Chapter 7

Air Quality and Climate

7.0 AIR AND CLIMATE

7.1 INTRODUCTION

This Chapter of the Environmental Impact Assessment Report (EIAR) was prepared by Tom Ryan TMS Environment Ltd who has over 20 years professional experience in preparing assessments of this type for various different types of development. Tom has a BSc (Hons) in Chemistry from University College Cork and a MSc in Environmental Science.

This chapter of the EIAR considers the potential air quality and climate impacts associated with the proposed development. Impacts of site operations are considered by taking account of the existing baseline, the projected impacts and compliance with relevant standards and best practice guidance.

The project, which is the subject of assessment in this EIAR and the accompanying Appropriate Assessment Report and Natura Impact Statement, will be facilitated by advance infrastructural works. These works were the subject of a Section 34 application to Fingal County Council (FCC F21A/0287) and are currently on appeal to An Bord Pleanála (ABP Reg. Ref. 312189). They consist of a connecting road to the north, drainage infrastructure, cycle and pedestrian facilities, and associated landscaping (the "AI Works"). The Project, is assessed to ensure that all cumulative and in combination effects of the Project with other plans and projects within the zone of influence, including the Advance Infrastructure Works (Ref. ABP-312189-21), the prior application for off-site road improvements serving the wider area (ABP Reg. Ref. 309409; FCC Reg. Ref. F20A/0324), and the proposals by Noonan Construction for Ballygossan Park Phase 2 have been fully assessed in order to enable the competent authority to undertake a lawful environmental impact assessment ("EIA"), appropriate assessment screening ("AA Screening") and appropriate assessment ("AA"). The location of these neighbouring proposed developments are shown on Figures 1.2 and 1.3 in Chapter 1.

The extent of the Study Area for this chapter is within a radius of 350m from the site boundaries. There is no national or other guidance available that defines a specific zone of influence for such an impact assessment but using professional experience the zone of influence for this chapter is considered to fall within the Study Area. While the zone of potential influence extends to 350m for the purpose of the overall assessment, the magnitude and significance of any impacts decreases with distance from the site with the maximum impacts observed within < 50m of the site boundaries.

7.2 STUDY METHODOLOGY

7.2.1 Introduction

The assessment follows a well-established scheme involving identification and characterisation of the air quality impacts that must be addressed, characterisation of the receiving environment to benchmark the existing situation, quantitative prediction of air quality impacts and assessment of the impacts against recognised Air Quality Standards and From this assessment comes a definition of the Management Plans and environmental solutions that are required to ensure that all aspects of the impacts of the proposed project through the Construction Phase and the Operational Phase, are managed and controlled to protect human health, the environment and amenity.

The following Guidance was considered in carrying out the assessment:

1. Advice Notes for Preparing Environmental Impact Statements, (Environmental Protection Agency, Draft September 2017);

2. Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);

3. Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);

4. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 – S.I. No. 296 of 2018.

The effects of the proposed project are described by considering the likely direct and indirect impacts that could occur as a result of the proposed project, the probability of their occurrence and the nature and significance of such impacts. The Environmental Protection Agency's (EPA's) draft *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2017) take account of Directive 2014/52/EU which amended Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment and have been considered in this assessment. Impacts are described in the draft Guidelines under various headings which are summarised as follows:

- Probability – likely, possible, unlikely;
- Quality – positive, neutral, negative;
- Significance – e.g. Imperceptible, Moderate, Profound; and
- Magnitude – duration, frequency, extent, context.

A description of the significance of effects is presented in Table 7.1, which shows the approach taken to quantifying the significance and magnitude of potential air quality impacts in this assessment.

In addition to considering the above guidance, the general approach adopted for the air quality impact assessment is summarised as follows:

- Describe the existing baseline air quality at the proposed project site and in the vicinity of receptors;
- Describe the potential impacts of the proposed project on air quality;
- Identify appropriate criteria against which to assess the significance of the impacts associated with the proposed project;
- Propose avoidance and mitigation measures where required; and
- Identify and assess all cumulative impacts with potential to impact upon the baseline environment.

Table 7.1 Describing the Significance and Magnitude of Environmental Effects (EPA 2017)

Aspect	Description
Significance of Effects	
Imperceptible	An effect capable of measurement but without noticeable consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
Significant	An effect which, by its character, magnitude, duration or intensity, alters most of a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics
Magnitude of Effects	
Extent	This is described by the size of the area, the number of sites and the proportion of the population affected by the effect.
Duration	**Momentary** effects last seconds to minutes.
	Brief effects last less than a day.
	Temporary effects last less than one year.
	Short-term effects last from one to seven years.
	Medium-term effects last from seven to 15 years.
	Long-term effects last from 15 to 60 years.
	Permanent effects last over 60 years.
Frequency	How often the effect will occur
Context	The contextual relationship between the effect and the existing baseline

Guidance on assessment of dust from demolition and construction was published in 2014 by the Institute of Air Quality Management (IAQM) *Guidance on the Assessment of Dust from Demolition and Construction.* This Guidance describes a five-step approach to the assessment which is summarised as follows:

- Screen the proposed project to determine if there is a requirement for a more detailed assessment;
- Assess the risk of dust impacts for each of the four activities outlined in the Guidance (demolition, earthworks, construction and construction traffic) and take account of the scale and nature of the works, and the sensitivity of the area;
- Determine the site-specific mitigation for each potential activity;
- Examine the residual effects and determine whether these are significant; and
- Prepare the dust assessment report.

This approach has been applied to the proposed project. According to the IAQM Guidance a detailed assessment is required when there are human receptors within 350m of the boundary of the project site, and since the closest human receptors to the proposed project site boundaries are within this distance, a detailed assessment was required.

There are no European or Designated Sites within 50m of the site boundary, which is the threshold distance for ecological sensitivity as recommended in the IAQM Guidance and which TMS have also assessed as the relevant distance of potential significant impact. Therefore the assessment concludes that there are no significant construction impacts predicted for ecological sites.

The impacts on air quality from the Construction Phase will arise through the generation and subsequent deposition of dust and elevated local PM_{10} concentrations. The construction activities have been assessed on the basis of the area sensitivity and the emission magnitude. The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. Dust emissions are defined according to the scale and nature of the work for each activity, as described in Table 7.2 below.

The two types of sensitive receptors that may be impacted by dust from construction activities, as defined by the IAQM Guidance, are human and ecological. These are defined as "*a location that may be affected by dust emissions during demolition and construction. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust*".

The guidance refers to human receptors as those properties that may be subject to adverse impacts of dust or PM_{10} over a time period relevant to the Air Quality Standard. Specific properties include dwellings, cultural heritage collections, food manufacturers, vehicle showrooms, electronics manufacturers and horticultural operations. According to the IAQM Guidance a single dwelling is classified as one receptor, whereas a school counts as 100.

Receptor sensitivity is defined by a number of factors including:

- specific sensitivities of those receptors;
- number of receptors;
- proximity to construction site;
- background PM10 concentrations; and
- site-specific factors.

The sensitivity of key receptors to each construction-related activity is determined for each of the following dust impacts:

- dust soiling;
- human health impacts; and
- impacts on ecological receptors.

The sensitivity of an area to the potential impacts of each activity is defined at various distances from the work site depending on the sensitivity and number of receptors. IAQM categorises these in several distance bands for different impacts at 20, 50, 100, 200 and 350m. Receptor sensitivity to dust soiling is assessed for only four IAQM distance bands, whereas sensitivity to human health impacts is assessed for all five. Table 7.3 defines the levels of sensitivity of areas at different distances for each of the impacts listed above.

Table 7.2 Quantitative Determination of the Magnitude of Dust Emissions for Demolition and Construction Activities (IAQM 2014)

Activity	**Dust Emission Magnitude**	
Demolition	Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
	Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
	Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.
Earthworks	Large	Total site area >10,000 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 >8 m in height, total material moved >100,000 tonnes;
	Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately, dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes; and
	Small	Total site area <2,500 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, total material moved <20,000 tonnes, earthworks during wetter months.
Construction	Large	Total building volume >100,000 m^3, on site concrete, batching, sandblasting;

	Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
	Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Track-out	Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m;
	Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m; and
	Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

Table 7.3 Area Sensitivity to the Effects of Dust Soiling (IAQM 2014)

Receptor Sensitivity	**Number of Receptors**	**Distance from the Source, m**			
		<20	**<50**	**<100**	**<350**
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

The estimated magnitudes of each construction activity (small, medium, large or negligible) are combined with the area sensitivity, which is determined by the number and proximity of receptors to the construction boundary and the background PM_{10} concentration. High sensitivity receptors include properties such as residences, care homes, hospitals and schools, and medium sensitivity receptors include hotels, offices and supermarkets. There are a significant number of private residences within 50m of the subject site boundary, and therefore as a worst-case approach, the assessment is based on a high sensitivity rating for all receptors. Since the potential emissions are predominantly in the 30µm to 75µm size range, PM_{10} impacts are screened out as insignificant for this assessment; the assessment therefore focuses on the larger particle sizes. This qualitative analysis provides the overall level of risk of impacts for dust soiling, human health and ecology. The level of risk of each impact is used to identify appropriate mitigation measures.

Climate

The potential climate impact of the proposed Project is assessed by comparing the total emissions of Greenhouse Gases (GHG) with those that would occur if the site was left as it is. The Climate Action and Low-Carbon Development Act 2015, provided for arrangements aimed at achieving transition to a low-carbon, climate-resilient and environmentally sustainable economy by 2050.

The Climate Action and Low-Carbon Development (Amendment) Act 2021 was signed into law in March 2021 and sets a more ambitious target for Ireland to reach net-zero carbon emissions no later than 2050, and a 51% reduction in carbon emissions by 2030. This Act will also provide the framework for Ireland to meet its international and EU climate commitments and to become a leader in addressing climate change. It requires that the applicant considers and reduces its carbon footprint in all aspects of the proposed development. This assessment provides information on how the proposed project considers this objective in the selection of the preferred approaches for the proposed development.

The principal GHG emissions associated with the proposed development are methane and carbon dioxide (CO_2). For the purposes of this assessment the proposed development is compared with a *Do Nothing* scenario and evaluated. Therefore, 2 scenarios have been assessed as follows:

- Scenario 1 – Do Nothing, in this scenario, there will be no development at the site and
- Scenario 2 – Do Something (proposed Project), in this scenario the proposed development is assessed.

The assessment estimates the total GHG emissions from direct and indirect activities associated with the proposed Project. Overall emissions over the lifetime of the project are considered. The assessment is presented in terms of relative GHG emissions from the various sources and while there are some uncertainties, the assessment allows a reliable comparison of the Climate Impact of the proposed project relative to the Do Nothing scenario.

Aspergillosis

The fungal disease known as "invasive Aspergillosis" may be contracted as result of disturbance of materials that release fungal spores into the atmosphere and is a potential concern that requires consideration. This is a disease which is detrimental to persons with suppressed immune systems, such as hospital patients. The Health Protection Surveillance Centre "*National Guidelines for the prevention of Nosocomial Invasive Aspergillosis during construction/renovation activities*" were published in 2018 and deals specifically with construction works occurring within or adjacent to hospitals. The report states that the fungal spores responsible for invasive Aspergillosis can originate from a number of sources such as construction, demolition, renovation, disturbance of soil, removal of fibrous insulation material, removal of suspended ceiling tiles and from poorly maintained air ventilation systems. The potential sources of the fungal spores associated with invasive Aspergillosis, as detailed above, are related to the occurrence of these operations either within or in very close proximity to any hospital buildings.

Fungal spores (the *Aspergillus* moulds) are found everywhere but are of particular concern when large scale demolition, excavation and earth-moving activity takes place and especially in close proximity to areas where vulnerable individuals are located. The dispersion of spores (or indeed dust or any other substance) which are released at a particular location depends on a significant number of factors which include the rate and temperature of the release, the release height, the wind speed, rainfall, wind direction, topography, local meteorological conditions, the nature of the substances released, the potential for physical or chemical interactions and the concentrations of the substances

released and other factors. The dispersion of fungal spores will depend on all of the above factors and this dispersion is evaluated by considering the factors noted above and the distances from the source at which the predicted impacts are to be assessed. In the first instance, the key factors are the concentration of the spores released and the distance to sensitive receptors. Dispersion of fungal spores released as a result of any activity is a function of time and distance and would be completely dispersed i.e. no measurable concentration at approximately 250m from the source of the release (UK HSE Research Report RR786 Bioaerosols from Composting, 2010). The National Guidelines report referred to above notes that the fundamental requirement in respect of eliminating *Aspergillus* infection from construction works is first to minimise the dust generated during construction and second to prevent dust infiltration into patient care areas.

7.2.2 Impact Assessment Criteria

The assessment of impact significance is based on a comparison of predicted impacts with air quality standards and guidelines, and consideration of the magnitude and duration of the potential impact.

Air Quality Standards in Ireland have been defined to ensure compliance with EC Directives; they are developed at different levels for different purposes. European legislation on air quality has been framed in terms of two categories, limit values and guide values. Limit values are concentrations that cannot be exceeded and are based on WHO guidelines for the protection of human health. Guide values are set as a long-term precautionary measure for the protection of human health and the environment. The WHO guidelines differ from EU air quality standards in that they are primarily set to protect public health from the effects of air pollution, whereas Air Quality Standards are recommended by governments, and other factors such as socio-economic factors, may be considered in setting the standards.

The air quality standards and guidelines referenced in this report are summarised in Table 7.4. The Clean Air for Europe (CAFE) Directive (Council Directive 2008/50/EC) was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). This Directive and the Irish Regulations set out the main standards against which the potential impact of the development on air quality are assessed.

In addition to the Air Quality Standards Regulations and the Directive Standards, it is also appropriate to consider the World Health Organisation (WHO) Guidelines. These guidelines were developed by the WHO to provide appropriate air quality targets worldwide, based on the latest health information available. The air quality guidelines for particulate matter (PM_{10}), nitrogen dioxide and sulphur dioxide, and $PM_{2.5}$ are considered in this report (WHO, 2005; updated in 2008). While the WHO Guidelines are not mandatory, they represent current informed opinion on the levels to which we should be aspiring in order to minimise adverse health impacts of air pollution. The WHO guidelines referenced in this report are summarised in Table 7.5.

There are no national or European Union air quality standards with which dust deposition can be compared. However, it is considered Best Practice to apply a figure of 350 mg/m^2-day for dust deposition rates which is based on the German Standard TA Luft Regulations and is commonly applied by Local Authorities and the EPA (Environmental Protection Agency) to ensure that no nuisance effects will result from specified industrial activities.

Table 7.4 Air Quality Standards Regulations 2011 (based on EU Clean Air For Europe [CAFE] Directive 2008/50/EC)

Pollutant	EU Regulation	Limit Type	Margin of Tolerance	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	None	200 µg/m^3 NO_2
		Annual limit for protection of human health	None	40 µg/m^3 NO_2
		Annual limit for protection of vegetation	None	30 µg/m^3 NO +NO_2
Sulphur Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	150 µg/m^3	350 µg/m^3
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	None	125 µg/m^3
		Annual & Winter limit for the protection of human health and ecosystems	None	20 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50%	50 µg/m^3
		Annual limit for protection of human health	20%	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health (Stage 1)	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m^3
		Annual limit for protection of human health (Stage 2)	None To be achieved by 2020	20 µg/m^3
Carbon Monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	60%	10 mg/m^3 (8.6 ppm)
Benzene	2008/50/EC	Annual limit for protection of human health	0% by 2010	5 µg/m^3

NOTE: The Air Quality Standards Regulations 2011 (SI 180 of 2011) transposed EU Directive 2008/50/EC (CAFE) into Irish law.

Table 7.5 WHO Air Quality Standards

Pollutant	Limit Type	Value
Nitrogen Dioxide	Hourly limit for protection of human health	200 µg/m^3
	Annual limit for protection of human health	40 µg/m^3
Sulphur Dioxide	Daily limit for protection of human health	20 µg/m^3
	10-minute limit for protection of human health	500 µg/m^3
Particulate matter (as PM_{10})	24-hour limit for protection of human health	50 µg/m^3
	Annual limit for protection of human health	20 µg/m^3
Particulate matter (as $PM_{2.5}$)	24-hour limit for protection of human health	25 µg/m^3
	Annual limit for protection of human health	10 µg/m^3

7.3 THE EXISTING RECEIVING ENVIRONMENT

7.3.1 Meteorological Conditions

The magnitude of potential impacts of the proposed development on air and climate will largely be influenced by the local meteorological conditions, in particular by wind speed and direction and by precipitation rates. An evaluation of the climatic conditions at the site is therefore useful for an assessment of the type required for this study.

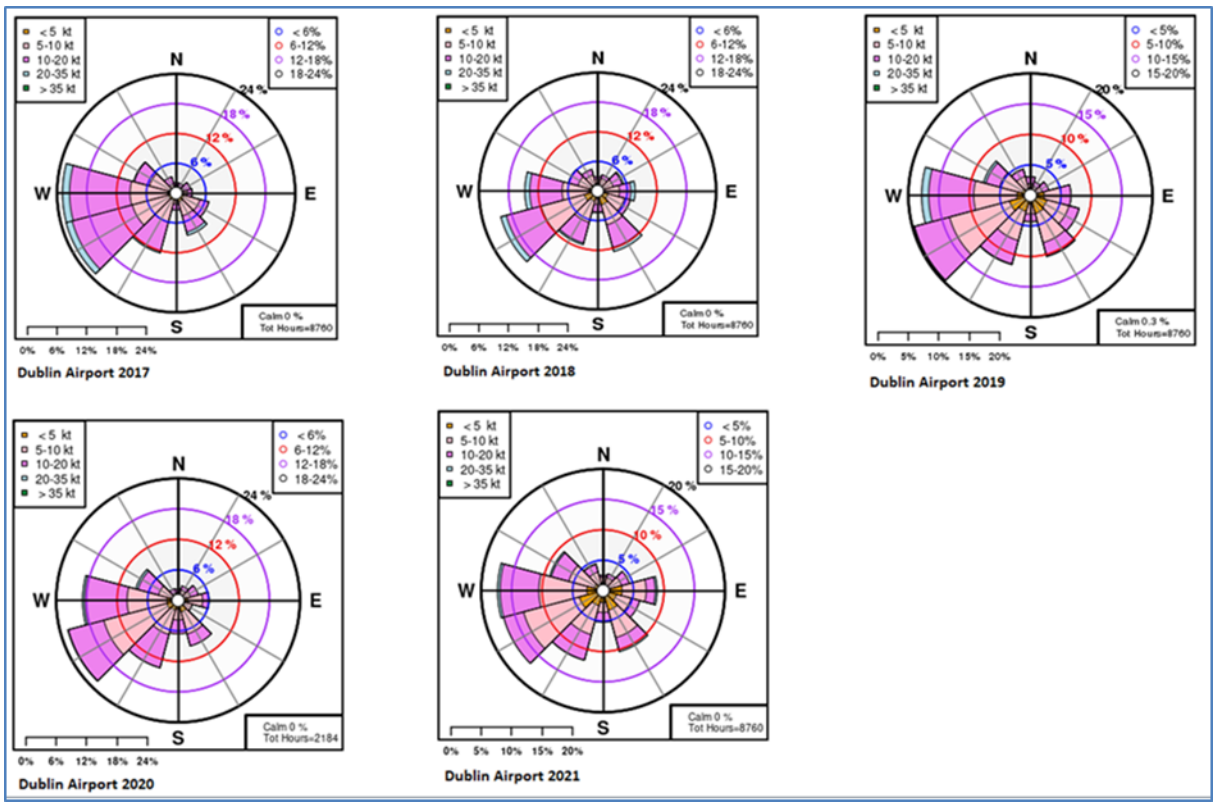
The Irish climate is subject to strong maritime influences, the effects decreasing with increasing distance from the Atlantic Coast. Data from the Irish Meteorological Service, Met Éireann, indicate that Ireland's average annual temperature is between 9°C and 10°C. Temperatures in the middle and east of the country tend to be somewhat more extreme than in other parts of the country. Mean annual wind-speed varies between about 4m/sec in the east midlands and 7m/sec in the north-west. Strong winds tend to be more frequent in winter than in summer. Sunshine duration is highest in the south-east of the country. Most areas of the western half of the country experience rainfall in the region of between 1,000mm and 1,400mm per annum, much higher than the eastern half of the country which experiences 750mm to 1,100mm per annum.

Met Éireann operate a Synoptic Network of weather stations at Belmullet, Malin Head, Rosslare (closed since 2008), Johnstown Castle, Birr, Clones, Kilkenny and Mullingar while the Aviation Division of Met Éireann maintains observing stations at Shannon Airport, Knock Airport, Casement Aerodrome, Dublin Airport and Cork Airport. There is no continuous meteorological monitoring on the subject site but the general guidance on selection of meteorological data for air quality impact assessments is to choose representative data, recently acquired, which best represents conditions at the site. At least three years of recently acquired data is preferred. Comprehensive monitoring data is available for Dublin Airport (approximately 18km northeast of the subject site) which would be indicative of the meteorological conditions that are experienced at the site. Therefore, for the purpose of obtaining reliable information about the climatological conditions at the site of the proposed development, a full set of meteorological data for the period 2017 – 2021 recorded at Dublin Airport was analysed. This is considered an appropriate data set for the study because of the close proximity

of the station to the site and the similarity in topography in the immediate area of both Dublin Airport and the site of the proposed development.

Wind speed and direction in particular is important in determining how emissions associated with the activity are dispersed. The prevailing wind direction determines which areas are most significantly affected by the emissions from the activity, and wind speed determines in part the effectiveness of the dispersion of the emissions. The windroses for Dublin Airport are presented in Figure 7.4 for each of the years from 2017 to 2021. The dominant wind direction for Dublin Airport is from the west-southwest. The average long-term wind speed over the period 1981 to 2010 is 5.3m/s.

Figure 7.1 Windroses for Dublin Airport (2017 to 2021)



7.3.2 Influences on Ambient Air Quality

The existing activities at and in the vicinity of the subject site have the potential to exert an influence on ambient air quality by release of emissions to atmosphere as follows:

- emissions of fine particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO) from domestic, commercial and industrial heating;
- emissions of particulate matter (PM_{10} and $PM_{2.5}$), SO_2, NO_x, CO and benzene from traffic on adjoining roads and railway line;
- emissions of particulate matter (PM_{10} and $PM_{2.5}$) from the active quarry within 200m of the subject site boundary

Overall the contribution of traffic travelling on the surrounding road network, rail transport activity and heating sources in the area are considered to be the dominating influence on air quality in the immediate vicinity of the site.

The main substances which are of interest in terms of existing air quality are sulphur dioxide, nitrogen oxides, particulate dusts including PM_{10} and $PM_{2.5}$ which could originate from combustion sources and traffic. There are no new substances expected to be present in emissions released from the proposed development. A description of existing levels of the various substances in ambient air is required to allow completion of the evaluation of air quality impacts associated with the development and is presented in the following section.

7.3.3 Existing Ambient Air Quality

The site is located in agricultural fields immediately south of the town of Skerries. Surrounding lands to the west, south and east are in agricultural use while Skerries Golf course lies immediately to the south of the site. There is an active quarry site 200m east of the subject site. The lands immediately north of the site have been developed by Noonan Construction with 103 no. dwellings plus a crèche under Planning Register Reference Number: F11A/0309/E1..

The dominant influences on air quality in the area are emissions from road traffic and to a much lesser extent from rail transport. Emissions from heating sources and the quarry east of the site are expected to be minor contributors to the ambient air quality in the vicinity of the site.

The main substances which are of interest in terms of existing air quality are sulphur dioxide, nitrogen oxides (nitric oxide, NO and nitrogen dioxide NO_2, collectively referred to as NO_x), fine particulate matter including PM_{10} and $PM_{2.5}$ which could originate from combustion sources, traffic and the existing commercial activities in the area. Carbon monoxide is also potentially of interest, and benzene may also be of interest from traffic sources. There are no significant new substances expected to be present in emissions released from the proposed development relative to the existing situation.

Particulate matter is made up of tiny particles in the atmosphere that can be solid or liquid and is produced by a wide variety of natural and manmade sources. Particulate matter includes dust, dirt, soot, smoke and tiny particles of pollutants. Particulate matter of 10 micrometers in aerodynamic diameter or less are also referred to as PM_{10} or more strictly, particles which pass through a size selective inlet with a 50% efficiency cut-off at 10 um aerodynamic diameter. Similarly, $PM_{2.5}$ refers to particulate matter of 2.5 micrometers or less in aerodynamic diameter. In the past domestic coal burning was a major source of particulate matter in Irish cities during winter months. Levels of particles have decreased significantly since then following the introduction of abatement strategies including Special Control Areas and other Regulations regarding the use, marketing, sale and distribution of certain fuels. The significance of particulate matter is predominantly related to human health and respiratory effects.

Nitrogen oxides (NO_x, which is the sum of NO and NO_2), are generated primarily by combustion processes. The main anthropogenic sources are mobile combustion sources (road, air and traffic) and stationary combustion sources (including industrial combustion). The main source of nitrogen oxides in the vicinity of the site is traffic. The significance is health-related for nitrogen dioxide (NO_2) and ecological for nitrogen oxides (NO_x).

Sulphur dioxide also originates from combustion but predominantly from heating sources and not traffic. The trend in ambient SO_2 concentrations in Ireland is very clearly downward and this pollutant is not a matter for concern in Ireland. This reduction can be attributed to fuel switching from high-sulphur fuels, such as coal and oil, to natural gas and to decreases in the sulphur content of oil.

Carbon Monoxide (CO) is a colourless and odourless gas, formed when carbon in fuel is not burned completely. It is a component of motor-vehicle exhaust, which accounts for most of the CO emissions

nationwide. Consequently, CO concentrations are generally higher in areas with heavy traffic congestion.

A description of existing levels of the various substances in ambient air is required to allow completion of the evaluation of air quality impacts associated with the development. The available data from the National Ambient Air Quality Network is a reliable data set for consideration in this study.

The Environmental Protection Agency (EPA) and local authorities maintain and operate a number of ambient air quality monitoring stations throughout Ireland in order to implement EU Directives and to assess the country's compliance with national air quality standards. Ireland's small population and generally good air quality means that a relatively small number of monitoring stations are sufficient across the country for the purposes of implementing the EU Air Directives.

For ambient air quality management and monitoring in Ireland, four zones, A, B, C and D are defined in the Air Quality Standards (AQS) Regulations (S.I. No. 180 of 2011) and are defined as follows:

- Zone A: Dublin Conurbation.
- Zone B: Cork Conurbation.
- Zone C: 24 cities and large towns. Includes Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Newbridge, Mullingar, Letterkenny, Celbridge and Balbriggan, Portlaoise, Greystones and Leixlip.
- Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B &C.

The subject site is considered to be located in Zone D and is considered a rural location site for assessment purposes. Air Quality Data from representative air monitoring stations in Zone D are therefore considered representative of air quality at the subject site. The EPA publishes Ambient Air Quality Reports every year which details the air quality in each of the four zones. The most recent report, published by the EPA in 2020, is the Air Quality in Ireland 2019, which contains monitoring data collected during 2019. Best practice requires that an average of at least three years of recent monitoring data is used for assessments of this type so data for 2018, 2019 and 2020 has been reviewed.

The EPA maintains monitoring stations in a number of rural locations including Castlebar, Claremorris, Emo, Enniscorthy, Kilkitt and Longford to monitor rural background air quality. Other monitoring stations have operated at various times and some new stations have been added to the network, but long-term data is available for the above stations.

Data from the Air Quality Monitoring Annual reports for 2018, 2019 and 2020 was reviewed and a summary of the data for representative stations for the three most recent years is presented for each parameter of interest in Table 7.6.

The approach taken is to take the average of the three most recent years (2018 – 2020) for each of the Zone D rural stations detailed above and the averages of the values for the stations are reported in Table 7.6. This is the data set which is used in the assessment of the potential impact of the proposed development on air quality. A graphical presentation comparing the data with the relevant Air Quality Standards (discussed further in Section 7.5 below) is presented in Figure 7.2.

It is noted from the data that existing ambient air quality is good for all health-related pollutants. All concentration levels are well within the EU Standards for all parameters of interest.

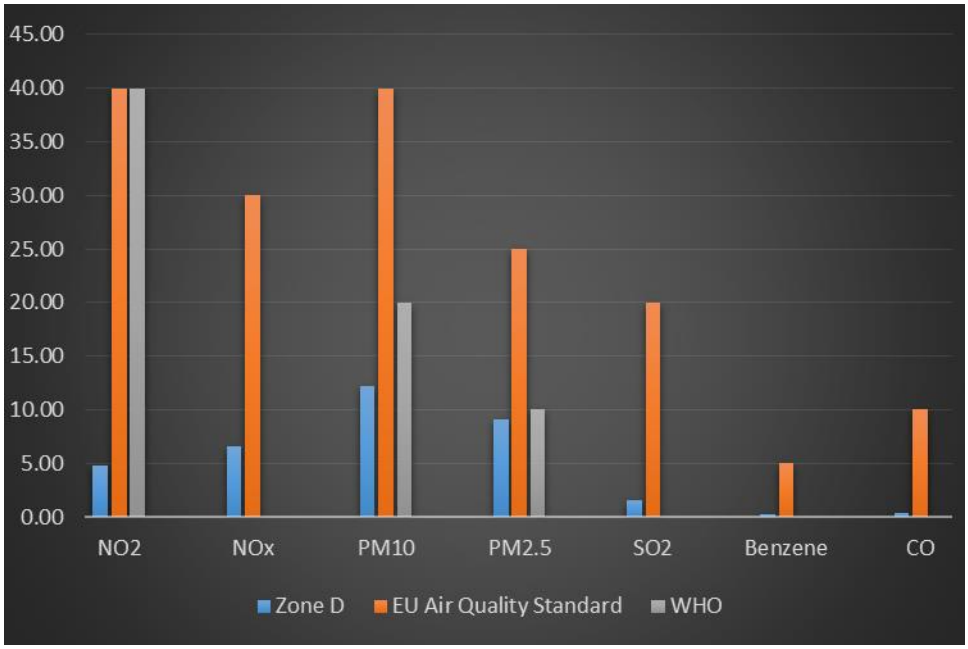
Table 7.6 Summary Baseline Air Quality Data (2018 - 2020)

Data set	Parameter and averaging interval		Concentration µg/m³
Rural background	Nitrogen dioxide NO_2	*Annual Mean, µg/m³*	4.8
Rural background	Nitrogen oxides, NO_x	*Annual Mean, µg/m³*	6.6
Rural background	Particulate Matter PM_{10}	*Annual Mean, µg/m³*	12.2
Rural background	Particulate Matter $PM_{2.5}$	*Annual Mean, µg/m³*	9.1
Rural background	Sulphur dioxide, SO_2	*Annual Mean, µg/m³*	1.6
Rural background	Carbon Monoxide CO	*Annual Mean 8-hour, mg/m³*	0.4
Rural background	Benzene	*Annual Mean, µg/m³*	0.21

NOTE

1. Data summarised from the EPA Annual Ambient Air Quality Monitoring Reports 2018 to 2020.

Figure 7.2 Comparison of baseline air quality data with Air Quality Standards



7.4 CHARACTERISTICS OF THE PROJECT

7.4.1 Existing Activities

The subject site is currently a greenfield site and in agricultural use. The only potential for emissions to air from the site are associated with the occasional use of agricultural machinery on the land or from ruminants grazing on the land. Existing activities in the immediate vicinity of the site of the proposed development have the potential to exert an influence on air quality by release of emissions associated with the following:

- emissions of particulate matter (PM_{10} and $PM_{2.5}$), Sulphur dioxide (SO_2), nitrogen oxides (NO_x) and carbon monoxide CO from heating sources in the area from existing residential and commercial activities;

- emissions of particulate matter (PM_{10} and $PM_{2.5}$), SO_2, NO_x, CO from road and rail traffic in the area.

The magnitude of the emissions from the existing site itself is very small relative to the dominant influence on air quality in the surrounding area which is traffic from the adjoining road and rail network and heating sources in the area.

7.4.2 Impact Identification of Proposed Activities

7.4.2.1 Construction Impacts

The potential air quality and climate impacts on the surrounding environment that requires consideration for a proposed development of this type includes two distinct stages, the short-term construction phase and the long-term operational phase.

The potential air quality impacts during Construction are summarised as follows:

a) Dust emissions associated with excavations and demolition works

There are no demolition works proposed for the proposed development. The most significant of the potential air quality impacts associated with the construction site is dust. Dust can be generated as a result of disturbance of materials, as a result of wind blowing across exposed surfaces and as a result of construction vehicle movements across exposed surfaces.

There are three potential impacts on air quality of the dust / particulate matter emissions. Dust deposition on surfaces is the main potential impact associated with the larger particles, nuisance effects such as reduced visibility could be associated with excessively high levels of suspended particulate matter and respiratory effects could occur as a result of excessive levels of fine particles such as PM_{10} and $PM_{2.5}$.

Dust emissions associated with the Construction Phase of the proposed development are expected to be predominantly in the 10 – 75µm particle size range so these particles, because of their size, will generally be deposited within 100m of the emission source. Only under exceptional meteorological conditions would the dusts be carried further downwind.

Suspended particulate matter (SPM) may also be released and this matter may remain suspended in the air. The main effect would be on visibility but this type of material could also be a respiratory nuisance if present at excessive levels. Emissions of dust in the form of fine particulate matter, PM_{10} and $PM_{2.5}$, may also occur, primarily as a result of materials handling and storage since the dominant

particle size of the main construction materials is in the lower size ranges. There may also be some emissions of particles in these size ranges from the general site activities.

b) Construction transport emissions

Emissions of dust raised by vehicle movement on the roads near the site and also on site are considered under the general construction phase emissions in section (a) above. Emissions from the construction vehicles as a result of fuel combustion are considered here. The emissions include PM_{10} and $PM_{2.5}$, NO_2 and NO_x and CO and benzene.

c) Aspergillus emissions from excavation and earthmoving activity

There is concern about a fungal disease, "invasive Aspergillosis" which may be contracted as result of disturbance of materials that release fungal spores into the atmosphere. Fungal spores (the Aspergillus moulds) are found everywhere but are of particular concern when large scale demolition, excavation and earth-moving activity takes place. It should be noted that there are no patient care facilities within 250m of the subject site boundary.

7.4.2.2 Operational Impacts

The most significant potential impacts remain the same as those associated with existing activities at and in the vicinity of the site - emissions of particulate matter and combustion gases such as carbon monoxide (CO), sulphur dioxide (SO_2) and nitrogen oxides (NO_2) from heating and traffic.

Sulphur dioxide and nitrogen oxide emissions are present in the emission stream as a result of the combustion process. Since all heating requirements are proposed to be provided by heat pump systems there will be no direct emissions to air from the proposed site as these systems will be powered electrically. Similarly, there is no potential for emissions of particulate matter, carbon dioxide and carbon monoxide at the site from heating sources.

7.4.2.3 Traffic Impacts

The Traffic and Transport Assessment (TTA) Report for the proposed development was prepared by DBFL Consulting Engineers and was reviewed as part of the assessment of the impacts of traffic on air quality and climate. The TTA report shows an overall increase of approximately 40% in traffic movements in the broader development site environs as a result of the operational phase of this proposal. The actual traffic volume numbers are not significant and such a change in traffic volume will not result in a quantifiable change in emissions and therefore traffic emissions will remain similar to the current situation. The principal substances that are associated with transport activity are particulate matter, nitrogen oxides and carbon monoxide. Dust emissions associated with construction traffic is also possible.

7.5 POTENTIAL IMPACTS OF THE PROJECT

7.5.1 Existing Activities

Section 7.3 describes the existing air quality at and in the vicinity of the site. The data supports the conclusion that heating and traffic emissions are the dominant influence on air quality in the area. The existing air quality complies with the Air Quality Standards and indicates that existing activities are not exerting an unacceptable effect on air quality.

7.5.2 Construction Phase Impacts

The construction of the proposed development will involve general construction activities. Site clearance will require the use of heavy earth-moving machinery and equipment that will be used for soil stripping, excavation, importation of materials to site and foundation laying equipment. Conventional construction work will then be required to build up the individual units that will be required on-site.

The risk of dust being emitted in sufficient quantities to cause a nuisance or health impacts is evaluated by considering the scale of the works programme. The IAQM's (2014) *Guidance on the Assessment of Dust from Demolition and Construction* gives advice on classifying the magnitude of the potential dust impacts and using the advice and information derived from the Construction Plan for the site, the magnitude of the dust emissions is estimated as shown in Table 7.7. The assessment is based on the closest receptors to any section of the proposed site and therefore represents a worst-case assessment scenario whereby the maximum potential impact is assessed.

Table 7.7 Assessment of Magnitude of Dust Emissions and Receptor Sensitivity for the Construction Programme for the Proposed Development

Activity	Magnitude of Dust Emission	Sensitivity of receptors and surrounding areas		
		Dust Soiling	Human Health	Ecological
Demolition	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Excavations	Medium	Medium	Low	Low
Construction	Small to Medium	Medium	Low	Low
Construction Traffic	Small	Medium	Low	Low

The proposed development consists of a construction programme only as there are no structures on the site that would require demolition. Excavation work is required as the site is a greenfield site with by far the majority of excavated materials being soils (grassed topsoil, topsoil and subsoil). Due to the scale of the construction programme it is considered that significant emissions could potentially arise.

The significance of the dust emissions and impacts is evaluated in terms of the sensitivity of the receptors in the area that could be affected by the emissions. In general, receptors located close to the construction site boundary are considered high sensitivity with sensitivity decreasing with increasing distance from the source reflecting the exponential decrease in dust levels as distance increases. The highest receptor sensitivity in the immediate vicinity of the proposed site is medium and is low for the vast majority of the construction activity.

The potential air quality impact arises from emissions of particulate matter and may result in deposition of dust around the site, and trackout onto the roads in the vicinity of the site. The magnitude of the potential emissions associated with Construction is assessed as medium using the above criteria.

Using the alternative assessment approach outlined in the Draft Guidelines on Environmental Impact Assessment as outlined in Section 9.2, the significance of potential dust emissions during construction is summarized in Table 7.8.

Table 7.8 Assessment of Significance of Dust Emissions for Construction Programme

Activity	Significance of Dust Emission	Duration of Dust Emission
Demolition	Not Applicable	Not Applicable
Excavations	Slight	Short-term
Construction	Not Significant	Short-term
Construction Traffic	Not significant	Short-term

This assessment shows that the most significant potential impacts are those associated with excavation work which is very dependent on weather conditions. Damp weather and low wind speeds will reduce the level of impact experienced at the receptor locations. There will be a short-term, slight impact on the closest receptors during the excavation programme and a short-term, not significant impact on the closest receptors during the construction works. Construction traffic impacts will be not significant and experienced in the short-term. In the absence of mitigation measures, the overall impact of dust arising during the construction phase is considered to be short term in duration and its significance will vary from not significant to slight.

Raw materials required for the construction will be delivered to the sites using conventional Heavy Goods Vehicles (HGVs) and any wastes requiring removal from the site will be removed using HGVs. The principal substances that are emitted from the vehicles are fine particulate matter, nitrogen oxides and carbon monoxide. Dust and particulate matter impacts associated with the passage of vehicles on roads has already been assessed as part of the dust and particulate matter impacts. The level of traffic movements has been reviewed in the context of potential contributions to air quality in the area.

Construction traffic will consist of private vehicles of site construction staff along with excavation plant and dumper trucks involved in site development works and material delivery vehicles. It is anticipated that a large proportion of construction workers shall arrive in shared transport or use public transport to access the site.

It is anticipated that heavy goods vehicle (HGV) traffic movements will occur at a steady rate throughout the course of the day. It is estimated in the Material Assets: Road Network and Traffic chapter of this EIAR that peak HGV movements would be in the region of 4 one-way movements per hour, depending on the construction activities active on the site.

Existing peak hour flows on the Golf Links Road are up to 614 movements per peak hour. Construction traffic is estimated to make up less than 1% of the peak hour traffic on the Golf Links Road and significantly less than 1% of the overall peak hour traffic in the general vicinity of the subject site.

Potential emissions from construction traffic using the local road network have been assessed to contribute less than 1% change to the existing air quality emission levels. It can therefore be concluded that the additional traffic will not generate significant emissions in terms of local air quality and no material change in air quality relative to the existing situation is predicted.

The fundamental requirement in respect of eliminating *Aspergillus* infection from construction works is first to minimise the dust generated during construction and second to prevent dust infiltration into

patient care areas. There are no patient care areas within 250m of a possible release source at the site and dust infiltration will therefore not occur. It is considered that in the absence of mitigation measures the potential construction phase impact of Aspergillus is short term and imperceptible.

In the absence of mitigation measures the construction phase activities will range from an imperceptible to slight impact on local air quality depending on the activities occurring and in all cases will be short-term in duration.

7.5.3 Operation Phase Impacts

The only predicted air quality impacts associated with operation of the development are emissions to atmosphere from traffic associated with the development.

The traffic flow data presented in the TIA Report has been used to assess the likely change in emissions to air as a result of changes in traffic numbers. The TIA Report presents figures for the Traffic Volume - Peak Hour for the key road junctions in the vicinity of the subject site. Traffic volumes for the Opening Year and Design Year were considered for key junctions for two scenarios, namely; the With Development and Without Development scenarios. The largest change in traffic volume at the key junctions for the opening year was +38 (15% increase) for the With Development scenario and the largest change in traffic volume for the design year was +151 (72% increase). The potential impact on air quality associated with a traffic volume change of this magnitude is considered not significant in a local context and imperceptible in an overall context particularly considering the advanced developments made in cleaner and more efficient vehicle engines

The design and construction of all buildings in the proposed development shall be in accordance with National Building Regulations (The Irish Building Regulations Technical Guidance Document L 2021 – Conservation of Fuel & Energy – Dwellings) and shall ensure that modern building materials are used and that they are designed to be thermally efficient resulting in eliminating the onsite fossil fuel requirement to heat the buildings. The Guidance Document L requires the setting of minimum energy performance requirements for new buildings to achieve Nearly Zero Energy Buildings. Therefore it is predicted that there will be no combustion gas emissions from the site associated with heating and consequently heating will not have an adverse impact on the existing ambient air quality in the vicinity of the proposed development site.

The operational phase activities will have a not significant impact on local air quality and will be long-term in duration.

7.5.4 Climate Impacts

The principal GHG emissions associated with construction are carbon dioxide from transport and machinery utilised in construction. For the *Do Nothing* Scenario, if the proposed development does not proceed then the emissions of GHGs in the area are projected to remain the same with some relatively minor increases as activity in the area develops. However, GHG emissions will still occur somewhere because the residential accommodation must be provided to cater for existing and future needs.

Although the overall impact of each of the potential scenarios assessed would be the same, opportunities for minimisation of GHG emissions during construction will arise and will be required to ensure that the overall objectives of enhanced energy efficiency and minimisation of GHG emission are achieved.

The operation of the proposed development will result in indirect emissions of GHGs including carbon dioxide (CO_2) and methane (CH_4) resulting from energy generation required for space heating and road traffic.

The CO_2 released due to energy usage is directly reduced by enhancing the energy efficiency of the proposed development. In this respect, the selection of electrical heat pumps as the heating source is the optimum strategy. The proposed design considers these factors and contributes to the overall objective of minimising GHG emissions.

A Building Energy Rating (BER) certificate will be provided for each dwelling in the proposed development which will provide detail of the energy performance of the dwellings. A BER is calculated through energy use for space and hot water heating, ventilation, and lighting and occupancy. It is proposed to target a BER of A2 or A3 for the residential units which equates to the following energy performance of each dwelling:

- BER A2 – 25-50 kWh/m^2/year with approximate CO_2 emissions of 10kgCO_2/m^2 year
- BER A3 – 51-75 kWh/m^2/year with approximate CO_2 emissions of 12kgCO_2/m^2 /year

For new dwellings in Ireland, Nearly Zero Energy Building performance has been defined as being (primarily) associated with demonstrating that a 70% reduction in carbon emissions has been achieved relative to the 2005 Technical Guidance Document Part L and that 20% of the primary energy comes from renewable sources. Since this development meets these requirements the reduction in carbon emissions relative to the regime that applied in 2005 has been demonstrated.

The scheme has been designed to provide thermally efficient buildings which will eliminate the consumption of fossil fuels within each individual unit. This will reduce the impact the operational phase of the development will have on the micro and macro climate. There will be no passive air vents in the residential units which are thermally inefficient and Mechanical Ventilation and Heat Recovery (MVHR) systems shall be incorporated into the design of the apartments. The MVHR systems together with thermally enhanced glazing and window frames will reduce the energy requirements of the residential units. These design features will ensure the residential units are thermally efficient leading to a zero fossil fuel requirement which will result in a reduction of the impact on climate.

Due to the size, nature and design of the development, greenhouse gas emissions resulting from the development will be imperceptible in the national context. There will therefore be no adverse impacts on climate and no significant contribution to Ireland's greenhouse gas budget.

The size and nature of the development and the nature and volume of emissions will lead to an imperceptible change in atmospheric conditions. There will be no change to the heat balance in the immediate area.

The potential impact of flooding due to climate change on the proposed development has also been assessed. The site specific Flood Risk Assessment (FRA) completed by DBFL Consulting Engineers was reviewed as part of this assessment. The risk of flooding to the site is very low and the FRA notes that in the event of extreme pluvial flooding then overland flood routes would direct water towards the open space areas and the Regional Drainage Facility and consequently the development does not increase the risk of flooding to adjacent areas and roads.

The construction phase activities will have a not significant impact on climate and will be short-term in duration while the operational phase activities will have an imperceptible impact on climate and will be long-term in duration.

7.6 POTENTIAL CUMULATIVE IMPACTS

The cumulative impacts of the proposed project in conjunction with current and future developments in the vicinity of the subject site are considered in this section. . Guidance published by the European Commission (1999, Guidelines for the Assessment of Indirect and Cumulative Effects as well as Impact Interactions) was considered in carrying out this element of the assessment.

A review of other existing and / or approved projects in the vicinity of the site was carried out as reported in Chapter 2 of the EIAR and these projects were considered to determine whether any of these existing / approved projects will likely have significant cumulative effects in combination with the proposed project. The assessment also considers whether all of the existing / approved projects if they all occurred simultaneously will likely have significant cumulative effects in combination with the proposed development.

The potential for cumulative impacts to arise is greatest for those developments closest to the proposed development site. At the time of writing there were three proposed developments in the vicinity of the subject site with the potential to generate significant cumulative effects in combination with the proposed project. The following three developments that were considered for potential cumulative impacts:

- Advance Infrastructure Application (An Bord Planeala Reference Number. ABP-312189-21). The proposed development consists of advance infrastructure works on a 2.5 hectare site at Hackettstown, Skerries to facilitate future residential development on lands zoned for residential use to the north and south of subject site. These infrastructural works include (1) construction of a new Link Road; (2) construction of Regional Drainage Facility; (3) foul, surface water and water supply services; (4) planting & landscaping of open space areas; (5) diversion and undergrounding of existing overhead power lines and (6) utilisation of existing field gate on Golf Links Road as a temporary access road for construction traffic.

- Ballygossan Park (Phase 2) Application (An Bord Planeala Reference Number ABP-308583-20). The proposed development will consist of Phase 2 of Ballygossan Park and will provide for the construction of 149 no. residential units, creche, parkland, and two playing pitches on a 4.8 hectare site located to the south and west of Ballygossan Park, Skerries, Co. Dublin.

- Off-site Road Improvement Works Application (An Bord Planeala Reference Number ABP-309409-21). The proposed development consists of (1) reconstruction of the Miller's Lane/Shenick Road/Golf Links Road junction to provide for a four armed mini roundabout; Upgrading and extension of the two-lane flared approach to the junction on both the northern (Dublin Road) and south-eastern (Miller's Lane) arms of the existing three-arm roundabout junction; (2) new street lighting system covering both junctions; (3) upgrades to the junction of Downside Heights/Golf Links Road and a new cycle path along the Golf Links Road; (4) new footpaths, cycle and pedestrian facilities, road gully's, road marking, signal and carriageway surfacing works;

The cumulative air quality impact of the proposed development and the three other local developments identified above are assessed with regard to having established the baseline air quality and then predicting the impact that the proposed development(s) will have on the baseline air quality.

For the Ballygossan Park (Phase 2) development, the type of activities that would be required, the general types of construction activities that would be undertaken and the magnitude of potential air emissions associated with such a proposed development are predicted to be very similar to those predicted for the subject site. Since the assessment for the subject site has concluded that the predicted impacts will range from imperceptible to slight and will be short term for any impacts

identified, there is deemed to be no risk of a significant adverse cumulative impact if both developments proceed simultaneously. The potential for cumulative impacts associated with the other two local developments are deemed to be significantly less than the Ballygossan Park (Phase 2) development and consequently there is no risk of a significant adverse cumulative impact if all developments simultaneously overlap.

In the event that the construction phase of the proposed development coincides with the construction of any of the other identified developments within the zone of influence of the subject site (< 350m) there is the potential for cumulative dust impacts to the nearby sensitive receptors. While the zone of potential influence extends to 350m for the purpose of the overall assessment, the magnitude and significance of any impacts decreases with distance from the site with the maximum impacts observed within < 50m of the site boundaries. The dust mitigation measures outlined in this chapter will be applied throughout the construction phase of the proposed development and with similar mitigation measures applied for other permitted developments in accordance with best practice guidance then this will prevent any significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the proposed development are deemed slight and short-term.

The proposed residential developments for the local area have the potential to add further additional vehicles to the local road network and additional heating systems to local area. The traffic and heating impact for the proposed development has been predicted to have a not significant impact on air quality and climate and it is considered likely that the proposed Ballygossan Park (Phase 2) development and any other future developments of similar scale would give rise to a not significant impact during the operational stages of those projects.

Once the development is completed and operational, there will be no residual adverse air quality or climate impact on the receiving environment as a result of the proposed development or in conjunction with other local developments that are planned for the area.

7.7 'DO NOTHING' IMPACT

There will be no change in air quality impacts if no change takes place. In the absence of the development proposal, the air quality is unlikely to change.

7.8 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

A Dust Management Plan will be formulated for the construction phase of the project, as construction activities will generate some dust emissions as described above. The principal objective of the Plan is to ensure that dust emissions do not cause significant nuisance at receptors in the vicinity of the site. The most important features of the Dust Management Plan are presented in Section 11 of the Construction and Environmental Management Plan and are summarised below:

- Apply a speed limit of 20km/hr for on-site vehicles
- Provide water bowsers during periods of dry weather to ensure unpaved areas are kept moist.
- Spray exposed site haul roads during dry and / or windy weather.
- Ensure paved roads are kept clean and free of mud and other materials. Sweep hard surface roads, inside and outside the site, to ensure roads are kept clear of debris, soil or other material.
- Restrict un-surfaced roads to essential site traffic.
- Construction techniques shall minimise dust release into the air.
- Protect overburden material from exposure to wind by storing the material in sheltered regions of the site.
- Regular watering of stockpiles during dry and windy periods.

- Located any stockpiles away from sensitive receptors, (i.e. receptors sensitive to dust release).
- Provide tarpaulins over all unacceptable excavated materials being carted off site.
- The excavating machines will be cleaned on a daily basis to ensure no excess grease and dust is left on the machine.

The design of the construction programme and the location and layout of the construction compound and the storage of materials will be carefully planned to ensure that air quality impacts are minimised. Any contractors working on the subject site will be contractually obliged to ensure the following mitigation features will be employed in order to minimise emissions from the activity and the associated impacts of such emissions.

- Activities with potential for significant emissions will wherever possible be located at a position as far as possible removed from the nearest residential and commercial receptors;
- The construction compound area will have hard standing areas to minimize dust generation from windblow.
- A daily inspection programme will be formulated and implemented in order to ensure that dust control measures are inspected to verify effective operation and management.
- A dust deposition monitoring programme will be implemented at the site boundaries for the duration of the construction phase in order to verify the continued compliance with relevant standards and limits.

7.9 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

During the construction phase of the proposed development there will be some dust impacts experienced at the nearest receptors to the subject site. It is predicted that the mitigation measures proposed will ensure that the air quality impacts are kept to a minimum. The predicted air quality impacts on the receiving environment during the construction phase are considered to be slight and short term and only affecting a small number of properties.

The only predicted air quality impacts associated with operation of the development are emissions to atmosphere from traffic associated with the development. The change in traffic movements will have no quantifiable impact on air quality. The predicted air quality and climate impacts on the receiving environment during the operational phase are considered to be not significant and long-term.

Due to the size and nature of the development and the nature and volume of the potential emissions, the construction phase activities will have a not significant impact on climate and will be short-term in duration while the operational phase activities will have an imperceptible impact on climate and will be long-term in duration.

7.10 MONITORING

The Contractor will be required to produce an Air Quality and Dust Management Plan including Best Practice Measures to control dust and in particular, measures to prevent dust nuisance. The Contractor will be obliged to include and observe the measures specified in the Construction Environmental Management Plan. The principal objective of the Air Quality and Dust Management Plan will be to ensure that dust emissions do not cause significant nuisance at receptors near the Proposed Project. A dust deposition monitoring programme will be implemented during the Construction Phase in order to verify the continued compliance with relevant standards and limits.

7.11 REINSTATEMENT

Reinstatement is not applicable for this chapter.

7.12 INTERACTIONS

The main interactions with air quality are in relation to human beings and flora and fauna.

The impact of air quality on human beings living in the area of the proposed development has been addressed above for both the construction and operational phase of the proposed development. The impact assessment shows that the air quality impacts that will be experienced by human beings in the vicinity of the proposed development are all within the prescribed criteria. This interaction is described as negative for the construction phase and neutral for the operational phase and is quantified as Not Significant for the construction phase and Imperceptible for the operation phase.

In relation to the interaction of emissions to atmosphere from the proposed development with flora and fauna, Table 7.4 sets out Air Quality Standards for the protection of vegetation and ecosystems. This assessment has shown that the emissions generated from the development are very limited and do not have potential to generate a significant adverse impact on the local ecosystems including birdlife and wildlife. Air quality in the area is good as shown in Section 7.3 and the Air Quality Standards will not be exceeded as a result of the development thereby ensuring that no significant adverse impact on ecosystems arises. This interaction is described as neutral and quantified as Not Significant.

7.13 REFERENCES

- Environmental Protection Agency (2017). Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
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- Air Quality Standards Regulations 2011 – S.I. No. 180 of 2011
- Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 – S.I. No. 58 of 2009