and nitrogen oxides was also undertaken over a three-month period (October 2023 to January 2024) to inform the baseline air quality in four locations as described in Section 16.3.2. Note, measured concentrations could not be adjusted for bias as no monitoring of these pollutants is carried out by the EPA analyser in Eyre Square, Galway. Monitoring results are shown below; ammonia is shown in Table 16.21 and NO_x in Table 16.22.

Table 16.21 On-site Monitoring Results Ammonia

Period	Maximum Ammonia Concentration (µg/m³)			
	Residential Dwelling in Ard An Locha, Bushypark	St. James' National School, Bushypark	Castlegar National School, Castlegar	Blackrock Clinic, Galway
Critical level (as worst-case)	**1**	**1**	**1**	**1**
28 October 2023 to 25 November 2023	-*	0.4	0.5	0.6
25 November 2023 to 19 December 2023	0.7	<0.3	<0.3	0.8
19 December 2023 to 16 January 2024	<0.3	<0.3	0.8	0.7

Note: * There are no results for the private residence as the diffusion tubes were removed from their location by the resident for house repairs and could not be located on arrival for collection

Table 16.22 On-site Monitoring Results NOx

Period	NO_x Concentration (µg/m³)			
	Residential Dwelling in Ard An Locha, Bushypark	St. James' National School, Bushypark	Castlegar National School, Castlegar	Blackrock Clinic, Galway
Critical level	**40**	**40**	**40**	**40**
28 October 2023 to 25 November 2023	-*	13.4	16.9	23.9
25 November 2023 to 19 December 2023	6.7	12.5	15.7	18.6
19 December 2023 to 16 January 2024	5.1	7.6	10.2	25.1
Maximum	6.7	13.4	16.9	23.9

Note: * There are no results for the private residence as the diffusion tubes were removed from their location by the resident for house repairs and could not be located on arrival for collection

Baseline concentrations of Ammonia and NO_x at ecological sensitive designated habitats are best represented by monitoring at the residential dwelling in Ard na Locha, Bushy Park as it is removed from the majority of traffic related pollutants. These values are added to predicted concentrations where no significant sources of Ammonia or NO_x are present. It is noted that APIS monitoring is likely to be an over-estimation of baseline concentrations. Anthony Dore et al in their paper 'Modelling of Ammonia Concentrations and Deposition of Reduced Nitrogen in the United Kingdom' (H11-068_Poster_HARMO11_FRAME_2007_05_03.doc), concludes that when comparing ADMS with FRAME modelling (on which APIS is based), an overstatement of concentrations using FRAME occurs.

The TII REM Tool and the ADMS model are used to calculate road traffic emission impacts for the assessment of ecological receptors.

16.3.4 National Emissions

In May 2024, the EPA published an update on Ireland's Air Pollutant Emissions (1990 – 2030). The report includes pollutant emissions for 2022 relative to Ireland's NEC commitments (based on a 2005 baseline), refer to Table 16.23.

Table 16.23 National Emissions Measured by EPA in 2005 and 2022

Pollutant	2005 Levels (kt)	2022 Levels (kt)
NOx	134.1	59
$PM_{2.5}$	18.7	10.7
NH_3	124.9	128.6

16.4 Characteristics of the Project

A detailed description of the Project and proposed construction works is provided in Chapter 5, Description of Project and Chapter 7, Construction Activities. There are five phases in the Project as set out below. The characteristics of the Project detailed in Chapter 5 of this updated EIAR that will potentially impact on air quality are set out below.

16.4.1 Project Phases

16.4.1.1 Phase 1

Phase 1 includes the construction of a temporary stableyard including horsebox parking, machinery shed, maintenance shed, ESB substation, two wells, new pre-parade ring and pavilion on Galway Racecourse lands. (Approval for which was granted by Galway City Council in December 2024 Planning Ref. No.:24/60279).

16.4.1.2 Phase 2

Phase 2 comprises the construction and operation of the proposed N6 GCRR. Phase 2 comprises the most significant characteristic of the Project likely to impact on air quality.

16.4.1.3 Phase 3

Phase 3 comprises the construction of the new permanent stableyard including horsebox parking post handover of the proposed N6 GCRR. (Approval for which was granted by Galway City Council in December 2024 Planning Ref. No.:24/60279).

16.4.1.4 Phase 4

Phase 4 comprises the demolition of the temporary stables constructed in Phase 1. (Approval for which was granted by Galway City Council in December 2024 Planning Ref. No.:24/60279).

16.4.1.5 Phase 5

Phase 5 is the operational phase of the Project.

16.4.2 Construction Phase

The construction of the proposed N6 GCRR will require earthworks, particularly during site clearance and excavation, refer to Chapter 7, Construction Activities for further details. Dust emissions are likely to arise from the following activities:

- Site earthworks
- Windblow from temporary stockpiles
- Handling of construction materials
- Landscaping
- Construction traffic movements
- Demolitions

- Concrete batching and crushing

In general, any additional airborne concentrations of particulate matter arising from construction would be small and very local to the construction activity (minimising human exposure). Particles generated by most construction activities tend to be larger than 10µm in diameter which are too large to enter the human lung.

Based on the assessment criteria outlined in Table 16.10 the potential dust impacts at locations where the main construction works will occur are assessed in Section 16.5. A number of construction compounds are proposed, refer to Figures 7.101 to 7.124 for the locations of these compounds. The main construction compound will be located at Lackagh Quarry. It is assumed that concrete batching and rock crushing plant will be utilised at each compound. It is also expected that a mobile crushing plant will be used in areas where extensive cut is required.

Demolition works will generate dust and the movement of machinery which will potentially impact on adjoining lands for a short duration.

16.4.3 Operational Phase

The Project comprises the construction of a single carriageway from the western side of Bearna as far as the Ballymoneen Road and a dual carriageway from here to the eastern tie in with the existing N6 at Coolagh with associated link roads. The Project also includes for the provision of the new Galway Racecourse Stables.

During the operational phase, there is the potential for air quality impacts to arise due to the redistribution of traffic on the existing and proposed road network. The assessment relies on predicted traffic volumes as outlined in Chapter 6, Traffic Assessment and Route Cross-section. No additional air quality impacts are likely to arise due to the operation of the Racecourse Stables; traffic volumes associated with the racecourse form part of the Do-Something scenario.

There is the potential for air quality impacts to arise during the maintenance of the proposed Project, however these are not considered as they would amount to standard road maintenance.

16.5 Assessment of Potential Effects

16.5.1 Introduction

The following sections consider the potential effects of the Project on air quality during the construction and operational phases. The construction assessment considers potential effects due to construction activities and traffic. The operational phase assesses the potential effects locally and regionally due to traffic emissions.

16.5.2 Do-Minimum Effects

Th Do-Minimum effects are considered and compared to the Do-Something scenario during the operational phase of the Project.

16.5.3 Do-Something Construction Effects

16.5.3.1 Introduction

There is potential for direct and indirect impacts to arise during the construction phase. Direct effects are likely due to construction phase activities. Indirect effects relate to the offsite impacts associated with construction traffic accessing the site for deliveries, removals and staff.

16.5.3.2 Direct Effects

Dust emissions are likely to arise from the following activities:

- Site clearance including demolitions
- Utility diversions
- Foundation construction

- Site excavation
- Use of generators
- Stockpiling of excavated materials
- Handling of construction materials
- Construction traffic movements

Dust Emission Magnitude

As outlined in Section 16.2.6, the IAQM guidance was used to assess the potential air quality impacts on ecological sensitive designated habitats during the construction phase.

Following the methodology outlined in Section 16.2.6, each dust generating activity has been assigned a dust emission magnitude as shown in Table 16.24.

Table 16.24 Dust Emission Magnitude for Construction Activities

Activity	Dust Emission Magnitude	Reasoning
Earthworks	Large	Total site area >110,000m^2
Construction	Large	Onsite concrete batching
Track-out	Large	>50 HDV (>3.5t) outward movements in any one day
Demolition	Medium	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material, demolition activities 6-12m above ground level

Sensitivity of the Area

The receptor sensitivity of the study area to dust soiling effects has been assigned as high, due to the presence of dwellings, schools and care homes with a high sensitivity for health effects. The sensitivity of the area to human health impact (based on Table 16.18) is considered medium due to the relatively low background concentration of PM_{10}. The sensitivity of the area to ecological sensitive designated habitats has been assigned as high, due to the number of sensitive designated habitats within 200m distance from dust generating activities.

The overall sensitivity has been summarised as shown in Table 16.25.

Table 16.25 Outcome of Defining Sensitivity of Area *(Source: IAQM Guidance)*

Potential Impact	Risk			
	Earthworks	Construction	Track-out	Demolition
Dust Soiling	High	High	High	High
Human Health	Medium	Medium	Medium	Medium
Ecological	High	High	High	High

Risk of Impacts

Taking into consideration the dust emission magnitude and the sensitivity of the area, the risk of dust impacts is presented in Table 16.26 based on the approach outlined in Table 16.10.

Table 16.26 Risk of Dust Impacts to Define Mitigation

Potential Impact	Risk			
	Earthworks	Construction	Track-out	Demolition
Dust Soiling	High	High	High	Medium
Human Health	Medium	Medium	Medium	Medium
Ecological	High	High	High	Medium

The impact risk is assigned, as shown in Table 16.26, prior to the implementation of mitigation measures. On this basis, the direct impact on air quality during the construction phase has the potential to be negative, significant, and short-term in proximity to the works. Specific mitigation is described in Section 16.6

16.5.3.3 Indirect effects

As outlined in Section 16.2.4 and in accordance with TII Standard, AADT flows of less than 1,000 or HDV flow change of less than 200 AADT during the operational and construction phases are unlikely to result in significant air quality effects. As no links are predicted to experience increases greater than these criteria during the construction phase (refer to Table 7.10 in Chapter 7, Construction Activities), no further assessment is required.

16.5.4 Do-Something Operational Effects

The following sections consider the potential for pollution due to the Project at human and ecological sensitive designated habitats and compared to relevant limits. Locations where air quality improvements are likely due to traffic reductions are also identified in Section 16.5.4.3.

16.5.4.1 Human Receptors

This section considers the potential effects of the Project on human receptors. All predicted concentrations include for maximum background concentrations as outlined in Table 16.19.

Opening Year – 2031

The predicted change in NO_2, $PM_{2.5}$ and PM_{10} concentrations in 2031 due to the projected changes in operational phase AADT are presented in Table 1 in Appendix A.16.2 for a number of nearest receptors on each affected road link. Table 16.27 presents the worst-case receptors (i.e. receptors with highest pollutant concentrations at given link) associated with each road link. Based on the significance criteria outlined in Table 16.11, the majority of receptors are predicted to experience a neutral worst-case impact rating for 2031, with one slight adverse (R81) and one moderate adverse (R72) rating predicted. Refer to Figures 16.1.101 to 16.1.110 for locations of sensitive receptors.

The low impact rating demonstrates that the pollutant concentrations from the Project are low relative to the background pollutant concentrations. The contribution the background concentration makes to the total Do-Something Scenario is important in the context of the commencement of the new EU Directive 2024/2881/EC which has more stringent limit values than those of the existing legislation. It is expected that the implementation of government strategies like the European Green Deal, Clean Air Strategy and CAP will help to lower the background pollutant concentrations. The background concentrations on which the assessment is based is from historical background values. Actual future (2031) concentrations are expected to be significantly less.

Predicted concentrations including the implementation of the Project are in compliance with air quality standards at all worst-case sensitive receptors.

Table 16.27 Percentage Change in Concentration Relative to AQLV - 2031

Receptor ID	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
R1	0.3	38.9	0.4	41.4	0.4	48.8	Neutral
R4	0.3	44.0	0.4	46.9	0.3	53.7	Neutral
R7	-1.3	41.2	-1.4	44.0	-1.3	51.0	Neutral
R10	2.2	44.3	2.4	47.4	2.1	54.1	Neutral
R13	0.3	43.0	0.4	46.6	0.4	53.4	Neutral
R16	0.7	42.3	0.7	44.6	0.6	51.7	Neutral
R22	2.2	40.1	2.2	41.8	2.0	49.2	Neutral
R25	3.5	41.3	3.4	42.9	3.0	50.2	Neutral
R28	0.2	42.6	0.3	45.5	0.2	52.4	Neutral
R31	1.2	42.9	1.0	45.8	0.9	52.7	Neutral
R34	3.8	42.9	3.9	44.6	3.5	51.7	Neutral
R66	3.6	39.3	4.4	41.8	3.8	49.1	Neutral
R69	5.0	40.8	5.3	42.7	4.7	50.0	Neutral
R72	11.5	47.2	12.2	49.6	10.8	56.0	Moderate Adverse
R75	1.9	37.6	2.3	39.7	2.0	47.3	Neutral
R78	3.9	39.6	3.8	41.2	3.4	48.7	Neutral

Receptor ID	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
R81	6.6	42.4	6.6	44.0	5.9	51.2	Slight Adverse
R84	2.3	38.1	2.7	40.2	2.4	47.7	Neutral
R89	3.8	39.6	4.4	41.9	3.9	49.2	Neutral
R92	2.7	38.4	3.1	40.5	2.7	48.0	Neutral
R95	2.5	38.3	2.9	40.4	2.6	47.8	Neutral
R106	1.2	37.0	1.4	38.9	1.3	46.6	Neutral
R60	0.2	43.6	0.1	41.0	0.1	48.9	Neutral
R63	0.2	38.8	0.1	38.9	0.0	46.7	Neutral
R45	0.8	37.1	0.8	38.8	0.7	46.5	Neutral
R48	-0.6	40.7	-0.6	42.3	-0.6	49.6	Neutral
R51	-0.8	36.5	-0.7	38.2	-0.7	46.0	Neutral
R54	1.0	38.1	1.0	39.9	0.9	47.4	Neutral
R57	1.5	38.8	1.6	40.7	1.4	48.2	Neutral
R3	1.3	37.4	1.6	39.5	1.4	47.0	Neutral
R42	2.3	38.1	2.6	40.1	2.3	47.6	Neutral
R19	4.7	43.0	5.1	45.0	4.6	52.0	Neutral
R9	0.1	38.9	0.1	41.1	0.1	48.5	Neutral
R38	1.8	37.8	2.0	39.8	1.8	47.4	Neutral

Receptor ID	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
R40	1.7	44.2	2.0	47.6	1.8	54.3	Neutral
R39	-0.1	43.1	-0.1	46.3	-0.1	53.1	Neutral
R97	0.3	36.1	0.4	37.8	0.3	45.6	Neutral
R100	2.5	38.3	2.9	40.4	2.6	47.9	Neutral
R103	1.9	37.7	2.3	39.7	2.0	47.3	Neutral
R107	0.4	36.2	0.5	38.0	0.4	45.7	Neutral
R112	0.8	36.5	1.0	38.4	0.8	46.1	Neutral

Design Year - 2046

The predicted change in NO_2, $PM_{2.5}$ and PM_{10} concentrations for 2046 due to the projected changes in operational phase AADT are presented in Table 2 in Appendix A.16.2 for a number of nearest receptors on each affected road link in 2046. Table 16.28 presents the worst-case receptors associated with each road link.

Based on the significance criteria outlined in Table 16.11, the majority of receptors are predicted to experience a neutral worst-case impact rating for 2046, with one slight adverse (R81) and one moderate adverse (R72) rating predicted.

The low impact rating demonstrates that the pollutant concentrations from the Project are low relative to the background pollutant concentrations. The contribution the background concentration makes to the total Do-Something Scenario is important in the context of the commencement of the new EU Directive 2024/2881/EC which has more stringent limit values than those of the existing legislation. It is expected that the implementation of government strategies like the European Green Deal, Clean Air Strategy and CAP will help to lower the background pollutant concentrations. The background concentrations on which the assessment is based is from historical background values. Actual future (2046) concentrations are expected to be significantly less.

Predicted concentrations including the implementation of the Project are in compliance with air quality standard values (AQLV).

Table 16.28 Percentage Change in Concentration Relative to AQLV - 2046

Receptor ID	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact rating
	% Change in Concentration Relative to AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
R1	0.4	38.4	0.6	41.9	0.5	49.2	Neutral
R4	0.2	42.2	0.2	47.2	0.2	53.9	Neutral
R7	-1.0	40.0	-1.5	44.3	-1.4	51.3	Neutral
R10	1.5	42.3	2.1	47.5	1.9	54.2	Neutral
R13	0.3	41.3	0.4	46.8	0.4	53.5	Neutral
R16	0.5	40.8	0.6	44.7	0.6	51.7	Neutral
R22	2.4	40.1	3.2	43.1	2.9	50.4	Neutral
R25	2.5	40.1	3.2	43.1	2.9	50.3	Neutral
R28	0.2	41.0	0.3	45.7	0.2	52.5	Neutral
R31	1.1	41.7	1.2	46.4	1.1	53.2	Neutral
R34	3.4	42.6	4.6	46.5	4.1	53.3	Neutral
R66	3.0	38.7	4.8	42.3	4.2	49.5	Neutral
R69	4.1	39.9	5.8	43.2	5.1	50.4	Neutral
R72	9.4	45.1	13.4	50.9	11.8	57.1	Moderate adverse
R75	1.7	37.5	2.7	40.2	2.4	47.7	Neutral
R78	3.3	39.1	4.4	41.8	3.9	49.2	Neutral
R81	5.3	41.0	7.0	44.4	6.2	51.5	Slight adverse
R84	1.9	37.7	3.0	40.5	2.6	47.9	Neutral

Receptor ID	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact rating
	% Change in Concentration Relative to AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
R89	3.0	38.7	4.6	42.0	4.0	49.3	Neutral
R92	2.1	37.9	3.3	40.7	2.9	48.2	Neutral
R95	2.0	37.8	3.1	40.5	2.7	48.0	Neutral
R106	1.2	36.9	1.8	39.2	1.6	46.8	Neutral
R60	0.4	42.3	0.2	41.5	0.2	49.3	Neutral
R63	0.2	38.2	0.1	39.0	0.1	46.8	Neutral
R117	0.5	43.6	0.6	47.4	0.6	54.2	Neutral
R45	0.5	36.9	0.7	38.9	0.6	46.6	Neutral
R48	-0.3	40.1	-0.5	43.1	-0.4	50.3	Neutral
R51	-0.5	36.3	-0.6	38.2	-0.5	46.0	Neutral
R54	0.6	37.7	0.8	40.1	0.7	47.6	Neutral
R57	1.1	38.4	1.6	41.2	1.4	48.6	Neutral
R3	1.1	37.1	1.9	39.8	1.6	47.3	Neutral
R42	1.8	37.6	2.7	40.3	2.4	47.8	Neutral
R19	3.9	42.3	5.7	46.4	5.0	53.3	Neutral
R9	0.1	38.2	0.1	41.3	0.1	48.6	Neutral
R38	1.5	37.4	2.2	40.0	2.0	47.6	Neutral
R40	1.5	42.6	2.4	48.7	2.1	55.2	Neutral

Receptor ID	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact rating
	% Change in Concentration Relative to AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
R39	-0.2	41.5	-0.1	46.9	-0.1	53.6	Neutral
R97	0.3	36.0	0.4	37.8	0.3	45.6	Neutral
R100	2.3	38.0	3.6	41.0	3.2	48.4	Neutral
R103	1.6	37.3	2.5	39.9	2.2	47.4	Neutral
R107	0.4	36.1	0.6	38.0	0.5	45.8	Neutral
R112	0.7	36.4	1.0	38.5	0.9	46.2	Neutral

16.5.4.2 Ecological Sensitive Designated Habitats

This section considers the potential effects of the Project on ecological sensitive designated habitats. All predicted concentrations include for maximum background concentrations as outlined in Table 16.20. Results are presented below using TII REM tool. Refer to Appendix A.16.3 for the results using the ADMS model. In general, the ADMS outputs are consistent with the TII REM tool in the immediate vicinity of the proposed Project, however, pollutant concentrations reduce at a greater rate with increased separation from the proposed Project with the ADMS model compared to TII REM tool.

Opening Year – 2031

The predicted change in NO_x concentrations due to the projected changes in operational phase AADT (2031) at the ecological sensitive designated habitats is presented in Table 16.29. Based on the significance criteria outlined in Table 16.11, within 50m of the Project a moderate adverse rating is predicted at Lough Corrib SAC with slight adverse effects predicted within 60m. Beyond 70m and beyond 40m at all Moycullen Bogs NHA receptor points, a neutral effect is predicted.

Predicted concentrations NO_x including the implementation of the Project are in compliance with AQLV. Refer to Chapter 8, Biodiversity for an analysis of the potential implications for the ecological sensitive designated habitats.

Table 16.29 Predicted NOx Concentrations at Various Distances from the Project - 2031

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (Background)	Do-Something Concentrations (µg/m³) (Including Background)	% Change in Concentration Relative to AQLV	% Do-Something Relative to AQLV	Impact Rating
Lough Corrib SAC	0	6.3	16.31	33.4	54.4	Moderate adverse
	10	6.3	15.34	30.1	51.1	Moderate adverse
	20	6.3	13.14	22.8	43.8	Moderate adverse
	30	6.3	11.55	17.5	38.5	Moderate adverse
	40	6.3	10.39	13.6	34.6	Moderate adverse
	50	6.3	9.51	10.7	31.7	Moderate adverse
	60	6.3	8.83	8.4	29.4	Slight adverse
	70	6.3	8.29	6.6	27.6	Slight adverse
	80	6.3	7.87	5.2	26.2	Neutral
	90	6.3	7.53	4.1	25.1	Neutral
	100	6.3	7.26	3.2	24.2	Neutral
	110	6.3	7.05	2.5	23.5	Neutral
	120	6.3	6.88	1.9	22.9	Neutral
	130	6.3	6.76	1.5	22.5	Neutral
	140	6.3	6.67	1.2	22.2	Neutral

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (Background)	Do-Something Concentrations (µg/m³) (Including Background)	% Change in Concentration Relative to AQLV	% Do-Something Relative to AQLV	Impact Rating
	150	6.3	6.62	1.1	22.1	Neutral
	160	6.3	6.59	1.0	22.0	Neutral
	170	6.3	6.57	0.9	21.9	Neutral
	180	6.3	6.53	0.8	21.8	Neutral
	190	6.3	6.48	0.6	21.6	Neutral
	200	6.3	6.44	0.5	21.5	Neutral
Moycullen Bogs NHA	40	1.9	3.87	6.6	12.9	Slight adverse
	50	1.9	3.45	5.2	11.5	Neutral
	60	1.9	3.12	4.1	10.4	Neutral
	70	1.9	2.86	3.2	9.5	Neutral
	80	1.9	2.66	2.5	8.9	Neutral
	90	1.9	2.49	2.0	8.3	Neutral
	100	1.9	2.36	1.5	7.9	Neutral
	110	1.9	2.26	1.2	7.5	Neutral
	120	1.9	2.18	0.9	7.3	Neutral
	130	1.9	2.12	0.7	7.1	Neutral
	140	1.9	2.08	0.6	6.9	Neutral
	150	1.9	2.05	0.5	6.8	Neutral
	160	1.9	2.04	0.5	6.8	Neutral
	170	1.9	2.03	0.4	6.8	Neutral
	180	1.9	2.01	0.4	6.7	Neutral
	190	1.9	1.99	0.3	6.6	Neutral
	200	1.9	1.97	0.2	6.6	Neutral

The predicted change in ammonia concentrations due to the projected changes in operational phase AADT (2031) at the ecological sensitive designated habitats is presented in Table 16.30 and compared to the maximum critical level of 3µg/m³ as presented in Table 16.4. Based on the significance criteria outlined in Table 16.11, within 30m of the Project a substantial adverse rating is predicted at Lough Corrib SAC with a moderate adverse predicted within 90m. Moderate adverse effects are also predicted at 40m from the Moycullen Bogs NHA. Refer to Chapter 8 Biodiversity for an analysis of the potential implications for the ecological sensitive designated habitats.

Table 16.30 Predicted Ammonia concentrations at Various Distances from the Project - 2031

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (background)	Do-Something Concentrations (µg/m³) (including background)	% Change in Concentration Relative to AQLV	% Do-Something relative to AQLV	Impact Rating
Lough Corrib SAC	0	1.3	4.3	100.0	143.3	Substantial adverse
	10	1.3	4.01	90.3	133.7	Substantial adverse
	20	1.3	3.35	68.3	111.7	Substantial adverse
	30	1.3	2.88	52.7	96.0	Substantial adverse
	40	1.3	2.53	41.0	84.3	Moderate adverse
	50	1.3	2.26	32.0	75.3	Moderate adverse
	60	1.3	2.06	25.3	68.7	Moderate adverse
	70	1.3	1.9	20.0	63.3	Moderate adverse
	80	1.3	1.77	15.7	59.0	Moderate adverse
	90	1.3	1.67	12.3	55.7	Moderate adverse
	100	1.3	1.59	9.7	53.0	Slight adverse
	110	1.3	1.52	7.3	50.7	Slight adverse
	120	1.3	1.48	6.0	49.3	Slight adverse
	130	1.3	1.44	4.7	48.0	Neutral
	140	1.3	1.41	3.7	47.0	Neutral
	150	1.3	1.39	3.0	46.3	Neutral
	160	1.3	1.39	3.0	46.3	Neutral
	170	1.3	1.38	2.7	46.0	Neutral
	180	1.3	1.37	2.3	45.7	Neutral
	190	1.3	1.35	1.7	45.0	Neutral
	200	1.3	1.34	1.3	44.7	Neutral
Moycullen Bogs NHA	40	1.1	1.46	12.0	48.7	Moderate adverse

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (background)	Do-Something Concentrations (µg/m³) (including background)	% Change in Concentration Relative to AQLV	% Do-Something relative to AQLV	Impact Rating
	50	1.1	1.38	9.3	46.0	Slight adverse
	60	1.1	1.32	7.3	44.0	Slight adverse
	70	1.1	1.28	6.0	42.7	Slight adverse
	80	1.1	1.24	4.7	41.3	Neutral
	90	1.1	1.21	3.7	40.3	Neutral
	100	1.1	1.18	2.7	39.3	Neutral
	110	1.1	1.17	2.3	39.0	Neutral
	120	1.1	1.15	1.7	38.3	Neutral
	130	1.1	1.14	1.3	38.0	Neutral
	140	1.1	1.13	1.0	37.7	Neutral
	150	1.1	1.13	1.0	37.7	Neutral
	160	1.1	1.13	1.0	37.7	Neutral
	170	1.1	1.12	0.7	37.3	Neutral
	180	1.1	1.12	0.7	37.3	Neutral
	190	1.1	1.12	0.7	37.3	Neutral
	200	1.1	1.11	0.3	37.0	Neutral

The predicted change in nitrogen deposition due to the projected changes in operational phase AADT (2031) at the ecological sensitive designated habitats is presented in Table 16.31 at various distances from the Project. Predicted deposition rates are compared to the maximum critical load of 30kgN/ha/y as presented in Table 16.4. Total nitrogen deposition is predicted to comply with critical loads at all receptors in Lough Corrib SAC and Moycullen Bogs NHA in 2031.

Table 16.31 Predicted Nitrogen Deposition - 2031

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Deposition (kgN/ha/yr) (background)	Do-Something Deposition (kgN/ha/yr) (including background)	% Total Deposition Relative to Maximum Critical Load
Lough Corrib SAC	0	4.9	29.82	99.4
	10	4.9	27.41	91.4
	20	4.9	21.93	73.1
	30	4.9	18.02	60.1
	40	4.9	15.12	50.4
	50	4.9	12.88	42.9

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Deposition (kgN/ha/yr) (background)	Do-Something Deposition (kgN/ha/yr) (including background)	% Total Deposition Relative to Maximum Critical Load
	60	4.9	11.22	37.4
	70	4.9	9.89	33.0
	80	4.9	8.81	29.4
	90	4.9	7.98	26.6
	100	4.9	7.31	24.4
	110	4.9	6.74	22.5
	120	4.9	6.39	21.3
	130	4.9	6.06	20.2
	140	4.9	5.82	19.4
	150	4.9	5.65	18.8
	160	4.9	5.64	18.8
	170	4.9	5.56	18.5
	180	4.9	5.48	18.3
	190	4.9	5.32	17.7
	200	4.9	5.23	17.4
Moycullen Bogs NHA	40	4.3	7.41	24.7
	50	4.3	6.72	22.4
	60	4.3	6.21	20.7
	70	4.3	5.85	19.5
	80	4.3	5.51	18.4
	90	4.3	5.25	17.5
	100	4.3	4.99	16.6
	110	4.3	4.91	16.4
	120	4.3	4.73	15.8
	130	4.3	4.64	15.5
	140	4.3	4.56	15.2
	150	4.3	4.55	15.2
	160	4.3	4.55	15.2
	170	4.3	4.48	14.9
	180	4.3	4.48	14.9

Ecological Sensitive Designated Habitat	Distance to Project (m)	Do-Minimum Deposition (kgN/ha/yr) (background)	Do-Something Deposition (kgN/ha/yr) (including background)	% Total Deposition Relative to Maximum Critical Load
	190	4.3	4.47	14.9
	200	4.3	4.39	14.6

Based on the significance criteria outlined in Table 16.11 and as the total deposition is greater than 1% of the maximum (and minimum) critical load, the results are to be analysed by the biodiversity practitioner. Refer to Chapter 8, Biodiversity for an analysis of the potential implications for the ecological sites.

Design Year – 2046

The predicted change in NO_x concentrations due to the projected changes in operational phase AADT (2046) at the ecological sensitive designated habitats is presented in Table 16.32. Based on the significance criteria outlined in Table 16.11, within 40m of the Project a moderate adverse rating is predicted at Lough Corrib SAC with slight adverse effects predicted within 60m. Beyond 70m a neutral effect is predicted. For all Moycullen Bogs NHA receptor points a neutral effect is predicted.

Predicted concentrations NO_x including the implementation of the Project are in compliance with AQLV. Refer to Chapter 8, Biodiversity for an analysis of the potential implications for the ecological sensitive designated habitats.

Table 16.32 Predicted NO_x Concentrations at Various Distances from the Project - 2046

Ecological Sensitive Designated Habitats	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (background)	Do-Something Concentrations (µg/m³) (including background)	% Change in Concentration Relative to AQLV	% Do-Something Relative to AQLV	Impact Rating
Lough Corrib SAC	0	6.3	14.46	27.2	48.2	Moderate adverse
	10	6.3	13.66	24.5	45.5	Moderate adverse
	20	6.3	11.87	18.6	39.6	Moderate adverse
	30	6.3	10.58	14.3	35.3	Moderate adverse
	40	6.3	9.63	11.1	32.1	Moderate adverse
	50	6.3	8.92	8.7	29.7	Slight adverse
	60	6.3	8.36	6.9	27.9	Slight adverse
	70	6.3	7.92	5.4	26.4	Neutral
	80	6.3	7.58	4.3	25.3	Neutral
	90	6.3	7.3	3.3	24.3	Neutral
	100	6.3	7.08	2.6	23.6	Neutral
	110	6.3	6.91	2.0	23.0	Neutral
	120	6.3	6.78	1.6	22.6	Neutral

Ecological Sensitive Designated Habitats	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (background)	Do-Something Concentrations (µg/m³) (including background)	% Change in Concentration Relative to AQLV	% Do-Something Relative to AQLV	Impact Rating
	130	6.3	6.68	1.3	22.3	Neutral
	140	6.3	6.6	1.0	22.0	Neutral
	150	6.3	6.56	0.9	21.9	Neutral
	160	6.3	6.53	0.8	21.8	Neutral
	170	6.3	6.52	0.7	21.7	Neutral
	180	6.3	6.48	0.6	21.6	Neutral
	190	6.3	6.45	0.5	21.5	Neutral
	200	6.3	6.41	0.4	21.4	Neutral
Moycullen Bogs NHA	40	1.9	3.68	5.9	12.3	Neutral
	50	1.9	3.3	4.7	11.0	Neutral
	60	1.9	3	3.7	10.0	Neutral
	70	1.9	2.77	2.9	9.2	Neutral
	80	1.9	2.58	2.3	8.6	Neutral
	90	1.9	2.44	1.8	8.1	Neutral
	100	1.9	2.32	1.4	7.7	Neutral
	110	1.9	2.23	1.1	7.4	Neutral
	120	1.9	2.15	0.8	7.2	Neutral
	130	1.9	2.1	0.7	7.0	Neutral
	140	1.9	2.06	0.5	6.9	Neutral
	150	1.9	2.04	0.5	6.8	Neutral
	160	1.9	2.02	0.4	6.7	Neutral
	170	1.9	2.02	0.4	6.7	Neutral
	180	1.9	2	0.3	6.7	Neutral
	190	1.9	1.98	0.3	6.6	Neutral
	200	1.9	1.96	0.2	6.5	Neutral

The predicted change in ammonia concentrations due to the projected changes in operational phase AADT (2046) at the ecological sensitive designated habitats is presented in Table 16.33 and compared to the maximum critical level of 3µg/m³. Based on the significance criteria outlined in Table 16.11, within 40m of the Project a substantial adverse rating is predicted at Lough Corrib SAC with a moderate adverse predicted within 100m. Moderate adverse effects are predicted within 50m of the Moycullen Bogs NHA. Refer to Chapter 8, Biodiversity for an analysis of the potential implications for the ecological sites.

Table 16.33 Predicted Ammonia Concentrations at Various Distances from the Project - 2046

Ecological Sensitive Designated Habitats	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (background)	Do-Something Concentrations (µg/m³) (including background)	% Change in Concentration Relative to AQSV	% Do-Something Relative to AQSV	Impact Rating
Lough Corrib SAC	0	1.3	5.15	128.3	171.7	Substantial adverse
	10	1.3	4.78	116.0	159.3	Substantial adverse
	20	1.3	3.93	87.7	131.0	Substantial adverse
	30	1.3	3.32	67.3	110.7	Substantial adverse
	40	1.3	2.87	52.3	95.7	Substantial adverse
	50	1.3	2.53	41.0	84.3	Moderate adverse
	60	1.3	2.27	32.3	75.7	Moderate adverse
	70	1.3	2.07	25.7	69.0	Moderate adverse
	80	1.3	1.9	20.0	63.3	Moderate adverse
	90	1.3	1.77	15.7	59.0	Moderate adverse
	100	1.3	1.67	12.3	55.7	Moderate adverse
	110	1.3	1.59	9.7	53.0	Slight adverse
	120	1.3	1.52	7.3	50.7	Slight adverse
	130	1.3	1.48	6.0	49.3	Slight adverse
	140	1.3	1.44	4.7	48.0	Neutral
	150	1.3	1.42	4.0	47.3	Neutral
	160	1.3	1.41	3.7	47.0	Neutral
	170	1.3	1.4	3.3	46.7	Neutral
	180	1.3	1.39	3.0	46.3	Neutral
	190	1.3	1.37	2.3	45.7	Neutral
	200	1.3	1.35	1.7	45.0	Neutral
Moycullen Bogs NHA	40	1.1	1.53	14.3	51.0	Moderate adverse

Ecological Sensitive Designated Habitats	Distance to Project (m)	Do-Minimum Concentrations (µg/m³) (background)	Do-Something Concentrations (µg/m³) (including background)	% Change in Concentration Relative to AQSV	% Do-Something Relative to AQSV	Impact Rating
	50	1.1	1.44	11.3	48.0	Moderate adverse
	60	1.1	1.37	9.0	45.7	Slight adverse
	70	1.1	1.31	7.0	43.7	Slight adverse
	80	1.1	1.27	5.7	42.3	Neutral
	90	1.1	1.23	4.3	41.0	Neutral
	100	1.1	1.2	3.3	40.0	Neutral
	110	1.1	1.18	2.7	39.3	Neutral
	120	1.1	1.16	2.0	38.7	Neutral
	130	1.1	1.15	1.7	38.3	Neutral
	140	1.1	1.14	1.3	38.0	Neutral
	150	1.1	1.13	1.0	37.7	Neutral
	160	1.1	1.13	1.0	37.7	Neutral
	170	1.1	1.13	1.0	37.7	Neutral
	180	1.1	1.12	0.7	37.3	Neutral
	190	1.1	1.12	0.7	37.3	Neutral
	200	1.1	1.11	0.3	37.0	Neutral

The predicted change in nitrogen deposition due to the projected changes in operational phase AADT (2046) at the ecological sensitive designated habitats is presented in Table 16.34 at various distances from the Project. Predicted deposition rates are compared to the maximum critical load of 30kgN/ha/yr (see Table 16.4). An exceedance of total nitrogen deposition is predicted within 10m of the proposed Project in 2046 at the Lough Corrib SAC. Total nitrogen deposition is predicted to comply with critical loads at all receptors in Moycullen Bogs NHA in 2046.

Table 16.34 Predicted Nitrogen Deposition - 2046

Ecological Site	Distance to Project (m)	Do-Minimum Deposition (kgN/ha/yr) (background)	Do-Something Deposition (kgN/ha/yr) (including background)	% Total Deposition Relative to Maximum Critical Load
Lough Corrib SAC	0	4.9	36.17	120.6
	10	4.9	33.16	110.5
	20	4.9	26.26	87.5
	30	4.9	21.32	71.1
	40	4.9	17.66	58.9
	50	4.9	14.89	49.6
	60	4.9	12.79	42.6
	70	4.9	11.16	37.2
	80	4.9	9.78	32.6
	90	4.9	8.72	29.1
	100	4.9	7.91	26.4
	110	4.9	7.25	24.2
	120	4.9	6.69	22.3
	130	4.9	6.36	21.2
	140	4.9	6.04	20.1
	150	4.9	5.88	19.6
	160	4.9	5.79	19.3
	170	4.9	5.71	19.0
	180	4.9	5.63	18.8
	190	4.9	5.47	18.2
	200	4.9	5.31	17.7
Moycullen Bogs NHA	40	4.3	7.93	26.4
	50	4.3	7.16	23.9
	60	4.3	6.58	21.9
	70	4.3	6.07	20.2
	80	4.3	5.73	19.1
	90	4.3	5.39	18.0
	100	4.3	5.14	17.1
	110	4.3	4.97	16.6

Ecological Site	Distance to Project (m)	Do-Minimum Deposition (kgN/ha/yr) (background)	Do-Something Deposition (kgN/ha/yr) (including background)	% Total Deposition Relative to Maximum Critical Load
	120	4.3	4.81	16.0
	130	4.3	4.72	15.7
	140	4.3	4.64	15.5
	150	4.3	4.55	15.2
	160	4.3	4.55	15.2
	170	4.3	4.55	15.2
	180	4.3	4.47	14.9
	190	4.3	4.47	14.9
	200	4.3	4.39	14.6

Based on the significance criteria outlined in Table 16.12 and as the total deposition is greater than 1% of the maximum (and minimum) critical load, the results are to be analysed by the biodiversity practitioner. Refer to Chapter 8 Biodiversity for a detailed analysis of the potential implications for the ecological sites. This assessment concludes that no likely significant effects on biodiversity are likely due to emissions to air during the construction and operational phases following the implementation of mitigation measures, apart from the following receptors: Imbricate bog-moss *Sphagnum affine*, Red bog-moss *Sphagnum capillifolium*, Woodsy thyme moss *Plagiomnium cuspidatum*, Lesser striated feathermoss *Plasteurhynchium striatulum and* Eyebright *Euphrasia arctica*.

16.5.4.3 Air Quality Improvements

As described in the Climate Action Plan, 2024 (CAP24) reducing transport emissions reduces exposure to pollutants and associated mortality risks and will help Ireland achieve its ambition to move towards the World Health Organisation Air Quality guidelines. Through removing congestion and high volumes of traffic from areas which are highly populated, exposure to pollution can be reduced which is a positive benefit of the Project.

Table 16.35 outlines locations where air quality has the potential to improve as a result of decreases in AADT. As set out in Section 16.2.4, change in Average Daily Traffic (AADT) flows of less than 1,000 or heavy-duty vehicle (HDV) flow change of less than 200 AADT during the operational and construction phases are unlikely to result in significant air quality effects. The links identified below are predicted to experience a reduction in AADT of greater than 1,000. Light green areas represent scenarios where AADT flow values will decrease by less than 20%, the darkest green represents a greater than 80% decrease. The reduction in traffic will result in a localised improvement of air quality in these regions, which will be particularly evident where sensitive receptors are adjacent to roadways and traffic reductions are substantial.

Table 16.35 Locations of Reduced AADT Flows

Link Number	Link Location	2031	2046
		DS - DM	DS - DM
4	N6 South of Briarhill	41%	42%
5	N6 Near Ballybrit Business Park	24%	20%
6	N6 between N17 and R865	29%	26%
7	N6 Between N84 and N17	29%	27%
8	N6 East of Quincentenary Bridge	20%	15%
9	N6 - On Quincentenary Bridge	32%	33%
10	R338 at Westside Playing fields	31%	30%
11	Western Distributor Road between Clybaun Road and R338	43%	43%
13	R337 Kingston Road. Kingston	42%	45%
15	R336. Barna Road. Barna Woods	54%	53%
16	R336. Barna Road. Barna. Creagan bus stop	51%	51%
28	R338. Dublin Road. Between Renmore Road and Michael Collins Road	15%	17%
29	R336. Tuam Road. Mervue Business Park	25%	26%
30	Wolfe Tone Bridge	26%	27%
44	Letteragh Road North of GCRR Link Road	93%	82%
94	N6 North of Briarhill	31%	30%
95	R339 East of Briarhill	27%	25%
98	Ballybrit Crescent North of R339	38%	36%
99	Ballybrit Crescent North of Briarhill Business Park	40%	37%
119	Western Distributor Road - East of Gort Na Bro	30%	36%

As noted in Section 16.3.2, high levels of NO_2 were measured by the EPA at a number of locations in Galway City under the 'Clean Air Together' programme, including Briarhill/N6. Reductions in traffic volumes of greater than 30% are expected to arise in this vicinity due to the Project, thereby reducing pollutant concentrations.

Pollutant concentrations are calculated in Table 16.36 to Table 16.37 for NO_2, PM_{10} and $PM_{2.5}$ for 2031 and 2046 on links where traffic reductions of greater than 1,000 AADT are predicted to occur. Concentrations are calculated at 10m from the road edge to represent a worst-case receptor.

Table 16.36 Percentage Change in Concentration Relative to AQLV - 2031

Link Location	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
N6 South of Briarhill	-2.3	46.1	-2.7	50.0	-2.4	56.4	Neutral
N6 Near Ballybrit Business Park	-1.3	47.2	-1.6	51.1	-1.4	57.4	Neutral
N6 Between N17 and R865	-1.5	45.9	-1.9	49.2	-1.6	55.7	Neutral
N6 Between N84 and N17	-1.6	46.7	-1.7	48.7	-1.5	55.3	Neutral
N6 East of Quincentenary Bridge	-1.1	47.8	-1.2	50.1	-1.1	56.6	Neutral
N6 - On Quincentenary Bridge	-2.0	47.8	-2.5	51.2	-2.2	57.5	Neutral
R338 at Westside Playing fields	-1.5	45.0	-1.7	46.9	-1.5	53.8	Neutral
Western Distributor Road between Clybaun Road and R338	-3.5	41.1	-3.9	43.1	-3.5	50.4	Neutral
Western Distributor Road between Clybaun Road and Ballymoneen Road	-1.9	41.3	-2.2	43.6	-1.9	50.8	Neutral
R337 Kingston Road. Kingston	-3.5	41.3	-3.8	43.3	-3.4	50.4	Neutral
R336. Salthill Road Upper. Galway Golf Course.	-0.9	43.7	-1.0	45.9	-0.9	52.8	Neutral
R336. Barna Road. Barna. Creagan Bus Stop	-4.6	40.7	-4.8	42.7	-4.2	50.0	Neutral
R336. Barna Road. Barna. Creagan Bus Stop	-4.0	39.7	-4.2	41.7	-3.7	49.1	Neutral

Link Location	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
Boleybeg Road. Between Cappagh Road and Ballymoneen Road	-0.8	38.4	-0.7	39.9	-0.6	47.5	Neutral
Rahoon Road. Between Clybaun Road and Bothar Stiofain	-1.0	39.1	-1.0	40.8	-0.9	48.2	Neutral
N59. Thomas Hynes road. Between Hazel Park and Cherry Park	-0.8	39.7	-1.1	41.6	-0.9	49.0	Neutral
N59. Upper Newcastle Road. Between R338 and Corrib Village	-1.1	41.4	-1.4	43.8	-1.2	51.0	Neutral
N59. Barnacranny. Between Chestnut Lane and Circular Road	-0.3	44.2	-0.7	47.0	-0.6	53.7	Neutral
R338. Dublin Road. West of Junction with Coast Road	-0.3	44.4	-0.4	47.9	-0.4	54.5	Neutral
R338. Dublin Road. Between Renmore Road and Michael Collins Road	-0.6	45.4	-0.7	48.6	-0.6	55.2	Neutral
R336. Tuam Road. Mervue Business Park	-1.1	44.9	-1.2	47.4	-1.1	54.2	Neutral
Wolfe Tone Bridge	-1.5	48.2	-1.2	48.3	-1.0	55.1	Neutral
O'Briens Bridge	-2.6	43.3	-2.1	43.3	-1.9	50.6	Neutral
N17. Tuam Road. Northeast of School Road	-0.2	45.0	-0.4	48.4	-0.4	55.0	Neutral

Link Location	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQLV)	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	% Change in Concentration Relative to AQLV	% DS Concentration Relative to AQLV	
Cappagh Road - North of GCRR	-1.1	37.8	-1.0	39.5	-0.9	47.1	Neutral
Letteragh Road North of GCRR Link Road	-3.1	36.0	-3.0	37.7	-2.7	45.5	Neutral
N6 North of Briarhill	-1.8	47.1	-2.1	51.1	-1.8	57.4	Neutral
R339 East of Briarhill	-1.3	45.3	-1.5	48.6	-1.4	55.2	Neutral
Ballybrit Crescent North of R339	-2.0	45.6	-2.2	47.5	-1.9	54.3	Neutral
Ballybrit Crescent North of Briarhill Business Park	-2.1	45.3	-2.3	47.2	-2.0	54.0	Neutral
School Road	-1.3	36.5	-1.4	38.3	-1.3	46.0	Neutral
Rahoon Road east of GCRR Link Road	-0.7	41.3	-0.7	43.0	-0.6	50.2	Neutral
Gort Na Bro South of Rahoon Road	-1.0	36.7	-0.9	38.4	-0.8	46.1	Neutral
Western Distributor Road - East of Gort Na Bro	-2.6	44.3	-2.5	45.1	-2.2	52.2	Neutral

Table 16.37 Percentage Change in Concentration Relative to AQSV - 2046

Link Location	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQSV)	% DS Concentration Relative to AQSV	% Change in Concentration Relative to AQSV	% DS Concentration Relative to AQSV	% Change in Concentration Relative to AQSV	% DS Concentration Relative to AQSV	
N6 South of Briarhill	-1.9	43.9	-2.9	50.6	-2.6	56.9	Neutral
N6 Near Ballybrit Business Park	-0.8	45.0	-1.4	51.9	-1.3	58.0	Neutral
N6 between N17 and R865	-1.0	44.0	-1.7	50.2	-1.5	56.5	Neutral
N6 Between N84 and N17	-1.2	44.6	-1.8	49.4	-1.6	56.0	Neutral
N6 East of Quincentenary Bridge	-0.7	45.3	-1.3	50.5	-1.1	56.9	Neutral
N6 - On Quincentenary Bridge	-1.6	45.1	-2.8	51.6	-2.4	57.8	Neutral
R338 at Westside Playing fields	-1.1	43.0	-1.7	47.2	-1.5	54.0	Neutral
Western Distributor Road between Clybaun Road and R338	-2.4	40.3	-3.7	43.9	-3.3	51.0	Neutral
Western Distributor Road between Clybaun Road and Ballymoneen Road	-1.1	40.5	-1.8	44.5	-1.6	51.5	Neutral
R337 Kingston Road. Kingston	-2.7	40.2	-3.9	43.5	-3.4	50.6	Neutral
R336. Salthill Road Upper. Galway Golf Course.	-0.4	42.3	-0.7	46.5	-0.6	53.3	Neutral
R336. Barna Road. Barna. Creagan bus stop	-3.3	39.8	-4.5	43.1	-4.0	50.3	Neutral
R336. Barna Road. Barna. Creagan bus stop	-3.2	38.8	-4.4	41.8	-3.9	49.1	Neutral
Boleybeg Road. Between Cappagh Road and Ballymoneen Road	-1.3	37.8	-1.6	40.0	-1.4	47.6	Neutral

Link Location	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQSV)	% DS Concentration Relative to AQSV	% Change in Concentration Relative to AQSV	% DS Concentration Relative to AQSV	% Change in Concentration Relative to AQSV	% DS Concentration Relative to AQSV	
Rahoon Road. Between Clybaun Road and Bothar Stiofain	-0.5	39.1	-0.6	41.8	-0.6	49.2	Neutral
N6 South of Briarhill	-1.5	40.0	-2.5	43.8	-2.2	50.9	Neutral
N6 Near Ballybrit Business Park	-0.2	42.3	-0.8	47.1	-0.7	53.8	Neutral
N6 Between N17 and R865	-0.2	42.6	-0.4	48.4	-0.4	54.9	Neutral
N6 Between N84 and N17	-0.5	43.3	-0.8	49.0	-0.7	55.5	Neutral
N6 East of Quincentenary Bridge	-0.9	43.0	-1.3	47.8	-1.2	54.5	Neutral
N6 - On Quincentenary Bridge	-1.2	45.3	-1.3	48.1	-1.2	54.9	Neutral
R338 at Westside Playing fields	-2.1	41.7	-2.2	43.5	-2.0	50.8	Neutral
Western Distributor Road between Clybaun Road and R338	-0.4	42.9	-0.7	49.0	-0.6	55.4	Neutral
Cappagh Road - North of GCRR	-0.9	38.0	-1.2	40.4	-1.0	47.9	Neutral
Letteragh Road North of GCRR Link Road	-2.8	36.4	-3.6	38.3	-3.2	46.0	Neutral
N6 North of Briarhill	-1.4	44.8	-2.2	51.7	-1.9	57.9	Neutral
R339 East of Briarhill	-0.9	43.4	-1.5	49.1	-1.3	55.6	Neutral
Ballybrit Crescent North of R339	-1.5	43.6	-2.2	48.0	-1.9	54.7	Neutral
Ballybrit Crescent North of Briarhill Business Park	-1.5	43.5	-2.1	47.9	-1.9	54.6	Neutral
School Road	-1.2	36.4	-1.7	38.4	-1.5	46.1	Neutral

Link Location	NO_2		PM_{10}		$PM_{2.5}$		Worst Case Impact Rating
	% Change in Concentration Relative to Air Quality Standard Value (AQSV)	% DS Concentration Relative to AQSV	% Change in Concentration Relative to AQSV	% DS Concentration Relative to AQSV	% Change in Concentration Relative to AQSV	% DS Concentration Relative to AQSV	
Gort Na Bro South of Rahoon Road	-0.6	36.4	-0.8	38.4	-0.7	46.1	Neutral
Western Distributor Road - East of Gort Na Bro	-2.0	42.8	-2.6	45.7	-2.3	52.7	Neutral
R446 West of Oranmore Business Park	-0.2	43.2	-0.3	49.5	-0.3	55.8	Neutral
R336 South of Eyre Square	-0.8	43.4	-0.7	44.6	-0.7	51.8	Neutral
N17 North of GCRR Off-Ramp	-0.2	43.0	-0.3	49.4	-0.2	55.8	Neutral
R339 East of Parkmore	-0.1	42.6	-0.3	47.5	-0.2	54.2	Neutral

16.5.4.4 Mass Emissions

Predicted changes in mass emissions are provided in Table 16.38 relative to Ireland's 2030 NEC Reduction Commitments for 2031 and 2046, refer to Table 16.23. Mass emissions are calculated using the ENEVAL tool, refer to Chapter 17, Climate for further information and are calculated based on total emissions across the study area of the transport model, refer to Chapter 6, Traffic Assessment and Route Cross-section.

Table 16.38 Predicted Change in Mass Emissions in 2031 and 2046 relative to Ireland's NEC Commitments

Pollutant	Year	Predicted DM Annual Emissions (kg/yr)	Predicted DS Annual Emissions (kg/yr)	% Change in Mass Emissions Relative to the 2030 Reduction Commitment
NOx	2031	559,945	565,246	0.013
	2046	53,407	51,135	-0.006
$PM_{2.5}$	2031	2,981	3,013	0.0002
	2046	595	598	0.00003
PM_{10}	2031	3,138	3,172	N/A
	2046	626	630	

Based on EPA guidelines, the level of impact of the Project on mass emissions is predicted to be imperceptible in both the opening and design years.

16.6 Mitigation Measures and Monitoring

16.6.1 Construction Phase

The following mitigation measures will be implemented for the construction phase of the Project, in order to reduce the dust risk associated with demolition, construction, earthworks and track-out, in accordance with IAQM guidance. Refer to the Construction Environmental Management Plan (CEMP) in Appendix A.7.5 for further details on construction phase mitigation. All measures will be fully implemented by the appointed contractor.

16.6.1.1 Measures Specific to all Sites: Communications

- Development and implement a stakeholder communications plan that includes community engagement before work commences on site
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager
- Display the head or regional office contact information

16.6.1.2 Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken
- Make the complaints log available to the local authority when asked
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book

- Hold regular liaison meetings with other high risk construction sites within 500m of the Project Assessment Boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes

16.6.1.3 Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This will include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of Project Assessment Boundary, with cleaning to be provided if necessary

- Particulate monitoring (PM_{10} and $PM_{2.5}$) will be carried out at the nearest sensitive receptors upwind and downwind of the construction works where sensitive receptors have been identified within 25m of the works. This monitoring programme will take place when works likely to generate dust are being carried out. The monitoring will allow direct comparison with the PM_{10} and $PM_{2.5}$ air quality standards on a daily basis

- Dust deposition monitoring will be conducted at a number of locations in the vicinity of the Project. At a minimum, monitoring will be carried out at the two nearest ecological receptors at locations where works are occurring within 250m. Monitoring will specifically take place at Castlegar nursing home while works are being undertaken within 250m of the site boundary of the home as agreed at the oral hearing. Monitoring will be carried out using the Bergerhoff method, i.e. analysis of dust collecting jars left on-site (German Standard VDI 2119, 1972). Results will be compared to the TA Luft guidelines. At least one month of dust deposition monitoring will be carried out in advance of the commencement of works to determine a baseline

- Carry out regular site inspections, record inspection results, and make an inspection log available to the local authority when asked

- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

16.6.1.4 Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible

- Solid dust screens will be implemented at locations where sensitive receptors are located within 100m of the works. In addition, a 2m dust screen will be provided at the locations at the locations in the areas of the overlap of the proposed N6 GCRR and the Lough Corrib cSAC

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extended period

- Avoid site runoff of water or mud

- Keep site fencing, barriers and scaffolding clean using wet methods

- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below

- Cover, seed or fence stockpiles to prevent wind whipping

16.6.1.5 Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles

- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable

- Impose and signpost a maximum-speed-limit of 20km/h on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)

16.6.1.6 Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate
- Use enclosed chutes and conveyors and covered skips
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods

16.6.1.7 Measure specific to demolition

- Ensure effective water suppression is used during demolition operations
- Bag and remove any biological debris or damp down such material before demolition

16.6.1.8 Measure specific to earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
- Only remove the cover in small areas during work and not all at once

16.6.1.9 Measure specific to construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery

16.6.1.10 Measure specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use
- Avoid dry sweeping of large areas
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable
- Record all inspections of haul routes and any subsequent action in a site log book
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)

- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits
- Access gates to be located at least 10m from receptors where possible

16.6.2 Operational Phase

As no significant adverse effects on air quality are predicted to arise at human receptors, no project specific measures are proposed.

As outlined in Section 16.2.7, an intermediate case has been applied to the TII REM Tool emissions calculations. Should the CAP scenario arise, based on achieving increases in EVs including 151,000 passenger car EV and PHEVs by 2025 and 840,000 passenger car EV and PHEVs by 2030, a lower level of pollutant concentrations would be predicted.

In addition, on 10 November 2022, the EU Commission proposed more stringent air pollutant emissions standards for combustion-engine vehicles, regardless of the fuel used. The current emission limits apply to cars and vans (Euro 6) and to buses, trucks and other heavy-duty vehicles (Euro VI).

For buses and trucks, stricter limits for exhaust emissions measured in laboratories (e.g. NO_x limit of 200mg/kWh) and in real driving conditions (NO_x limit of 260 mg/kWh). The Euro 7 proposal tackles non-exhaust emissions (microplastics from tyres and particles from brakes) and includes requirements concerning battery durability. This regulation will have the effect of further reducing vehicle emissions, particularly affecting the design year.

16.7 Residual Effects

16.7.1 Construction Phase

Following the implementation of the mitigation measures outlined in Section 16.6.1, a negative, slight and short-term effect on air quality is expected in proximity to the works during the construction phase.

16.7.2 Operational Phase

All predicted pollutant concentrations for the protection of human health comply with the air quality standards in 2031 and 2046. A worst-case effect of moderate adverse is predicted at one modelled receptor with the vast majority of receptors predicted to experience a neutral effect. Some areas will experience an improvement in air quality as set out in 16.5.4.3. Any further reduction in traffic volumes due to potential further demand management will improve air quality.

The low impact rating demonstrates that the pollutant concentrations from the Project are low relative to the background pollutant concentrations. The contribution that the background concentration adds to the total Do-Something Scenario is important in the context of the commencement of the new EU Directive 2024/2881/EC which has more stringent limit values than those of the existing legislation. It is expected that the implementation of government strategies like the European Green Deal, Clean Air Strategy and CAP will help to lower the background pollutant concentrations. The background concentrations on which the assessment is based is from historical background values. Actual future concentrations are expected to be significantly less.

Predicted concentrations of NO_x are predicted to comply with existing air quality standards with a worst-case impact rating of moderate adverse expected in 2031 and 2046. Concentrations of ammonia are predicted to exceed the maximum critical level up to 30m (2031) and 40m (2046) from the proposed Project in the vicinity of Lough Corrib SAC. A substantial adverse impact rating is assigned at these locations. Levels of nitrogen deposition are predicted to comply with the critical load in 2031 with exceedances projected in 2046 within 10m of the proposed Project at the Lough Corrib SAC.

As outlined in the TII standard and as outlined in Section 16.2.7, to determine if the air quality impacts at a sensitive designated habitat are significant, the project biodiversity practitioner shall consider a number of aspects, including the degree of sensitivity of fauna to relatively subtle changes in botanical composition and the extent of the sensitive designated habitat that is negatively affected. Refer to section 8.5.4 of Chapter 8, Biodiversity which concludes that no likely significant effects on biodiversity are likely due to emissions to

air during the construction and operational phases following the implementation of mitigation measures, apart from the following receptors: Imbricate bog-moss *Sphagnum affine*, Red bog-moss *Sphagnum capillifolium*, Woodsy thyme moss *Plagiomnium cuspidatum*, Lesser striated feathermoss *Plasteurhynchium striatulum and* Eyebright *Euphrasia arctica*.

16.8 Cumulative Impacts

16.8.1 Introduction

The EPA guidelines defines cumulative effects as the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects. EU Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report states that cumulative effects can arise from the interaction between all of the different Projects. On the basis of these guidance, the assessment of cumulative effects considers planned or approved projects.

A number of Plans are applicable to the site of the proposed Project, including the Galway Transport Strategy, the Galway City Development Plan and the Galway County Development Plan. Strategic Environmental Assessments (SEA) were completed of all these plans, which assessed the potential cumulative environmental effects of implementing the various policies and objectives contained within these Plans. It is not considered appropriate to assess these high level Plans as part of a cumulative assessment as relevant guidance refers to the assessment of projects and Plans are assessed through SEA for this particular discipline of air quality.

16.8.2 Construction Phase

In accordance with the TII Standard, sensitive human receptors located within 250m of the proposed Project Assessment Boundary require an assessment of air quality effects. In order to account for 250m from the other project, projects which are located outside of 500m from the Project Assessment Boundary were excluded from the assessment of potential construction dust effects.

All the projects listed in Appendix A.21.1 have been assessed for cumulative effects with the Project with respect to Air Quality within a 500m of the Projects Assessment Boundary.

The approved projects outlined in Table 16.39 have been considered in the cumulative assessment.

Table 16.39 Projects Considered in the Cumulative Assessment

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
An Bord Pleanála	ABP-318687 EIA Portal ID: 2022248	Gort Na Bró, Rahoon, Galway, Galway	0	The development will consist of provision of 227 no. residential apartments in 7 no. blocks.	An EIAR and a NIS were prepared in respect of the proposed development. The potential for health effects arising from the construction stage are considered short term, imperceptible, and negative as the potential for both exhaust and dust emissions will be limited and controlled through the mitigation measures described. Following implementation of the mitigation measures for dust emissions, residual impacts of dust generation from the construction phase will be Short-term Imperceptible and of Negative effect. No significant cumulative effects likely to arise.
An Bord Pleanála	ABP-308431-20 EIA Portal ID: 2020168	Townlands of Trusky East, Trusky West, Freeport and Ahaglugger, Bearna, Co. Galway	300	Demolition of existing outbuildings, construction of 121 no. residential units (comprising of 52 no. houses and 69 no. apartments), childcare facility and all other associated site works.	An EIAR was produced for the proposed development. The construction of the proposed development will require the use of machinery and plant, thereby giving rise to exhaust emissions. This is likely to have a short to medium-term slight negative effect, which will be reduced through the use of the best practices mitigation measures presented. The potential for dust to be emitted will depend on the type of activity being carried out in conjunction with some environmental factors. Due to the nature of the site, there is reduced potential sources of dust generation. Following implementation of the mitigation measures outlined, residual impacts of dust generation from the construction phase will be Short-term Imperceptible Negative.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council (Refused by Galway City Council on 29 January 2025. Awaiting decision of developer to appeal or not)	2460270	Ballymoneen Road (L5024), Keeraun and Ballynahown East, Galway	0	LRD Permission for development which consists of the demolition of 2 no. existing and construction of 156 no. residential units. Erection of a retaining wall varying in height from 0.5m to 3.5m along parts of the western boundary of the site to be constructed in the event the subject site is developed prior to the proposed N6 Galway City Ring Road Strategic Infrastructure Development (ABP-318220-23).	There may be a minor localised increase in dust levels and degradation of air quality during certain parts of the construction process. These increases will be short term and will remain insignificant due to appropriate management and mitigation measures to be employed on site through the implementation of the CEMP. There may be possible short-term nuisances to human being from noise, dust and vibration. These are not likely to be at a scale or significance that would warrant the completion of a sub threshold EIAR. Noise and dust or pollution will be subject to standard mitigation measures as per typical construction projects. There will be some exhaust emissions generated from use of excavators, HGVs and vibrating rollers during the demolition and construction phase. These impacts will be temporary in duration and are not considered likely to give rise to significant air quality impacts following the implementation of the mitigation measures. No significant cumulative effects likely to arise.
Galway City Council	2360177	Boston Scientific, Ballybrit Business Park, Galway, H91Y868	0	Permission for development which consists of: (a) the construction of 2 no. carparks, providing total of 550 new parking spaces, associated landscaping and lighting; (b) the removal of leylandii trees to northern boundary and erection of boundary fence and gate, with landscaping; (c) the provision of covered, secure motorbike and bike shelters; (d) the provision of a pedestrian and bike turnstile to the south-west corner of the campus; (e) the erection a fence and removal of a section of fence to the modified boundary to the south-east of the campus, and (f) all ancillary site works.	The proposed development is not expected to cause any likely significant impact on ambient air quality. There may be a minor localised increase in dust levels and degradation of air quality during certain parts of the construction process. These increases will be short term and will remain insignificant due to appropriate management and mitigation measures to be employed on site through the implementation of the CEMP. No significant cumulative effects likely to arise.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council	2460348	Site located to the west of the Coolough Road (L-1005) in addition to road improvement works located on the Dyke Road (L-1004)	58	The proposed development will consist of the demolition of 2 no. existing dwellings and ancillary structures located centrally within the site and construction of a student accommodation scheme, comprising 84 no. apartments with 586 no. bedspaces	The proposed development is not expected to cause any likely significant impact on ambient air quality. There may be a minor localised increase in dust levels and degradation of air quality during certain parts of the construction process. These increases will be short term and will remain insignificant due to appropriate management and mitigation measures to be employed on site through the implementation of the CEMP. No significant cumulative effects likely to arise.
Galway City Council	2460370	Altán Road, Rahoon Knocknacarra, Galway	56	Permission for the development of a swimming pool and sports facility at a 0.87ha site.	The construction phase of the proposed works may result in short-term imperceptible negative effects on human health after mitigation is implemented. There will be a short term imperceptible negative effect on general air quality, dust, and traffic from the Proposed Development during the construction phase. Best practice measures will be adhered to onsite during the construction of the Proposed Development. Good site practices will be implemented to mitigate against these likely short-term negative effects. There will be no significant impact on human health from dust emissions in the vicinity of the Proposed Development site once the development has been built, and all construction vehicles and personnel are offsite. Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. There is the potential for some effects arising from the works, however, these will be managed and minimised through appropriate methodologies and mitigation set out in the CEMP. No significant cumulative effects likely to arise.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council	2460394	Letteragh Road, Letteragh, Galway	0	Permission for development that will consist of the demolition of 1 no. dwelling house (222.3sqm) and 5 no. sheds on the southern portion of the site and the removal of the existing vehicular access fronting onto the Letteragh Road. Construction of 53 no. units	The proposed development is not expected to cause any likely significant impact on ambient air quality. There may be a minor localised increase in dust levels and degradation of air quality during certain parts of the construction process. These increases will be short-term and will remain insignificant due to appropriate management and mitigation measures to be employed on site through the implementation of the CWMP. No emissions other than from heating units are anticipated. There are no adverse impacts on ambient air quality predicted as a result of the operation phase of the proposed development. It is considered that there will be no negative impact on the climate that would be likely to have a significant effect on the environment. There may be possible short-term nuisances to human beings from noise, dust, and vibration. Plant and machinery operating on the site will be the main source of noise during the works. Noise and dust or pollution will be subject to standard mitigation measures as per typical construction projects. No significant cumulative effects likely to arise.
Galway City Council	2460039	Galway Clinic, Doughiska, Galway	58	Development which consists of the 2 no. storey extension to the rear of the Galway Clinic providing healthcare facilities (GFA: 1,637.6sqm) comprising additional enhanced medical assessment, diagnostic facilities, staff changing and medical storage facilities.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council	2452	Clybaun Road, Knocknacarra, Galway	151	Permission for development which consists of; development of 33 apartments, 2 retail units and 1 medical unit.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	2460056	Letteragh, Road, Galway	0	Permission for a housing development of 20 no. units at Letteragh Road, Galway.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	19372	National University of Ireland Galway (now known as University of Galway), Sports Grounds, Dangan	0	Development of 1 no. 3G pitch and 1 no. grassed GAA/soccer pitch plus all ancillary infrastructure, ball stop fencing, floodlighting, drainage, an enhanced biodiversity area and all associated site development works.	A NIS has been prepared. Following the implementation of best practice and mitigation, there will be no long term, significant impacts on biodiversity. The potential residual impacts on ecological receptors will not be significant and no potential for the proposed development to contribute to any cumulative impacts on biodiversity when considered in combination with other plans and projects was identified. Provided that the proposed development is constructed and operated in accordance with the design described within this application, long-term significant effects on biodiversity are not anticipated at any geographic scale. No significant cumulative effects likely to arise.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council	20261	Galway City North Business Park, Tuam Road	0	Development which will consist of 1. a mixed-use scheme with an overall gross floor area (GFA) of approximately 97,936sqm. on a site of circa 6.81 hectares. The development is arranged across 13 no. development blocks (A-M) ranging in height from 2 to 8 storeys with associated ground level and basement level car parking.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	23141	Dangan Lower immediately to the North of the N59, Galway-Clifden National School Road, adjacent to the Galway University Regional Sports Centre	0	Development which consists of a 11,134sqm school comprising classrooms, specialist room accommodation, PE Hall/ Multi-Purpose Hall, a 2 classroom Special Needs Unit, ancillary accommodation, five external Ball Courts, 79 car parking spaces, bicycle storage, hard and soft landscaping, water attenuation system and all necessary pathways.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	2256	Letteragh Road, Letteragh, Rahoon	0	Development which will consist of the demolition of existing derelict bungalow and outbuilding, and construction of 82 no. residential units.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council	20342	Lands adjacent to the Briarhill Shopping Centre, Galway City	2	Development which will consist of - the construction of 75 no. apartments, within a 5 storey building over an extended basement area. - Construction of 4 no. ground floor retail units (260sqm)	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	23157	Clybaun Road and, Mincloon Cross, Galway	0	Development which consists of the provision of 2 no. 3-storey duplex buildings. Duplex block No. 1 will contain 15 no. units, and Duplex block No.2 will contain 14 no. units.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway County Council	21618	Brockagh	350	New Advance Technology unit consisting of office and light industrial / production space, at the IDA Parkmore East Business & Technology Park, Parkmore, Galway.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway County Council	20753	Parkmore West	111	Additional floor area at Buildings No. 1, 2, 3 and 4 in the existing warehouse facility at Pollkeen Townland, Ballybrit, Galway, at the premises of SSL in the IDA Business and Technology Park, Parkmore West, Co. Galway	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	1933	Circular Road, Galway	340	Development which consists of 8 no. new dwelling houses in total.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
					considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	2460021	Galway Business Park, Knocknacarra, Galway	101	Development which consists of 3 no. offices blocks (GFA: 14,650sqm) and all associated site development works.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	19206	Ballybrit Business Park, Ballybane Beg, Galway	6	Development which consists of works to the existing building 2 (the former APC Building).	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	2360174	Coolough Road, Terryland, Galway City	104	Amendments to extant Permission (Ref. ABP-306403-20) for a Student Housing Development within 2 no. blocks.	An EIA Screening Report has been prepared and it concluded that an Environmental Impact Assessment of the proposed development is not required. Mitigation measures to manage noise, dust and/or pollution, tree protection etc during the construction phase will be based on standard best practice and as per the recommendations from the NIS, policies and guidance and will be incorporated into a comprehensive Construction Management Plan.
Galway City Council	2360007	Tornóg, Headford Road, Galway City	489	Development which consists of the provision of 2 no. two and three storey blocks, and 2 no. three storey blocks consisting of 14 no. 2 bed and 16 no. 3 bed apartments, 6 no. 3 bed dwellings, creche; access road, car parking, cycle parking, bin storage, communal open space, landscaping, and all associated site works and services.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway County Council	211445	Parkmore West	184	Construction of a new warehouse building to include for Warehouse Storage Space, Transit Bond, Loading and Unloading facilities, Meeting Rooms, Staff Rooms, WC's. Offices, Reception having a total floor area of 11,387.2sqm.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	19375	Lenabower, Cappagh Road, Galway	244	Development which will consist of the development of 43 no. residential units.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	20218	Site 4 Briarhill Business Park, Bothar na dTreabh	0	Development which will consist of construction of an eight storey over basement, 186 no. bedroom hotel with below ground pool plant equipment, tank room, standby generator and pumping station (Gross Floor Area: c.12,478sqm.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway County Council	20638	Brockagh Parkmore	339	The development will consist of the extension of the internal access road which consists of the construction of approx. 500m length of 7m wide carriageway, verge, footpaths, site services and all associated siteworks.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	21100	Galway City East Primary Care Centre, Doughiska, Galway	375	Development which will consist of a 3-storey,1,722sqm extension to the north-west of the existing building.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway County Council	2261255	Pollkeen, Pollkeen Townland, Co. Galway	285	The construction of a high bay warehouse facility. Gross floor space of proposed works 4,384.00sqm.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	21264	Lenabower, Cappagh Road, Galway	165	Development which will consist of the demolition of 2 no. derelict houses and the provision of 3 no. blocks of Duplexes split over 1 and 2 stories. Duplex Block 01 will consist of 6 no. units. Duplex Block 02 and 03 will consist of 12 no. units each.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway County Council	19479	Pollkeen	285	Production facility development at Parkmore West Business and Technology Park. Gross floor space of proposed works: 4133sqm.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	2360119	Culgharrai, Rahoon, Co. Galway	97	The construction of a 3-storey apartment building, containing a total of 21 no. residential units.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	19251	The junction of Bothar Stiofain & Western Distributor Road, Galway	123	Construction of a part single storey, part two storey mixed use development totalling 2,694sqm gross floor space.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.

Planning Authority	Planning Authority No.	Address	Approximate Distance to Fenceline Boundary (m)	Description	Discussion of Potential Cumulative Effects
Galway City Council	23121	Letteragh Road, Galway City	243	The demolition of a vacant 2-storey dwelling /guesthouse and 2 no. single storey vacant shed /workshop buildings and the construction of 28 no. residential units in 3 no. separate blocks.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	2157	Ballybrit Business Park, Galway	5	Works to building 2 MOD 3 comprising of the refurbishment and fit out of a vacant area of the existing MOD 3 building (north east corner).	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.
Galway City Council	21233	Bóthar Stiofáin, Rahoon, Galway	209	Demolition of existing basement structures on site and associated infilling and construction of 7 no. residential units.	Given the scale and nature of the proposed development, it did not warrant the preparation of detailed environmental assessments. As a result, the potential for significant cumulative air quality impacts to arise is considered negligible due to the mitigation measures proposed as part of the proposed Project.

Following the implementation of mitigation measures provided for the purposes of the Project and the individual projects listed in Table 16.39, no significant adverse cumulative effects are likely to arise during the construction phase.

16.8.3 Operational Phase

The operational phase air quality assessment is based on traffic data at the year of opening and at design year which is a further 15 years later. The traffic model includes forecasted growth in population aligned to landuse plans. This alignment with the landuse plans enables prediction of future traffic forecasts as the forecasts include for planned and/or committed projects. The traffic model builds in future traffic growth which relates to other future development (refer to Section 6.2 of Chapter 6 of this updated EIAR for further details). On this basis, the operational phase assessment included in Section 16.5.4 is inherently cumulative as is based on future traffic forecasts which already account for all future development.

16.9 Summary

The key changes to the chapter since the 2018 EIAR involve updating:

- the description of the receiving environment and impact assessments to take account of changes, new developments, updated traffic surveys and traffic modelling outputs, etc.
- updated assessment through the application of the new TII Air Quality Standard
- new software to calculate transport emissions – REM tool
- Appendices 16.1, 16.2 and 16.3 and Figures 16.1 series to take account of new monitoring, new developments, updated modelling results etc.
- to take account of points raised from the Brief of Evidence presented to An Bord Pleanála (ABP) at the oral hearing in 2020 and from the ABP Inspector's Report dated June 2021

The methodology applied to the air quality assessment in the 2018 EIAR has been updated to reflect new guidance, legislation, policy, baseline data and modelling tools. The main change from 2018, is the publication in December 2022 of the TII Standard and associated REM tool for the calculation of transport emissions. More recent long-term EPA air quality monitoring data was utilised in assessment alongside site specific air quality monitoring completed in 2023/2024.

The potential effects of the proposed Project on air quality were assessed for both the construction and operational phases by considering pollutant background concentrations, emissions from changes in traffic movements (construction and operational) and potential for construction dust during construction phase. Predicted pollutant concentrations were compared to the relevant limit values.

The Project is located in air quality zone C (24 Cities and towns) as designated by the EPA. Background pollutant concentrations from 2023, 2022, 2021, 2020, 2019 and 2018 air quality monitoring of NO_2, $PM_{2.5}$ and PM_{10} are used to inform the baseline environment. Site specific monitoring of particulate matter and nitrogen dioxide was also carried out over a period of three months in the vicinity of the proposed Project. Both sets of monitoring shows that all current baseline pollutant concentrations are in compliance with air quality standards.

During the construction phase, a number of mitigation measures will be implemented to minimise pollution and nuisance at the nearest sensitive receptors, including ecological sensitive designated habitat. Particulate monitoring and dust deposition monitoring will be carried out to ensure the effectiveness of the mitigation measures and compliance with air quality standards. Following the implementation of mitigation measures, no significant adverse effects are predicted to occur during the construction phase.

During the operational phase, modelling of air quality impacts due to the redistribution of traffic has been carried out using the TII REM tool. The modelling demonstrates compliance with air quality standards at most affected human receptor locations. A worst-case effect of moderate adverse is predicted at one human sensitive receptor in 2031 (opening year) and 2046 (design year).

In relation to ecological sensitive designated habitats, concentrations of nitrogen oxides are predicted to comply with air quality standards in both 2031 and 2046 with a worst-case impact rating of moderate adverse

at Lough Corrib SAC and slight adverse at Moycullen Bogs NHA. Concentrations of ammonia are predicted to exceed the maximum critical level within 30m of the proposed Project at the River Corrib SAC in 2031 and within 40m in 2046. Total nitrogen deposition is predicted to comply with critical loads in 2031 at both River Corrib SAC and Moycullen Bogs NHA but predicted exceedances within 10m of the proposed Project in 2046 at the Lough Corrib SAC only. Refer to section 8.5.4 of Chapter 8, Biodiversity which concludes that no likely significant effects on biodiversity are likely due to emissions to air during the construction and operational phases following the implementation of mitigation measures, apart from the following receptors: Imbricate bog-moss *Sphagnum affine,* Red bog-moss *Sphagnum capillifolium,* Woodsy thyme moss *Plagiomnium cuspidatum,* Lesser striated feathermoss *Plasteurhynchium striatulum and* Eyebright *Euphrasia arctica.*

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