Chapter 07
Air Quality

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7 AIR QUALITY

7.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the potential air quality impacts associated with the Construction and Operational Phases of the BusConnects Galway: Dublin Road scheme (hereafter referred to as the Proposed Development).

During the Construction Phase, the potential air quality impacts associated with the development of the Proposed Development have been assessed. This included construction activities such as utility diversions, road carriageway / cycleway / footway resurfacing and kerb road realignments. Construction traffic access routes are also assessed as part of the study area for this phase of the works.

During the Operational Phase, the potential air quality impacts associated with altered traffic flows along the Proposed Development, reallocated traffic lanes and displaced traffic flows have been assessed.

The assessment has been carried out according to best practice and guidelines relating to air quality.

The aim of the Proposed Development when in operation is to provide enhanced walking, cycling and bus infrastructure on the key access route along the R338 Dublin Road, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the Proposed Development. The objectives of the Proposed Development are described in Chapter 1 (Introduction). The Proposed Development which is described in Chapter 4 (Proposed Development Description) has been designed to meet these objectives.

The design of the Proposed Development has evolved through the application of a comprehensive design iteration process with particular emphasis on minimising the potential for environmental impacts where practicable whilst ensuring the objectives of the Proposed Development are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development programme have been incorporated where appropriate.

7.2 Methodology

7.2.1 General

Air quality assessments are concerned with the presence of airborne pollutants in the atmosphere. The likely significant effects of the Proposed Development on air quality have been assessed by considering the background concentration levels of pollutants in the atmosphere and the potential for construction, operational and decommissioning (where relevant) effects associated with the Proposed Development.

The potential impacts to air quality relate to alterations to traffic patterns, with a particular attention focused on those areas where the Proposed Development will be encroaching closer to air quality receptors, specifically where bus or traffic lanes are moving closer to air quality receptors.

The assessment has been undertaken with reference to the most applicable guidance documents (refer to Section 7.2.3.1) relating to air quality which are set out in the following sections of this Chapter.

An overview of the methodology undertaken for the air quality impact assessment is outlined below:

- A detailed baseline air monitoring study has been undertaken in order to characterise the existing ambient environment in areas along the Proposed Development. This has been undertaken through a review of available published ambient air monitoring data and site-specific ambient air monitoring at sensitive locations along the Proposed Development;
- A review of the most applicable standards and guidelines has been undertaken in order to define the air quality significance criteria for the Construction and Operational Phases of the Proposed Development;

- Predictive calculations and impact assessments relating to the likely Construction Phase air quality impacts have been undertaken at the nearest sensitive locations to the construction work areas associated with the Proposed Development;
- Predictive calculations have been performed to assess the potential air quality impacts associated with traffic alterations associated with the operation of the Proposed Development at the most sensitive locations; and
- A schedule of mitigation measures has been incorporated where required, to reduce, where necessary, the identified potential air quality impacts associated with the Proposed Development.

7.2.2 Study Area

The Proposed Development is located along the R338 Dublin Road, representing a west-east approximately 3.9 km long public transport corridor commencing east of the Moneenageisha Junction where it ties into the BusConnects Galway: Cross City Link proposals and extends to the junction with Doughiska Road, tying into the Martin Junction Upgrade. Refer to Figure 1-1 (Chapter 1 Introduction) of this EIAR for the extents of the Proposed Development.

For the full length of the route a dedicated bus lane, segregated cycle lanes and footpaths are proposed on both sides of the road. Dublin Road will remain two-way for general traffic. All major junctions along the route, including the Skerrit Roundabout, are proposed to be upgraded to include for bus priority measures, signalised pedestrian crossings and segregated cyclist facilities. This is to be achieved via a combination of carriageway widening, repurposing of existing traffic lanes and setting back the existing footpath. Additional land will be required throughout the Proposed Development, the approximate area equates to 25,000m^2 (2.5 Hectares).

The existing land use in the vicinity of the R338 Dublin Road is a mixture of residential, commercial and public service use properties, as well as recreational open green spaces. The existing land use across the proposed road development will stay largely the same with works designed to improve the existing road infrastructure to facilitate pedestrians, cyclists and buses moving along the R338 Dublin Road.

Full details of the Construction Phase activities are given in Chapter 5 (Construction) of this EIAR. The construction activities at Section 1 and Section 2 will comprise pavement reconstruction and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of relocation and reconstruction of boundary walls and boundary fences, additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, bus stop (including shelters and information displays etc.) and landscaping works.

It is proposed to demolish two single-story buildings located just inside the existing boundary wall in the Brothers of Charity. The wall will also be demolished either side of the main entrance and will be rebuilt at the new boundary location reusing the stone from the existing wall. The existing boundary wall outside the Connacht Hotel will also be demolished and the stone reused in the new boundary treatment.

Skerritt Junction is proposed to be replaced with the construction of a new “cyclops” (Cycle Optimised Protected Signals) junction. The new junction is designed to separate pedestrians and cyclists from traffic at the junction, reducing the possibility of collisions or conflict. The junction of Dublin Road with Rosshill Road will be signalised.

For the Construction Phase dust assessment, the focus is on air quality sensitive receptors adjacent to the proposed works (e.g. demolition of existing structures such as retaining walls, utility diversions, road widening works, road excavation works (where required), road reconfiguration and resurfacing works) that are susceptible to air quality impacts but also those receptors along construction traffic access routes or routes along which traffic is redistributed within the study area (please see Chapter 5 (Construction) of this EIAR for more information on construction traffic access routes). The extent of the overall study area is typically up to a maximum of 350m from a specific area of construction work, as per the Institute of Air Quality Management (IAQM) *Guidance on the Assessment of Dust from Demolition and Construction* (hereafter referred to as the IAQM Guidance) (IAQM, 2024), depending on the air emission sources in

question and the local area under consideration. For the Operational Phase, assessment of the dust impacts from maintenance of the Proposed Development has been scoped out on the basis that these activities have low potential for dust release and are likely to have a negligible impact on air quality sensitive receptors. The range of air quality sensitive receptors are discussed in Section 7.2.2.1.

For the Construction Phase and Operational Phase traffic assessment, the focus is on air quality sensitive receptors within an overall study area of 200 m from the Proposed Development or diverted routes within the key impacted study area, as per the Transport Infrastructure Ireland (TII) guidance document *Air Quality Assessment of Proposed National Roads – Standard (PE-ENV-01107)* (hereafter referred to as the TII guidance) (TII, 2022). The range of air quality sensitive receptors are discussed in Section 7.2.2.1. The locations of sensitive receptors are provided in Figures 7.3 to 7.8 in Volume 3 of this EIAR.

7.2.2.1 Sensitive Receptors

7.2.2.1.1 Construction Dust Assessment

In line with the IAQM Guidance (IAQM, 2024), prior to assessing the impact of dust from the Proposed Development the sensitivity of the area must first be assessed as outlined below. The sensitivity of the area is determined by taking into account the type of individual receptor and its sensitivity, the number of individual receptors, their proximity to proposed works areas and the background particulate matter (PM_{10} i.e. airborne particles of dust which are less than 10 microns in size) concentration.

Individual receptor sensitivity to dust soiling, health effects of PM_{10} and ecological effects are defined in Section 7.3 of the IAQM guidance and can be categorised as high, medium or low sensitivity and are reproduced in Table 7-1.

Table 7-1: Examples of Sensitive Receptors as per IAQM Guidance (IAQM, 2024)

Sensitivities of People to Dust Soiling Effects	
High	Locations where users can expect enjoyment of a high level of amenity
	Appearance, aesthetics, value of property diminished by soiling
	People or property present either continuously or for extended periods of time
	Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms
Medium	Locations where 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
	Appearance, aesthetics, value of property diminished by soiling
	People or property not present continuously or regularly for extended periods of time
	Indicative examples include parks and places of work
Low	Locations where enjoyment of amenity is not reasonably expected
	Property not expected to be diminished in appearance, aesthetics, value by soiling
	Areas of transient exposure where the people or property would reasonably be expected to be present only for limited periods of time
	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 PM_{10}	
High	Areas where people are exposed over a time period relevant to the air quality objective for PM_{10} (refer to Table 7-7 for Air Quality Standards)
	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

Medium	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (refer to Table 7-7 for Air Quality Standards)
	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
Low	Locations where human exposure is transient
	Indicative examples include public footpaths, playing fields, parks and shopping streets
Sensitivities of Ecology	
High	Locations with an international or national designation and the designated features may be affected by dust soiling
	Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings
Medium	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknow
	Indicative example is a National Heritage Area (NHA) with dust sensitive features
Low	Locations with a local designation where the features may be affected by dust deposition
	Indicative example is a local Nature Reserve with dust sensitive features

The definitions of area sensitivity for the purpose of the air quality assessment are provided in Table 7-2, Table 7-3 and Table 7-4.

The sensitivity of the area to dust soiling impacts is considered using the sensitivity criteria outlined in Table 7-2. There are between 10-100 high sensitivity residential receptors (within 20 m of the Proposed Development construction site boundary along its full length. The sensitivity of the area to dust soiling is therefore **high**.

Table 7-2 Sensitivity of the Area to Dust Soiling Effects on People and Property

Individual Receptor Sensitivity	**Number of Receptors**	**Distance from 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

In addition to sensitivity to dust soiling, the IAQM Guidance (IAQM, 2024) also outlines the assessment criteria for determining the sensitivity of the area to human health impacts. The health effects of PM_{10} on *high sensitivity receptors* includes residential areas, residential properties, schools and residential care homes in close proximity to the Proposed Development. The sensitivity of the area to human health impacts are considered using the sensitivity criteria outlined in Table 7-3. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works.

Using the criteria set out in, the annual mean PM_{10} concentration in the region of the construction site is less than 24 µg/m^3, and there are between 10 and 100 high sensitivity residential receptors within 20 m of the

Proposed Development construction site boundary along its full length. The sensitivity of the area to human health impacts is therefore **low**, as per Table 7-3.

Table 7-3 Sensitivity of the Area to Human Health Impacts

Individual Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	< 24µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24µg/m^3	>1	Low	Low	Low	Low

Dust deposition impacts on ecology can occur due to chemical or physical effects. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. Often impacts will be reversible once the works are completed, and dust deposition ceases. Designated sites within 50 m of the construction site boundary or within 50 m of the roads used by construction vehicles on public highways up to a distance of 500 m from a construction site entrance can be affected according to the IAQM Guidance. The sensitivity of the area to ecological impacts are considered using the sensitivity criteria outlined in Table 7-4.

Sensitive designated habitats within 50 m of the Proposed Development are:

- Galway Bay Complex SAC and pNHA (Site Code 000268),
- Inner Galway Bay SPA (Site Code 004031).
- Annex I habitat type 'Lowland Hay Meadows' at Merlin Park located on the north-eastern boundary of the study area.

These are high sensitivity receptors, and therefore the sensitivity of the area to ecological impacts is high, as per Table 7-4.

Table 7-4 Sensitivity of the Area to Ecological Impacts

Individual Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	< 24µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24µg/m^3	>1	Low	Low	Low	Low

7.2.2.1.2 Road Traffic Assessment

Section 3.5.2 of the TII guidance defines sensitive receptor locations as residential properties, hospitals, schools, care homes, and hotels and B&Bs, where members of the public are likely to spend 24 hours. The

worst-case air quality receptors within 200 m of affected roads (refer to Section 7.2.2.1.2 for methodology) modelled to assess the impact of road traffic emissions are shown in Table 7-5.

Table 7-5 Modelled Air Quality Sensitive Receptors

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Type	Phase
AQ1	531036	726190	R339 College Road	Residential	Operation
AQ2	531031	726242	R339 College Road	Residential	Operation
AQ3	531012	726211	R339 College Road	Residential	Operation
AQ4	531060	726142	R339 College Road	Residential	Operation
AQ5	531023	726173	R339 College Road	Residential	Operation
AQ6	531311	726122	R338 Dublin Road	Residential	Operation
AQ7	531070	726285	R339 Wellpark Road	Residential	Operation
AQ8	531458	726096	R338 Dublin Road	Residential	Operation
AQ9	531716	725949	R338 Dublin Road	Residential	Operation
AQ10	531680	726041	R338 Dublin Road	Residential	Operation
AQ11	531899	725948	R338 Dublin Road	Hotel	Operation
AQ12	531855	725889	R338 Dublin Road	Residential	Operation
AQ13	531963	725813	R338 Dublin Road	Medical Care	Operation
AQ14	532046	725807	R338 Dublin Road	Medical Care	Operation
AQ15	531940	725906	Glenina Heights	Residential	Operation
AQ16	532090	725860	Glenina Heights	Residential	Operation
AQ17	532119	725853	Glenina Heights	Residential	Operation
AQ18	532176	725835	Glenina Heights	Residential	Operation
AQ19	532153	725782	R338 Dublin Road	Residential	Operation
AQ20	532099	725769	R338 Dublin Road	Medical Care	Operation
AQ21	532429	725763	R338 Dublin Road	Residential	Operation
AQ22	532326	725729	R338 Dublin Road	Residential	Operation
AQ23	532419	725677	R338 Dublin Road	Residential	Operation
AQ24	532681	725718	R338 Dublin Road	School	Operation
AQ25	532765	725766	R865 Ballybane Rd	Residential	Operation
AQ26	532778	725579	Lurgan Park	Residential	Operation
AQ27	532921	725612	R338 Dublin Road	Residential	Operation
AQ28	532978	725641	Woodhaven	Residential	Operation
AQ29	532666	725925	R865 Ballybane Rd	Residential	Operation
AQ30	532718	725961	R865 Ballybane Rd	Residential	Operation
AQ31	532648	726080	R865 Ballybane Rd	Residential	Operation
AQ32	532663	726198	R865 Ballybane Rd	Residential	Operation
AQ33	532646	726324	R865 Ballybane Rd	Residential	Operation

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Type	Phase
AQ34	532624	726224	R865 Ballybane Rd	Residential	Operation
AQ35	532592	726344	R865 Ballybane Rd	Residential	Operation
AQ36	532633	726386	R865 Ballybane Rd	Residential	Operation
AQ37	532570	726489	R865 Ballybane Rd	Residential	Operation
AQ38	532558	726562	R865 Ballybane Rd	Residential	Operation
AQ39	532619	726475	R865 Ballybane Rd	Residential	Operation
AQ40	533199	725446	Lios an Uisce	Residential	Operation
AQ41	533726	725265	L5037 Rosshill Road	Residential	Operation
AQ42	533875	725494	Merlin Park University Hospital	Residential	Operation
AQ43	534802	725450	Duirling	Residential	Operation
AQ44	534955	725724	Durabhan	Residential	Operation
AQ45	535028	725783	Durabhan	Residential	Operation
AQ46	535059	725814	Durabhan	Residential	Operation
AQ47	535093	725829	Durabhan	Residential	Operation
AQ48	535152	725840	Durabhan	Residential	Operation
AQ49	534935	725883	Doughiska Road	Residential	Construction & Operation
AQ50	534998	725950	Doughiska Road	Residential	Construction & Operation
AQ51	535117	726024	L5038	Residential	Construction & Operation
AQ52	535274	725986	L5038	Residential	Construction & Operation
AQ53	534035	725522	Merlin Park University Hospital	Residential	Operation
AQ54	531567	725977	R338 Dublin Road	Medical Care	Operation
AQ55	531534	726006	R338 Dublin Road	Medical Care	Operation
AQ56	531612	725966	R338 Dublin Road	Medical Care	Operation
AQ57	531904	725902	R338 Dublin Road	Residential	Operation
AQ58	532507	725725	R338 Dublin Road	School	Operation
AQ59	532721	725558	Gleann Rua	Residential	Operation
AQ60	533021	725573	R338 Dublin Road	Residential	Operation
AQ61	533114	725515	R338 Dublin Road	Residential	Operation
AQ62	534949	725711	Durabhan	Residential	Operation
AQ63	532727	725906	R865 Ballybane Rd	Residential	Operation
AQ64	532681	726093	R865 Ballybane Rd	Residential	Operation
AQ65	532696	726033	R865 Ballybane Rd	Residential	Operation
AQ66	534983	726040	Doughiska Road	Residential	Construction
AQ67	534900	726184	Garran Ard	Residential	Construction

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Type	Phase
AQ68	534821	726312	Garran Ard	Residential	Construction
AQ69	534714	726471	Sraith Fada	Residential	Construction
AQ70	534509	726793	An Sean Bhaile	Residential	Construction
AQ71	534456	726876	An Sean Bhaile	Residential	Construction
AQ72	534399	726975	An Sean Bhaile	Residential	Construction
AQ73	534325	727092	An Sean Bhaile	Residential	Construction
AQ74	534348	727281	R339 Monivea Road	Residential	Construction
AQ75	534072	727198	R339 Monivea Road	Residential	Construction
AQ76	534000	727197	R339 Monivea Road	Residential	Construction
AQ77	533924	727311	N6 Bothair na dTreabh	Residential	Construction
AQ78	534049	727307	N6 Bothair na dTreabh	Hotel	Construction
AQ79	533832	727310	N6 Bothair na dTreabh	Residential	Construction
AQ80	533630	727283	N6 Bothair na dTreabh	Residential	Construction
AQ81	533563	727271	N6 Bothair na dTreabh	Residential	Construction
AQ82	533480	727231	N6 Bothair na dTreabh	Residential	Construction
AQ83	533281	727164	N6 Bothair na dTreabh	Residential	Construction
AQ84	532688	726999	N6 Bothair na dTreabh	Residential	Construction
AQ85	532558	726892	R339 Monivea Road	Residential	Construction
AQ86	532442	726895	R339 Monivea Road	Residential	Construction
AQ87	532392	726936	R339 Monivea Road	Residential	Construction
AQ88	532211	726135	Michael Collins Road	Medical Care	Construction
AQ89	531845	725829	Renmore Road	Residential	Construction
AQ90	531662	725908	Renmore Park	Residential	Construction
AQ91	531555	725704	Renmore Park	Residential	Construction
AQ92	531568	725677	Renmore Park	Residential	Construction
AQ93	531542	725685	Renmore Park	Residential	Construction
AQ94	531379	725761	Lakeshore Drive	Residential	Construction
AQ95	531363	725603	Lakeshore Drive	Residential	Construction
AQ96	531329	725545	Lakeshore Drive	Residential	Construction
AQ97	531312	725518	Lakeshore Drive	Residential	Construction
AQ98	531447	725405	Renmore Road	Residential	Construction
AQ99	531484	725394	Renmore Road	Residential	Construction
AQ100	531535	725449	Renmore Road	Residential	Construction
AQ101	531514	725477	Renmore Road	Residential	Construction
AQ102	531718	725680	Renmore Road	Residential	Construction
AQ103	531771	725741	Renmore Road	Residential	Construction
AQ104	534620	725102	L5037 Rosshill Road	Residential	Construction

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Type	Phase
AQ105	534885	725082	L5037 Rosshill Road	Residential	Construction
AQ106	534944	725096	Radharc an Chaisleain	Residential	Construction

Section 3.5.2 of the TII guidance considers ecologically designated sites (Irish and European designations) as highly sensitive air quality receptors, and states that European sensitive designated sites within 2 km of the route and all sensitive designated habitats within 200 m of the route should be identified.

Sensitive designated habitats within 200 m of the Proposed Development are:

- Galway Bay Complex SAC and pNHA (Site Code 000268) and Inner Galway Bay SPA (Site Code 004031) are located on the south-western boundary of the study area; and
- Annex I habitat type 'Lowland Hay Meadows' at Merlin Park located on the north-eastern boundary of the Proposed Development.

European sensitive designated sites within 2 km of the Proposed Development are:

- Lough Corrib SAC (Site Code 000297); and
- Lough Corrib SPA (Site Code 004042).

The designated habitat receptors within 200 m of affected roads (refer to Section 7.2.5.3 and Section 7.2.5.8 for methodology) modelled to assess the impact of road traffic emissions are shown in Table 7-6.

Table 7-6 Modelled Designated Habitat Receptors

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Distance to Road Edge (m)
Galway Bay Complex pNHA	531216	726113	R338 Dublin Road	0
	531212	726104	R338 Dublin Road	10
	531207	726095	R338 Dublin Road	20
	531203	726086	R338 Dublin Road	30
	531198	726077	R338 Dublin Road	40
	531194	726068	R338 Dublin Road	50
	531189	726059	R338 Dublin Road	60
	531185	726051	R338 Dublin Road	70
	531180	726042	R338 Dublin Road	80
	531176	726033	R338 Dublin Road	90
	531171	726024	R338 Dublin Road	100
	531167	726015	R338 Dublin Road	110
	531162	726006	R338 Dublin Road	120
	531158	725997	R338 Dublin Road	130
	531153	725988	R338 Dublin Road	140
	531149	725979	R338 Dublin Road	150
	531144	725970	R338 Dublin Road	160

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Distance to Road Edge (m)
	531140	725961	R338 Dublin Road	170
	531135	725952	R338 Dublin Road	180
	531131	725943	R338 Dublin Road	190
	531126	725935	R338 Dublin Road	200
Galway Bay Complex SAC	531233	726101	R338 Dublin Road	6
	531231	726096	R338 Dublin Road	10
	531226	726087	R338 Dublin Road	20
	531222	726078	R338 Dublin Road	30
	531217	726069	R338 Dublin Road	40
	531213	726060	R338 Dublin Road	50
	531208	726051	R338 Dublin Road	60
	531204	726042	R338 Dublin Road	70
	531199	726033	R338 Dublin Road	80
	531194	726024	R338 Dublin Road	90
	531190	726016	R338 Dublin Road	100
	531185	726007	R338 Dublin Road	110
	531181	725998	R338 Dublin Road	120
	531176	725989	R338 Dublin Road	130
	531172	725980	R338 Dublin Road	140
	531167	725971	R338 Dublin Road	150
	531163	725962	R338 Dublin Road	160
	531158	725953	R338 Dublin Road	170
	531154	725944	R338 Dublin Road	180
	531149	725935	R338 Dublin Road	190
	531145	725926	R338 Dublin Road	200
Inner Galway Bay SPA	531223	726099	R338 Dublin Road	0
	531218	726090	R338 Dublin Road	10
	531214	726081	R338 Dublin Road	20
	531209	726072	R338 Dublin Road	30
	531205	726063	R338 Dublin Road	40
	531200	726055	R338 Dublin Road	50
	531196	726046	R338 Dublin Road	60
	531191	726037	R338 Dublin Road	70
	531186	726028	R338 Dublin Road	80
	531182	726019	R338 Dublin Road	90
	531177	726010	R338 Dublin Road	100
	531173	726001	R338 Dublin Road	110

Receptor	X Co-Ordinate (ITM)	Y Co-Ordinate (ITM)	Location	Distance to Road Edge (m)
	531168	725992	R338 Dublin Road	120
	531164	725983	R338 Dublin Road	130
	531159	725974	R338 Dublin Road	140
	531155	725965	R338 Dublin Road	150
	531150	725956	R338 Dublin Road	160
	531146	725947	R338 Dublin Road	170
	531141	725939	R338 Dublin Road	180
	531137	725930	R338 Dublin Road	190
	531132	725921	R338 Dublin Road	200
Annex I habitat type 'Lowland Hay Meadows' at Merlin Park	533989	725387	R338 Dublin Road	0
	533986	725397	R338 Dublin Road	10
	533984	725407	R338 Dublin Road	20
	533982	725417	R338 Dublin Road	30
	533979	725426	R338 Dublin Road	40
	533977	725436	R338 Dublin Road	50
	533975	725446	R338 Dublin Road	60
	533973	725456	R338 Dublin Road	70
	533970	725465	R338 Dublin Road	80
	533968	725475	R338 Dublin Road	90
	533966	725485	R338 Dublin Road	100
	533963	725494	R338 Dublin Road	110
	533961	725504	R338 Dublin Road	120
	533959	725514	R338 Dublin Road	130
	533957	725524	R338 Dublin Road	140
	533954	725533	R338 Dublin Road	150
	533952	725543	R338 Dublin Road	160
	533950	725553	R338 Dublin Road	170
	533947	725563	R338 Dublin Road	180
	533945	725572	R338 Dublin Road	190
	533943	725582	R338 Dublin Road	200

The ecological sensitivities associated with these areas are assessed in Chapter 12 (Biodiversity) of this EIAR.

7.2.3 Relevant Guidelines, Policy and Legislation

Guidelines, policy and legislation specifically relevant to the air quality assessment are outlined this section.

7.2.3.1 Overview

The following Environmental Protection Agency (EPA) guidance was considered and consulted in the preparation of this assessment:

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA, 2022).

The statutory ambient air quality standards in Ireland are outlined in S.I. No. 739 of 2022 Air Quality Standards Regulations 2022 (hereafter referred to as the Air Quality Regulations), which 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, as amended (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 7.2.3.2. Relevant legislation considered by this assessment is summarised below:

- 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; and
- S.I. No. 739 of 2011 Air Quality Standards Regulations 2022.

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. These are summarised below:

- The Institute of Air Quality Management – A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (IAQM, 2020);
- The Institute of Air Quality Management – Guidance on the assessment of dust from demolition and construction v2.2 (IAQM, 2024);
- Transport Infrastructure Ireland (TII) Guidance: Air Quality Assessment of Proposed National Roads - Standard – PE-ENV-01107 (TII, 2022);
- 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);
- United Kingdom (UK) Department of Environment Food and Rural Affairs (DEFRA) Part IV of the Environment Act 1995 as amended by the Environment Act 2021: Local Air Quality Management Policy Guidance (PG22) (hereafter referred to as LAQM (PG22)) (DEFRA, 2022a);
- DEFRA, Part IV of the Environment Act 1995 as amended by the Environment Act 2021, Environment (Northern Ireland) Order 2002 Part III: Local Air Quality Management Technical Guidance (TG22) (hereafter referred to as LAQM (TG22)) (DEFRA, 2022b);
- World Health Organization (WHO) Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide Global Update 2005 (hereafter referred to as the WHO Air Quality Guidelines) (WHO 2006); and
- World Health Organization (WHO) Global Air Quality Guidelines (2021).

7.2.3.2 Ambient Air Quality Standards / Limit Values

The Air Quality Regulations 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; and
- 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 7-7.

Table 7-7 Limit Values in the Air Quality Regulations

Pollutant	Limit value for the protection of:	Averaging period	Limit value (µg/m^3)	Basis of application of limit value
NO_2 (Nitrogen Dioxide)	Human Health	1-hour	200	≤ 18 exceedances per year (99.79th percentile)
		Calendar year	40	Annual mean
NO_X (Oxides of Nitrogen)	Vegetation	Calendar year	30	Annual mean
PM_{10} (Particulate Matter)	Human Health	24-hours	50	≤ 35 exceedances per year (90.4th percentile)
		Calendar year	40	Annual mean
$PM_{2.5}$ (Particulate Matter)	Human Health	Calendar year	25	Annual mean
NH_3 (Ammonia)	Vegetation	Calendar year	1-3 Note 1	Annual mean

Note 1 Established by the Working Group on Effects of the UNECE Convention on Long Range Transboundary Air Pollution (2010). Annual, long-term, critical levels have been set to 1 µg/m^3 for lichens and bryophytes, and 3 µg/m^3 for higher plants.

The WHO Global Air Quality Guidelines (WHO, 2021) values relating to NO_2, PM_{10} and $PM_{2.5}$ are shown in Table 7-8. The WHO Air Quality Guidelines values are more stringent than the European Union (EU) statutory limit values for NO_2, PM_{10} and $PM_{2.5}$. However, the WHO NO_2 one-hour guideline value is an absolute value while the EU standards allow this limit to be exceeded for 18 hours / annum without breaching the statutory limit value.

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland, which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target (IT) 3 by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 7-8). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also 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*'. Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

The appropriate compliance limit values for the assessment of air quality impacts of the Proposed Development are those outlined in the existing Air Quality Regulations, which incorporate the CAFE Directive.

Table 7-8 WHO Air Quality Guidelines (WHO, 2021)

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	Hourly limit for protection of human health	50 µg/m^3	50 µg/m^3	25 µg/m^3
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	10 µg/m^3
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m^3	50 µg/m^3	45 µg/m^3
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	15 µg/m^3
PM	24-hour limit for protection of human health	37.5 µg/m^3	25 µg/m^3	15 µg/m^3

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
(as $PM_{2.5}$)	Annual limit for protection of human health	15 µg/m^3	10 µg/m^3	5 µg/m^3

7.2.3.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and the EU ambient air quality standards outlined in Table 7-7 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

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 the Construction Phase of a development in Ireland.

The Verein Deutscher Ingenieure (VDI) German Technical Instructions on Air Quality Control – TA Luft standard for dust deposition (VDI, 2002) (non-hazardous dust) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Health and Local Government (DEHLG) Quarries and Ancillary Activities, Guidelines for Planning Authorities (DEHLG, 2004) apply the Bergerhoff limit of 350mg/m^2/day measured over monitoring periods of between 28 and 32 days which are then averaged over a one-year period to the site boundary of quarries. This guidance value is applied to dust impacts from the construction of the Proposed Development.

7.2.3.4 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, as amended (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 Directive) until 2020 and established new national emission reduction commitments which are applicable from 2020 and 2030 for SO_2, NO_X, non- methane volatile organic compounds (NMVOC), ammonia (NH_3), $PM_{2.5}$ and methane (CH_4). In relation to Ireland, the 2020 to 2029 emission targets are 25kt (kilotonnes) for SO_2 (65% on 2005 levels), 65kt for NO_X (49% reduction on 2005 levels), 43kt for NMVOCs (25%A reduction on 2005 levels), 108kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels) as shown in Table 7-9. In relation to 2030, Ireland's emission targets are 85% below 2005 levels for SO_2, 69% reduction for NO_x, 32% reduction for VOCs, 5% reduction for NH_3 and 41% reduction for $PM_{2.5}$, also shown in Table 7-9.

Table 7-9 National Air Emission Targets (Ireland's Air Pollutant Emissions 2020 to 2030)

Pollutant	2020 to 2029 Reduction Commitments (kt) (and % Reduction Compared to 2005 Levels)	2030 Reduction Commitments (kt) (and % Reduction Compared to 2005 Levels)
SO_2	25.6	11.0
	-65%	-85%
NO_X	66.8	40.6
	-49%	-69%
NMVOC	56.3	51.1
	-25%	-32%
NH_3	112.1	107.5
	-1%	-5%

Pollutant	2020 to 2029 Reduction Commitments (kt) (and % Reduction Compared to 2005 Levels)	2030 Reduction Commitments (kt) (and % Reduction Compared to 2005 Levels)
$PM_{2.5}$	15.6	11.2
	-18%	-41%

7.2.3.5 Regional Policy

The Galway City Development Plan 2023-2029 (Galway City Council (GCC), 2023) came into effect in January 2023 and includes a range of strategies defined to improve air quality in Galway City. The strategies included an improvement in co-ordination to build on the good work to date, to mainstream air quality management into all major policy areas, strengthen the decision-making by improving sharing of information on air quality, introduce measures related to local authority activities that will reduce air emissions and identify and prioritise the main potential threats to air quality.

In relation to specific policies, Policy 4.5 (Transport Demand Management Measures) states that the local authority shall:

1. *'Support GTS measures for a reduction of car movements through the city centre, to be achieved by specific traffic management arrangements including the implementation of a City Centre Access Network.*
2. *Support the GTS proposals to prioritise public transport movements in the city centre through the implementation of a designated public transport route, the Cross-City Link.*
5. *Support and promote the use of smarter mobility and Intelligent Transport Solutions (ITS) to increase efficiency, safety and co-ordination across all transport networks.*
7. *Increase the use of sustainable transport modes including public transport through targeted promotion and encouragement of behavioural change.'*

Additionally, Policy 9.7 (Air Quality) states that the Council "*supports the implementation of measures that improve air quality and reduce exposure to pollution*" and "*the initiatives which emanate from the proposed [Clean Air] Strategy*", and that:

"*Climate adaptation and mitigation policies to support a move from fossil fuels to renewable energy, modal change to sustainable transport and the promotion of energy efficient building design will also deliver significant reductions in sources of air pollution. The continued enhancement of the city's green network and increased urban greening and tree planting will also support better air quality naturally removing pollutants from the air*."

7.2.3.6 Institute of Air Quality Management Guidance

The IAQM Guidance gives guidance to air quality consultants and environmental health officers on how to assess air quality impacts from construction activities. The IAQM Guidance provides a method for classifying the significance of effect from construction activities based on the 'dust magnitude' (high, medium or low) and proximity of the site to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. The guidance notes that once the appropriate mitigation measures are applied, in most cases the resulting dust impacts can be reduced to negligible levels.

7.2.4 Data Collection and Collation

The baseline data for this assessment has been collected through carrying out a desk study, availing of the most up-to-date available data including national ambient air quality monitoring data, at the time of writing, in addition to site- specific baseline ambient monitoring surveys.

7.2.4.1 Desk Study

A desk-based air quality assessment was carried out following guidelines described in the TII guidance (TII, 2022). TII states that wherever possible use should be made of existing certified air quality data such as that undertaken by the EPA. Air quality monitoring programmes have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report at the time of assessment, *Air Quality in Ireland 2023* (EPA, 2024), details the range and scope of monitoring undertaken throughout Ireland. The baseline air quality data collected through the desk study is detailed in Section 0.

A review of potentially sensitive ecological areas has also been conducted using the National Parks and Wildlife Services (NPWS) online mapping services. This review is discussed in Section 7.2.2.1.1 and 7.2.2.1.2.

7.2.4.2 Site Specific Baseline Surveys

A site-specific baseline monitoring study was undertaken at monthly intervals from June 2023 to August 2023 as part of the air quality assessment for NO_2 using diffusion tube monitoring at 11 locations as detailed in Section 7.3.3 and as shown in Figure 7.1 of Volume 3 of this EIAR. The TII guidance (TII, 2022) note that NO_2 diffusion tube monitoring provides a simple, cost-effective means of monitoring at a number of locations across an area and can provide useful information on spatial distributions.

Passive sampling of NO_2 involves the molecular diffusion of NO_2 molecules through a polycarbonate tube and their subsequent adsorption onto a stainless steel disc coated with triethanolamine. Following a month of sampling, the tubes were analysed using ultraviolet (UV) spectrophotometry, at a United Kingdom Accreditation Service (UKAS) accredited laboratory (SOCOTEC Laboratories in Burton-on-Trent, UK).

7.2.5 Appraisal Method for the Assessment of Impacts

7.2.5.1 Overview

The air quality assessment has been carried out in accordance with the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA, 2022b), the IAQM Guidelines (IAQM, 2024) and the TII guidance (TII, 2022).

The methodology for this assessment topic is informed by existing best practice and experience on other infrastructure projects. The assessment methodologies have been applied to assess both the potential impacts during the Construction Phase and the potential impacts during the Operational Phase of the Proposed Development, unless otherwise stated.

7.2.5.2 Construction Dust

For the Construction Phase assessment, the focus is on air quality sensitive receptors adjacent to the proposed works (e.g. demolition of existing structures such as retaining walls, utility diversions, road widening works, road excavation works (where required), road reconfiguration and resurfacing works) that are susceptible to dust impacts.

As outlined in Section 7.2.5.2, the Construction Phase traffic has been scoped out of further assessment based on the screening criteria outlined in the TII guidance (TII, 2022). 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 latest IAQM Guidance, as detailed in Section 7.2.3.6. 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 Proposed Development 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; and
- 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 including:

- Demolition of existing structures;
- Earthworks;
- Construction of new structures; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

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;
- The risk of health effects due to a significant increase in PM_{10} exposure; and
- Harm to ecological receptors.

The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure. The sensitive receptors are listed in Section 7.2.2.1.1.

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 are also proposed to reduce the risk of the site. Transport Infrastructure Ireland recommend the use of the IAQM Guidance in their guidance document Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01107 (TII, 2022) for undertaking a dust assessment. The steps for this assessment are outlined below.

Step 1: Screen the need for Detailed Assessment

The first step is the initial screening to determine whether a detailed assessment is required. According to the IAQM Guidance, an assessment is required where there are sensitive receptors within 250 m of the site boundary, for ecological receptors within 50 m of the site boundary and/or within 50 m of the route(s) used by the construction vehicles on the public highway and up to 500 m from the entrance(s) of a large site.

There are sensitive dust and human health receptors within 250 m of the site boundary so therefore an assessment of the air quality effects is required. The sensitivity of the area to dust soiling and human health has been described in Section 7.2.2.1.1.

The following ecological sensitive areas, as noted in Section 7.2.2.1.1, are in close proximity to the Proposed Development (as per above thresholds, within 50 m), therefore, the potential air quality effects on such receptors are screened in for further assessment:

- Galway Bay Complex SAC and pNHA (Site Code 000268) and Inner Galway Bay SPA (Site Code 004031) are located on the south-western boundary of the study area; and
- Annex I habitat type 'Lowland Hay Meadows' at Merlin Park located on the north-eastern boundary of the Proposed Development.

Step 2: Assess the Risk of Dust Impacts Arising

This step is split into three sections as follows:

- Define the potential dust emission magnitude;
- Define the sensitivity of the area; and
- 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 7-10.

Table 7-10 Categorisation of Dust Emission Magnitude (IAQM, 2024)

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
▪ total building volume <12,000 m^3 ▪ construction material with low potential for dust release (e.g. metal cladding or timber) ▪ demolition activities <6 m above ground ▪ demolition during wetter months	▪ total building volume 12,000 - 75,000 m^3 ▪ potentially dusty construction material ▪ demolition activities 6 – 12 m above ground level	▪ total building volume >75,000 m^3 ▪ potentially dusty construction material (e.g. concrete) ▪ on-site crushing and screening ▪ demolition activities >12 m above ground level
Earthworks		
▪ total site area <18,000 m^2 ▪ soil type with large grain size (e.g. sand) ▪ <5 heavy earth moving vehicles active at any one time ▪ formation of bunds <4 m in height ▪ earthworks during wetter months	▪ total site area 18,000 m^2 - 110,000 m^2 ▪ moderately dusty soil type (e.g. silt) ▪ 5 – 10 heavy earth moving vehicles active at any one time ▪ formation of bunds 3 – 6 m in height	▪ total site area >110,000 m^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 >6 m in height
Construction		
▪ total building volume ▪ <12,000 m^3 ▪ construction material with low potential for dust release (e.g. metal cladding or timber)	▪ total building volume 12,000 - 75,000 m^3 ▪ potentially dusty construction material (e.g. concrete) ▪ on-site concrete batching	▪ total building volume ▪ >75,000 m^3 ▪ on-site concrete batching ▪ sandblasting
Trackout		
▪ <20 HDV (>3.5 t) outward movements in any one day ▪ surface material with low potential for dust release ▪ unpaved road length <50 m	▪ 20 – 50 HDV (>3.5 t) ▪ outward movements in any one day ▪ moderately dusty surface material (e.g. high clay content) ▪ unpaved road length 50 – 100 m	▪ >50 HDV (>3.5 t) outward movements in any one day ▪ potentially dusty surface material (e.g. high clay content) ▪ unpaved road length >100 m

The sensitivity of the surrounding area is then 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. The sensitivity of the area in terms of dust soiling, human health and ecology has been described in Section 7.2.2.1.1.

The overall risk of the impacts for each activity is then determined (Step 2C) prior to the application of any mitigation measures (defined in Table 7-11) and an overall risk for the site is derived.

Table 7-11 Risk of Dust Impacts (IAQM, 2024)

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
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
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.

For the Operational Phase, assessment of the dust impacts from maintenance of the route has been scoped out on the basis that these activities have low potential for dust release and are likely to have a negligible impact on air quality sensitive receptors.

7.2.5.3 Traffic Screening Criteria

The TII guidance (TII, 2022) states that the following scoping criteria shall be used to determine whether the air quality impacts can be scoped out or require an assessment based on the changes between the Do Something traffic (with the Proposed Development) compared to the Do Minimum traffic (without the Proposed Development):

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

The above scoping criteria have been used in the current assessment to determine if a modelling assessment is required for the Construction (as per Section 3.8.5.3 of PE-ENV-01107) and Operational Phases ((as per Section 3.6.1.3 of PE-ENV-01107).

Based on the redistribution of traffic in the construction and Operational Phase there are multiple road links resulting in an AADT increase above 1,000 or more. As such, it has been determined that a modelling assessment is required for the construction and Operational Phase.

Sensitive receptors within 200m of impacted road links were included within the modelling assessment as detailed in Section 7.2.2.1.2.

7.2.5.4 Road Traffic Assessment

As outlined in Section 7.2.5.3 the construction and Operational Phase traffic has been screened in for detailed assessment as per the screening criteria outlined in TII guidance (TII, 2022).

The TII guidance (TII, 2022) states that the assessment must progress to detailed modelling:

- If existing air quality exceeds 90% of the standard (e.g. for annual mean NO_2 standards, >36 µg/m^3); or
- Where sensitive receptors exist within 50 m of a complex road layout e.g. grade separated junctions or hills with gradients > 2.5%.

The TII guidance (TII, 2022) states that modelling should be conducted for NO_2, PM_{10} and $PM_{2.5}$ for the Base, Opening and Design Years for both the Do Minimum (Do Nothing) and Do Something scenarios.

Vehicle-derived air emissions were modelled using the ADMS-Roads dispersion model (Version 5.0.1) which has been developed by Cambridge Environmental Research Consultants (CERC) (CERC, 2022). The model is a steady-state Gaussian plume model used to assess ambient pollutant concentrations associated with road sources.

The ADMS-Roads dispersion model has been used to predict the ground level concentrations (GLC) of NO_2 and PM_{10} / $PM_{2.5}$ (at sensitive human receptors), and NO_X and NH_3 (at sensitive designated habitats) in the vicinity of the impacted areas for the baseline year of 2023, the peak construction year of 2026, the opening year of 2028 and the design year of 2043.

The modelling incorporated the following features:

- Hourly-sequenced meteorological information for Athenry in 2022 has been used in the model. The selection of the appropriate meteorological data has followed the guidance issued by the LAQM (TG22) (DEFRA, 2022b). A primary requirement is that the data used should have a data capture of greater than 90% for all parameters; and
- Specific air sensitive receptors (ASRs) were also mapped into the model. Receptor heights were input at 1.5 m to represent breathing height. For elevated receptors, it has been assumed that each floor is 3 m and therefore first floor receptors are at 4.5 m. Concentrations were reported for each ASR modelled for all modelling scenarios.

The ADMS-Roads model input parameters selected are summarised in Table 7-12.

Table 7-12 Summary of the ADMS-Roads Model Input Parameters

Parameter	Description	Input Value
Coordinate System	Spatial data in ADMS-Roads is linked to a Cartesian coordinate system, measured in meters.	Irish Transverse Mercator (ITM) Coordinate system was used.
Pollutants	A range of preset pollutants can be selected in ADMS-Roads for modelling.	NO_X, PM_{10}, $PM_{2.5}$ and NH_3 were specifically modelled.

Parameter	Description	Input Value
Road Source Emissions	Road sources emissions can be entered manually or calculated from traffic flow data.	Road emissions have been calculated from traffic flow data.
Road Emission Factors	TII REM online tool was used.	TII REM online tool with the Intermediate Case fleet data was used.
Traffic Speed	ADMS-Roads can adjust pollutant emission factors to take account of traffic speed.	Average traffic speed specific to each link, as advised by traffic consultant, has been used in the model.
Meteorological Data	ADMS-Roads requires hourly meteorological data from a suitable meteorological station for a full year.	2022 data from Athenry has been used in the model.
Surface Roughness	The model requires a representative surface roughness value for both the modelling domain and the meteorological station.	A value of 0.5 m has been selected for the modelling domain with a value of 0.2 m selected for Athenry.
Complex Terrain	Where terrain exceeds 1;10, terrain effects may be modelled	Flat terrain has been used in the modelling domain

Road traffic emission rates for NO_X, PM_{10} and $PM_{2.5}$ were generated using the TII Road Emissions Model (REM) online calculator tool[1] (TII, 2024) and are derived using traffic data for the baseline year of 2023, peak construction year of 2026, opening year of 2028 and the design year of 2043 provided in Chapter 6 (Traffic & Transport). The version of the TII REM tool utilised at the time of assessment incorporated emission factors from the COPERT V database (EMISIA, 2020).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The Default fleet mix option was selected along with the Intermediate Case fleet data base selection, as per TII Guidance (TII, 2024). The Intermediate Case assumes a linear interpolation between the Business-as-Usual case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM_{10} emissions associated with brake and tyre wear (TII, 2024).

Road traffic emission rates for NH_3 were generated using the best available method at the time of undertaking the assessment, namely the Calculator for Road Emissions of Ammonia (CREAM) Tool developed by Air Quality Consultants (AQC, 2020), as recommended by the TII (TII, 2022).

Model verification investigates the level of agreement between modelled and measured concentrations. Differences between modelled and measured pollutant concentrations can arise due to uncertainties in or limitations to the model input data (such as traffic data and meteorological data), uncertainties in monitoring data and inherent modelling limitations. As outlined in LAQM (TG22) (DEFRA 2022b), an adjustment to the

[1] In order to get access to the REM Tool, prospective users should email climatetools@tii.ie to be set up as an authorised user on the TII Web Application Portal.

modelled results is usually required in order to ensure that the final concentrations presented are representative of monitoring information in the area.

7.2.5.5 Model Verification

A verification study was undertaken using the traffic data for the study area which was received from the NTA Western Regional Model (WRM) traffic model (see Chapter 6 (Traffic & Transport)) for the base year 2023. Background data was based on the annual mean NO_2 concentration monitored at the site specific survey location of DT8, located in a suburban background area on Gleann Rua (refer to Section 7.3.3). PM_{10} background concentrations were based on the annual mean recorded by the continuous monitor at Rahoon, Galway, while the $PM_{2.5}$ background concentration was based on the annual mean recorded by the continuous monitor at Briarhill, Galway (see Section 0). The backgrounds were also utilised in the 2023, 2028 and 2043 modelling.

The first step of model verification, in line with LAQM.TG22, is to consider the performance of the model, prior to any adjustment. The monitored road NO_X contribution and ambient NO_2 concentrations at each of the site-specific survey (Section 7.3.3) diffusion tube locations, assumed to be representative of the baseline, were compared to the ADMS-Roads model output at these locations. In line with LAQM (TG22), the model verification was based on NO_X rather than NO_2 with the NO_2 diffusion tube data first converted to NO_X using the NO_X to NO_2 Calculator tool (DEFRA, 2020).

Model verification used the following 7 diffusion tube monitoring sites:

- DT3 Old Dublin Rd;
- DT7 Old Dublin Rd;
- DT1 Old Dublin Rd;
- DT4 Old Dublin Rd;
- DT5 Old Dublin Rd;
- DT6 Old Dublin Rd; and
- DT9 Scoil Chaitriona, Renmore Avenue.

These are roadside sites on the modelled road network. Other monitoring sites were not included in the model verification as they were either too far from the Proposed Development, not located on the modelled road network or data capture at a monitoring location was too low.

A comparison of monitored and modelled annual mean NO2 concentrations for 2023 is shown in Table 7-13 and in Figure 7-1, as the red points and trendline. This shows that on average, the unadjusted model under predicts total NO_2 concentrations by around 4%.

Table 7-13 Comparison of Modelled and Monitored Annual Mean NO_2 Concentrations

Diffusion Tube	Modelled NO_X concentration ($\mu g/m^3$)	Modelled NO_2 concentration ($\mu g/m^3$)	Monitored NO_X concentration ($\mu g/m^3$)	Monitored NO_2 concentration ($\mu g/m^3$)	Difference (modelled – monitored)/ (monitored) *100	Adjustment Factor
DT3	18.3	15.0	33.0	22.5	-33%	1.74
DT7	15.8	13.7	25.9	19.0	-28%	
DT1	16.3	14.0	18.5	15.1	-8%	1.04
DT4	14.0	12.8	11.8	11.6	10%	
DT5	17.6	14.7	19.8	15.8	-7%	
DT6	10.2	10.7	11.2	11.3	-5%	
DT9	4.4	7.5	0.5	5.4	40%	

In line with LAQM (TG22), the model adjustment was based on NO_X rather than NO_2 with the NO_2 diffusion tube data first converted to NO_X using the NO_X to NO_2 Calculator (DEFRA, 2020). Additionally, the adjustment was applied to the road source contribution only rather than total NO_X, again in line with LAQM (TG22). This process identified that the model performed better at some locations than others, and the adjustment of model bias took this into account.

The comparison of road NO_X contributions provided the following collective bias adjustment factors across the study area, which were then applied to the modelled road contributions at the air quality sensitive receptors most represented by them, before being converted into total NO_2 concentrations:

- 1.74 – "More congested". Applied to modelled receptors on the section of the R338 Dublin Road between Renmore Park and Ballyloughane Road, and on the section of the R338 Dublin Road between Doughiska Road and the R446 Eastern Approach Road junction; and
- 1.04 – "Less congested". Applied to all other receptors.

Following the application of the model bias adjustment factor, the modelled and measured values at these locations included in the verification exercise were compared again. This comparison is shown in Figure 7-1 as the blue points and trendline. This shows that on average, the adjusted model is within the target 10% of the air quality standard, with a root mean square error (RMSE) of 1.17 µg/m³. In the absence of measured PM_{10} and $PM_{2.5}$ at roadside locations in the study area, the same factors calculated for the modelled road NO_X contribution were applied to the road PM_{10} and road $PM_{2.5}$ contributions.

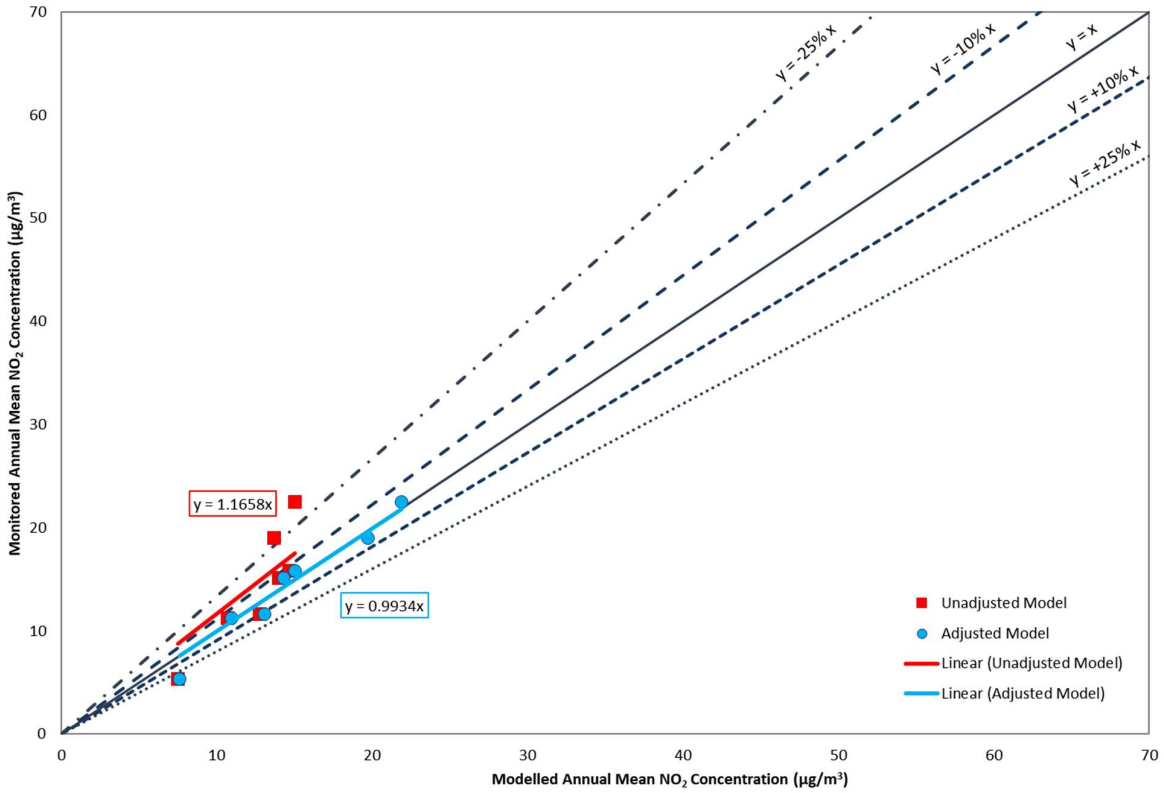

Figure 7-1 Dispersion Model Verification - Comparison of Monitored and Modelled NO_2 Concentrations (µg/m³)

7.2.5.6 Air Quality Impact Significance Criteria

The TII guidance (TII, 2022) details a methodology for determining air quality impact significance criteria for road schemes. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do Minium scenario. The TII significance criteria are outlined in Table 3.21 of Air Quality Assessment of Proposed National Roads – Standard (PE-ENV-01107) (TII, 2022) and

reproduced in Table 7-14 below. These criteria have been adopted to predict the impact of NO_2, PM_{10} and $PM_{2.5}$ emissions as a result of the Proposed Development.

Table 7-14 Air Quality Significance Criteria (TII, 2022)

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Standard 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

7.2.5.7 Regional Assessment

The potential changes in regional air emissions due to the Operational Phase traffic impacts of the Proposed Development have also been assessed using the TII REM tool, as per the TII PE-ENV-01107 guidance. Total annual emissions in (kg/yr) of NO_2, PM_{10} and $PM_{2.5}$ were generated by the tool for each road link of the full road network, to provide a robust large-scale assessment of the impact of regional air impacts due to the Proposed Development.

7.2.5.8 Ecology

The impacts of dust to ecological receptors during the Construction Phase is determined using the methodology outlined in Section 7.2.5.3 using the IAQM Guidance methodology. There is potential for impacts from pollutant deposition at ecologically sensitive sites due to the operation of the Proposed Development.

For routes which passes within 2 km of a European designated area of conservation or within 200 m of an area of either Irish or European designation, the TII guidance (TII, 2022) requires the air quality specialist to consult with the project ecologist. Sites identified within these parameters are considered Key Ecological Receptors. The TII guidance (TII, 2022) and the *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (DEHLG, 2010) provide details regarding the legal protection of designated conservation areas.

Further guidance can also be found in the IAQM document *A Guide to The Assessment of Air Quality Impacts on Designated Nature Conservation Sites* (IAQM 2020) and in the TII guidance (TII, 2022), both of which describe NO_X and ammonia emissions, nitrogen deposition and acid deposition as the most likely source of significant impacts from road traffic. Pollutants such as CO_2, CO, SO_2 and volatile organic compounds are not considered in this guidance and have been scoped out of detailed assessment.

The following assessment criteria, in accordance with TII guidance, is used to determine whether an assessment for nitrogen and acid deposition should be conducted:

- There is a designated area of conservation within 200 m of the Proposed Development; and
- There is a significant change in AADT flows (see Section 7.2.5.2).

For road transport sources within 200 m of a designated habitat, individual ecological receptors along a transect at 10 m intervals are modelled. Ecological receptors are modelled up to a maximum distance of 200 m regardless of whether the habitat extends beyond 200 m. It is considered that the greatest impacts will have occurred in proximity to the road. The TII guidance (TII, 2022) notes that only sites that are sensitive to nitrogen and acid deposition need to be included in the assessment, it is not necessary to include sites

for example that have been designated as a geological feature or water course. The ecological receptors along the 200 m transect are modelled using the methodology for sensitive human receptors in Section 7.2.5.3.

7.2.5.8.1 Sensitive Designated Habitats

The designated sites in proximity to the Proposed Development are listed in Section 7.2.2.1.

Sensitive designated habitats within 200 m of the Proposed Development or within 200 m of an impacted road are:

- Galway Bay Complex SAC and pNHA (Site Code 000268) and Inner Galway Bay SPA (Site Code 004031) are located on the south-western boundary of the study area; and
- Annex I habitat type 'Lowland Hay Meadows' at Merlin Park located on the north-western boundary of the Proposed Development.

European sensitive designated sites within 2 km of the Proposed Development are as follows, however have been scoped out of detailed assessment as they are not within 200 m of an impacted road:

- Lough Corrib SAC (000297); and
- Lough Corrib SPA (Site Code 004042).

Consultation with the project ecologist has been undertaken. Habitats of particular ecological importance at these sites include the following:

- Mudflats and sandflats;
- Coastal lagoons;
- Reefs;
- Large shallow inlets and bays;
- Perennial vegetation of stony banks;
- Salicornia and other annuals colonising mud and sand;
- Semi-natural dry grasslands and scrublands;
- Calcareous and alkaline fens;
- Juniperus communis formations on heaths or calcareous grasslands;
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae);
- Mediterranean salt meadows (Juncetalia maritimi);
- Turloughs;
- Oligotrophic and standing waters; and
- Limestone pavements.

Species of particular ecological importance include the following:

- Otter;
- Harbour seal;
- Freshwater Pearl Mussel;
- Crayfish, Lamprey, Salmon; and
- Breeding and wintering birds.

Chapter 12 (Biodiversity) of this EIAR includes further details on the ecological sensitivities associated with these sites.

7.2.5.8.2 Ecology Significance Criteria

The Air Quality 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.*'

The TII guidance (TII, 2022) outlines the assessment of significance of effects at sensitive designated habitats (Section 3.6.6.6 of the guidance), stating that if the nitrogen deposition and acid deposition (due to the Proposed Development) are more than 1% of the critical loads then the modelled results should be discussed further with the project ecologist.

A 'Critical Load' is defined by the United Nations Economic Commission for Europe (UNECE) as a *'a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge'* (UNECE, 2003).

To determine if the air quality impacts at a sensitive designated habitat are significant, the project ecologist 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; and
- The extent of the sensitive designated site that is negatively affected shall be taken into consideration.

If 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.

Critical loads for nitrogen deposition and acid deposition were derived from the APIS website (APIS, 2023), as per the TII guidance (TII, 2022). These are only available for internationally designated habitats (SPA and SAC). Critical loads for the nationally designated habitats or proposed designated habitats can be derived by searching APIS for the habitat type, rather than a specific site.

The range of critical loads for nitrogen deposition to which the nitrogen deposition at each modelled designated habitat can be compared is shown in Table 7-15.

Table 7-15 Nitrogen Deposition Critical Loads (APIS, 2023)

Designated Habitat Site	Worst-case Habitat	Is this feature sensitive to N?	Nitrogen Critical Load Class	Minimum critical loads for N (kg/ha/yr)	Maximum critical loads for N (kg/ha/yr)	Is this species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
Inner Galway Bay SPA	*Gavia arctica* (Western Siberia/Europe)	Yes	Permanent oligotrophic waters: Softwater lakes	3	10	No	Qualifying interest is not located within 200 m of affected road
Galway Bay Complex SAC	*Juniperus communis* formations on heaths or calcareous grasslands	Yes	Dry heaths	5	10	n/a	n/a

Designated Habitat Site	Worst-case Habitat	Is this feature sensitive to N?	Nitrogen Critical Load Class	Minimum critical loads for N (kg/ha/yr)	Maximum critical loads for N (kg/ha/yr)	Is this species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
	Limestone pavements	Yes	Alpine and subalpine grasslands	5	10	n/a	n/a
Galway Bay Complex pNHA	Habitat information not available - assumed same as Galway Bay Complex SAC	Yes	Alpine and subalpine grasslands	5	10	n/a	n/a
Annex I habitat type 'Lowland Hay Meadows' at Merlin Park	Lowland hay meadow	Yes	Alpine and subalpine grasslands (assumed from APIS)	5	10	n/a	n/a

The range of critical loads for nitrogen deposition to which the nitrogen deposition at each modelled designated habitat can be compared is shown in Table 7-15.

Table 7-16 Acid Deposition (as N) Critical Loads (APIS, 2023)

Designated Habitat Site	Worst-case Habitat	Critical Load Class	Is this feature sensitive to acid deposition (as N)?	Maximum Critical Load Range	Is this species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
Inner Galway Bay SPA	*Gavia arctica* (Western Siberia/Europe) *Phalacrocorax carbo* (North-western Europe) *Sterna hirundo* (Northern/Eastern Europe - breeding)	Freshwater	Yes	0.714 – 6.258	No	Qualifying interest is not located within 200m of affected road
	Sterna hirundo (Northern/Eastern Europe - breeding)	Acid grassland Calcareous grassland (using base cation)	Yes	0.714 – 6.258	No	Qualifying interest is not located within 200m of affected road
Galway Bay Complex SAC	Juniperus communis formations on heaths or calcareous grasslands	Calcareous grassland (using base cation) Dwarf shrub heath	Yes	0.714 – 6.258	n/a	n/a
	Limestone pavements Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Calcareous grassland (using base cation)	Yes	0.714 – 6.258	n/a	n/a
	Perennial vegetation of stony banks	Acid grassland	Yes	0.714 – 6.258	n/a	n/a
	Lutra lutra	Calcareous grassland (using base cation) Dwarf shrub heath Acid grassland Freshwater	Yes	0.714 – 6.258	n/a	n/a
Galway Bay Complex pNHA	Habitat information not available - assumed same as Galway Bay Complex SAC	Calcareous grassland (using base cation) Dwarf shrub heath	Yes	0.714 – 6.258	n/a	n/a
Annex I habitat type 'Lowland	Lowland hay meadow	Calcareous grassland (using base cation)	Yes	0.714 – 6.258	n/a	n/a

Designated Habitat Site	Worst-case Habitat	Critical Load Class	Is this feature sensitive to acid deposition (as N)?	Maximum Critical Load Range	Is this species sensitive due to nutrient nitrogen impacts on broad habitat?	Reason
Hay Meadows' at Merlin Park		(assumed equivalent from APIS)				

7.2.5.8.3 Nitrogen and Acid Deposition Calculation

The TII guidance (TII, 2022) outlines a methodology to derive the road contribution to dry deposition and thereafter to compare with the published critical loads for the appropriate habitat.

In order to calculate the nitrogen deposition, the NO_X / NO_2 concentration determined through modelling including the background concentration must be converted firstly into a dry deposition flux using the equation below which is taken from UK Environment Agency publication *AGTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air* (hereafter referred to as AGTAG06) (EA, 2014):

Dry deposition flux (µg/m^2/s) = ground-level concentration (µg/m^3) x deposition velocity (m/s)

Deposition velocities are provided in both the TII (TII, 2022) and AGTAG06 (EA, 2014) guidance for NO_2 and NH_3 in grassland and forestry.

Once the dry deposition flux (µg/m^2/s) is calculated it must then be converted to nitrogen deposition and nitrogen equivalent acidification flux (keq/ha/year, where keq is a unit of equivalents (a measure of how acidifying the chemical species can be) for comparison with critical loads.

In order to convert the dry deposition flux from units of µg/m^2/s to units of nitrogen deposition (kg/ha/year) the dry deposition flux is multiplied by the conversion factors shown in Table 7-17, and provided in AGTAG06 (EA, 2014). For NO_2 this factor is 95.9 and for NH_3 the factor is 260.

Nitrogen (N) deposition (kg/ha/yr) = Dry deposition flux (µg/m^2/s) x N deposition conversion factor

In order to convert the dry deposition flux from units of µg/m^2/s to units of acid deposition (keq/ha/year) the dry deposition flux is multiplied by the conversion factors shown in Table 7-17, and provided AGTAG06 (EA, 2014). For NO_2 this factor is 6.84 and for NH_3 the factor is 18.5.

Acid (N) deposition (keq/ha/yr) = Dry deposition flux (µg/m^2/s) x Acid deposition conversion factor

Nitrogen deposition and acid deposition is calculated in this manner for both NO_2 and NH_3, and these are then summed for total nitrogen deposition and acid deposition at each sensitive designated habitat.

Table 7-17 Dry Deposition, Nitrogen and Acid Deposition Fluxes for NO_2 and NH_3

Chemical Species	Habitat Type	Recommended Deposition Velocity (m/s)	Dry Deposition Flux (µg/m^2/s) Conversion Factor to N Deposition Flux (kg/ha/yr)	Nitrogen Deposition to Acid Deposition Conversion factor kg/ha/yr to keq/ha/yr
NO_2 (as N)	Grassland	<0.0115	95.9	0.0714
NH_3 (as N)	Grassland	0.02	260	

Background concentrations for NO_X, ammonia and nitrogen deposition at the closest point to the modelled road within each modelled designated habitat were derived from the 1 km grid square concentrations provided on the Air Pollution Information System (APIS) website (APIS, 2023), in line with UKEA (2014) and UK DEFRA (2022b) TG22 guidance, and are shown in Section 7.2.5.8.1 and 7.2.5.8.2 The background concentrations are added directly to the modelled NO_X and nitrogen deposition process contributions to give a total predicted environmental concentration.

7.3 Baseline Environment

7.3.1 Overview

Galway City falls within Zone C. A desk study of the EPA air quality monitoring programs has been undertaken. The most recent annual report on air quality at the time of assessment 2 *Air Quality in Ireland 2023* (EPA, 2024) details the range and scope of monitoring undertaken throughout Ireland. The EPA air quality monitoring data was reviewed for NO_2, NO_X, PM_{10} and $PM_{2.5}$.

In 2020 the EPA reported (EPA, 2024) that Ireland was compliant with EU legal limits at all locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA report details the effect that the Covid-19 restrictions had on stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. The report also notes that Central Statistics Office (CSO) figures show that while traffic volumes are still slightly below 2019 levels, they have significantly increased since 2020 levels. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. For this reason, they have been reported in the baseline section but not included in the long-term trend analysis.

In addition, Proposed Development specific baseline air quality monitoring has been conducted. The data collected has been included to provide site specific baseline concentrations of NO_2 in areas which have the potential to be impacted by the Proposed Development.

7.3.2 Meteorological Conditions

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds, when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ to PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

Athenry meteorological station, which is located approximately 12.5 km east of the Proposed Development at the closest point, collects meteorological data in the correct format for the purposes of this assessment and has a data collection of greater than 90%. Long-term hourly observations at Athenry meteorological station provide an indication of the prevailing wind conditions for the region (see Figure 7-2). Results indicate that the prevailing wind direction is from south to westerly in direction over the period 2018 to 2022.

Figure 7-2 Athenry Meteorological Station Windrose 2018 to 2022 (Met Éireann, 2023)

7.3.3 Site Specific Monitoring (NO_2)

Monitoring of NO_2 in proximity to the Proposed Development, and roads that have the potential to be impacted by it, was carried out using passive diffusion tubes. The baseline monitoring study was carried out close to the alignment of the Proposed Development, with monitoring focusing on areas of greatest potential impact. The results of the monitoring survey allow for an indicative comparison with the annual statutory limit value for NO_2. The results also provide information on the influence of road sources relative to the prevailing background level of these pollutants in the area.

A baseline NO_2 monitoring survey was undertaken as part of the air quality assessment for the Proposed Development. There were 10 monitoring locations tested on a monthly basis over 3 months to ascertain general NO_2 concentrations along and in close proximity to the R338 Old Galway Road. Triplicate tubes were co-located with the continuous monitor at Briarhill, Galway for 2 months for local bias adjustment purposes (a minimum of one month's data is required). Samples were tested using diffusion tubes (20% TEA / Water) and analysed by SP01 Photometer in an accredited laboratory.

For baseline monitoring TII guidance (TII, 2022) states that:

'The duration of the monitoring campaign shall be for at least 6 months; however, a minimum duration of 3 months is acceptable if the project programme does not allow for longer'.

The diffusion tube monitoring results generally have a positive or negative bias when compared to continuous analysers. This bias is laboratory specific and is dependent on the specific analysis procedures at each laboratory. The bias for the tubes was determined by assessment against a reference analyser at Briarhill (EPA Station 109), calibrated with ISO 17025 gases. A local bias adjustment factor was calculated for the Briarhill (EPA Station 109) monitor of 0.53. A diffusion tube bias of 0.76 was also obtained for the SOCOTEC laboratory (which analysed the diffusion tubes) from the UK DEFRA website (DEFRA, 2023).

The local bias adjustment factor of 0.53 was selected for the diffusion tube monitoring results as this value was the more conservative of the laboratory derived and site-specific biases.

In addition to the bias adjustment, an annualization factor is required as the monitoring period did not extend to a full year. The annualization factor was prepared as per LAQM (TG22) (DEFRA, 2022b), using the DEFRA diffusion tube data processing tool v3.0 (DEFRA, 2023). The annualization factor is necessary as NO_2 concentrations vary across the year and this should be accounted for within the baseline monitoring. This factor was calculated using 2022 and 2023 EPA published annual and period averages (EPA, 2024) from Zone C locations, with more than 85% data coverage (Galway Eyre Square, Kilkenny Seville Lodge, Waterford Brownes Road and Navan), and was calculated to be 1.689 for the period of the diffusion tube monitoring (Table 7-18).

The diffusion tubes were put in place from 1st June 2023 with samples taken monthly for June (start date 1st June), July (start date 29th June) and August (start date 28th July). The average across the three months were taken for each sample location, as included in Table 7-18. No exceedances of the annual mean limit value for NO_2 were recorded at the site-specific survey locations.

Table 7-18 Monitoring Data from Site Specific Survey Locations (Annualised and Bias Adjusted)

Monitoring Sample		**NO_2 Concentrations µg/m³**			**Time Weighted Annual Mean (µg/m³)**	
No.	**Location**	**Jun-23**	**Jul-23**	**Aug-23**	**Raw Data**	**Bias Adjusted (0.53) and Annualised (1.689)**
DT1	Old Dublin Rd	20.1	13.7	17.0	16.9	15.1
DT2	Old Dublin Rd	-	22.8	-	-	-
DT3	Old Dublin Rd	27.5	25.2	22.7	25.2	22.5
DT4	Old Dublin Rd	15.8	11.2	11.9	13.0	11.6
DT5	Old Dublin Rd	19.8	16.2	17.0	17.7	15.8
DT6	Old Dublin Rd	11.2	12.5	14.1	12.6	11.3
DT7	Old Dublin Rd	21.2	19.9	22.6	21.2	19.0
DT8	Gleann Rua	5.5	5.7	5.8	5.7	5.1
DT9	Scoil Chaitriona, Renmore Avenue	5.8	5.7	6.5	6.0	5.4
DT10	Ballybane Rd	-	12.5	12.7	-	-
DT11a	Briarhill Continuous Monitor Co-Location	-	20.6	22.8	-	-
DT11b		-	22.5	21.3	-	-
DT11c		-	23.1	-	-	-

The annual mean NO_2 concentration recorded at diffusion tube location DT8 was considered a representative background concentration in the area of the Proposed Development. EPA monitoring data for Zone C was reviewed (refer to Section 0) and the Eyre Square monitoring location in Galway was determined less representative than the site-specific survey location.

7.3.4 EPA Data

As outlined in Section 7.3.1, the Proposed Development is located within Zone C. The continuous monitoring data from EPA monitoring stations in Zone C was reviewed.

7.3.4.1 NO_2

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2024) at the Zone C suburban background, suburban traffic and urban traffic locations, shown in Table 7-19, showed current levels of NO_2 are below both the annual and 1-hour limit values, with annual mean concentrations ranging from 4 – 22 µg/m^3 in 2023.

Annual mean NO_2 concentrations of 17 µg/m^3 and 16 were recorded at urban traffic locations of Eyre Square and at Briarhill in Galway in 2023, respectively (EPA, 2024). As discussed in Section 7.3.3, this annual mean is too conservative for modelling purposes, therefore a background concentration has been derived from the site-specific survey monitoring.

Table 7-19 Annual Mean and 99.8th Percentile 1-Hour Background NO_2 Concentrations for Zone C

Station	Site Classification	Averaging Period	Year				
			2019	2020	2021	2022	2023
Dundalk	Suburban Background	Annual Mean NO_2 (µg/m^3)	12	10	11	10.4	9
		99.8th%ile 1-hr NO_2 (µg/m^3)	69	73	67	71	-
Kilkenny (Seville Lodge)	Suburban Background	Annual Mean NO_2 (µg/m^3)	5	4	4	5	4
		99.8th%ile 1-hr NO_2 (µg/m^3)	42	40	35	44	-
Portlaoise	Suburban Background	Annual Mean NO_2 (µg/m^3)	11	8	8	9	8
		99.8th%ile 1-hr NO_2 (µg/m^3)	60	52	49	55	-
Limerick (People's Park)	Urban Background	Annual Mean NO_2 (µg/m^3)	13	10	10	10	9
		99.8th%ile 1-hr NO_2 (µg/m^3)	75	64	59	-	-
Galway Briarhill (Zone D)	Suburban Traffic	Annual Mean NO_2 (µg/m^3)	-	-	-	-	16
		99.8th%ile 1-hr NO_2 (µg/m^3)	-	-	-	-	-
Navan	Suburban Traffic	Annual Mean NO_2 (µg/m^3)	23	19	22	21	22
		99.8th%ile 1-hr NO_2 (µg/m^3)	-	83	78	-	-
Waterford (Brownes Road)	Suburban Traffic	Annual Mean NO_2 (µg/m^3)	8	7	7	7	7
		99.8th%ile 1-hr NO_2 (µg/m^3)	63	50	47	-	-
Galway Eyre Square	Urban Traffic	Annual Mean NO_2 (µg/m^3)	-	-	-	18	17
		99.8th%ile 1-hr NO_2 (µg/m^3)	-	-	-	-	-
Limerick (Henry Street)	Urban Traffic	Annual Mean NO_2 (µg/m^3)	-	-	15	15	14
		99.8th%ile 1-hr NO_2 (µg/m^3)	-	-	62	-	-
Sligo Town	Urban Traffic	Annual Mean NO_2 (µg/m^3)	-	17	17	-	-
		99.8th%ile 1-hr NO_2 (µg/m^3)	-	80	78	-	-

In addition to the continuous monitoring stations, the EPA gathered NO_2 data using the passive diffusion tube methodology in proximity to the Proposed Development in 208 and 2019 (EPA, 2020). The diffusion tube sampling was carried out in conjunction with GCC; locations and annual mean NO_2 concentrations are shown in Table 7-20. Monitoring is for single year periods; therefore, long-term averages are not available at diffusion tube locations. No exceedances of the annual mean NO_2 concentration in 2019 were recorded at any of the diffusion tube monitoring locations.

Table 7-20 EPA NO_2 Diffusion Tube Monitoring Data

Monitoring Site	Monitoring Year	Annual Mean NO_2 Concentration ($\mu g/m^3$)
Black Box Theatre Car Park, Dyke Road	2019	11.7
Bothar Ui Eithir, LED Signage	2019	18.3
Bowling Green Car Park	2019	12.7
Castlelawn Heights Road, off Kirwan Rndabt.	2019	13.6
Existing Bodkin Monitoring Station	2019	23.4
Forster Street Junction - kerbside	2019	25.0
Mill Street Car Park	2019	12.1
Monivea Road Approach to Briarhill Junction	2019	29.7
N59 Moycullen Road	2019	20.0
N6 Bothar na dTreabh Briarhill Junction	2019	39.7
N6 Briarhill Inbound > 25m from junction	2019	33.2
N6 Briarhill Outbound > 25m from junction	2019	23.7
N84 Headford Road - Ballinfoile Community Centre	2019	12.6
R336 Spanish Parade (Civic Museum)	2019	18.7
R336 Spanish Parade	2019	24.0
R338 Dublin Road (Wellpark Pumping Station	2019	32.1
Sandy Road	2019	18.2
Waterside (Town Hall Theatre)	2019	14.3
Western Distributor Road	2019	16.7

7.3.4.2 PM_{10}

Continuous PM_{10} monitoring carried out at the Zone C suburban background, urban background, suburban traffic and urban traffic locations, shown in Table 7-21, showed annual mean concentrations ranging from 9 – 16 $\mu g/m^3$ in 2023, with at most 11 exceedances (in Ennis) of the daily limit value of 50 $\mu g/m^3$ (35 exceedances are permitted per year). Sufficient data is available for Athlone, Carlow Town, Dundalk, Ennis, Kilkenny, Portlaoise, Letterkenny, Limerick (People's Park) and Waterford to observe trends over the period 2019 – 2023, with annual mean PM_{10} concentrations ranging from 11 – 20 $\mu g/m^3$.

The suburban background location of Rahoon Road in Galway is considered most representative of background PM_{10} concentrations in the area of the Proposed Development, with an annual mean PM_{10} concentration of 13 $\mu g/m^3$ in 2023.

Table 7-21 Annual Mean and 24-Hour Mean Background PM_{10} Concentrations for Zone C

Station	Site Classification	Averaging Period	Year				
			2019	2020	2021	2022	2023
Athlone	Suburban Background	Annual Mean PM_{10} ($\mu g/m^3$)	17	16	12	12	12
		24-hr Mean > 50 $\mu g/m^3$ (days)	0	3	2	3	1
		90^{th}%ile of 24-hr Means	-	29	20	-	-
Carlow Town		Annual Mean PM_{10} ($\mu g/m^3$)	11	11	10	11	10

Station	Site Classification	Averaging Period	Year				
			2019	2020	2021	2022	2023
	Suburban Background	24-hr Mean > 50 µg/m^3 (days)	0	1	0	0	0
		90th%ile of 24-hr Means	-	18	18	-	-
Drogheda	Suburban Background	Annual Mean PM_{10} (µg/m^3)	-	-	11	12	11
		24-hr Mean > 50 µg/m^3 (days)	-	-	0	0	0
		90th%ile of 24-hr Means	-	-	17	-	-
Dundalk	Suburban Background	Annual Mean PM_{10} (µg/m^3)	14	13	12	12	13
		24-hr Mean > 50 µg/m^3 (days)	2	2	0	2	1
		90th%ile of 24-hr Means	-	23	19	-	-
Ennis	Suburban Background	Annual Mean PM_{10} (µg/m^3)	18	20	19	20	16
		24-hr Mean > 50 µg/m^3 (days)	12	19	17	21	11
		90th%ile of 24-hr Means	34	34	35	-	-
Greystones	Suburban Background	Annual Mean PM_{10} (µg/m^3)	-	-	10	13	11
		24-hr Mean > 50 µg/m^3 (days)	-	-	0	0	0
		90th%ile of 24-hr Means	-	-	16	-	-
Kilkenny (Seville Lodge)	Suburban Background	Annual Mean PM_{10} (µg/m^3)	18	18	17	12	14
		24-hr Mean > 50 µg/m^3 (days)	7	1	2	0	0
		90th%ile of 24-hr Means	-	29	28	-	-
Naas	Suburban Background	Annual Mean PM_{10} (µg/m^3)	-	-	11	14	11
		24-hr Mean > 50 µg/m^3 (days)	-	-	0	2	1
		90th%ile of 24-hr Means	-	-	19	-	-
Portlaoise	Suburban Background	Annual Mean PM_{10} (µg/m^3)	15	12	11	12	11
		24-hr Mean > 50 µg/m^3 (days)	0	0	1	2	0
		90th%ile of 24-hr Means	27	21	20	-	-
Rahoon Road (Galway)	Suburban Background	Annual Mean PM_{10} (µg/m^3)	13	-	11	12	13
		24-hr Mean > 50 µg/m^3 (days)	0	-	1	0	0
		90th%ile of 24-hr Means	-	-	19	-	-
Tralee	Suburban Background	Annual Mean PM_{10} (µg/m^3)	-	16	17	18	15
		24-hr Mean > 50 µg/m^3 (days)	2	7	11	14	2
		90th%ile of 24-hr Means	-	28	28	-	-
Wexford Opera House	Suburban Background	Annual Mean PM_{10} (µg/m^3)	-	12	13	15	13
		24-hr Mean > 50 µg/m^3 (days)	-	0	2	5	1
		90th%ile of 24-hr Means	-	21	24	-	-
Clonmel	Urban Background	Annual Mean PM_{10} (µg/m^3)	-	-	11	11	9
		24-hr Mean > 50 µg/m^3 (days)	-	-	0	1	1
		90th%ile of 24-hr Means	-	-	19	-	-
Letterkenny	Urban Background	Annual Mean PM_{10} (µg/m^3)	17	15	15	14	13
		24-hr Mean > 50 µg/m^3 (days)	9	9	9	2	3

Station	Site Classification	Averaging Period	Year				
			2019	2020	2021	2022	2023
		90th%ile of 24-hr Means	-	24	24	-	-
Limerick (People's Park)	Urban Background	Annual Mean PM_{10} (µg/m^3)	13	13	13	18	11
		24-hr Mean > 50 µg/m^3 (days)	4	1	2	2	0
		90th%ile of 24-hr Means	-	22	21	-	-
Galway Briarhill (Zone D)	Suburban Traffic	Annual Mean PM_{10} (µg/m^3)	-	-	-	14	12
		24-hr Mean > 50 µg/m^3 (days)	-	-	-	0	0
		90th%ile of 24-hr Means	-	-	-	-	-
Navan	Suburban Traffic	Annual Mean PM_{10} (µg/m^3)	-	14	13	14	13
		24-hr Mean > 50 µg/m^3 (days)	-	0	1	1	0
		90th%ile of 24-hr Means	-	23	22	-	-
Waterford (Brownes Road)	Suburban Traffic	Annual Mean PM_{10} (µg/m^3)	15	14	14	15	12
		24-hr Mean > 50 µg/m^3 (days)	3	3	3	3	1
		90th%ile of 24-hr Means	-	25	14	-	-
Limerick (Henry Street)	Urban Traffic	Annual Mean PM_{10} (µg/m^3)	-	-	11	14	11
		24-hr Mean > 50 µg/m^3 (days)	-	-	0	2	0
		90th%ile of 24-hr Means	-	-	17	-	-
Sligo Town	Urban Traffic	Annual Mean PM_{10} (µg/m^3)	-	16	18	-	-
		24-hr Mean > 50 µg/m^3 (days)	-	2	20	-	-
		90th%ile of 24-hr Means	-	31	37	-	-

7.3.4.3 $PM_{2.5}$

Continuous $PM_{2.5}$ monitoring carried out at the Zone C suburban background, urban background, suburban traffic and urban traffic locations, shown in Table 7-22, showed annual mean concentrations ranging from 6 – 12 µg/m^3 in 2023. Sufficient data is available for Athlone, Bray, Carlow Town, Ennis, Limerick People's Park, Letterkenny, Navan and Waterford (Brownes Road) to observe trends over the period 2019 – 2023, with annual mean $PM_{2.5}$ concentrations ranging from 5 – 16 µg/m^3.

Continuous monitoring commenced at the urban traffic location Briarhill in Galway in December 2022. The annual mean concentrations monitored in 2023 at this location were 16.2, 12.1 and 7.1 for NO_2, PM_{10} and $PM_{2.5}$ respectively. However, data capture during 2023 was 89%, where EU Directive 2008/50/EC requires a minimum of 90% for PM_{10} and $PM_{2.5}$ and a minimum of 90% in summer and 75% in winter for NO_2 to accurately determine annual mean concentrations.

An annual mean $PM_{2.5}$ concentration can be derived from the Rahoon, Galway PM_{10} annual mean in 2022. A maximum ratio of 0.8 of $PM_{10}/PM_{2.5}$ was applied, calculated by comparing the 2022 monitoring data in Table 7-22 with the PM_{10} data in Table 7-21. This results in a maximum annual mean $PM_{2.5}$ concentration of 10.4 µg/m^3 in 2023. This is considered a conservative estimate of the background $PM_{2.5}$ concentrations in the area of the Proposed Development.

Table 7-22 Annual Mean Background $PM_{2.5}$ Concentrations for Zone C

Station	Site Classification	Averaging Period	Year				
			2019	2020	2021	2022	2023
Athlone	Suburban Background	Annual mean (µg/m^3)	14	12	9	9	8
Bray	Suburban Background	Annual mean (µg/m^3)	7	5	6	6	6
Carlow Town	Suburban Background	Annual mean (µg/m^3)	8	7	7	7	6
Drogheda	Suburban Background	Annual mean (µg/m^3)	-	-	6	7	6
Ennis	Suburban Background	Annual mean (µg/m^3)	14	14	15	16	12
Greystones	Suburban Background	Annual mean (µg/m^3)	-	-	6	7	6
Naas	Suburban Background	Annual mean (µg/m^3)	-	-	7	8	7
Portlaoise	Suburban Background	Annual mean (µg/m^3)	-	12	8	8	7
Tralee	Suburban Background	Annual mean (µg/m^3)	-	10	13	13	10
Leixlip	Suburban Background	Annual mean (µg/m^3)	-	-	-	10	6
Dundalk	Suburban Background	Annual mean (µg/m^3)	-	-	-	20	9
Clonmel	Urban Background	Annual mean (µg/m^3)	-	8	7	7	6
Letterkenny	Urban Background	Annual mean (µg/m^3)	13	11	11	11	10
Limerick People's Park	Urban Background	Annual mean (µg/m^3)	9	8	9	9	7
Wexford Town	Background Traffic	Annual mean (µg/m^3)	-	5	10	10	8
Navan	Suburban Traffic	Annual mean (µg/m^3)	11	8	8	8	8
Waterford Brownes Road	Suburban Traffic	Annual mean (µg/m^3)	11	8	9	10	8
Limerick Henry Street	Urban Traffic	Annual mean (µg/m^3)	-	9	7	8	6
Sligo	Urban Traffic	Annual mean (µg/m^3)	-	12	13	-	-

7.3.5 Sensitive Designated Habitats

Background concentrations for NO_X, ammonia and nitrogen deposition at the closest point to the modelled road within each modelled designated habitat were derived from the 1 km grid square concentrations provided on the Air Pollution Information System (APIS) website (APIS, 2023), in line with UKEA (2014) and UK DEFRA (2022b) TG22 guidance, and are shown in Table 7-23. The background concentrations are added directly to the modelled NO_X and nitrogen deposition process contributions to give a total predicted environmental concentration.

Table 7-23 Background Concentrations for NO_X, NH_3, Nitrogen and Acid Deposition (APIS, 2023)

Sensitive Designated Habitat	NOx ($\mu g/m^3$)	NH_3 ($\mu g/m^3$)	Nitrogen Deposition (kg/ha/yr)
Galway Bay Complex pNHA	3.4	1.2	4.9
Galway Bay Complex SAC	3.4	1.2	4.9
Inner Galway Bay SPA	3.4	1.2	4.9
Annex I habitat type 'Lowland Hay Meadows' at Merlin Park	3.2	1.3	4.7

7.3.6 Existing Baseline Modelling Scenario

In the Existing Baseline Scenario, the current air quality environment experienced within the study area has been modelled. The Existing Baseline modelling scenario has been modelled using ADMS-Roads for the representative baseline year of 2023, to establish baseline concentrations at receptors within the Proposed Development study area.

Predicted annual mean concentrations of NO_2, PM_{10}, $PM_{2.5}$ and the number of exceedances of the 24-hour PM_{10} limit value objective, at worst-case existing air quality sensitive receptors in the 2023 Existing Baseline scenario are listed in Table 7-24. Locations of these receptors are shown in Figures 7.3 to 7.8 in Volume 3 of this EIAR.

Table 7-24 Existing Baseline Scenario Modelling Results at Worst-Case Receptor Locations

Existing Baseline (2023)					
Receptor	Receptor Location	Annual Mean Conc. ($\mu g/m^3$)			No of PM_{10} days > 50 $\mu g/m^3$
		NO_2	PM_{10}	$PM_{2.5}$	
AQ1	R339 College Road	12.9	14.1	11.0	1
AQ2	R339 College Road	13.0	14.0	11.0	1
AQ3	R339 College Road	11.4	13.9	10.9	1
AQ4	R339 College Road	8.2	13.4	10.6	1
AQ5	R339 College Road	13.7	14.2	11.1	1
AQ6	R338 Dublin Road	12.5	13.9	10.9	1
AQ7	R339 Wellpark Road	19.0	14.6	11.3	<1
AQ8	R338 Dublin Road	10.7	13.7	10.8	1
AQ9	R338 Dublin Road	15.4	14.2	11.1	1
AQ10	R338 Dublin Road	9.0	13.4	10.7	1
AQ11	R338 Dublin Road	11.2	13.7	10.8	1
AQ12	R338 Dublin Road	14.4	14.1	11.1	1
AQ13	R338 Dublin Road	9.5	13.5	10.7	1
AQ14	R338 Dublin Road	11.5	13.7	10.8	1
AQ15	Glenina Heights	15.3	14.1	11.1	1
AQ16	Glenina Heights	14.8	14.1	11.1	1
AQ17	Glenina Heights	14.2	14.1	11.1	1

Existing Baseline (2023)					
Receptor	Receptor Location	Annual Mean Conc. (µg/m³)			No of PM_{10} days > 50 µg/m³
		NO_2	PM_{10}	$PM_{2.5}$	
AQ18	Glenina Heights	11.8	13.8	10.9	1
AQ19	R338 Dublin Road	12.9	14.0	11.0	1
AQ20	R338 Dublin Road	9.0	13.4	10.7	1
AQ21	R338 Dublin Road	9.2	13.5	10.7	1
AQ22	R338 Dublin Road	12.1	13.9	10.9	1
AQ23	R338 Dublin Road	10.0	13.6	10.7	1
AQ24	R338 Dublin Road	9.5	13.5	10.7	1
AQ25	R865 Ballybane Rd	9.9	13.6	10.8	1
AQ26	Lurgan Park	8.9	13.4	10.7	1
AQ27	R338 Dublin Road	9.1	13.6	10.8	1
AQ28	Woodhaven	8.5	13.5	10.7	1
AQ29	R865 Ballybane Rd	8.8	13.4	10.7	1
AQ30	R865 Ballybane Rd	9.2	13.5	10.7	1
AQ31	R865 Ballybane Rd	7.8	13.3	10.6	1
AQ32	R865 Ballybane Rd	8.2	13.4	10.6	1
AQ33	R865 Ballybane Rd	7.8	13.3	10.6	1
AQ34	R865 Ballybane Rd	7.2	13.3	10.6	1
AQ35	R865 Ballybane Rd	7.3	13.3	10.6	1
AQ36	R865 Ballybane Rd	8.2	13.4	10.6	1
AQ37	R865 Ballybane Rd	6.8	13.2	10.5	1
AQ38	R865 Ballybane Rd	8.1	13.4	10.6	1
AQ39	R865 Ballybane Rd	8.1	13.4	10.6	1
AQ40	Lios an Uisce	6.8	13.3	10.6	1
AQ41	Rosshill Rd	6.2	13.2	10.5	1
AQ42	Merlin Park University Hospital	6.1	13.2	10.5	1
AQ43	Duirling	6.0	13.1	10.5	1
AQ44	Durabhán	16.1	14.3	11.2	<1
AQ45	Durabhán	14.1	14.1	11.1	1
AQ46	Durabhán	15.9	14.3	11.2	<1
AQ47	Durabhán	13.7	14.1	11.0	1
AQ48	Durabhán	12.4	13.9	11.0	1
AQ49	Doughiska Road	8.4	13.4	10.6	1
AQ50	Doughiska Road	7.7	13.3	10.6	1
AQ51	L5038	8.9	13.5	10.7	1
AQ52	L5038	7.4	13.3	10.6	1

Existing Baseline (2023)					
Receptor	Receptor Location	Annual Mean Conc. (µg/m³)			No of PM_{10} days > 50 µg/m³
		NO_2	PM_{10}	$PM_{2.5}$	
AQ53	Merlin Park University Hospital	6.2	13.2	10.5	1
AQ54	R338 Dublin Road	8.2	13.3	10.6	1
AQ55	R338 Dublin Road	9.4	13.5	10.7	1
AQ56	R338 Dublin Road	8.6	13.4	10.6	1
AQ57	R338 Dublin Road	24.0	15.2	11.7	<1
AQ58	R338 Dublin Road	10.9	13.8	10.9	1
AQ59	Gleann Rua	8.6	13.4	10.6	1
AQ60	R338 Dublin Road	11.5	14.0	11.0	1
AQ61	R338 Dublin Road	8.2	13.5	10.7	1
AQ62	Durabhán	15.8	14.3	11.2	1
AQ63	R865 Ballybane Rd	9.6	13.6	10.7	1
AQ64	R865 Ballybane Rd	8.8	13.5	10.7	1
AQ65	R865 Ballybane Rd	9.1	13.5	10.7	1
Air Quality Limit Value Objective		**40**	**40**	**25**	**35**

In the 2023 Existing Baseline scenario, annual mean concentrations of NO_2 are below the national air quality limit value objective at all modelled receptors. The TII guidance (2022) states that the hourly limit value for NO_2 of 200 µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³. Annual mean NO_2 concentrations did not exceed 60 µg/m³, indicating that exceedances of the NO_2 1-hour mean are unlikely to occur.

Annual mean PM_{10} concentrations are below the relevant national air quality standards in 2023 for all modelled receptors. At all receptors, modelling of the maximum 24-hour PM_{10} concentration indicated that there are likely to be no more than one exceedance of the 50 µg/m³ ambient limit value compared to the threshold which allows 35 daily exceedances in any one calendar year.

Annual mean $PM_{2.5}$ concentrations are also below the relevant national air quality limit value objective for all modelled receptors.

7.4 Potential Impacts

7.4.1 Characteristics of the Proposed Development

In the context of the Proposed Development, the potential air quality impact on the surrounding environment must be considered for two distinct stages:

- Construction Phase; and
- Operational Phase.

7.4.2 Construction Phase

The Construction Phase of the Proposed Development will involve predominately utility diversions, road widening works, road excavation works (where required), road and junction reconfiguration and resurfacing

works, public realm improvements including landscaping, pavement works including bus lanes, cycle tracks, bus terminals, and movement of machinery and materials along the Proposed Development.

7.4.2.1 Construction Dust

Chapter 4 (Proposed Development Description) provides a description of the Proposed Development with Chapter 5 (Construction) providing details of the proposed construction strategy for the Proposed Development.

Dust emissions are likely to arise from the following activities:

- Demolition of existing structure;
- Site clearance;
- Utility diversions;
- Earthworks;
- Stockpiling of excavated materials;
- Use of the on-site crusher for processing materials for recycling/reuse;
- Handling of construction materials; and
- Construction traffic movements.

Where possible, excavated material will be reused and quantities of waste minimised, as outlined in Chapter 17 (Waste & Resources) of this EIAR.

7.4.2.1.1 Dust Emission Magnitude

Following the methodology outlined in Section 7.2.5.2 each dust generating activity has been assigned a dust emission magnitude as shown in Table 7-25.

Table 7-25 Dust Emission Magnitude for Construction Activities

Activity	Dust emission magnitude	Reasoning
Demolition	Small	Total demolition building volume <12,000 m^3
Earthworks	Large	Total site area > 110,000 m^2
Construction	Medium	Potentially dusty construction material
Trackout	Medium	Between 20 - 50 HDV (>3.5 t) outward movements in any one day

7.4.2.1.2 Sensitivity of the Area

The sensitivity of the area to dust soiling has been assigned as high, due to the number of sensitive receptors within proximity of dust generating activities, as per Table 7-2.

The sensitivity of the area to human health has been assigned as low as the background PM_{10} concentration is less than the lower value of 24 µg/m^3, outlined in Table 7-3.

The sensitivity of the area to ecological impacts has been assigned as high, due to the designated habitats within proximity of dust generating activities, as per Table 7-4.

The overall sensitivity has been summarised as shown in Table 7-26.

Table 7-26 Sensitivity of the Area

Potential Impact	Sensitivity
Dust Soiling	High
Human Health	Low
Ecological	High

7.4.2.1.3 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 7-27.

Table 7-27 Risk of Dust Impacts

Potential Impact	Risk of Dust Impacts			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium risk	High risk	Medium risk	Medium risk
Human Health	Negligible risk	Low risk	Low risk	Low risk
Ecological	Medium risk	High risk	Medium risk	Medium risk

Overall, the site has been classified as high risk for earthworks, medium risk for demolition and construction, and low risk for trackout, without mitigation as summarised in Table 7-28.

Table 7-28 Result of Dust Assessment Prior to Mitigation

Activity	Dust risk prior to mitigation
Demolition	Medium
Earthworks	High
Construction	Medium
Trackout	Medium

There are a number of sensitive receptors located close to the proposed works, as described in Section 7.2.2.1, therefore, there is potential for air quality effects arising from dust during construction activities. The impact risk is assigned a worst-case risk, as shown in Table 7-28 prior to the implementation of mitigation measures. In accordance with IAQM guidance, the significance of effects is determined after the application of mitigation measures. Specific mitigation is described in Section 7.5.1.

7.4.2.2 Construction Traffic

7.4.2.2.1 NO_2

The Do Minimum (DM) and the Do Something (DS) are defined scenarios within the traffic modelling exercise in Chapter 6 (Traffic & Transport) and are based on the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without and with the Proposed Development. The output of this analysis and its impact on air quality has been modelled using AMDS-Roads for the Construction Year 2026. Predicted annual mean concentrations of NO_2 at worst-case existing air quality sensitive receptors in the Construction Year 2026 are listed in Table 7-29. Locations of these receptors are shown in Figure 7.3 in Volume 3 of this EIAR.

Table 7-29 Predicted Construction Year 2026 Impact At Worst-Case Receptor Locations - NO_2

Construction Year 2026						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ1	R339 College Road	8.0	8.1	0.09	0.23%	Neutral
AQ2	R339 College Road	7.9	8.0	0.13	0.33%	Neutral
AQ3	R339 College Road	7.8	7.9	0.15	0.38%	Neutral
AQ4	R339 College Road	7.7	7.8	0.15	0.38%	Neutral
AQ5	R339 College Road	8.3	8.7	0.34	0.85%	Neutral
AQ6	R338 Dublin Road	8.3	8.7	0.36	0.90%	Neutral
AQ7	R339 Wellpark Road	8.5	8.9	0.38	0.95%	Neutral
AQ8	R338 Dublin Road	8.6	9.0	0.38	0.95%	Neutral
AQ9	R338 Dublin Road	16.5	17.9	1.37	3.42%	Neutral
AQ10	R338 Dublin Road	10.3	10.7	0.42	1.05%	Neutral
AQ11	R338 Dublin Road	11.8	12.3	0.50	1.25%	Neutral
AQ12	R338 Dublin Road	16.4	17.0	0.63	1.58%	Neutral
AQ13	R338 Dublin Road	19.1	19.9	0.84	2.10%	Neutral
AQ14	R338 Dublin Road	15.8	16.5	0.65	1.63%	Neutral
AQ15	Glenina Heights	16.8	17.5	0.69	1.72%	Neutral
AQ16	Glenina Heights	18.4	19.2	0.77	1.93%	Neutral
AQ17	Glenina Heights	13.0	13.4	0.45	1.13%	Neutral
AQ18	Glenina Heights	11.6	11.9	0.38	0.95%	Neutral
AQ19	R338 Dublin Road	21.8	22.8	0.99	2.48%	Neutral
AQ20	R338 Dublin Road	13.8	14.2	0.41	1.03%	Neutral
AQ21	R338 Dublin Road	10.0	10.1	0.15	0.38%	Neutral
AQ22	R338 Dublin Road	11.4	11.6	0.18	0.45%	Neutral
AQ23	R338 Dublin Road	8.3	8.6	0.28	0.70%	Neutral
AQ24	R338 Dublin Road	9.3	8.2	-1.12	-2.80%	Neutral
AQ25	R865 Ballybane Rd	8.0	9.0	1.09	2.73%	Neutral
AQ26	Lurgan Park	6.2	7.4	1.19	2.98%	Neutral
AQ27	R338 Dublin Road	6.1	6.3	0.26	0.65%	Neutral
AQ28	Woodhaven	6.0	6.5	0.44	1.10%	Neutral
AQ29	R865 Ballybane Rd	5.9	7.0	1.05	2.63%	Neutral
AQ30	R865 Ballybane Rd	5.7	6.4	0.67	1.68%	Neutral
AQ31	R865 Ballybane Rd	5.7	6.6	0.89	2.23%	Neutral
AQ32	R865 Ballybane Rd	5.6	6.0	0.40	1.00%	Neutral
AQ33	R865 Ballybane Rd	6.6	6.7	0.16	0.40%	Neutral
AQ34	R865 Ballybane Rd	6.3	6.3	-0.03	-0.08%	Neutral

Construction Year 2026						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ35	R865 Ballybane Rd	6.3	6.0	-0.31	-0.77%	Neutral
AQ36	R865 Ballybane Rd	6.8	6.2	-0.65	-1.63%	Neutral
AQ37	R865 Ballybane Rd	10.1	9.4	-0.71	-1.78%	Neutral
AQ38	R865 Ballybane Rd	8.9	8.2	-0.71	-1.78%	Neutral
AQ39	R865 Ballybane Rd	5.8	6.7	0.92	2.30%	Neutral
AQ40	Lios an Uisce	6.6	7.5	0.89	2.23%	Neutral
AQ41	L5037 Rosshill Road	8.5	7.6	-0.91	-2.28%	Neutral
AQ42	Merlin Park University Hospital	12.7	12.7	-0.03	-0.08%	Neutral
AQ43	Duirling	13.1	13.1	<0.01	<0.01%	Neutral
AQ44	Durabhan	15.5	15.5	0.02	0.05%	Neutral
AQ45	Durabhan	10.5	10.5	-0.04	-0.10%	Neutral
AQ46	Durabhan	18.7	18.7	-0.06	-0.15%	Neutral
AQ47	Durabhan	16.8	15.8	-1.05	-2.63%	Neutral
AQ48	Durabhan	28.5	29.0	0.52	1.30%	Neutral
AQ49	Doughiska Road	10.7	10.2	-0.55	-1.38%	Neutral
AQ50	Doughiska Road	10.6	10.6	-0.07	-0.17%	Neutral
AQ51	L5038	8.7	8.4	-0.32	-0.80%	Neutral
AQ52	L5038	8.9	8.6	-0.35	-0.87%	Neutral
AQ53	Merlin Park University Hospital	11.0	10.4	-0.64	-1.60%	Neutral
AQ54	R338 Dublin Road	8.0	7.7	-0.30	-0.75%	Neutral
AQ55	R338 Dublin Road	9.2	8.8	-0.39	-0.98%	Neutral
AQ56	R338 Dublin Road	11.7	11.0	-0.77	-1.93%	Neutral
AQ57	R338 Dublin Road	15.3	14.7	-0.59	-1.48%	Neutral
AQ58	R338 Dublin Road	10.8	10.6	-0.16	-0.40%	Neutral
AQ59	Gleann Rua	9.1	8.8	-0.29	-0.73%	Neutral
AQ60	R338 Dublin Road	9.7	9.3	-0.37	-0.93%	Neutral
AQ61	R338 Dublin Road	7.5	7.3	-0.15	-0.37%	Neutral
AQ62	Durabhan	11.7	11.2	-0.49	-1.23%	Neutral
AQ63	R865 Ballybane Rd	9.2	8.9	-0.31	-0.78%	Neutral
AQ64	R865 Ballybane Rd	9.5	9.8	0.29	0.72%	Neutral
AQ65	R865 Ballybane Rd	9.2	8.8	-0.39	-0.97%	Neutral
AQ66	Doughiska Road	9.5	9.0	-0.56	-1.40%	Neutral
AQ67	Garran Ard	8.5	8.3	-0.14	-0.35%	Neutral
AQ68	Garran Ard	8.3	8.4	0.12	0.30%	Neutral

Construction Year 2026						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ69	Sraith Fada	8.2	8.4	0.19	0.47%	Neutral
AQ70	An Sean Bhaile	10.5	10.3	-0.23	-0.57%	Neutral
AQ71	An Sean Bhaile	11.1	10.7	-0.42	-1.05%	Neutral
AQ72	An Sean Bhaile	9.5	9.0	-0.42	-1.05%	Neutral
AQ73	An Sean Bhaile	10.3	9.7	-0.59	-1.48%	Neutral
AQ74	R339 Monivea Road	9.5	9.2	-0.31	-0.77%	Neutral
AQ75	R339 Monivea Road	7.2	7.0	-0.18	-0.45%	Neutral
AQ76	R339 Monivea Road	7.1	7.3	0.21	0.53%	Neutral
AQ77	N6 Bothair na dTreabh	8.1	8.0	-0.11	-0.28%	Neutral
AQ78	N6 Bothair na dTreabh	6.9	6.8	-0.04	-0.10%	Neutral
AQ79	N6 Bothair na dTreabh	8.0	7.9	-0.08	-0.20%	Neutral
AQ80	N6 Bothair na dTreabh	8.1	8.0	-0.12	-0.30%	Neutral
AQ81	N6 Bothair na dTreabh	6.7	6.8	0.10	0.25%	Neutral
AQ82	N6 Bothair na dTreabh	6.1	6.2	0.18	0.45%	Neutral
AQ83	N6 Bothair na dTreabh	6.1	6.0	-0.06	-0.15%	Neutral
AQ84	N6 Bothair na dTreabh	6.1	5.9	-0.18	-0.45%	Neutral
AQ85	R339 Monivea Road	10.8	10.7	-0.15	-0.38%	Neutral
AQ86	R339 Monivea Road	10.1	9.7	-0.39	-0.98%	Neutral
AQ87	R339 Monivea Road	11.5	11.1	-0.42	-1.05%	Neutral
AQ88	Michael Collins Road	9.7	9.4	-0.21	-0.53%	Neutral
AQ89	Renmore Road	8.3	8.3	-0.02	-0.05%	Neutral
AQ90	Renmore Park	8.2	8.1	-0.12	-0.30%	Neutral
AQ91	Renmore Park	7.5	7.5	<0.01	<0.01%	Neutral
AQ92	Renmore Park	8.7	8.8	0.11	0.27%	Neutral
AQ93	Renmore Park	7.4	7.5	0.02	0.05%	Neutral
AQ94	Lakeshore Drive	6.2	6.1	-0.10	-0.25%	Neutral
AQ95	Lakeshore Drive	8.1	7.8	-0.25	-0.63%	Neutral
AQ96	Lakeshore Drive	9.2	8.8	-0.40	-1.00%	Neutral
AQ97	Lakeshore Drive	8.5	8.2	-0.26	-0.65%	Neutral
AQ98	Renmore Road	17.4	15.9	-1.48	-3.70%	Neutral
AQ99	Renmore Road	10.5	10.1	-0.37	-0.92%	Neutral
AQ100	Renmore Road	8.1	8.1	-0.07	-0.17%	Neutral
AQ101	Renmore Road	10.1	10.6	0.55	1.38%	Neutral
AQ102	Renmore Road	7.7	7.9	0.21	0.53%	Neutral
AQ103	Renmore Road	10.4	10.6	0.22	0.55%	Neutral

Construction Year 2026						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ104	L5037 Rosshill Road	9.2	8.8	-0.44	-1.10%	Neutral
AQ105	L5037 Rosshill Road	8.7	8.3	-0.44	-1.10%	Neutral
AQ106	Radharc an Chaisleain	8.8	8.4	-0.39	-0.97%	Neutral

The predicted average NO_2 concentration is in compliance with the limit value at the worst-case receptors in 2026. The TII guidance (2022) states that the hourly limit value for NO_2 of 200 µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³. Annual mean NO_2 concentrations did not exceed 60 µg/m³, indicating that exceedances of the NO_2 1-hour mean are unlikely to occur.

The impact of the Proposed Development on annual mean NO_2 concentrations can be assessed relative to the DM scenario, as shown in Table 7-29. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7-7) and there is a less than 5% change in concentrations compared with the Do Minimum scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7-14). Therefore, the impact of the Proposed Development on NO_2 concentrations is neutral at all modelled receptors in the Construction Year 2026.

7.4.2.2.2 PM_{10}

The Do Minimum (DM) and the Do Something (DS) are defined scenarios within the traffic modelling exercise in Chapter 6 (Traffic & Transport) and are based on the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without and with the Proposed Development. The output of this analysis and its impact on air quality has been modelled using AMDS-Roads for the Construction Year 2026. Predicted annual mean concentrations of PM_{10} and the number of exceedances of the 24-hour PM_{10} limit value objective at worst-case existing air quality sensitive receptors in the Construction Year 2026 are listed in Table 7-30. Locations of these receptors are shown in Figure 7.7 in Volume 3 of this EIAR.

Table 7-30 Predicted Construction Year 2026 Impact At Worst-Case Receptor Locations – PM_{10}

Construction Year 2026							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ1	R339 College Road	13.5	13.5	0.02	0.04%	<1	Neutral
AQ2	R339 College Road	13.5	13.5	0.02	0.06%	<1	Neutral
AQ3	R339 College Road	13.5	13.5	0.03	0.06%	<1	Neutral
AQ4	R339 College Road	13.4	13.5	0.02	0.06%	<1	Neutral
AQ5	R339 College Road	13.6	13.6	0.04	0.10%	<1	Neutral
AQ6	R338 Dublin Road	13.6	13.6	0.04	0.10%	<1	Neutral
AQ7	R339 Wellpark Road	13.6	13.6	0.04	0.11%	<1	Neutral
AQ8	R338 Dublin Road	13.6	13.6	0.04	0.11%	<1	Neutral
AQ9	R338 Dublin Road	14.8	14.9	0.09	0.22%	<1	Neutral

Construction Year 2026							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ10	R338 Dublin Road	13.8	13.9	0.06	0.15%	<1	Neutral
AQ11	R338 Dublin Road	14.1	14.2	0.08	0.20%	<1	Neutral
AQ12	R338 Dublin Road	15.1	15.2	0.13	0.32%	<1	Neutral
AQ13	R338 Dublin Road	15.7	15.8	0.16	0.39%	<1	Neutral
AQ14	R338 Dublin Road	15.0	15.1	0.11	0.29%	<1	Neutral
AQ15	Glenina Heights	15.2	15.3	0.14	0.34%	<1	Neutral
AQ16	Glenina Heights	15.6	15.7	0.15	0.37%	<1	Neutral
AQ17	Glenina Heights	14.5	14.6	0.09	0.23%	<1	Neutral
AQ18	Glenina Heights	14.3	14.3	0.08	0.20%	<1	Neutral
AQ19	R338 Dublin Road	16.2	16.5	0.22	0.54%	<1	Neutral
AQ20	R338 Dublin Road	14.4	14.5	0.08	0.19%	<1	Neutral
AQ21	R338 Dublin Road	13.8	13.8	0.03	0.08%	<1	Neutral
AQ22	R338 Dublin Road	14.0	14.0	0.04	0.10%	<1	Neutral
AQ23	R338 Dublin Road	13.5	13.5	0.04	0.11%	<1	Neutral
AQ24	R338 Dublin Road	13.5	13.4	-0.14	-0.36%	<1	Neutral
AQ25	R865 Ballybane Rd	13.4	13.5	0.12	0.31%	<1	Neutral
AQ26	Lurgan Park	13.1	13.3	0.15	0.37%	<1	Neutral
AQ27	R338 Dublin Road	13.1	13.2	0.03	0.08%	<1	Neutral
AQ28	Woodhaven	13.1	13.2	0.06	0.14%	<1	Neutral
AQ29	R865 Ballybane Rd	13.1	13.2	0.13	0.32%	<1	Neutral
AQ30	R865 Ballybane Rd	13.1	13.2	0.08	0.21%	<1	Neutral
AQ31	R865 Ballybane Rd	13.1	13.2	0.11	0.27%	<1	Neutral
AQ32	R865 Ballybane Rd	13.1	13.1	0.05	0.12%	<1	Neutral
AQ33	R865 Ballybane Rd	13.2	13.2	0.02	0.05%	<1	Neutral
AQ34	R865 Ballybane Rd	13.2	13.2	<0.01	-0.01%	<1	Neutral
AQ35	R865 Ballybane Rd	13.2	13.1	-0.04	-0.09%	<1	Neutral
AQ36	R865 Ballybane Rd	13.2	13.1	-0.08	-0.20%	<1	Neutral
AQ37	R865 Ballybane Rd	13.6	13.5	-0.08	-0.20%	<1	Neutral
AQ38	R865 Ballybane Rd	13.5	13.4	-0.09	-0.22%	<1	Neutral
AQ39	R865 Ballybane Rd	13.1	13.3	0.14	0.34%	<1	Neutral
AQ40	Lios an Uisce	13.3	13.4	0.11	0.28%	<1	Neutral
AQ41	L5037 Rosshill Road	13.7	13.4	-0.22	-0.54%	<1	Neutral
AQ42	Merlin Park University Hospital	14.2	14.2	<0.01	-0.01%	<1	Neutral

Construction Year 2026							
Receptor	**Receptor Location**	**Annual Mean PM_{10} Concentrations (µg/m³)**				**Change in No of PM_{10} days > 50 µg/m³**	**Impact**
		DM	**DS**	**DS-DM Change**	**% Change of AQLV**		
AQ43	Duirling	14.2	14.2	<0.01	-0.01%	<1	Neutral
AQ44	Durabhan	14.7	14.7	<0.01	-0.01%	<1	Neutral
AQ45	Durabhan	13.8	13.8	<0.01	-0.01%	<1	Neutral
AQ46	Durabhan	15.3	15.3	-0.01	-0.02%	<1	Neutral
AQ47	Durabhan	14.7	14.6	-0.07	-0.18%	<1	Neutral
AQ48	Durabhan	16.0	16.1	0.06	0.16%	<1	Neutral
AQ49	Doughiska Road	13.8	13.7	-0.03	-0.08%	<1	Neutral
AQ50	Doughiska Road	13.8	13.7	-0.05	-0.13%	<1	Neutral
AQ51	L5038	13.5	13.5	-0.02	-0.06%	<1	Neutral
AQ52	L5038	13.5	13.5	-0.06	-0.16%	<1	Neutral
AQ53	Merlin Park University Hospital	13.8	13.7	-0.12	-0.30%	<1	Neutral
AQ54	R338 Dublin Road	13.4	13.3	-0.04	-0.09%	<1	Neutral
AQ55	R338 Dublin Road	13.5	13.5	-0.05	-0.12%	<1	Neutral
AQ56	R338 Dublin Road	13.8	13.7	-0.10	-0.26%	<1	Neutral
AQ57	R338 Dublin Road	14.3	14.2	-0.08	-0.19%	<1	Neutral
AQ58	R338 Dublin Road	13.8	13.7	-0.03	-0.08%	<1	Neutral
AQ59	Gleann Rua	13.6	13.5	-0.06	-0.15%	<1	Neutral
AQ60	R338 Dublin Road	13.7	13.6	-0.08	-0.20%	<1	Neutral
AQ61	R338 Dublin Road	13.3	13.3	-0.03	-0.07%	<1	Neutral
AQ62	Durabhan	14.0	13.9	-0.08	-0.19%	<1	Neutral
AQ63	R865 Ballybane Rd	13.6	13.5	-0.07	-0.16%	<1	Neutral
AQ64	R865 Ballybane Rd	13.6	13.6	0.03	0.08%	<1	Neutral
AQ65	R865 Ballybane Rd	13.6	13.5	-0.05	-0.13%	<1	Neutral
AQ66	Doughiska Road	13.6	13.6	-0.08	-0.20%	<1	Neutral
AQ67	Garran Ard	13.4	13.4	-0.02	-0.06%	<1	Neutral
AQ68	Garran Ard	13.6	13.5	-0.05	-0.11%	<1	Neutral
AQ69	Sraith Fada	13.5	13.5	-0.04	-0.11%	<1	Neutral
AQ70	An Sean Bhaile	13.7	13.7	-0.04	-0.11%	<1	Neutral
AQ71	An Sean Bhaile	13.9	13.8	-0.09	-0.22%	<1	Neutral
AQ72	An Sean Bhaile	13.6	13.6	-0.07	-0.16%	<1	Neutral
AQ73	An Sean Bhaile	13.8	13.7	-0.09	-0.23%	<1	Neutral
AQ74	R339 Monivea Road	13.7	13.6	-0.05	-0.13%	<1	Neutral
AQ75	R339 Monivea Road	13.3	13.3	-0.03	-0.07%	<1	Neutral

Construction Year 2026							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)				Change in No of PM_{10} days > 50 $\mu g/m^3$	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ76	R339 Monivea Road	13.3	13.3	0.02	0.06%	<1	Neutral
AQ77	N6 Bothair na dTreabh	13.5	13.4	-0.02	-0.04%	<1	Neutral
AQ78	N6 Bothair na dTreabh	13.3	13.3	-0.01	-0.02%	<1	Neutral
AQ79	N6 Bothair na dTreabh	13.4	13.4	-0.01	-0.02%	<1	Neutral
AQ80	N6 Bothair na dTreabh	13.5	13.4	-0.02	-0.04%	<1	Neutral
AQ81	N6 Bothair na dTreabh	13.3	13.3	-0.02	-0.06%	<1	Neutral
AQ82	N6 Bothair na dTreabh	13.2	13.2	<0.01	<0.01%	<1	Neutral
AQ83	N6 Bothair na dTreabh	13.2	13.1	-0.03	-0.09%	<1	Neutral
AQ84	N6 Bothair na dTreabh	13.2	13.1	-0.04	-0.09%	<1	Neutral
AQ85	R339 Monivea Road	13.8	13.8	-0.03	-0.07%	<1	Neutral
AQ86	R339 Monivea Road	13.7	13.7	-0.04	-0.10%	<1	Neutral
AQ87	R339 Monivea Road	13.9	13.9	-0.05	-0.11%	<1	Neutral
AQ88	Michael Collins Road	13.6	13.6	-0.02	-0.06%	<1	Neutral
AQ89	Renmore Road	13.5	13.5	<0.01	<0.01%	<1	Neutral
AQ90	Renmore Park	13.4	13.4	-0.02	-0.04%	<1	Neutral
AQ91	Renmore Park	13.4	13.4	<0.01	<0.01%	<1	Neutral
AQ92	Renmore Park	13.5	13.6	0.02	0.05%	<1	Neutral
AQ93	Renmore Park	13.4	13.4	0.01	0.01%	<1	Neutral
AQ94	Lakeshore Drive	13.2	13.2	-0.04	-0.11%	<1	Neutral
AQ95	Lakeshore Drive	13.4	13.4	-0.01	-0.04%	<1	Neutral
AQ96	Lakeshore Drive	13.5	13.5	-0.02	-0.06%	<1	Neutral
AQ97	Lakeshore Drive	13.4	13.4	-0.01	-0.04%	<1	Neutral
AQ98	Renmore Road	14.6	14.4	-0.24	-0.60%	<1	Neutral
AQ99	Renmore Road	13.9	13.8	-0.06	-0.16%	<1	Neutral
AQ100	Renmore Road	13.4	13.4	-0.01	-0.03%	<1	Neutral
AQ101	Renmore Road	13.9	13.9	-0.07	-0.18%	<1	Neutral

Construction Year 2026							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ102	Renmore Road	13.5	13.4	-0.04	-0.10%	<1	Neutral
AQ103	Renmore Road	13.8	13.8	0.01	0.04%	<1	Neutral
AQ104	L5037 Rosshill Road	13.6	13.5	-0.07	-0.18%	<1	Neutral
AQ105	L5037 Rosshill Road	13.5	13.5	-0.07	-0.17%	<1	Neutral
AQ106	Radharc an Chaisleain	13.5	13.5	-0.06	-0.16%	<1	Neutral

The predicted average PM_{10} concentration is in compliance with the limit value at the worst-case receptors in 2026. At all receptors, modelling of the maximum 24-hour PM_{10} concentration indicated that there are likely to be no more than one exceedance of the 50 µg/m³ ambient limit value compared to the threshold which allows 35 daily exceedances in any one calendar year.

The impact of the Proposed Development on annual mean PM_{10} concentrations can be assessed relative to the DM scenario, as shown in Table 7-30. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7-7) and there is a less than 5% change in concentrations compared with the Do Minimum scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7-14). Therefore, the impact of the Proposed Development on PM_{10} concentrations is neutral at all modelled receptors in the Construction Year 2026.

7.4.2.2.3 $PM_{2.5}$

The Do Minimum (DM) and the Do Something (DS) are defined scenarios within the traffic modelling exercise in Chapter 6 (Traffic & Transport) and are based on the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without and with the Proposed Development. The output of this analysis and its impact on air quality has been modelled using AMDS-Roads for the Construction Year 2026. Predicted annual mean concentrations of $PM_{2.5}$ at worst-case existing air quality sensitive receptors in the Construction Year 2026 are listed in Table 7-31. Locations of these receptors are shown in Figure 7.5 in Volume 3 of this EIAR.

Table 7-31 Predicted Construction Year 2026 Impact At Worst-Case Receptor Locations - $PM_{2.5}$

Construction Year 2026						
Receptor	Receptor Location	Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ1	R339 College Road	10.7	10.7	0.01	0.04%	Neutral
AQ2	R339 College Road	10.7	10.7	0.01	0.05%	Neutral
AQ3	R339 College Road	10.7	10.7	0.01	0.06%	Neutral
AQ4	R339 College Road	10.7	10.7	0.01	0.05%	Neutral
AQ5	R339 College Road	10.7	10.7	0.02	0.10%	Neutral
AQ6	R338 Dublin Road	10.7	10.7	0.02	0.10%	Neutral

Construction Year 2026						
Receptor	Receptor Location	Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ7	R339 Wellpark Road	10.7	10.8	0.03	0.11%	Neutral
AQ8	R338 Dublin Road	10.7	10.8	0.03	0.10%	Neutral
AQ9	R338 Dublin Road	11.5	11.5	0.06	0.23%	Neutral
AQ10	R338 Dublin Road	10.9	10.9	0.04	0.14%	Neutral
AQ11	R338 Dublin Road	11.0	11.1	0.05	0.18%	Neutral
AQ12	R338 Dublin Road	11.6	11.7	0.07	0.29%	Neutral
AQ13	R338 Dublin Road	11.9	12.0	0.09	0.37%	Neutral
AQ14	R338 Dublin Road	11.6	11.6	0.07	0.28%	Neutral
AQ15	Glenina Heights	11.7	11.7	0.07	0.30%	Neutral
AQ16	Glenina Heights	11.9	11.9	0.09	0.35%	Neutral
AQ17	Glenina Heights	11.3	11.3	0.05	0.20%	Neutral
AQ18	Glenina Heights	11.1	11.2	0.05	0.18%	Neutral
AQ19	R338 Dublin Road	12.2	12.4	0.13	0.53%	Neutral
AQ20	R338 Dublin Road	11.2	11.2	0.05	0.18%	Neutral
AQ21	R338 Dublin Road	10.8	10.9	0.02	0.08%	Neutral
AQ22	R338 Dublin Road	11.0	11.0	0.02	0.09%	Neutral
AQ23	R338 Dublin Road	10.7	10.7	0.03	0.10%	Neutral
AQ24	R338 Dublin Road	10.7	10.6	-0.09	-0.34%	Neutral
AQ25	R865 Ballybane Rd	10.6	10.7	0.07	0.30%	Neutral
AQ26	Lurgan Park	10.5	10.6	0.09	0.35%	Neutral
AQ27	R338 Dublin Road	10.5	10.5	0.02	0.08%	Neutral
AQ28	Woodhaven	10.5	10.5	0.03	0.13%	Neutral
AQ29	R865 Ballybane Rd	10.5	10.5	0.08	0.31%	Neutral
AQ30	R865 Ballybane Rd	10.5	10.5	0.05	0.19%	Neutral
AQ31	R865 Ballybane Rd	10.5	10.5	0.06	0.26%	Neutral
AQ32	R865 Ballybane Rd	10.4	10.5	0.03	0.12%	Neutral
AQ33	R865 Ballybane Rd	10.5	10.5	0.01	0.05%	Neutral
AQ34	R865 Ballybane Rd	10.5	10.5	<0.01	-0.01%	Neutral
AQ35	R865 Ballybane Rd	10.5	10.5	-0.02	-0.09%	Neutral
AQ36	R865 Ballybane Rd	10.5	10.5	-0.05	-0.19%	Neutral
AQ37	R865 Ballybane Rd	10.8	10.7	-0.05	-0.20%	Neutral
AQ38	R865 Ballybane Rd	10.7	10.6	-0.05	-0.21%	Neutral
AQ39	R865 Ballybane Rd	10.5	10.5	0.08	0.32%	Neutral
AQ40	Lios an Uisce	10.6	10.6	0.07	0.27%	Neutral
AQ41	L5037 Rosshill Road	10.8	10.7	-0.12	-0.48%	Neutral

Construction Year 2026						
Receptor	Receptor Location	Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ42	Merlin Park University Hospital	11.1	11.1	<0.01	-0.01%	Neutral
AQ43	Duirling	11.1	11.1	<0.01	<0.01%	Neutral
AQ44	Durabhan	11.4	11.4	<0.01	-0.01%	Neutral
AQ45	Durabhan	10.9	10.9	<0.01	-0.01%	Neutral
AQ46	Durabhan	11.7	11.7	<0.01	-0.01%	Neutral
AQ47	Durabhan	11.4	11.3	-0.05	-0.19%	Neutral
AQ48	Durabhan	12.2	12.2	0.03	0.13%	Neutral
AQ49	Doughiska Road	10.8	10.8	-0.02	-0.09%	Neutral
AQ50	Doughiska Road	10.9	10.8	-0.03	-0.11%	Neutral
AQ51	L5038	10.7	10.7	-0.02	-0.06%	Neutral
AQ52	L5038	10.7	10.7	-0.04	-0.14%	Neutral
AQ53	Merlin Park University Hospital	10.9	10.8	-0.07	-0.27%	Neutral
AQ54	R338 Dublin Road	10.6	10.6	-0.02	-0.09%	Neutral
AQ55	R338 Dublin Road	10.7	10.7	-0.03	-0.12%	Neutral
AQ56	R338 Dublin Road	10.9	10.8	-0.06	-0.24%	Neutral
AQ57	R338 Dublin Road	11.2	11.1	-0.04	-0.17%	Neutral
AQ58	R338 Dublin Road	10.9	10.8	-0.02	-0.08%	Neutral
AQ59	Gleann Rua	10.7	10.7	-0.03	-0.13%	Neutral
AQ60	R338 Dublin Road	10.8	10.7	-0.04	-0.18%	Neutral
AQ61	R338 Dublin Road	10.6	10.6	-0.02	-0.06%	Neutral
AQ62	Durabhan	11.0	10.9	-0.04	-0.18%	Neutral
AQ63	R865 Ballybane Rd	10.7	10.7	-0.04	-0.15%	Neutral
AQ64	R865 Ballybane Rd	10.8	10.8	0.02	0.07%	Neutral
AQ65	R865 Ballybane Rd	10.7	10.7	-0.03	-0.12%	Neutral
AQ66	Doughiska Road	10.8	10.7	-0.05	-0.19%	Neutral
AQ67	Garran Ard	10.7	10.6	-0.01	-0.05%	Neutral
AQ68	Garran Ard	10.7	10.7	-0.02	-0.09%	Neutral
AQ69	Sraith Fada	10.7	10.7	-0.02	-0.08%	Neutral
AQ70	An Sean Bhaile	10.8	10.8	-0.02	-0.10%	Neutral
AQ71	An Sean Bhaile	10.9	10.9	-0.05	-0.20%	Neutral
AQ72	An Sean Bhaile	10.8	10.7	-0.04	-0.16%	Neutral
AQ73	An Sean Bhaile	10.9	10.8	-0.05	-0.21%	Neutral
AQ74	R339 Monivea Road	10.8	10.8	-0.03	-0.12%	Neutral
AQ75	R339 Monivea Road	10.6	10.6	-0.02	-0.07%	Neutral

Construction Year 2026						
Receptor	Receptor Location	Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ76	R339 Monivea Road	10.6	10.6	0.01	0.06%	Neutral
AQ77	N6 Bothair na dTreabh	10.7	10.7	-0.01	-0.04%	Neutral
AQ78	N6 Bothair na dTreabh	10.6	10.6	<0.01	-0.02%	Neutral
AQ79	N6 Bothair na dTreabh	10.6	10.6	-0.01	-0.02%	Neutral
AQ80	N6 Bothair na dTreabh	10.7	10.7	-0.01	-0.04%	Neutral
AQ81	N6 Bothair na dTreabh	10.6	10.5	-0.01	-0.05%	Neutral
AQ82	N6 Bothair na dTreabh	10.5	10.5	<0.01	0.01%	Neutral
AQ83	N6 Bothair na dTreabh	10.5	10.5	-0.02	-0.07%	Neutral
AQ84	N6 Bothair na dTreabh	10.5	10.5	-0.02	-0.09%	Neutral
AQ85	R339 Monivea Road	10.9	10.9	-0.02	-0.06%	Neutral
AQ86	R339 Monivea Road	10.8	10.8	-0.02	-0.10%	Neutral
AQ87	R339 Monivea Road	10.9	10.9	-0.03	-0.11%	Neutral
AQ88	Michael Collins Road	10.8	10.8	-0.01	-0.06%	Neutral
AQ89	Renmore Road	10.7	10.7	<0.01	-0.01%	Neutral
AQ90	Renmore Park	10.7	10.6	-0.01	-0.04%	Neutral
AQ91	Renmore Park	10.6	10.6	<0.01	<0.01%	Neutral
AQ92	Renmore Park	10.7	10.7	0.01	0.05%	Neutral
AQ93	Renmore Park	10.6	10.6	<0.01	0.01%	Neutral
AQ94	Lakeshore Drive	10.5	10.5	-0.02	-0.09%	Neutral
AQ95	Lakeshore Drive	10.6	10.6	-0.01	-0.04%	Neutral
AQ96	Lakeshore Drive	10.7	10.7	-0.02	-0.07%	Neutral
AQ97	Lakeshore Drive	10.7	10.7	-0.01	-0.04%	Neutral
AQ98	Renmore Road	11.3	11.2	-0.14	-0.56%	Neutral
AQ99	Renmore Road	10.9	10.9	-0.04	-0.14%	Neutral
AQ100	Renmore Road	10.6	10.6	-0.01	-0.03%	Neutral
AQ101	Renmore Road	10.9	10.9	-0.03	-0.13%	Neutral
AQ102	Renmore Road	10.7	10.6	-0.02	-0.08%	Neutral
AQ103	Renmore Road	10.8	10.8	0.01	0.04%	Neutral
AQ104	L5037 Rosshill Road	10.8	10.7	-0.04	-0.17%	Neutral
AQ105	L5037 Rosshill Road	10.7	10.7	-0.04	-0.16%	Neutral
AQ106	Radharc an Chaisleain	10.7	10.7	-0.04	-0.15%	Neutral

The predicted average $PM_{2.5}$ concentration is in compliance with the limit value at the worst-case receptors in 2026.

The impact of the Proposed Development on annual mean $PM_{2.5}$ concentrations can be assessed relative to the DM scenario, as shown in Table 7-31. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7-7) and there is a less than 5% change in concentrations compared with the Do Minimum scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7-14). Therefore, the impact of the Proposed Development on $PM_{2.5}$ concentrations is neutral at all modelled receptors in the Construction Year 2026.

7.4.2.2.4 Sensitive Designated Habitats

An assessment of the impact of the Proposed Development has been undertaken using the approach outlined in the IAQM guidance document A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020) and the TII guidance (TII, 2022). An assessment of the ecologically sensitive sites listed in Section 7.2.2.1 has been carried out.

As outlined in Section 7.2.5.5, the Galway Bay Complex SAC and pNHA (Site Code 000268), Inner Galway Bay SPA (Site Code 004031) the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park are within 200 m of the boundary of the Proposed Development. The Lough Corrib SAC (Site Code 000297) and Lough Corrib SPA (Site Code 004042) are within 2 km of the Proposed Development.

Annual mean NOx and ammonia concentrations, as well as nitrogen and acid deposition levels have been compared to the relevant critical levels and loads in Table 7-39 for the worst-case ecologically sensitive receptors. The ground level concentrations for NO_X and ammonia, nitrogen deposition flux and acid deposition flux are presented for the closest locations within the ecological sites to the nearest road.

Table 7-32 Construction Year 2026 Maximum Predicted NO_X and NH_3 Concentrations, and Nitrogen and Acid Deposition Rates at Closest Point within Ecological Sites to Road

Scenario	Predicted Ground Level NO_X Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NO_X Concentration (including background $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (including background $\mu g/m^3$	Total Nitrogen Deposition Flux (kg/ha/yr)	Total Acid Deposition Flux (keq/ha/yr)
Galway Bay Complex pNHA						
Do-Minimum	21.02	1.24	24.42	2.44	12.98	0.93
Do-Something	20.49	1.22	23.89	2.42	12.83	0.92
Difference between Do-Something and Do-Minimum	-0.53	-0.02	-0.53	-0.02	-0.15	-0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	-1.5%	-0.2%
Galway Bay Complex SAC						
Do-Minimum	13.83	0.82	17.23	2.02	5.34	0.38

Scenario	Predicted Ground Level NO_X Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NO_X Concentration (including background $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (including background $\mu g/m^3$	Total Nitrogen Deposition Flux (kg/ha/yr)	Total Acid Deposition Flux (keq/ha/yr)
Do-Something	13.29	0.80	16.69	2.00	5.20	0.37
Difference between Do-Something and Do-Minimum	-0.54	-0.02	-0.54	-0.02	-0.14	-0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	-1.4%	-0.2%
Inner Galway Bay SPA						
Do-Minimum	7.29	0.43	10.69	1.63	2.83	0.20
Do-Something	7.00	0.42	10.40	1.62	2.76	0.20
Difference between Do-Something and Do-Minimum	-0.29	-0.01	-0.29	-0.01	-0.07	-0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	-0.7%	-0.1%
Annex I habitat type 'Lowland Hay Meadows' at Merlin Park						
Do-Minimum	21.66	2.07	24.86	3.37	12.44	0.89
Do-Something	16.25	1.25	19.45	2.55	7.77	0.55
Difference between Do-Something and Do-Minimum	-5.41	-0.82	-5.41	-0.82	-4.67	-0.33
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	-9.3%	-5.3%

The annual mean NO_X concentrations (including background) are below the critical level of 30 µg/m^3 at all modelled habitats, in both the DM and the DS scenarios.

The annual mean NH_3 concentrations (including background) exceed the critical level for higher plants of 3 µg/m^3 at the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park in the DM scenario. The Proposed Development results in a decrease in the annual mean NH_3 concentration in the DS scenario, reducing the annual mean concentration below the critical level.

Nitrogen deposition levels (including background) are above the maximum critical loads for nitrogen deposition (see Section 7.2.5.8.2 and Table 7-15) at the Galway Bay Complex pNHA in both the DM and the DS scenarios and at the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park in DM scenario. Nitrogen deposition levels are within the critical load ranges at the Inner Galway Bay SPA and the Galway Bay Complex SAC in both the DM and the DS scenarios and at the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park in the DS scenario.

The acid deposition (as N) levels are within the maximum critical load ranges for acid deposition (as N) (see Section 7.2.5.8.2 and Table 7-16 at all modelled designated sites, in both the DM and the DS scenarios.

Annual mean NOx and ammonia concentrations, and nitrogen and acid deposition levels decrease at all modelled habitats due to the Construction Phase of the Proposed Development.

In accordance with the EPA Guidelines (EPA, 2022) the ecological impacts associated with the Construction Phase traffic emissions are overall direct, short-term, positive and slight, which is not significant in EIA terms.

7.4.3 Operational Phase

7.4.3.1 NO_2

The Do Minimum (DM) and the Do Something (DS) are defined scenarios within the traffic modelling exercise in Chapter 6 (Traffic & Transport) and are based on the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without and with the Proposed Development. The output of this analysis and its impact on air quality has been modelled using AMDS-Roads for the Opening Year 2028 and the Design Year 2043. Predicted annual mean concentrations of NO_2 at worst-case existing air quality sensitive receptors in the Opening Year 2028 are listed in Table 7-33 and in the Design Year 2043 in Table 7-34. Locations of these receptors are shown in Figure 7.4 in Volume 3 of this EIAR.

Table 7-33 Predicted Opening Year 2028 Impact at Worst-Case Receptor Locations - NO_2

Opening Year 2028						
Receptor	**Receptor Location**	**Annual Mean NO_2 Concentrations (µg/m^3)**				**Impact**
		DM	**DS**	**DS-DM Change**	**% Change of AQLV**	
AQ1	R339 College Road	7.0	7.0	-0.01	-0.02%	Neutral
AQ2	R339 College Road	6.8	6.8	-0.01	-0.02%	Neutral
AQ3	R339 College Road	6.6	6.6	-0.01	-0.02%	Neutral
AQ4	R339 College Road	6.2	6.2	<0.01	<0.01%	Neutral
AQ5	R339 College Road	7.0	7.1	0.13	0.33%	Neutral
AQ6	R338 Dublin Road	7.0	7.1	0.13	0.33%	Neutral
AQ7	R339 Wellpark Road	7.2	7.3	0.15	0.37%	Neutral
AQ8	R338 Dublin Road	7.3	7.4	0.15	0.37%	Neutral

Opening Year 2028						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ9	R338 Dublin Road	13.1	13.4	0.35	0.87%	Neutral
AQ10	R338 Dublin Road	8.5	8.6	0.09	0.23%	Neutral
AQ11	R338 Dublin Road	9.3	9.4	0.10	0.25%	Neutral
AQ12	R338 Dublin Road	12.5	12.6	0.12	0.30%	Neutral
AQ13	R338 Dublin Road	14.7	14.9	0.18	0.45%	Neutral
AQ14	R338 Dublin Road	12.0	12.1	0.11	0.27%	Neutral
AQ15	Glenina Heights	11.9	12.0	0.10	0.25%	Neutral
AQ16	Glenina Heights	12.7	12.8	0.12	0.30%	Neutral
AQ17	Glenina Heights	6.6	6.6	0.02	0.05%	Neutral
AQ18	Glenina Heights	5.6	5.6	-0.01	-0.02%	Neutral
AQ19	R338 Dublin Road	5.7	5.6	-0.03	-0.08%	Neutral
AQ20	R338 Dublin Road	6.3	6.3	-0.07	-0.18%	Neutral
AQ21	R338 Dublin Road	5.6	5.6	-0.02	-0.05%	Neutral
AQ22	R338 Dublin Road	5.6	5.6	-0.02	-0.05%	Neutral
AQ23	R338 Dublin Road	5.9	5.9	0.02	0.05%	Neutral
AQ24	R338 Dublin Road	8.0	8.0	0.03	0.08%	Neutral
AQ25	R865 Ballybane Rd	7.0	7.3	0.33	0.83%	Neutral
AQ26	Lurgan Park	5.5	5.5	-0.01	-0.02%	Neutral
AQ27	R338 Dublin Road	5.5	5.5	-0.01	-0.02%	Neutral
AQ28	Woodhaven	5.5	5.5	-0.01	-0.02%	Neutral
AQ29	R865 Ballybane Rd	5.5	5.5	<0.01	<0.01%	Neutral
AQ30	R865 Ballybane Rd	5.4	5.4	-0.01	-0.02%	Neutral
AQ31	R865 Ballybane Rd	5.3	5.3	<0.01	<0.01%	Neutral
AQ32	R865 Ballybane Rd	5.3	5.3	<0.01	<0.01%	Neutral
AQ33	R865 Ballybane Rd	5.3	5.3	-0.01	-0.02%	Neutral
AQ34	R865 Ballybane Rd	5.3	5.3	-0.01	-0.02%	Neutral
AQ35	R865 Ballybane Rd	5.3	5.3	-0.01	-0.02%	Neutral
AQ36	R865 Ballybane Rd	5.3	5.3	-0.01	-0.03%	Neutral
AQ37	R865 Ballybane Rd	5.6	5.6	-0.01	-0.02%	Neutral
AQ38	R865 Ballybane Rd	6.4	6.4	<0.01	<0.01%	Neutral
AQ39	R865 Ballybane Rd	5.3	5.3	-0.01	-0.02%	Neutral
AQ40	Lios an Uisce	5.7	5.7	-0.04	-0.10%	Neutral
AQ41	L5037 Rosshill Road	6.7	6.6	-0.11	-0.28%	Neutral
AQ42	Merlin Park University Hospital	10.6	10.6	-0.02	-0.05%	Neutral

Opening Year 2028						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ43	Duirling	11.0	11.0	<0.01	<0.01%	Neutral
AQ44	Durabhan	12.7	12.6	-0.01	-0.02%	Neutral
AQ45	Durabhan	9.0	9.0	<0.01	<0.01%	Neutral
AQ46	Durabhan	15.0	14.9	-0.09	-0.23%	Neutral
AQ47	Durabhan	13.6	13.8	0.22	0.55%	Neutral
AQ48	Durabhan	23.0	23.1	0.09	0.23%	Neutral
AQ49	Doughiska Road	9.1	9.2	0.11	0.27%	Neutral
AQ50	Doughiska Road	8.9	9.0	0.05	0.13%	Neutral
AQ51	L5038	7.6	7.6	0.04	0.10%	Neutral
AQ52	L5038	7.8	7.6	-0.12	-0.30%	Neutral
AQ53	Merlin Park University Hospital	9.2	9.1	-0.12	-0.30%	Neutral
AQ54	R338 Dublin Road	7.1	6.9	-0.22	-0.55%	Neutral
AQ55	R338 Dublin Road	8.0	7.6	-0.37	-0.93%	Neutral
AQ56	R338 Dublin Road	9.9	9.3	-0.58	-1.45%	Neutral
AQ57	R338 Dublin Road	12.4	11.8	-0.56	-1.40%	Neutral
AQ58	R338 Dublin Road	9.1	9.1	-0.09	-0.23%	Neutral
AQ59	Gleann Rua	7.9	7.8	-0.07	-0.18%	Neutral
AQ60	R338 Dublin Road	8.3	8.3	-0.08	-0.20%	Neutral
AQ61	R338 Dublin Road	6.7	6.6	-0.11	-0.27%	Neutral
AQ62	Durabhan	9.7	9.4	-0.31	-0.78%	Neutral
AQ63	R865 Ballybane Rd	7.9	7.9	-0.08	-0.20%	Neutral
AQ64	R865 Ballybane Rd	8.2	7.7	-0.48	-1.20%	Neutral
AQ65	R865 Ballybane Rd	8.0	7.5	-0.47	-1.18%	Neutral

Table 7-34 Predicted Design Year 2043 Impact at Worst-Case Receptor Locations - NO_2

Design Year 2043						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ1	R339 College Road	7.6	7.6	-0.03	-0.08%	Neutral
AQ2	R339 College Road	7.2	7.2	-0.04	-0.10%	Neutral
AQ3	R339 College Road	6.9	6.9	-0.04	-0.10%	Neutral
AQ4	R339 College Road	6.5	6.4	-0.02	-0.05%	Neutral
AQ5	R339 College Road	7.7	7.7	0.03	0.08%	Neutral

Design Year 2043						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ6	R338 Dublin Road	7.8	7.8	0.03	0.08%	Neutral
AQ7	R339 Wellpark Road	8.1	8.1	0.03	0.07%	Neutral
AQ8	R338 Dublin Road	8.1	8.2	0.03	0.07%	Neutral
AQ9	R338 Dublin Road	15.9	16.4	0.48	1.20%	Neutral
AQ10	R338 Dublin Road	9.4	9.5	0.07	0.18%	Neutral
AQ11	R338 Dublin Road	10.3	10.3	-0.01	-0.03%	Neutral
AQ12	R338 Dublin Road	14.2	13.9	-0.29	-0.73%	Neutral
AQ13	R338 Dublin Road	16.9	16.6	-0.32	-0.80%	Neutral
AQ14	R338 Dublin Road	13.5	13.3	-0.29	-0.72%	Neutral
AQ15	Glenina Heights	13.5	13.2	-0.29	-0.73%	Neutral
AQ16	Glenina Heights	14.4	14.1	-0.29	-0.73%	Neutral
AQ17	Glenina Heights	7.0	6.9	-0.07	-0.17%	Neutral
AQ18	Glenina Heights	5.8	5.7	-0.03	-0.08%	Neutral
AQ19	R338 Dublin Road	5.8	5.7	-0.05	-0.13%	Neutral
AQ20	R338 Dublin Road	6.6	6.5	-0.12	-0.30%	Neutral
AQ21	R338 Dublin Road	5.7	5.6	-0.05	-0.13%	Neutral
AQ22	R338 Dublin Road	5.8	5.7	-0.04	-0.10%	Neutral
AQ23	R338 Dublin Road	6.1	6.1	-0.01	-0.02%	Neutral
AQ24	R338 Dublin Road	8.1	8.0	-0.07	-0.18%	Neutral
AQ25	R865 Ballybane Rd	7.9	8.6	0.68	1.70%	Neutral
AQ26	Lurgan Park	5.6	5.6	0.01	0.02%	Neutral
AQ27	R338 Dublin Road	5.6	5.6	<0.01	<0.01%	Neutral
AQ28	Woodhaven	5.6	5.6	<0.01	<0.01%	Neutral
AQ29	R865 Ballybane Rd	5.6	5.6	0.01	0.02%	Neutral
AQ30	R865 Ballybane Rd	5.4	5.4	<0.01	<0.01%	Neutral
AQ31	R865 Ballybane Rd	5.4	5.4	<0.01	<0.01%	Neutral
AQ32	R865 Ballybane Rd	5.4	5.4	-0.01	-0.02%	Neutral
AQ33	R865 Ballybane Rd	5.3	5.3	-0.01	-0.02%	Neutral
AQ34	R865 Ballybane Rd	5.3	5.3	-0.01	-0.02%	Neutral
AQ35	R865 Ballybane Rd	5.4	5.4	-0.01	-0.03%	Neutral
AQ36	R865 Ballybane Rd	5.4	5.4	<0.01	<0.01%	Neutral
AQ37	R865 Ballybane Rd	5.7	5.7	-0.01	-0.02%	Neutral
AQ38	R865 Ballybane Rd	6.5	6.4	-0.05	-0.13%	Neutral
AQ39	R865 Ballybane Rd	5.4	5.4	-0.01	-0.02%	Neutral
AQ40	Lios an Uisce	5.9	5.8	-0.07	-0.18%	Neutral

Design Year 2043						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ41	L5037 Rosshill Road	7.1	6.9	-0.20	-0.50%	Neutral
AQ42	Merlin Park University Hospital	11.6	11.6	0.05	0.12%	Neutral
AQ43	Duirling	12.0	12.0	0.09	0.23%	Neutral
AQ44	Durabhan	14.0	14.0	0.08	0.20%	Neutral
AQ45	Durabhan	9.6	9.7	0.07	0.18%	Neutral
AQ46	Durabhan	16.7	16.7	0.03	0.08%	Neutral
AQ47	Durabhan	14.8	15.4	0.55	1.38%	Neutral
AQ48	Durabhan	26.3	26.7	0.45	1.13%	Neutral
AQ49	Doughiska Road	9.9	10.2	0.27	0.67%	Neutral
AQ50	Doughiska Road	9.6	9.8	0.24	0.60%	Neutral
AQ51	L5038	8.0	8.2	0.14	0.35%	Neutral
AQ52	L5038	8.2	8.2	0.03	0.07%	Neutral
AQ53	Merlin Park University Hospital	9.8	9.8	0.04	0.10%	Neutral
AQ54	R338 Dublin Road	7.5	7.5	0.01	0.02%	Neutral
AQ55	R338 Dublin Road	8.6	8.6	0.02	0.05%	Neutral
AQ56	R338 Dublin Road	10.7	10.8	0.05	0.12%	Neutral
AQ57	R338 Dublin Road	13.8	13.9	0.10	0.25%	Neutral
AQ58	R338 Dublin Road	9.9	10.0	0.05	0.13%	Neutral
AQ59	Gleann Rua	8.2	8.2	-0.01	-0.03%	Neutral
AQ60	R338 Dublin Road	8.7	8.7	-0.02	-0.05%	Neutral
AQ61	R338 Dublin Road	7.0	7.0	-0.03	-0.08%	Neutral
AQ62	Durabhan	10.2	10.0	-0.18	-0.45%	Neutral
AQ63	R865 Ballybane Rd	8.3	8.2	-0.07	-0.18%	Neutral
AQ64	R865 Ballybane Rd	9.1	8.5	-0.60	-1.50%	Neutral
AQ65	R865 Ballybane Rd	8.4	7.8	-0.56	-1.40%	Neutral

The predicted average NO_2 concentration is in compliance with the limit value at the worst-case receptors in 2028 and 2043. The TII guidance (2022) states that the hourly limit value for NO_2 of 200 µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³. Annual mean NO_2 concentrations did not exceed 60 µg/m³, indicating that exceedances of the NO_2 1-hour mean are unlikely to occur.

The impact of the Proposed Development on annual mean NO_2 concentrations can be assessed relative to the DM scenario, as shown in Table 7-33 and Table 7-34. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7-7) and there is a less than 5% change in concentrations compared with the Do Minimum scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7-14). Therefore, the impact of the Proposed Development on NO_2

concentrations is direct, long-term and neutral at all modelled receptors in both the Opening Year 2028 and the Design Year 2043, which is not significant in EIA terms.

7.4.3.2 PM_{10}

The Do Minimum (DM) and the Do Something (DS) are defined scenarios within the traffic modelling exercise in Chapter 6 (Traffic & Transport) and are based on the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without and with the Proposed Development. The output of this analysis and its impact on air quality has been modelled using AMDS-Roads for the Opening Year 2028 and the Design Year 2043. Predicted annual mean concentrations of PM_{10} and the number of exceedances of the 24-hour PM_{10} limit value objective at worst-case existing air quality sensitive receptors in the Opening Year 2028 are listed in Table 7-35 and in the Design Year 2043 in Table 7-36. Locations of these receptors are shown in Figure 7.8 in Volume 3 of this EIAR.

Table 7-35 Predicted Opening Year 2028 Impact at Worst-Case Receptor Locations – PM_{10}

Opening Year 2028							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ1	R339 College Road	13.4	13.4	<0.01	-0.01%	<1	Neutral
AQ2	R339 College Road	13.4	13.4	<0.01	-0.01%	<1	Neutral
AQ3	R339 College Road	13.4	13.4	<0.01	-0.01%	<1	Neutral
AQ4	R339 College Road	13.3	13.3	<0.01	<0.01%	<1	Neutral
AQ5	R339 College Road	13.4	13.5	0.01	0.03%	<1	Neutral
AQ6	R338 Dublin Road	13.5	13.5	0.01	0.03%	<1	Neutral
AQ7	R339 Wellpark Road	13.5	13.5	0.01	0.03%	<1	Neutral
AQ8	R338 Dublin Road	13.5	13.5	0.01	0.03%	<1	Neutral
AQ9	R338 Dublin Road	14.7	14.7	0.03	0.08%	<1	Neutral
AQ10	R338 Dublin Road	13.7	13.7	0.02	0.04%	<1	Neutral
AQ11	R338 Dublin Road	13.9	14.0	0.02	0.06%	<1	Neutral
AQ12	R338 Dublin Road	14.9	14.9	0.03	0.09%	<1	Neutral
AQ13	R338 Dublin Road	15.5	15.6	0.05	0.13%	<1	Neutral
AQ14	R338 Dublin Road	14.8	14.8	0.03	0.09%	<1	Neutral
AQ15	Glenina Heights	14.8	14.8	0.03	0.09%	<1	Neutral
AQ16	Glenina Heights	15.0	15.0	0.03	0.09%	<1	Neutral
AQ17	Glenina Heights	13.4	13.4	<0.01	0.01%	<1	Neutral
AQ18	Glenina Heights	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ19	R338 Dublin Road	13.1	13.1	-0.01	-0.01%	<1	Neutral
AQ20	R338 Dublin Road	13.3	13.2	-0.01	-0.03%	<1	Neutral
AQ21	R338 Dublin Road	13.1	13.1	<0.01	-0.01%	<1	Neutral
AQ22	R338 Dublin Road	13.1	13.1	<0.01	-0.01%	<1	Neutral
AQ23	R338 Dublin Road	13.1	13.2	0.01	0.02%	<1	Neutral

Opening Year 2028							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)				Change in No of PM_{10} days > 50 $\mu g/m^3$	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ24	R338 Dublin Road	13.5	13.5	0.02	0.04%	<1	Neutral
AQ25	R865 Ballybane Rd	13.3	13.4	0.05	0.14%	<1	Neutral
AQ26	Lurgan Park	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ27	R338 Dublin Road	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ28	Woodhaven	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ29	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ30	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ31	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ32	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	<1	Neutral
AQ33	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	<1	Neutral
AQ34	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	<1	Neutral
AQ35	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	<1	Neutral
AQ36	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	<1	Neutral
AQ37	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ38	R865 Ballybane Rd	13.2	13.2	<0.01	0.01%	<1	Neutral
AQ39	R865 Ballybane Rd	13.1	13.1	<0.01	-0.01%	<1	Neutral
AQ40	Lios an Uisce	13.2	13.2	-0.01	-0.03%	<1	Neutral
AQ41	L5037 Rosshill Road	13.4	13.4	-0.03	-0.08%	<1	Neutral
AQ42	Merlin Park University Hospital	14.2	14.2	-0.01	-0.03%	<1	Neutral
AQ43	Duirling	14.1	14.1	<0.01	<0.01%	<1	Neutral
AQ44	Durabhan	14.6	14.6	-0.01	-0.01%	<1	Neutral
AQ45	Durabhan	13.8	13.8	<0.01	<0.01%	<1	Neutral
AQ46	Durabhan	15.3	15.3	-0.02	-0.04%	<1	Neutral
AQ47	Durabhan	14.6	14.7	0.05	0.11%	<1	Neutral
AQ48	Durabhan	15.9	15.9	0.02	0.04%	<1	Neutral
AQ49	Doughiska Road	13.7	13.7	0.02	0.05%	<1	Neutral
AQ50	Doughiska Road	13.7	13.7	0.01	0.02%	<1	Neutral
AQ51	L5038	13.4	13.5	0.01	0.02%	<1	Neutral
AQ52	L5038	13.5	13.5	<0.01	-0.01%	<1	Neutral
AQ53	Merlin Park University Hospital	13.8	13.8	<0.01	-0.01%	<1	Neutral
AQ54	R338 Dublin Road	13.3	13.3	<0.01	<0.01%	<1	Neutral
AQ55	R338 Dublin Road	13.5	13.5	<0.01	0.01%	<1	Neutral
AQ56	R338 Dublin Road	13.8	13.8	<0.01	0.01%	<1	Neutral

Opening Year 2028							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ57	R338 Dublin Road	14.2	14.3	0.06	0.14%	<1	Neutral
AQ58	R338 Dublin Road	13.7	13.8	0.04	0.11%	<1	Neutral
AQ59	Gleann Rua	13.5	13.5	0.01	0.04%	<1	Neutral
AQ60	R338 Dublin Road	13.6	13.6	0.02	0.04%	<1	Neutral
AQ61	R338 Dublin Road	13.3	13.3	<0.01	0.01%	<1	Neutral
AQ62	Durabhan	13.9	13.9	-0.03	-0.09%	<1	Neutral
AQ63	R865 Ballybane Rd	13.6	13.6	<0.01	0.01%	<1	Neutral
AQ64	R865 Ballybane Rd	13.6	13.5	-0.08	-0.20%	<1	Neutral
AQ65	R865 Ballybane Rd	13.6	13.5	-0.07	-0.18%	<1	Neutral

Table 7-36 Predicted Design Year 2043 Impact At Worst-Case Receptor Locations – PM_{10}

Design Year 2043							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ1	R339 College Road	13.5	13.5	-0.01	-0.02%	0	Neutral
AQ2	R339 College Road	13.5	13.5	-0.01	-0.03%	0	Neutral
AQ3	R339 College Road	13.4	13.4	-0.01	-0.03%	0	Neutral
AQ4	R339 College Road	13.3	13.3	-0.01	-0.02%	0	Neutral
AQ5	R339 College Road	13.6	13.6	0.01	0.02%	0	Neutral
AQ6	R338 Dublin Road	13.6	13.6	0.01	0.02%	0	Neutral
AQ7	R339 Wellpark Road	13.6	13.6	0.01	0.02%	0	Neutral
AQ8	R338 Dublin Road	13.6	13.7	0.01	0.02%	0	Neutral
AQ9	R338 Dublin Road	15.1	15.1	0.04	0.10%	0	Neutral
AQ10	R338 Dublin Road	13.9	13.9	0.01	0.02%	0	Neutral
AQ11	R338 Dublin Road	14.2	14.2	<0.01	0.01%	0	Neutral
AQ12	R338 Dublin Road	15.3	15.3	-0.01	-0.04%	0	Neutral
AQ13	R338 Dublin Road	16.0	16.0	-0.01	-0.04%	0	Neutral
AQ14	R338 Dublin Road	15.1	15.1	-0.02	-0.04%	0	Neutral
AQ15	Glenina Heights	15.1	15.1	-0.01	-0.03%	0	Neutral
AQ16	Glenina Heights	15.4	15.4	-0.02	-0.04%	0	Neutral
AQ17	Glenina Heights	13.4	13.4	<0.01	-0.01%	0	Neutral
AQ18	Glenina Heights	13.1	13.1	<0.01	-0.01%	0	Neutral
AQ19	R338 Dublin Road	13.1	13.1	-0.01	-0.02%	0	Neutral

Design Year 2043							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ20	R338 Dublin Road	13.3	13.3	-0.02	-0.06%	0	Neutral
AQ21	R338 Dublin Road	13.1	13.1	-0.01	-0.02%	0	Neutral
AQ22	R338 Dublin Road	13.1	13.1	-0.01	-0.02%	0	Neutral
AQ23	R338 Dublin Road	13.2	13.2	<0.01	<0.01%	0	Neutral
AQ24	R338 Dublin Road	13.5	13.5	-0.01	-0.02%	0	Neutral
AQ25	R865 Ballybane Rd	13.5	13.6	0.11	0.27%	1	Neutral
AQ26	Lurgan Park	13.1	13.1	<0.01	<0.01%	0	Neutral
AQ27	R338 Dublin Road	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ28	Woodhaven	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ29	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	0	Neutral
AQ30	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ31	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ32	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	0	Neutral
AQ33	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	0	Neutral
AQ34	R865 Ballybane Rd	13.0	13.0	<0.01	<0.01%	0	Neutral
AQ35	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	0	Neutral
AQ36	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	<1	Neutral
AQ37	R865 Ballybane Rd	13.1	13.1	<0.01	<0.01%	0	Neutral
AQ38	R865 Ballybane Rd	13.2	13.2	-0.01	-0.02%	0	Neutral
AQ39	R865 Ballybane Rd	13.1	13.1	<0.01	-0.01%	0	Neutral
AQ40	Lios an Uisce	13.2	13.2	-0.02	-0.05%	0	Neutral
AQ41	L5037 Rosshill Road	13.5	13.5	-0.06	-0.14%	0	Neutral
AQ42	Merlin Park University Hospital	14.4	14.4	<0.01	0.01%	0	Neutral
AQ43	Duirling	14.3	14.3	0.01	0.03%	0	Neutral
AQ44	Durabhan	14.9	14.9	0.01	0.02%	0	Neutral
AQ45	Durabhan	13.9	13.9	0.01	0.03%	0	Neutral
AQ46	Durabhan	15.7	15.7	0.01	0.02%	0	Neutral
AQ47	Durabhan	14.9	15.0	0.11	0.26%	1	Neutral
AQ48	Durabhan	16.5	16.5	0.06	0.16%	0	Neutral
AQ49	Doughiska Road	13.8	13.9	0.05	0.12%	0	Neutral
AQ50	Doughiska Road	13.8	13.9	0.03	0.09%	0	Neutral
AQ51	L5038	13.5	13.5	0.03	0.06%	0	Neutral
AQ52	L5038	13.5	13.5	0.01	0.02%	0	Neutral

Design Year 2043							
Receptor	Receptor Location	Annual Mean PM_{10} Concentrations (µg/m³)				Change in No of PM_{10} days > 50 µg/m³	Impact
		DM	DS	DS-DM Change	% Change of AQLV		
AQ53	Merlin Park University Hospital	13.8	13.8	0.01	0.02%	0	Neutral
AQ54	R338 Dublin Road	13.4	13.4	0.01	0.02%	0	Neutral
AQ55	R338 Dublin Road	13.5	13.5	0.02	0.06%	0	Neutral
AQ56	R338 Dublin Road	13.8	13.8	0.03	0.08%	0	Neutral
AQ57	R338 Dublin Road	14.4	14.5	0.06	0.16%	0	Neutral
AQ58	R338 Dublin Road	13.8	13.9	0.04	0.10%	0	Neutral
AQ59	Gleann Rua	13.6	13.6	0.03	0.09%	0	Neutral
AQ60	R338 Dublin Road	13.7	13.7	0.04	0.11%	0	Neutral
AQ61	R338 Dublin Road	13.3	13.3	0.01	0.03%	0	Neutral
AQ62	Durabhan	14.0	14.0	<0.01	-0.01%	0	Neutral
AQ63	R865 Ballybane Rd	13.6	13.6	0.03	0.07%	0	Neutral
AQ64	R865 Ballybane Rd	13.7	13.6	-0.11	-0.27%	-1	Neutral
AQ65	R865 Ballybane Rd	13.6	13.6	-0.06	-0.16%	-1	Neutral

The predicted average PM_{10} concentration is in compliance with the limit value at the worst-case receptors in 2028 and 2043. At all receptors, modelling of the maximum 24-hour PM_{10} concentration indicated that there are likely to be no more than one exceedance of the 50 µg/m³ ambient limit value compared to the threshold which allows 35 daily exceedances in any one calendar year.

The impact of the Proposed Development on annual mean PM_{10} concentrations can be assessed relative to the DM scenario, as shown in Table 7-35 and Table 7-36. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7-7) and there is a less than 5% change in concentrations compared with the Do Minimum scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7-14). Therefore, the impact of the Proposed Development on PM_{10} concentrations is direct, long-term and neutral at all modelled receptors in both the Opening Year 2028 and the Design Year 2043, which is not significant in EIA terms.

7.4.3.3 $PM_{2.5}$

The Do Minimum (DM) and the Do Something (DS) are defined scenarios within the traffic modelling exercise in Chapter 6 (Traffic & Transport) and are based on the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without and with the Proposed Development. The output of this analysis and its impact on air quality has been modelled using AMDS-Roads for the Opening Year 2028 and the Design Year 2043. Predicted annual mean concentrations of $PM_{2.5}$ at worst-case existing air quality sensitive receptors in the Opening Year 2028 are listed in Table 7-37 and in the Design Year 2043 in Table 7-38. Locations of these receptors are shown in Figure 7.6 in Volume 3 of this EIAR.

Table 7-37 Predicted Opening Year 2028 Impact at Worst-Case Receptor Locations - $PM_{2.5}$

Opening Year 2028						
Receptor	Receptor Location	Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ1	R339 College Road	10.6	10.6	<0.01	<0.01%	Neutral
AQ2	R339 College Road	10.6	10.6	<0.01	-0.01%	Neutral
AQ3	R339 College Road	10.6	10.6	<0.01	<0.01%	Neutral
AQ4	R339 College Road	10.6	10.5	<0.01	<0.01%	Neutral
AQ5	R339 College Road	10.7	10.7	0.01	0.02%	Neutral
AQ6	R338 Dublin Road	10.7	10.7	0.01	0.02%	Neutral
AQ7	R339 Wellpark Road	10.7	10.7	0.01	0.03%	Neutral
AQ8	R338 Dublin Road	10.7	10.7	0.01	0.03%	Neutral
AQ9	R338 Dublin Road	11.4	11.4	0.02	0.08%	Neutral
AQ10	R338 Dublin Road	10.8	10.8	0.01	0.04%	Neutral
AQ11	R338 Dublin Road	10.9	10.9	0.01	0.05%	Neutral
AQ12	R338 Dublin Road	11.5	11.5	0.02	0.07%	Neutral
AQ13	R338 Dublin Road	11.8	11.8	0.03	0.10%	Neutral
AQ14	R338 Dublin Road	11.4	11.4	0.02	0.07%	Neutral
AQ15	Glenina Heights	11.4	11.4	0.02	0.07%	Neutral
AQ16	Glenina Heights	11.5	11.5	0.02	0.08%	Neutral
AQ17	Glenina Heights	10.6	10.6	<0.01	0.01%	Neutral
AQ18	Glenina Heights	10.5	10.5	<0.01	<0.01%	Neutral
AQ19	R338 Dublin Road	10.5	10.5	<0.01	-0.01%	Neutral
AQ20	R338 Dublin Road	10.5	10.5	-0.01	-0.03%	Neutral
AQ21	R338 Dublin Road	10.5	10.5	<0.01	-0.01%	Neutral
AQ22	R338 Dublin Road	10.5	10.5	<0.01	-0.01%	Neutral
AQ23	R338 Dublin Road	10.5	10.5	<0.01	0.01%	Neutral
AQ24	R338 Dublin Road	10.7	10.7	0.01	0.04%	Neutral
AQ25	R865 Ballybane Rd	10.6	10.6	0.03	0.12%	Neutral
AQ26	Lurgan Park	10.4	10.4	<0.01	<0.01%	Neutral
AQ27	R338 Dublin Road	10.4	10.4	<0.01	<0.01%	Neutral
AQ28	Woodhaven	10.4	10.4	<0.01	<0.01%	Neutral
AQ29	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ30	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ31	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ32	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ33	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ34	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral

Opening Year 2028						
Receptor	Receptor Location	Annual Mean $PM_{2.5}$ Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ35	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ36	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ37	R865 Ballybane Rd	10.5	10.5	<0.01	<0.01%	Neutral
AQ38	R865 Ballybane Rd	10.5	10.5	<0.01	<0.01%	Neutral
AQ39	R865 Ballybane Rd	10.4	10.4	<0.01	-0.01%	Neutral
AQ40	Lios an Uisce	10.5	10.5	-0.01	-0.03%	Neutral
AQ41	L5037 Rosshill Road	10.6	10.6	-0.02	-0.07%	Neutral
AQ42	Merlin Park University Hospital	11.1	11.1	<0.01	-0.01%	Neutral
AQ43	Duirling	11.0	11.0	<0.01	<0.01%	Neutral
AQ44	Durabhan	11.3	11.3	<0.01	-0.01%	Neutral
AQ45	Durabhan	10.8	10.8	<0.01	<0.01%	Neutral
AQ46	Durabhan	11.7	11.7	-0.01	-0.03%	Neutral
AQ47	Durabhan	11.3	11.4	0.02	0.10%	Neutral
AQ48	Durabhan	12.1	12.1	0.01	0.04%	Neutral
AQ49	Doughiska Road	10.8	10.8	0.01	0.05%	Neutral
AQ50	Doughiska Road	10.8	10.8	<0.01	0.02%	Neutral
AQ51	L5038	10.7	10.7	0.01	0.02%	Neutral
AQ52	L5038	10.7	10.7	<0.01	-0.01%	Neutral
AQ53	Merlin Park University Hospital	10.8	10.8	<0.01	-0.01%	Neutral
AQ54	R338 Dublin Road	10.6	10.6	<0.01	<0.01%	Neutral
AQ55	R338 Dublin Road	10.7	10.7	<0.01	<0.01%	Neutral
AQ56	R338 Dublin Road	10.8	10.8	<0.01	-0.01%	Neutral
AQ57	R338 Dublin Road	11.1	11.1	0.03	0.10%	Neutral
AQ58	R338 Dublin Road	10.8	10.8	0.02	0.10%	Neutral
AQ59	Gleann Rua	10.7	10.7	0.01	0.02%	Neutral
AQ60	R338 Dublin Road	10.8	10.8	0.01	0.03%	Neutral
AQ61	R338 Dublin Road	10.6	10.6	<0.01	<0.01%	Neutral
AQ62	Durabhan	10.9	10.9	-0.02	-0.08%	Neutral
AQ63	R865 Ballybane Rd	10.7	10.7	<0.01	<0.01%	Neutral
AQ64	R865 Ballybane Rd	10.7	10.7	-0.05	-0.19%	Neutral
AQ65	R865 Ballybane Rd	10.7	10.7	-0.04	-0.17%	Neutral

Table 7-38 Predicted Design Year 2043 Impact at Worst-Case Receptor Locations - NO_2

Design Year 2043						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m³)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ1	R339 College Road	10.7	10.7	<0.01	-0.02%	Neutral
AQ2	R339 College Road	10.7	10.7	-0.01	-0.02%	Neutral
AQ3	R339 College Road	10.6	10.6	-0.01	-0.02%	Neutral
AQ4	R339 College Road	10.6	10.6	<0.01	-0.02%	Neutral
AQ5	R339 College Road	10.7	10.7	<0.01	0.02%	Neutral
AQ6	R338 Dublin Road	10.7	10.7	<0.01	0.02%	Neutral
AQ7	R339 Wellpark Road	10.8	10.8	0.01	0.02%	Neutral
AQ8	R338 Dublin Road	10.8	10.8	<0.01	0.02%	Neutral
AQ9	R338 Dublin Road	11.6	11.6	0.03	0.10%	Neutral
AQ10	R338 Dublin Road	10.9	10.9	<0.01	0.01%	Neutral
AQ11	R338 Dublin Road	11.1	11.1	<0.01	0.01%	Neutral
AQ12	R338 Dublin Road	11.7	11.7	-0.01	-0.03%	Neutral
AQ13	R338 Dublin Road	12.1	12.1	-0.01	-0.03%	Neutral
AQ14	R338 Dublin Road	11.6	11.6	-0.01	-0.03%	Neutral
AQ15	Glenina Heights	11.6	11.6	-0.01	-0.03%	Neutral
AQ16	Glenina Heights	11.7	11.7	-0.01	-0.04%	Neutral
AQ17	Glenina Heights	10.6	10.6	<0.01	-0.01%	Neutral
AQ18	Glenina Heights	10.5	10.5	<0.01	-0.01%	Neutral
AQ19	R338 Dublin Road	10.5	10.5	<0.01	-0.02%	Neutral
AQ20	R338 Dublin Road	10.6	10.6	-0.01	-0.06%	Neutral
AQ21	R338 Dublin Road	10.5	10.5	<0.01	-0.02%	Neutral
AQ22	R338 Dublin Road	10.5	10.5	<0.01	-0.02%	Neutral
AQ23	R338 Dublin Road	10.5	10.5	<0.01	<0.01%	Neutral
AQ24	R338 Dublin Road	10.7	10.7	-0.01	-0.02%	Neutral
AQ25	R865 Ballybane Rd	10.7	10.7	0.06	0.25%	Neutral
AQ26	Lurgan Park	10.5	10.5	<0.01	<0.01%	Neutral
AQ27	R338 Dublin Road	10.4	10.5	<0.01	<0.01%	Neutral
AQ28	Woodhaven	10.4	10.4	<0.01	<0.01%	Neutral
AQ29	R865 Ballybane Rd	10.5	10.5	<0.01	<0.01%	Neutral
AQ30	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ31	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ32	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ33	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ34	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral

Design Year 2043						
Receptor	Receptor Location	Annual Mean NO_2 Concentrations (µg/m^3)				Impact
		DM	DS	DS-DM Change	% Change of AQLV	
AQ35	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ36	R865 Ballybane Rd	10.4	10.4	<0.01	<0.01%	Neutral
AQ37	R865 Ballybane Rd	10.5	10.5	<0.01	<0.01%	Neutral
AQ38	R865 Ballybane Rd	10.5	10.5	-0.01	-0.02%	Neutral
AQ39	R865 Ballybane Rd	10.4	10.4	<0.01	-0.01%	Neutral
AQ40	Lios an Uisce	10.5	10.5	-0.01	-0.04%	Neutral
AQ41	L5037 Rosshill Road	10.7	10.7	-0.03	-0.13%	Neutral
AQ42	Merlin Park University Hospital	11.2	11.2	<0.01	0.01%	Neutral
AQ43	Duirling	11.2	11.2	0.01	0.03%	Neutral
AQ44	Durabhan	11.5	11.5	0.01	0.02%	Neutral
AQ45	Durabhan	10.9	10.9	0.01	0.03%	Neutral
AQ46	Durabhan	11.9	11.9	<0.01	0.01%	Neutral
AQ47	Durabhan	11.5	11.5	0.06	0.25%	Neutral
AQ48	Durabhan	12.4	12.4	0.04	0.17%	Neutral
AQ49	Doughiska Road	10.9	10.9	0.03	0.11%	Neutral
AQ50	Doughiska Road	10.9	10.9	0.02	0.08%	Neutral
AQ51	L5038	10.7	10.7	0.01	0.06%	Neutral
AQ52	L5038	10.7	10.7	<0.01	0.02%	Neutral
AQ53	Merlin Park University Hospital	10.9	10.9	<0.01	0.01%	Neutral
AQ54	R338 Dublin Road	10.6	10.6	<0.01	0.02%	Neutral
AQ55	R338 Dublin Road	10.7	10.7	0.01	0.05%	Neutral
AQ56	R338 Dublin Road	10.9	10.9	0.02	0.07%	Neutral
AQ57	R338 Dublin Road	11.2	11.2	0.03	0.14%	Neutral
AQ58	R338 Dublin Road	10.9	10.9	0.02	0.08%	Neutral
AQ59	Gleann Rua	10.7	10.7	0.02	0.07%	Neutral
AQ60	R338 Dublin Road	10.8	10.8	0.02	0.09%	Neutral
AQ61	R338 Dublin Road	10.6	10.6	<0.01	0.02%	Neutral
AQ62	Durabhan	11.0	11.0	<0.01	-0.01%	Neutral
AQ63	R865 Ballybane Rd	10.7	10.8	0.01	0.05%	Neutral
AQ64	R865 Ballybane Rd	10.8	10.8	-0.06	-0.25%	Neutral
AQ65	R865 Ballybane Rd	10.8	10.7	-0.04	-0.15%	Neutral

The predicted average $PM_{2.5}$ concentration is in compliance with the limit value at the worst-case receptors in 2028 and 2043.

The impact of the Proposed Development on annual mean $PM_{2.5}$ concentrations can be assessed relative to the DM scenario, as shown in Table 7-37 and Table 7-38. Where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7-7) and there is a less than 5% change in concentrations compared with the Do Minimum scenario, then the impact is considered neutral as per the TII significance criteria (see Table 7-14). Therefore, the impact of the Proposed Development on $PM_{2.5}$ concentrations is direct, long term and neutral at all modelled receptors in both the Opening Year 2028 and the Design Year 2043, which is not significant in EIA terms.

7.4.3.4 Sensitive Designated Habitats

An assessment of the impact of the Proposed Development has been undertaken using the approach outlined in the IAQM guidance document A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020) and the TII guidance (TII, 2022). An assessment of the ecologically sensitive sites listed in Section 7.2.2.1 has been carried out.

As outlined in Section 7.2.5.5, the Galway Bay Complex SAC and pNHA (Site Code 000268), Inner Galway Bay SPA (Site Code 004031) the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park are within 200 m of the boundary of the Proposed Development. The Lough Corrib SAC (Site Code 000297) and Lough Corrib SPA (Site Code 004042) are within 2 km of the Proposed Development.

Annual mean NOx and ammonia concentrations, as well as nitrogen and acid deposition levels have been compared to the relevant critical levels and loads in Table 7-39 for the Opening Year 2028 and for the Design Year 2043 for the worst-case ecologically sensitive receptors. The ground level concentrations, nitrogen deposition flux and acid deposition flux are presented for the closest locations within the ecological sites to the nearest road.

Table 7-39 Opening Year 2028 Maximum Predicted NO_X and NH_3 Concentrations, and Nitrogen and Acid Deposition Rates at Closest Point within Ecological Sites to Road

	Predicted Ground Level NO_X Concentration (excluding background) µg/m³	**Predicted Ground Level NH_3 Concentration (excluding background) µg/m³**	**Predicted Ground Level NO_X Concentration (including background Note 1) µg/m³**	**Predicted Ground Level NH_3 Concentration (including background Note 2) µg/m³**	**Total Nitrogen Deposition Flux (kg/ha/yr)**	**Total Acid Deposition Flux (keq/ha/yr)**
Galway Bay Complex pNHA						
Do-Minimum	15.29	1.28	18.69	2.48	12.75	0.91
Do-Something	15.55	1.30	18.95	2.50	12.87	0.92
Difference between Do-Something and Do-Minimum	0.25	0.02	0.25	0.02	0.12	0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	1.2%	0.1%
Galway Bay Complex SAC						

	Predicted Ground Level NO_X Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NO_X Concentration (including background Note 1) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (including background Note 2) $\mu g/m^3$	Total Nitrogen Deposition Flux (kg/ha/yr)	Total Acid Deposition Flux (keq/ha/yr)
Do-Minimum	9.84	0.83	13.24	2.03	5.07	0.36
Do-Something	10.04	0.84	13.44	2.04	5.16	0.37
Difference between Do-Something and Do-Minimum	0.19	0.01	0.19	0.01	0.09	0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	0.9%	0.1%
Inner Galway Bay SPA						
Do-Minimum	5.24	0.44	8.64	1.64	2.71	0.19
Do-Something	5.35	0.45	8.75	1.65	2.75	0.20
Difference between Do-Something and Do-Minimum	0.10	0.01	0.10	0.01	0.04	0.00
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	0.4%	0.0%
Annex I habitat type 'Lowland Hay Meadows' at Merlin Park						
Do-Minimum	15.61	2.14	18.81	3.44	12.36	0.88
Do-Something	15.34	2.03	18.54	3.33	11.76	0.84
Difference between Do-Something and Do-Minimum	-0.27	-0.11	-0.27	-0.11	-0.60	-0.04
Change relative to upper	n/a	n/a	n/a	n/a	-6.0%	-0.7%

	Predicted Ground Level NO_X Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NO_X Concentration (including background Note 1) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (including background Note 2) $\mu g/m^3$	Total Nitrogen Deposition Flux (kg/ha/yr)	Total Acid Deposition Flux (keq/ha/yr)
critical load (%)						

Table 7-40 Design Year 2043 Maximum Predicted NO_X and NH_3 Concentrations, and Nitrogen and Acid Deposition Rates at Closest Point within Ecological Sites to Road

	Predicted Ground Level NO_X Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (excluding background) $\mu g/m^3$	Predicted Ground Level NO_X Concentration (including background Note 1) $\mu g/m^3$	Predicted Ground Level NH_3 Concentration (including background Note 2) $\mu g/m^3$	Total Nitrogen Deposition Flux (kg/ha/yr)	Total Acid Deposition Flux (keq/ha/yr)
Galway Bay Complex pNHA						
Do-Minimum	17.81	1.51	21.21	2.71	14.12	1.01
Do-Something	18.43	1.56	21.83	2.76	14.43	1.03
Difference between Do-Something and Do-Minimum	0.62	0.05	0.62	0.05	0.31	0.02
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	3.1%	0.4%
Galway Bay Complex SAC						
Do-Minimum	11.44	0.97	14.84	2.17	5.94	0.42
Do-Something	11.96	1.01	15.36	2.21	6.20	0.44
Difference between Do-Something and Do-Minimum	0.51	0.04	0.51	0.04	0.26	0.02
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	2.6%	0.3%

	Predicted Ground Level NO_X Concentration (excluding background) $\mu g/m^3$	**Predicted Ground Level NH_3 Concentration (excluding background) $\mu g/m^3$**	**Predicted Ground Level NO_X Concentration (including background Note 1) $\mu g/m^3$**	**Predicted Ground Level NH_3 Concentration (including background Note 2) $\mu g/m^3$**	**Total Nitrogen Deposition Flux (kg/ha/yr)**	**Total Acid Deposition Flux (keq/ha/yr)**
Inner Galway Bay SPA						
Do-Minimum	6.11	0.52	9.51	1.72	3.17	0.23
Do-Something	6.38	0.54	9.78	1.74	3.31	0.24
Difference between Do-Something and Do-Minimum	0.27	0.02	0.27	0.02	0.14	0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	1.4%	0.2%
Annex I habitat type 'Lowland Hay Meadows' at Merlin Park						
Do-Minimum	16.39	2.31	19.59	3.61	13.31	0.95
Do-Something	16.89	2.29	20.09	3.59	13.21	0.94
Difference between Do-Something and Do-Minimum	0.50	-0.03	0.50	-0.03	-0.10	-0.01
Change relative to upper critical load (%)	n/a	n/a	n/a	n/a	-1%	-0.1%

The annual mean NO_X concentrations (including background) are below the critical level of 30 $\mu g/m^3$ at all modelled habitats, in both the DM and the DS scenarios, in both the Opening and Design Years.

The annual mean NH_3 concentrations (including background) exceed the critical level for higher plants of 3 $\mu g/m^3$ at the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park in both the DM and the DS scenarios. However, the Proposed Development results in a decrease in the annual mean NH_3 concentration in the DS scenario in both the Opening Year and Design Year.

Nitrogen deposition levels (including background) are above the maximum critical loads for nitrogen deposition (see Section 7.2.5.8.2 and Table 7-15) at the Galway Bay Complex pNHA and the Annex I habitat type 'Lowland Hay Meadows' at Merlin Park, in both the DM and the DS scenarios, in both the Opening and

Design Years. Nitrogen deposition levels are within the critical load ranges for the Inner Galway Bay SPA and the Galway Bay Complex SAC in both the DM and the DS Opening Year and Design Year scenarios.

The acid deposition (as N) levels are within the maximum critical load range for acid deposition (as N) (see Section 7.2.5.8.2 and Table 7-16) at all modelled designated sites, in both the DM and the DS scenarios, in both the Opening and Design Years.

In accordance with the EPA Guidelines (EPA, 2022) the ecological impacts associated with the Operational Phase traffic emissions are overall direct, long-term, negative and slight, which is not significant in EIA terms.

7.4.3.5 Regional Air Quality Assessment

The potential changes in regional air emissions due to the traffic impacts of the Proposed Development during the Operational Phase has been assessed using the online TII REM tool.

Pollutant emissions (in tonnes) produced in both the DM and DS scenarios during the opening year of the Operational Phase are shown in Table 7-41. The Proposed Development will result in minor decreases in regional emission concentrations for all pollutants modelled for the opening year. These decreases are expected to have an imperceptible, positive, long-term impact to air quality. There is potential for the predicted emissions to be lower with potential for an increased modal shift, further decreasing car usage and thus the associated emissions.

Table 7-41 Operational Phase Regional Pollutant Emissions (Tonnes) – Opening Year 2028

Scenario	NO_X (tonnes/year)	PM_{10} (tonnes/year)	$PM_{2.5}$ (tonnes/year)
DM	194,886	24,100	13,540
DS	194,120	24,009	13,488
Change	-765	-91	-52
% Change	-0.4%	-0.4%	-0.4%

Pollutant emissions (in tonnes) produced in both the DM and DS scenarios during the design year of the Operational Phase are shown in Table 7-42. The Proposed Development will result in slight increases in regional PM_{10} and $PM_{2.5}$ emission concentrations and a decrease in regional NO_X emission concentrations modelled for the design year. This reflects the technical challenges in converting particularly heavy goods vehicles to electric vehicles, which would reduce emissions. However, given the low ambient air concentrations, these PM increases are expected to have a direct, negative, long-term and imperceptible impact to air quality. There is potential for the predicted emissions to be lower with potential for an increased modal shift, further decreasing car usage and thus the associated emissions.

Table 7-42 Operational Phase Regional Pollutant Emissions (Tonnes) – Design Year 2043

Scenario	NO_X (tonnes/year)	PM_{10} (tonnes/year)	$PM_{2.5}$ (tonnes/year)
DM	234,615	28,684	16,123
DS	234,393	28,691	16,126
Change	-222	6	3
% Change	-0.1%	0.02%	0.02%

In accordance with the EPA Guidelines (EPA, 2022), the regional impacts associated with the Operational Phase traffic emissions pre-mitigation are considered overall direct, neutral and long-term, which is not significant in EIA terms.

7.5 Mitigation and Monitoring Measures

7.5.1 Construction Phase

7.5.1.1 Construction Phase Mitigation Measures

The following mitigation measures will be implemented for the Construction Phase of the Proposed Development, in order to reduce the dust risk associated with the construction activities.

In order to ensure that no significant dust nuisance occurs, a series of mitigation measures that are applicable to the Construction Phase of the Proposed Development will be implemented. In summary, the mitigation measures will include:

- Fully enclose structures with screens during demolition to minimise dust dispersion;
- Public roads outside the Proposed Development will be regularly inspected for cleanliness and cleaned as necessary;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays (or similar dust suppression methods) will be used as required if particularly dusty activities associated with the construction contract are necessary during dry or windy periods;
- During movement of dust-generating or potentially hazardous materials both on and off-site, trucks will be covered with tarpaulin and before entrance onto public roads, trucks will be checked to ensure the tarpaulins are properly in place; and
- The appointed contractor will provide a site hoarding of 2.4m height along boundaries where works are taking place adjacent to ecological sensitive receptors and at the main construction compound which will assist in minimising the potential for dust impacts off- site.

The mitigation measures are included in the Construction Environmental Management Plan (CEMP) (Appendix A5.1 of Volume 4 of this EIAR).

The appointed Contractor will keep the effectiveness of the mitigation measures under daily review and revise them as necessary. In the event of dust nuisance occurring outside the works boundary associated with the Proposed Development, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem.

In terms of construction traffic, a Construction Traffic Management Plan shall be prepared by the contractor to deliver the mitigation measures outlined in Chapters 5 and 7 of this EIAR on a location-specific basis by the appointed contractor(s) in advance of the works commencing on-site. The following measures will be included:

- A designated delivery route shall be used for all materials to/from the site for all drivers, as overseen by the Project Supervisor for Construction Stage (PSCS) to be appointed by GCC;
- The use of low emissions vehicles within the haulage fleet will be included within the Contract Documents; and
- The use of private vehicles by construction staff to access the site will be minimised through the encouragement of use of public transport, encouragement of car sharing, and maximising use of local labour to reduce transport emissions. To implement this, the contractor shall prepare a Mobility Management Plan for site staff and Construction Plant.

To reduce emissions from compounds and mobile plant the following mitigation is recommended:

- For electricity generation at the construction compounds, hydrogen generators or electrified plant shall be utilised over traditional diesel generators. This should also apply to lower powered mobile plant as appropriate;
- A regular maintenance schedule for all construction plant machinery shall be undertaken to maintain optimum machinery efficiency; and
- Engines will be turned off when machinery is not in use.

7.5.1.2 Construction Phase Monitoring Measures

The following monitoring measures, will be implemented for the Construction Phase of the Proposed Development:

- The contractor will undertake on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to Galway City Council on request. The frequency of the inspections will be increased during site activities with a high potential to produce dust are being carried out.
- Dust monitoring will be undertaken at the three nearest sensitive receptors (with agreement from the landowner) to the works during the Construction Phase. The TA Luft dust deposition limit values of 350 mg/m^2/day applied as a 30-day average.

The monitoring measures are included in the Construction Environmental Management Plan (CEMP) (Appendix A5.1 of Volume 4 of this EIAR).

7.5.2 Operational Phase

There are no significant effects to air quality predicted during the Operational Phase as all ambient air pollutants will remain in compliance with the ambient air quality standards and the Proposed Development will have a generally neutral impact on air quality, therefore, no specific operation phase mitigation or monitoring measures are required.

7.6 Residual Impacts

7.6.1 Summary of Effects

Table 7-43 summarises the construction and Operational Phase impacts prior and post mitigation.

Table 7-43 Summary of Potential Construction and Operational Phase Impacts Following the Implementation of Mitigation and Monitoring Measures

Assessment Topic	Potential Impact (Pre- Mitigation and Monitoring)	Predicted Impact (Post Mitigation and Monitoring)
Construction dust emissions	-	Not Significant, Negative, Short-term, Direct
Construction Phase - road traffic impacts on local human receptors	Neutral, Short-term, Direct	Neutral, Short-term, Direct
Construction Phase - road traffic impacts on local ecological receptors	Slight, Positive, Short-term, Direct	Slight, Negative, Short-term, Direct
Operational Phase - road traffic impacts on local human receptors	Neutral, Long-term, Direct	Neutral, Long-term, Direct
Operational Phase - road traffic impacts on local ecological receptors	Slight, Negative, Long-term, Direct	Slight, Negative, Long-term, Direct
Operational Phase - regional air quality	Neutral, Long-term, Direct	Neutral, Long-term, Direct

7.6.2 Construction Phase

With the implementation of the mitigation measures outlined in Section 7.5.1.1, no significant adverse residual effects on air quality are predicted during the Construction Phase of the Proposed Development. Overall, it is considered that the residual effects as a result of the Proposed Development's construction are at most direct, short-term, negative and not significant, which is not significant in EIA terms.

7.6.3 Operational Phase

The air dispersion modelling assessment has found that all receptors will be in compliance with ambient air quality standards for the Do Something (and Do Minimum) scenario. There are no substantial or moderate adverse effects predicted as a result of the Operational Phase of the Proposed Development.

Therefore, it is considered that the residual effects as a result of the Proposed Development's operation are direct, long-term and neutral, which is not significant in EIA terms. No significant negative residual impacts have been identified during the operation of the Proposed Development, whilst meeting the Proposed Development objectives set out in Chapter 1 (Introduction).

7.7 References

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