# Shannon Technology and Energy Park (STEP) Power Plant

Environmental Impact Assessment Report – Volume 2

Chapter 08 Air Quality

Shannon LNG Limited

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Delivering a better world

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## 8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) describes the potential for the construction, operation and decommissioning of the Shannon Technology and Energy Park Power Plant (STEP Power Plant) project (herein referred to as the "Proposed Development") to have a likely significant effect on local air quality. Impacts on air quality can affect human receptors through harm to health and amenity, and nature conservation receptors through harm to vegetation and habitat.

This chapter provides a description of relevant legislation and policy framework, assessment methodology, baseline conditions at the Site and its surroundings, an estimate of the anticipated air emissions associated with each of the phases of the Proposed Development, the mitigation measures required to prevent, reduce, or offset any significant adverse effects, and the likely residual effects after these measures have been employed.

The Site of the Proposed Development (herein referred to as "the Site") is located in the townlands of Kilcolgan Lower and Ralappane, between Tarbert and Ballylongford, Co. Kerry. The application Site boundary ('red line') encloses an area of approximately 41 hectares (ha) and is entirely owned by the Applicant.

Full details on the background, Site history and the Proposed Development is provided in **Chapter 02** (Description of the Proposed Development) and also the Planning Statement submitted with this planning application.

### 8.1.1 Competent Expert

The assessment has been undertaken by Gareth Hodgkiss, an Associate Director with AECOM who has over 18 years' professional experience in the field of air quality assessment. Gareth holds a Master of Science degree in Environmental Management from the University of Nottingham and is a Member of the Institute of Air Quality Management and a Member of the Institution of Environmental Sciences. He has experience of undertaking air quality assessment to support planning and licence applications for industrial sources across Ireland, and experience of assessing air quality impacts in the power sector for projects in Ireland, the United Kingdom (UK) and internationally.

### 8.1.2 Scope of Assessment

The construction and operational phases of the Proposed Development are covered by this assessment. The air quality impacts arising from these are summarised as follows:

- Construction phase:
  - Emissions of dust and particulates from construction activity.
  - Emissions of oxides of nitrogen ($NO_X$) (including nitrogen dioxide ($NO_2$) and particulate matter ($PM_{10}$ and $PM_{2.5}$) from construction phase traffic movements, site plant and Non-Road Mobile Machinery.
- Operational phase:

- Combustion emissions associated with the operation of the CCGT plant and other energy plant emissions, including $NO_X$ (including $NO_2$), $PM_{10}$ and $PM_{2.5}$, organic carbons (assumed as benzene), carbon monoxide (CO) and sulphur dioxide ($SO_2$).
- Emissions of $NO_2$ and particulate matter $PM_{10}$ and $PM_{2.5}$ from operational phase traffic movements.

This assessment does not focus on the impact of decommissioning. As outlines in Section 2.10 of **Chapter 02** (Description of the Proposed Development), in the event of decommissioning, measures would be undertaken by the Applicant to ensure that there would be no significant, negative environmental effects during the decommissioning phase. Potential air quality impacts during the decommissioning will be comparable to and no worse than those that are assessed during the construction phase scenarios that are being assessed.

## 8.2 Legislation and Policy

### 8.2.1 National Air Quality Standards

The Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) (Government of Ireland, 2022) were transcribed from the following EU legislation:

- European Union (EU) air quality legislation is provided within Directive 2008/50/EC (Clean Air for Europe (CAFE)), which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new air quality objectives for particulate matter with an aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$). The consolidated Directive includes:
  - Directive 99/30/EC - the First Air Quality 'Daughter' Directive - sets ambient Air Quality Limit Values (AQLVs) for $NO_2$, oxides of nitrogen ($NO_X$), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm ($PM_{10}$).
  - Directive 2000/69/EC - the Second Air Quality 'Daughter' Directive - sets ambient AQLVs for benzene and carbon monoxide.
  - Directive 2002/3/EC - the Third Air Quality 'Daughter' Directive - seeks to establish long term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.
- The fourth daughter Directive was not included within the consolidation and is described as Directive 2004/107/EC. This sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.
- Directive 2008/50/EC has been implemented through the Air Quality Standards Regulations 2011 (Environmental Protection Agency (EPA), 2011). These regulations set out upper and lower assessment thresholds for the pollutants of concern. The Air Quality Standards include thresholds to encourage a higher standard of air quality where possible.

The EU Limit Values and Ambient Air Quality Standards that are of relevance to this assessment are presented in **Table 8.1**.

In addition to the Limit Values and Ambient Air Quality Standards, **Table 8.1** provides relevant Environmental Assessment Levels and averaging periods for other pollutants, as referred to within EPA guidance (EPA, 2020). These, which are commonly associated with industrial emissions, are not covered by the EU Directives listed above, but are considered potentially harmful to the environment and human health if present at concentrations exceeding the Environmental Assessment Levels listed.

**Table 8.1** also refers to Critical Loads for nutrient nitrogen and acid (nitrogen and sulphur), set by the Convention on Long-Range Transboundary Air Pollution (APIS, 2016), for habitats that may potentially be affected by emissions associated with the Proposed Development.

### Table 8.1: Air Quality Standards and Environmental Assessment Levels

| Pollutant | Averaging Period | Irish Air Quality Standard / EU Limit Value / Environmental Assessment Level | Allowable Exceedance |
|---|---|---|---|
| **National Air Quality Standard/ EU Limit Value** | | | |
| Nitrogen dioxide ($NO_2$) | Annual mean | 40 µg/m$^3$ | No exceedances allowed |
| | Hourly mean | 200 µg/m$^3$ | 18 allowable exceedances (99.79$^{th}$ percentile of hours/year) |
| Particulate matter ($PM_{10}$) | Annual mean | 40 µg/m$^3$ | No exceedances allowed |
| | Daily mean | 50 µg/m$^3$ | 35 allowable exceedances (99.41$^{st}$ percentile of days/year) |
| Fine particulate matter ($PM_{2.5}$) | Annual mean | 20 µg/m$^3$ | No exceedances allowed |
| Carbon monoxide (CO) | Rolling 8-hour maximum | 10,000 µg/m$^3$ | No exceedances allowed |
| Sulphur dioxide ($SO_2$) | Daily mean | 125 µg/m$^3$ | 3 allowable exceedances (99.18$^{th}$ percentile of days/year) |
| | Hourly mean | 350 µg/m$^3$ | 24 allowable exceedances (99.73$^{th}$ percentile of hours/year) |
| Benzene ($C_6H_6$) | Annual mean | 5 µg/m$^3$ | No exceedances allowed |
| Oxides of nitrogen ($NO_X$) – for the protection of ecosystems | Annual mean | 30 µg/m$^3$ | No exceedances allowed |
| Sulphur dioxide ($SO_2$) – for the protection of ecosystems | Annual mean | 20 µg/m$^3$ | No exceedances allowed |
| **UK EA Environmental Assessment Levels** | | | |
| Carbon monoxide (CO) | Hourly maximum | 30,000 µg/m$^3$ | No exceedance allowed (100$^{th}$ percentile rolling 8-hour periods/year) |
| Sulphur dioxide ($SO_2$) | 15-minute mean | 266 µg/m$^3$ | 35 allowable exceedances (99.99$^{th}$ percentile of 15-minute periods/year) |
| Benzene ($C_6H_6$) | Hourly maximum | 195 µg/m$^3$ | No exceedance allowed (100$^{th}$ percentile of hours/year) |
| Formaldehyde ($CH_2O$) | Annual Mean | 5 µg/m$^3$ | No exceedances allowed |
| | Hourly maximum | 100 µg/m$^3$ | No exceedance allowed (100$^{th}$ percentile of hours/year) |
| Oxides of nitrogen ($NO_X$) – for the protection of ecosystems[1] | Daily maximum | 75 µg/m$^3$ | No allowable exceedances (100$^{th}$ percentile of days/year) |
| Sulphur dioxide ($SO_2$) – for the protection of ecosystems | Annual Mean | 10-20 µg/m$^3$ | No exceedances allowed |
| **Convention on Long-Range Transboundary Air Pollution Critical Loads** | | | |
| Nutrient nitrogen deposition | Annual | Habitat relevant Critical Loads[2] | No exceedances allowed |

| Pollutant | Averaging Period | Irish Air Quality Standard / EU Limit Value / Environmental Assessment Level | Allowable Exceedance |
|---|---|---|---|
| Acid deposition | Annual | Habitat relevant Critical Loads[2] | No exceedances allowed |

*Notes:*

*[1] Research cited in IAQM guidance (2020) states that the daily $NO_X$ standard is of less importance than the annual $NO_X$ standard at nature conservation sites. The daily $NO_X$ standard is typically only of concern at a nature conservation site when $SO_2$ and $O_3$ concentrations are elevated close to or in excess of their Air Quality Standards for the protection of ecosystems. The $SO_2$ concentrations reported in Table 8.17 and the $O_3$ data reported in Table 8.14 demonstrate that concentrations of neither $SO_2$ or $O_3$ are elevated close to those standards and as such, the nature conservation receptors included in this assessment are not considered sensitive to the daily $NO_X$ impacts reported.*

*[2] See **Table 8.10** for habitat specific Critical Loads.*

#### 8.2.1.1 Clean Air Strategy for Ireland

The Clean Air Strategy for Ireland was published in April 2023 and sets out several frameworks and measures to improve air quality and reduce emissions across the country (Government of Ireland, 2023). The Strategy refers to the most recent World Health Organisation Guidelines and Interim Targets and the EU's commitment to reconsider existing air quality Limit values. The Clean Air Strategy acknowledges that achieving the WHO AQG Levels will be a major challenge, but sets out 'Ambition Actions' to comply with:

- WHO Interim Target 3 levels by 2026.
- WHO Interim Target 4 levels by 2030.
- WHO Air Quality Guideline Levels by 2040.

The current WHO Guidelines and Interim Targets are provided below in **Table 8.2.**

**Table 8.2: NEC Directive Ceilings for Pollutant Concentrations**

| Pollutant | Averaging Period | Interim Target Concentration (µg/m3) | | | | | Permitted Exceedances |
|---|---|---|---|---|---|---|---|
| | | Interim Target 1 | Interim Target 2 | Interim Target 3 | Interim Target 4 | Final AQG Level | |
| **$NO_2$** | Hourly maximum | - | - | - | - | 200 | None |
| | 99$^h$ percentile of daily means | 120 | 50 | 50 | 50 | 25 | 4 per calendar year |
| | Annual mean | 40 | 30 | 20 | 20 | 10 | None |
| **$PM_{10}$** | 99$^{th}$ percentile of daily means | 150 | 100 | 75 | 50 | 45 | 4 per calendar year |
| | Annual mean | 70 | 50 | 30 | 20 | 15 | None |
| **$PM_{2.5}$** | 99$^{th}$ percentile of daily means | 75 | 50 | 37.5 | 25 | 15 | 4 per calendar year |
| | Annual mean | 35 | 25 | 15 | 10 | 5 | None |
| **$SO_2$** | 10-minute maximum | - | - | - | - | 500 | None |
| | 99$^{th}$ percentile of daily means | 125 | 50 | 50 | 50 | 40 | 4 per calendar year |
| **CO** | 15-minute maximum | - | - | - | - | 100,000 | None |
| | Hourly maximum | - | - | - | - | 35,000 | None |

| Pollutant | Averaging Period | Interim Target Concentration (µg/m3) | | | | | Permitted Exceedances |
|---|---|---|---|---|---|---|---|
| | | Interim Target 1 | Interim Target 2 | Interim Target 3 | Interim Target 4 | Final AQG Level | |
| | Running 8-hour maximum | - | - | - | - | 10,000 | None |
| | 99th percentile of Daily means | 7,000 | 7,000 | 7,000 | 7,000 | 4,000 | 4 per calendar year |

[1] *Data obtained from Clean Air Strategy for Ireland (Government of Ireland, 2023).*

### 8.2.2 Industrial Emissions Directive

The installed aggregated thermal capacity of the Proposed Development will exceed 50 MW. As such, its operations will fall within the remit of the EU's Industrial Emissions Directive (2010/75/EU). The primary aims of the Industrial Emissions Directive are to prevent or reduce pollution from industrial activities, to reduce waste and to promote energy efficiency. The Industrial Emissions Directive applies to all large industrial installations and to power plants, which are above a certain size threshold. The Industrial Emissions Directive will apply to the applicable combustion plant associated with the Site.

The Environmental Protection Agency (EPA) is the statutory body for the regulation of IE licences. For the operation of the Proposed Development, the Applicant will be required to obtain an IE licence from the EPA for the proposed CCGT Power Plant. IE licences are determined having regard to the principle of Best Available Techniques (BAT), which, in turn, is based on the Best Available Techniques Reference Documents ('BREF' documents) developed and published by the European Commission. The EU has prepared a series of reference documents for different industrial activities, which define BAT for that activity, including in the power sector. More information on BAT and what it concerns summarised in **Chapter 01** (Introduction).

### 8.2.3 Relevant Environmental Legislation

Other national legislative measures that relate to air quality and are of relevance to this assessment are listed are follows:

- European Union (EU) (Environmental Impact Assessment) (Environmental Protection Agency Act 1992) (Amendment) Regulations 2020, S.I. No. 191 of 2020.
- European Communities (EC) (Birds and Natural Habitats) (Amendment) Regulations 2015, S.I. No. 355 of 2015.
- European Union (Industrial Emissions) Regulations 2013, S.I. No. 138 of 2013.
- Environmental Protection Agency (EPA) (Industrial Emissions) (Licensing) Regulations 2013, S.I. No. 137 of 2013.
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011, S.I. No. 477 of 2011.

### 8.2.4 National Planning Policy

#### 8.2.4.1 Project Ireland 2040

Project Ireland 2040 is the Government's long-term overarching strategy for future development and infrastructure in Ireland. It consists of several documents, including the National Planning Framework

(NPF) (Government of Ireland, 2018), which is the Government's high-level strategic plan for shaping the future growth and development of Ireland up to 2040.

The NPF includes the following overarching aim that is relevant to this assessment:

> '*Creating a Clean Environment for a Healthy Society:*
>
> *…Promoting Cleaner Air: Addressing air quality problems in urban and rural areas through better planning and design.*'

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

> '*National Policy Objective 64: Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, the promotion of energy efficient buildings and homes, heating systems with zero local emissions, green infrastructure planning and innovative design solutions.*'

Project Ireland 2040 also includes the Government's National Development Plan (Government of Ireland, 2018). This document is focused on Ireland's long-term economic, environmental and social progress up to 2027, and references improvements in air quality as an additional benefit to improving energy efficiency for the primary purpose of reducing carbon emissions.

The air quality assessment described in this chapter will consider whether or not the emissions associated with the construction, operation and decommissioning of the Proposed Development contravene the relevant aims and objectives of Project Ireland 2040.

#### 8.2.4.2 Climate Action Plan 2024

The Climate Action Plan (CAP) 2024 was updated in December 2023, and includes new actions to reduce greenhouse gas emissions across Ireland and reach net zero by 2050 (Government of Ireland, 2023). Air quality is listed as a co-benefit to reducing greenhouse gas emissions. The plan aims to encourage electrification of public transport vehicles and reduce the dependency on cars, which will subsequently improve air quality.

### 8.2.5 Local Planning Policy

#### 8.2.5.1 Kerry County Development Plan 2022 – 2028

Planning decisions within County Kerry's administrative area are considered against the policies set out in the current Kerry County Development Plan (Kerry CDP) 2022-2028 (Kerry Co. Co., 2022). With regards to local air quality and amenity impacts, the following policies are of relevance:

- **KCDP 2-1:** Facilitate and support national climate change objectives contained in the Climate Action Plan 2023.
- **KCDP 11-31**: Improve and maintain food air quality and support measures to prevent harmful effects on human health and the environment in our urban and rural areas.
- **KCDP 11-32**: Promote the development of energy efficient buildings and homes (…) and promotion of measures that improve air quality including provision and management of green infrastructure.

The air quality assessment described in this chapter will demonstrate whether or not the emissions associated with the construction, operation and decommission of the Proposed Development contravene the relevant strategies and aims of the Kerry CDP.

#### 8.2.5.2 Kerry Climate Change Action Plan 2024 – 2029

The Kerry Climate Change Action Plan 2024-2029 (Kerry Co. Co., 2024) was published to outline the Council's vision of how a climate resilient county should look and operate in 2030 and on to 2050. The Council intend to meet the environmental, economic, and social challenges of climate change. The Plan includes a number of objectives to reduce emissions of the pollutants associated with climate change. Whilst not a direct objective of the Plan, the decarbonisation of emissions sources will indirectly reduce emissions of other pollutants associated with combustion and with the potential harm to local air quality.

## 8.3 Methodology

### 8.3.1 Study Area

The air quality study area varies dependent on the source of emissions being considered. The construction phase dust assessment follows the industry standard guidance published by the Institute of Air Quality Management (IAQM) (2024) and considers construction dust impacts on amenity and human health at locations within 250 m of the construction Site boundary, and at locations with 50 m of a public road used by construction traffic that is within 250 m of the egress point onto the public road. Construction dust impacts on ecologically sensitive areas within 50 m of the construction Site boundary are considered.

The methodology for the assessment of road traffic emissions impacts follows guidance explicitly for that source (TII, 2022; Moorcroft and Barrowcliffe, *et al.,* 2017) and considers impacts on selected representative receptors located within 200 m of a public road that experiences a defined change in traffic flows. Of the guidance available, that published by the IAQM (Moorcroft and Barrowcliffe, *et al.,* 2017) provides the most stringent criteria, with consideration suggested for roads that experience an increase in traffic flow, and composition to the extent that it exceeds the following:

- an increase in Light Duty Vehicles (weight <3.5t) of ≥500 two-way movements per average 24-hour day; and / or
- an increase in Heavy Duty Vehicles (weight >3.5t) of ≥100 two-way movements per average 24-hour day.

It should be noted that the IAQM guidance (Moorcroft and Barrowcliffe, *et al.,* 2017) does state that the screening criteria above is indicative and that they are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases and as such, the criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality.

The methodology for the assessment of site emissions impacts is based on the EPA's Air Dispersion Modelling Guidance Note (AG4) (2020), with reference to UK Environment Agency's Air emissions risk assessment for your environmental permit guidance (2016), which considers locations to represent the

worst-case impacts of such emissions from the Site, as well as internationally designated nature conservation sites within 10 km of the Site.

## 8.3.2 Impact Assessment

### 8.3.2.1 Construction Phase Dust and Particulate Matter Assessment

#### 8.3.2.1.1 Overview

The movement and handling of soils and spoil during construction is likely to give rise to some short-term airborne dust. The occurrence and significance of dust generated by earth moving operations onsite depositing beyond the Site boundary is difficult to estimate and depends upon the weather conditions, ground conditions and location of the work relative to receptors, and the nature of the actual activity being carried out.

Dust emissions and subsequent deposition and soiling at sensitive locations have the potential to harm the amenity of the users of that sensitive land use and or harm vegetation by affecting the rate of photosynthesis. Particulates emissions at sensitive locations is associated with increased risk of harm to human health.

At present, there are no statutory Irish or EU standards relating to the assessment or control of dust. The emphasis of the regulation and control of construction dust, therefore, is through the adoption of Best Practicable Means (BPM) when working onsite. It is intended that significant adverse environmental effects are avoided at the design stage and through embedded mitigation where possible, including the use of good working practices to minimise dust formation which is detailed further in **Section 8.6.1** of this chapter.

#### 8.3.2.1.2 Assessment Approach

The IAQM provides guidance for good practice qualitative assessment of risk of dust emissions from construction and demolition activities (IAQM, 2024). The guidance considers the risk of dust emissions from unmitigated activities to cause human health ($PM_{10}$) impacts, dust soiling impacts, and ecological impacts (such as physical smothering, and chemical impacts for example from deposition of alkaline materials). The appraisal of risk is based on the scale and nature of activities and on the sensitivity of receptors, and the outcome of the appraisal is used to determine the level of good practice mitigation required for adequate control of dust.

The assessment undertaken for this chapter is consistent with the overarching approach to the assessment of the impacts of construction, and the application of example descriptors of impact and risk set out in IAQM guidance. It considered the significance of effects from potential impacts with no mitigation and recommends mitigation measures appropriate to the identified risks to receptors. To encourage consistency with the wider EIA, some of the terminology used in the IAQM guidance has been adjusted to match common terminology used in EPA guidance (2022). The steps in the assessment are to:

- Identify receptors within the screening distance of the Site boundary.
- Identify the magnitude of impact through consideration of the scale, duration and location of activities being carried out (including demolition, earthworks, construction and trackout, where construction vehicles could carry mud onto the public highway).

- Establish the sensitivity of the area through determination of the sensitivity and number of receptors and their distance from construction activities.
- Determine the risk of significant effects from impacts on receptors occurring as a result of the magnitude of impact and the sensitivity of the area, assuming no additional mitigation (beyond the identified development design and impact avoidance measures) is applied.
- Determine the level of mitigation required based on the level of risk, to reduce potential impacts at receptors to insignificant or negligible.
- Summarise the potential residual effects of the mitigated works.

A detailed description of the IAQM construction dust assessment methodology is provided in **Appendix A8.1**, Volume 4.

#### 8.3.2.2 Construction Phase Site Plant and Non-Road Mobile Machinery Emissions Assessment

##### 8.3.2.2.1 Overview

Combustion products will be emitted to air from onsite construction plant and / or Non-Road Mobile Machinery (NRMM) operations during construction activities. This will affect air quality and give rise to impact in the form of exposure to increased concentrations of pollutants of sensitive receptors.

##### 8.3.2.2.2 Assessment Approach

The IAQM guidance on the assessment of dust from demolition and construction (Holman *et al.*, 2014) includes some discussion of onsite plant and NRMM emissions and states:

> '*Experience of assessing the exhaust emissions from onsite plant … and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and onsite traffic, consideration should be given to the number of plant/ vehicles and their operating hours and locations to assess whether a significant effect is likely to occur.*'

In this instance, the closest human health sensitive receptor is over 300 m from the nearest point of the Site boundary and whilst sections of the Site boundary adjoin a Special Area of Conservation (SAC) and Special Protection Area (SPA), the nearest habitat within the SAC / SPA that is considered sensitive to air quality impacts is over 2 km away.

TII (HE) guidance (2022) suggests that a source of road traffic emissions that is in excess of 200 m from a receptor will not likely contribute to a significant effect and does not require quantification. For the purpose of this assessment, it is considered that such conditions also apply to site plant and NRMM, due to the similar height of emissions release and the intermittent and transient nature of those emissions. As such, and due to the distance between the construction Site boundary (and works within) and the nearest air quality sensitive receptors, it is considered that site plant and NRMM emissions impacts will not have a significant effect on local air quality. The impact of construction phase Site plant and NRMM emissions has not been considered further.

#### 8.3.2.3 Construction Phase Traffic Emissions Assessment

##### 8.3.2.3.1 Overview

The incomplete combustion of fuel in vehicle engines results in the presence of combustion products of CO, $PM_{10}$, and $PM_{2.5}$ in exhaust emissions as well as hydrocarbons (HC) such as benzene and 1,3-

butadiene. Similarly, but to a lesser extent, any sulphur in the fuel can be converted to $SO_2$ that is then released to the atmosphere. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form oxides of nitrogen, mainly in the form of nitric oxide (NO), which is then converted to $NO_2$ in the atmosphere. $NO_2$ is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long-term.

Although $SO_2$, CO, benzene, and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this Proposed Development. This is because the released concentrations of these pollutants are low enough so as to not be likely to give rise to significant effects, either in isolation or in combination. In addition, no areas within the local area are considered to be at risk of exceeding the relevant objectives for these pollutants. Therefore, the risks to the attainment of the relevant air quality objectives in the vicinity of the Proposed Development are considered Negligible. Emissions of $SO_2$, CO, benzene, and 1,3-butadiene from road traffic are therefore not considered further within this assessment.

The exhaust emissions from road vehicles that do have the potential to affect the ambient concentrations of pollutants are $NO_2$, $PM_{10}$ and $PM_{2.5}$. Therefore, these pollutants are the focus of the assessment of the significance of road traffic air quality impacts.

#### 8.3.2.3.2 Assessment Approach

TII guidance (2022) sets out criteria to establish the need for an air quality assessment from road traffic. The guidance considers the following changes in traffic anticipated as a result of a development, to identify the need for further evaluation or assessment:

- Annual Average Daily Traffic (AADT) flows of more than 1,000 vehicles.
- 200 Heavy Duty Vehicles (HDV, all vehicles greater than 3.5 tonnes gross weight, including buses).
- A change in the daily speed of 10 kph or more.
- A change in peak hour speed of 20 kph or more.
- A change in carriageway alignment by 5 m or more.

Guidance published by the IAQM / EPUK (Moorcroft and Barrowcliffe *et al.,* 2017) sets out alternative and more stringent criteria with a change of 500 light duty vehicles (LDV) and / or 100 HDV movements when outside of an area considered highly sensitive to changes in emissions (e.g. where an Air Quality Standard is being exceeded or at risk of being exceeded). For changes in traffic below these criteria, significant changes in air quality are not expected. That guidance also suggests that even where these criteria are exceeded, it does not necessarily mean there is potential for significant effect, but more detailed consideration may be required to confirm that.

Prior to any assessment, construction phase traffic movements are screened against appropriate criteria, to establish if there is the potential for a significant effect to occur. Should the screening exercise and professional judgement identify the potential for significant effects, a detailed modelling of road traffic emissions shall be undertaken.

#### 8.3.2.4 Operational Phase Site Emissions Assessment

##### 8.3.2.4.1 Overview

The operation of the Proposed Development will include a number of sources with emissions to air associated with the CCGT and other energy generating combustion plant onsite. Emissions to air associated with such plant vary with the type of plant and its purpose, the thermal capacity of the plant and the fuel used to enable combustion.

Natural gas will be the primary fuel source for the CCGT plant and all non-emergency plant at the Site. Emissions from natural gas-fired plant predominantly include the pollutants $NO_X$ and CO but may also include other pollutants to a lesser extent for some sources, including organic compounds (THCs and VOCs).

The CCGT plant will have the capability to run on liquid fuel as a secondary fuel option, to act as a backup should the primary natural gas fuel source become compromised[1]. Startup and emergency generators onsite will also be fired by liquid fuel stored onsite. Emissions from liquid-fired plant predominantly include the pollutants $NO_X$, $PM_{10}$, $PM_{2.5}$, CO and $SO_2$, as well as THCs and VOCs.

##### 8.3.2.4.2 Assessment Method

The assessment of operational Site emissions has been undertaken with detailed reference to the EPA's Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (EPA, 2020). Detailed dispersion modelling has been undertaken using the atmospheric dispersion model system (ADMS) 6 (version 6.0.0.1), which is an advanced steady-state Gaussian type plume model that can simulate dispersion from multiple sources, and is a model authorised for use by the EPA. It has been used to calculate the contribution of site emissions to the total concentration of key pollutants at identified sensitive receptors. The contribution and total pollutant concentrations quantified have been compared with the defined Ambient Air Quality Standards and Environmental Assessment Levels that are relevant to this assessment.

*Modelled Scenarios*

The main assessment considered in this chapter focuses on what is referred to in this assessment as the Normal Operational Scenario. This is based on the operation of plant at the Site in the manner anticipated. However, a series of Sensitivity Scenarios have also been considered, based on alternative and / or conservative assumptions on the operation of plant at the Site. The Normal Operational Scenario and subsequent Sensitivity Scenarios are summarised in **Table 8.4.**

**Table 8.3: Modelled Scenarios Description**

| Scenario | Operational Plant | Description of Operation | Modelling Approach |
|---|---|---|---|
| **Sc1: Gas-fired CCGT (Normal Operation)** | 6x Combine Cycle Gas Turbines (CCGT) | Gas-fired with 8,760 hours of operation / year[1]. | Informs the prediction of long-term and short-term pollutant impacts. |
| | 3x Water Bath Heaters (WBH) | Gas-fired with 8,760 hours of operation / year. | |
| | 4x (+1 spare) package boilers for the Above Ground Installation (AGI) | Gas-fired with 8,760 hours of operation / year. | |
| | 5x emergency / backup / auxiliary plant | Gas-fired and liquid fuel-fired with 52 hours / year for testing and maintenance. | |

[1] It is not envisaged that distillate oil would be used in the normal course of events other than for testing. Under Eirgrid rules, the secondary fuel testing must be completed within five hours twice per annum.

| Scenario | Operational Plant | Description of Operation | Modelling Approach |
|---|---|---|---|
| **Sc2: Liquid fuel-fired CCGT (Gas Shortage Operation)[2]** | 6x Combine Cycle Gas Turbines (CCGT) | Liquid-fired for an unknown but limited number of hours of operation / year. | Informs the prediction of short-term pollutant impacts only. |
| | 3x Water Bath Heaters (WBH) | Gas-fired with 8,760 hours of operation / year. | Long-term pollutant impacts will be no worse than that reported for Sc1 (Normal Operation), because of the limited hours of liquid-fired CCGT operation per year. |
| | 4x (+1 spare) package boilers for the Above Ground Installation (AGI) | Gas-fired with 8,760 hours of operation / year. | |

*[1] Continuous operation of the CCGT plant is precautionary for this assessment. In reality, the CCGT plant will not be operational on every hour of the year.*

*[2] Emergency plan and backup plant are not included in scenario Sc2. This is because:*

- *they are only likely to run for less than an hour each time they operate, thus having little impact over a 24-hour averaging period; and*
- *their operation is so infrequent that it is statistically and highly unlikely that their limited operation will coincide with the worst hours of meteorological data for each receptor, thus having little impact on the hourly air quality standards that allow a set number of exceedances each calendar year.*

The scenarios described above include emissions associated with emergency / backup / auxiliary plant for testing and maintenance purposes only. The assessment does not consider a scenario for the operation of the emergency / backup / auxiliary plant in unison. Such an event when all such plant is in operation at any one time is considered highly unlikely, as is the operation of such plant for a duration of more than one hour. Emergency / backup / auxiliary plant operating in isolation for anything other than routine testing and maintenance is also considered unlikely.

*Emissions Inventory*

A list of individual sources of emissions to air at the Site, as included in the dispersion modelling assessment, their emissions characteristics and emission rates are provided in **Table 8.5**. The table includes the source of data for each emissions point and describes any assumptions on emissions sources that have had to be made. Where assumptions have been made, the intention has been to be precautionary and err on the side of caution.

**Table 8.6** provides the same details for the major cumulative sources of emissions to air in the vicinity of the Proposed Development – Moneypoint Power Station and Tarbert Power Station.

## Table 8.4: Proposed Development Emissions Inventory[1]

| Source | Location | | Operational Profile (hrs/yr)[2] | Emissions Release Height (m)[3] | Emissions Release Diameter (m) | Emissions Exit Temp. (ºC) | Emissions Volumetric Flow Rate ($m^3/s$) | Emissions Exit Velocity (m/s) | Mass Emission Rates (g/s) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | Y | | | | | | | $NO_X$ | CO | THC/VOC | $SO_2$ | PM |
| **Water Bath Heater_1** | 102618 | 148765 | 8760 | 10 | 0.30 | 398 | 2.36 | 32.0 | 0.08 | 0.12 | 0.02 | - | - |
| **Water Bath Heater _2** | 102615 | 148770 | 8760 | 10 | 0.30 | 398 | 2.36 | 32.0 | 0.08 | 0.12 | 0.02 | - | - |
| **Water Bath Heater _3** | 102612 | 148775 | 8760 | 10 | 0.30 | 398 | 2.36 | 32.0 | 0.08 | 0.12 | 0.02 | - | - |
| **AGI Package Boiler_1** | 102775 | 148628 | 8760 | 8 | 0.20 | 70 | 0.28 | 9.00 | 0.04 | 0.03 | - | - | - |
| **AGI Package Boiler_2** | 102781 | 148626 | 8760 | 8 | 0.20 | 70 | 0.28 | 9.00 | 0.04 | 0.03 | - | - | - |
| **AGI Package Boiler_3** | 102788 | 148624 | 8760 | 8 | 0.20 | 70 | 0.28 | 9.00 | 0.04 | 0.03 | - | - | - |
| **AGI Package Boiler_4** | 102793 | 148623 | 8760 | 8 | 0.20 | 70 | 0.28 | 9.00 | 0.04 | 0.03 | - | - | - |
| **CCGT_1a (gas-fired)** | 102263 | 148549 | 8760 | 35 | 3.00 | 76 | 143 | 19.0 | 5.63 | 11.3 | 2.50 | - | - |
| **CCGT_1b (gas-fired)** | 102282 | 148561 | 8760 | 35 | 3.00 | 76 | 143 | 19.0 | 5.63 | 11.3 | 2.50 | - | - |
| **CCGT_2a (gas-fired)** | 102348 | 148601 | 8760 | 35 | 3.00 | 76 | 143 | 19.0 | 5.63 | 11.3 | 2.50 | - | - |
| **CCGT_2b (gas-fired)** | 102368 | 148613 | 8760 | 35 | 3.00 | 76 | 143 | 19.0 | 5.63 | 11.3 | 2.50 | - | - |
| **CCGT_3a (gas-fired)** | 102434 | 148654 | 8760 | 35 | 3.00 | 76 | 143 | 19.0 | 5.63 | 11.3 | 2.50 | - | - |
| **CCGT_3b (gas-fired)** | 102453 | 148666 | 8760 | 35 | 3.00 | 76 | 143 | 19.0 | 5.63 | 11.3 | 2.50 | - | - |
| **CCGT_1a (liquid-fired)** | 102263 | 148549 | Unknown[4] | 35 | 3.00 | 130.7 | 150 | 21 | 9.40 | 0.70 | 0.40 | 0.06 | 0.30 |
| **CCGT_1b (liquid -fired)** | 102282 | 148561 | Unknown[4] | 35 | 3.00 | 130.7 | 150 | 21 | 9.40 | 0.70 | 0.40 | 0.06 | 0.30 |
| **CCGT_2a (liquid -fired)** | 102348 | 148601 | Unknown[4] | 35 | 3.00 | 130.7 | 150 | 21 | 9.40 | 0.70 | 0.40 | 0.06 | 0.30 |
| **CCGT_2b (liquid -fired)** | 102368 | 148613 | Unknown[4] | 35 | 3.00 | 130.7 | 150 | 21 | 9.40 | 0.70 | 0.40 | 0.06 | 0.30 |
| **CCGT_3a (liquid -fired)** | 102434 | 148654 | Unknown[4] | 35 | 3.00 | 130.7 | 150 | 21 | 9.40 | 0.70 | 0.40 | 0.06 | 0.30 |
| **CCGT_3b (liquid -fired)** | 102453 | 148666 | Unknown[4] | 35 | 3.00 | 130.7 | 150 | 21 | 9.40 | 0.70 | 0.40 | 0.06 | 0.30 |
| **Startup/standby Generator 1** | 102337 | 148544 | 52 | 17 | 0.25 | 523 | 1.98 | 39.1 | 2.40 | 0.12 | 0.01 | - | - |
| **Startup/standby Generator 2** | 102430 | 148601 | 52 | 17 | 0.25 | 523 | 1.98 | 39.1 | 2.40 | 0.12 | 0.01 | - | - |
| **Startup/standby Generator 3** | 102516 | 148653 | 52 | 17 | 0.25 | 523 | 1.98 | 39.1 | 2.40 | 0.12 | 0.01 | - | - |

| Source | Location | | Operational Profile (hrs/yr)[2] | Emissions Release Height (m)[3] | Emissions Release Diameter (m) | Emissions Exit Temp. (ºC) | Emissions Volumetric Flow Rate ($m^3/s$) | Emissions Exit Velocity (m/s) | Mass Emission Rates (g/s) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | Y | | | | | | | $NO_X$ | CO | THC/VOC | $SO_2$ | PM |
| **Auxiliary Boiler[3]** | 102491 | 148570 | 52 | 32 | 0.80 | 150 | 9.44 | 17.8 | 0.45 | 0.65 | 0.20 | - | - |

*Notes: [1] Emissions data presented as provided by the Proposed Development design team.[2] Profile based on normal operational scenario, as provided by the Proposed Development design team. [3] Emissions release height above ground level for onshore sources and sea level for Offshore sources. [4] Anticipated to be only a few hours per year.*

## Table 8.5: Cumulative Sources Emissions Inventory Emissions Inventory

| Source | Location | | Operational Profile (hrs/yr) | Emissions Release Height (m)[6] | Emissions Release Diameter (m) | Emissions Exit Temp. (ºC) | Emissions Volumetric Flow Rate ($m^3/s$) | Emissions Exit Velocity (m/s) | Mass Emission Rates (g/s) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | Y | | | | | | | $NO_X$ | CO | $SO_2$ | PM | $NH_3$ |
| **Moneypoint Power Station Stack 1[1,2,3]** | 103503 | 151696 | 8,760 | 220 | 6.89 | 72 | 1079.01 | 28.94 | 133.3 | - | 133.3 | 13.3 | - |
| **Moneypoint Power Station Stack 2[1,2,3]** | 103637 | 151646 | 8,760 | 220 | 6.89 | 72 | 539.51 | 14.47 | 66.7 | - | 66.7 | 6.67 | - |
| **Moneypoint Auxiliary Boiler[1,2]** | 103549 | 151802 | 8,760 | 3 | 0.45 | 200 | 1.88 | 11.8 | 0.34 | - | 0.34 | 0.01 | - |
| **Tarbert Emergency Generator 1[2,4]** | 107090 | 149479 | 500 | 30 | 4 | 451.6 | 11.78 | 15 | 10.08 | 11.20 | 7.39 | 1.90 | - |
| **Tarbert Emergency Generator 2[2,4]** | 107118 | 149466 | 500 | 30 | 4 | 451.6 | 11.78 | 15 | 10.08 | 11.20 | 7.39 | 1.90 | - |
| **Tarbert Emergency Generator 3[2,4]** | 107145 | 149454 | 500 | 30 | 4 | 451.6 | 11.78 | 15 | 10.08 | 11.20 | 7.39 | 1.90 | - |
| **Tarbert Power Station OCGT[5]** | 107535 | 149578 | 1,800 | 55 | 9 | 350 | 1237 | 15 | 36.30 | 72.60 | 3.63 | 7.30 | 6.00 |

*Notes:[1] Emissions information sourced from the air quality assessment reported in the Temporary Emergency Generation Power Plant (SSE, 2023) and the Moneypoint Power Station Environmental Licence (Licence Reg No. P0605-04).[2] Emissions data based on Moneypoint and Tarbert Power Stations operating at Licenced Emission Limits. In reality, they likely operate at levels below Licenced Emission Limits (Moneypoint in particular). The cumulative assessment is therefore precautionary.[3] Furthermore, it is currently proposed that coal burning at Moneypoint Power Station is to be replaced by oil burning. Should this proposal occur, mass emissions of the pollutants of concern to this assessment will be lower than those reported in this table.[4] Emissions information sourced from the air quality assessment reported in the Temporary Emergency Generation Power Plant (SSE, 2023) and the Tarbert Power Station Environmental Licence (Licence Reg. No. 716).[5] Emissions sourced from the Tarbert Power Station OCGT EIAR.[6] Emissions release height above ground level.*

*Meteorological Data*

Actual measured hourly-sequential meteorological data is required for input into dispersion models, and it is important to select data as representative as possible for the Site that will be modelled. This is usually achieved by selecting a meteorological station as close to the Site as possible, although other stations may be used if the local terrain and conditions vary considerably, or if the station does not provide sufficient data.

The meteorological site that was selected for the assessment is Shannon Airport, located approximately 35 km east-northeast of the Site, at a location close to the Shannon Estuary, on a flat airfield in a principally agricultural area. Therefore, the meteorological site is considered representative of the air quality study area and a surface roughness of 0.2 m (representative of an agricultural area) has been selected for the meteorological site.

The modelling for this assessment has utilised 5 years of meteorological data for the period 2019 – 2023. Wind roses for each of the years within this period are shown in **Figure 8.1**.

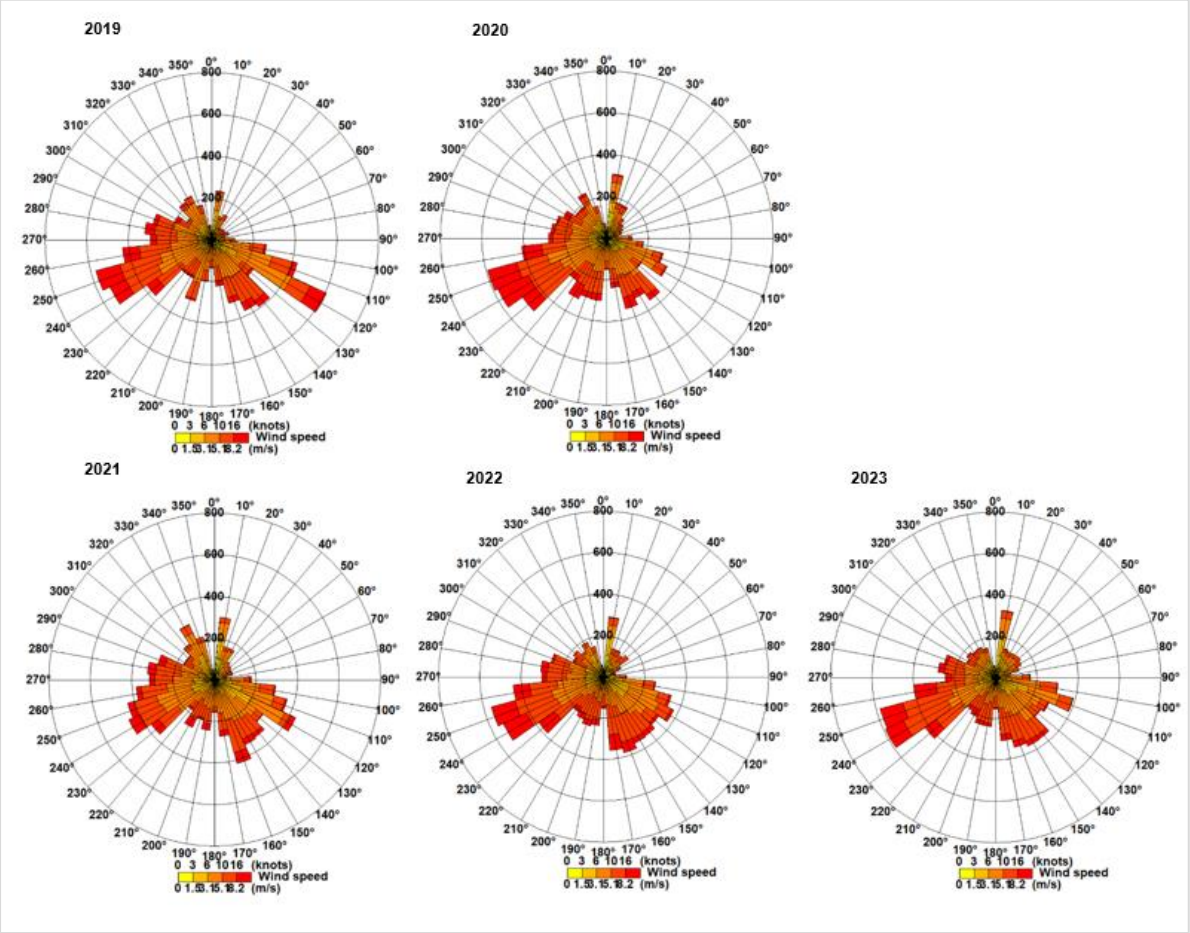


**Figure 8.1: Wind Rose Plots for Shannon Airport**

A sensitivity analysis of the use of meteorological data in the model is provided in **Appendix A8.2**, Volume 4.

*Building Data*

The buildings and structures that make up the Proposed Development have the potential to affect the dispersion of emissions from the operational site sources. The ADMS 6 buildings effect module has therefore been used to incorporate building downwash effects as part of the modelling procedure. Nearby buildings and structures that are greater than one third of the range of stack heights modelled have the potential to affect the dispersion of emissions and have been included within the modelling assessment.

Buildings associated with the Proposed Development that have been considered to be of sufficient height and size to potentially impact on the dispersion of emission stacks are shown in **Table 8.7**. A plan showing the buildings layout used in the ADMS simulation is illustrated in **Figure 8.2**. A sensitivity analysis of the influence of building data in the model is provided in **Appendix A8.2**, Volume 4.

**Table 8.6: Building Downwash Input Data**

| Building Name | Location | | Height (m) | Length (m) | Width (m) | Orientation (º) | Diameter (m) |
|---|---|---|---|---|---|---|---|
| | X | Y | | | | | |
| **HRSG Building 1** | 102272 | 148559 | 28.8 | 46 | 28 | 238.5 | - |
| **HRSG Building 2** | 102359 | 148613 | 28.8 | 46 | 28 | 238.5 | - |
| **HRSG Building 3** | 102444 | 148665 | 28.8 | 46 | 28 | 238.5 | - |
| **Turbine Hall 1** | 102474 | 148661 | 13.8 | 96 | 66 | 238.5 | - |
| **Turbine Hall 2** | 102302 | 148556 | 13.8 | 96 | 66 | 238.5 | - |
| **Turbine Hall 3** | 102389 | 148609 | 13.8 | 96 | 66 | 238.5 | - |
| **Cooling Tower 1** | 102285 | 148631 | 25 | 57 | 50 | 238.5 | - |
| **Cooling Tower 2** | 102368 | 148682 | 25 | 57 | 50 | 238.5 | - |
| **Cooling Tower 3** | 102454 | 148734 | 25 | 57 | 50 | 238.5 | - |
| **Auxiliary Boiler** | 102485 | 148580 | 15.5 | 15 | 15 | 148.5 | - |
| **GIS Substation** | 102346 | 148497 | 14.2 | 61 | 19 | 238.5 | - |
| **Canteen** | 102450 | 148559 | 7.5 | 52 | 14 | 238.5 | - |
| **Central Control** | 102507 | 148594 | 5.7 | 23 | 14 | 148.5 | - |
| **FG Regulating** | 102620 | 148773 | 4.8 | 17 | 16 | 148.5 | - |
| **Raw Water Tank B** | 102582 | 148746 | 24 | - | - | - | 21 |
| **Raw Water Tank A** | 102568 | 148770 | 24 | - | - | - | 21 |
| **Diesel Storage 1** | 102598 | 148707 | 21 | - | - | - | 18 |
| **Diesel Storage 2** | 102614 | 148678 | 21 | - | - | - | 18 |

Due to the limited variation in terrain across the study area, Shuttle Radar Topography Mission (SRTM) terrain data has been incorporated into the model with a resolution of 90 m. **Figure 8.3** provides a visual representation of the terrain data across the air quality study area. A sensitivity analysis of the influence of terrain data in the model is provided in **Appendix A8.2**, Volume 4.

*Surface Roughness Data*

Due to the location of the Site on and adjacent to the Shannon Estuary, the effect of surface roughness on turbulence and flow field has been accounted for with the inclusion of a variable surface roughness file in the dispersion model. Areas of the Shannon Estuary have a surface roughness value of 0.0001 m and areas on land 0.2 m. This is illustrated in **Figure 8.4**, with white representing areas with a surface roughness of 0.0001 m and purple representing areas with a surface roughness of 0.2 m. A sensitivity analysis of the influence of surface roughness data in the model is provided in **Appendix A8.2**, Volume 4.

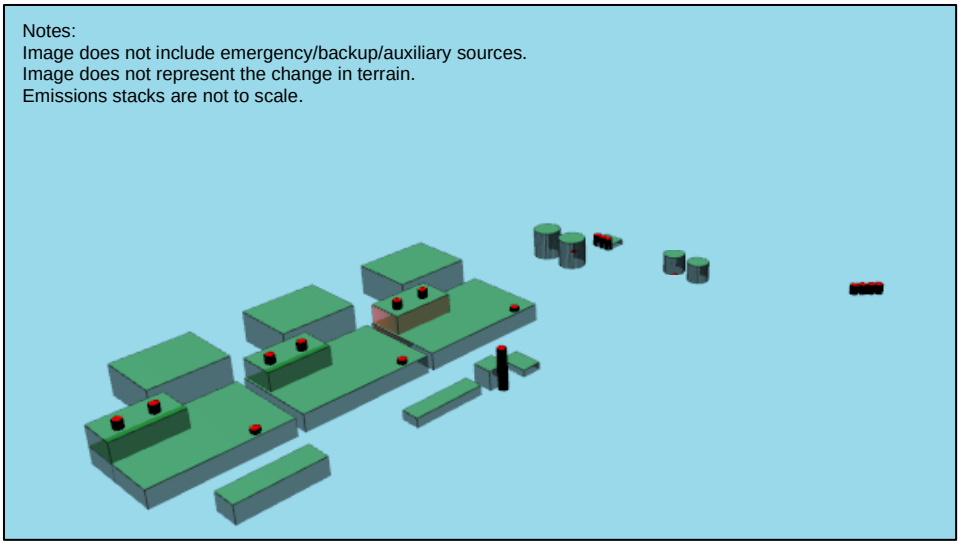


**Figure 8.2: Visual Representation of Modelled Building in ADMS 6 Dispersion Model**

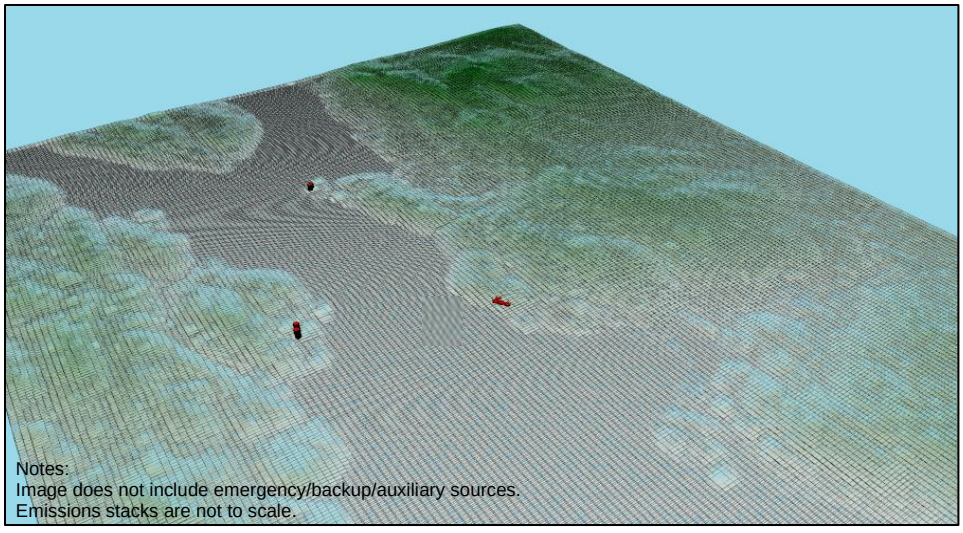


**Figure 8.3: Visual Representation of Modelled Terrain Data in ADMS Dispersion Model**

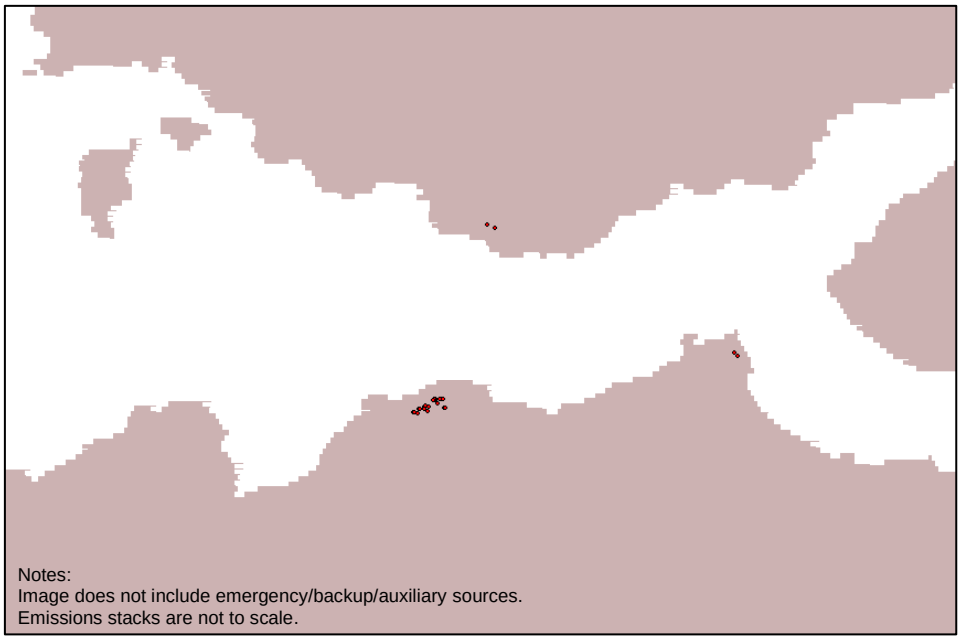


**Figure 8.4: Visual Representation of Modelled Surface Roughness Data in ADMS Dispersion Model**

*Conversion of $NO_X$ to $NO_2$*

Emissions of nitrogen oxides from industrial point sources are typically dominated by nitric oxide (NO), with emissions from combustion sources typically in the ratio of nitric oxide to nitrogen dioxide of 9:1. However, it is nitrogen dioxide that has specified environmental standards due to its potential impact on human health. In the ambient air, nitric oxide is oxidised to nitrogen dioxide by the ozone present, and the rate of oxidation is dependent on the relative concentrations of nitric oxide and ozone in the ambient air.

For the purposes of detailed modelling, and in accordance with EPA (AG4) technical guidance (2020), it is assumed that 100% of nitric oxide emitted from the stack is oxidised to nitrogen dioxide in the long term and 50% of the emitted nitric oxide is oxidised to nitrogen dioxide in the local vicinity of the Site in the short-term.

*Conversion of $NO_2$ to Nitrogen and Acid Deposition*

The deposition of nutrient nitrogen and acid at sensitive nature conservation receptors has been calculated, using the modelled Process Contribution predicted at the receptor points. The deposition rates are determined using conversion rates and factors contained within EPA (AG4) guidance (2020), which account for various deposition mechanisms in different types of habitat. The conversion rates and factors used in the assessment are detailed in **Table 8.8**.

**Table 8.7: Deposition Conversion Factors**

| Pollutant | Deposition velocity grassland (m/s) | Deposition velocity woodland (m/s) | Nutrient Nitrogen Conversion Factor (µg/m$^3$/s to kg/ha/yr) | Acid Nitrogen Conversion Factor (µg/m$^3$/s to keq/ha/yr) |
|---|---|---|---|---|
| **$NO_2$** | 0.0015 | 0.003 | 96 | 0.071428 |
| **$SO_2$** | 0.012 | 0.024 | 157.7 | 0.0625 |

*Background Pollutant Concentration Data*

The dispersion model predicts the contribution of pollutants from Proposed Development emissions sources at selected air quality sensitive receptors. To report total pollutant concentrations that can be compared to the relevant Air Quality Standards and Environmental Assessment Levels at the selected air quality sensitive receptors, this contribution needs to be added onto the background (or ambient) pollutant concentrations that are representative of those locations.

The background pollutant concentrations used to inform this assessment have been obtained from the most recent *Air Quality in Ireland* report published by the EPA (2023), the Environmental Impact Assessment Report for the *Foynes to Limerick Road (including Adare Bypass)* (Roughan & O'Donovan – AECOM Alliance, 2019) and the Air Pollution Information System (APIS).

The background pollutant concentration data is listed in **Table 8.9.** For pollutants with averaging periods of less than the annual mean, it is standard practice to assume the background concentration is the annual mean (long-term) value doubled, which is in line with EPA guidance (2020). This is sometimes considered overly precautionary for pollutants that have an Air Quality Standard or Environmental Assessment Level averaged over 24-hours, and it is often more appropriate that the background for pollutants with daily mean Standards or Assessment Levels is the annual mean background x 1.5. In this instance, double the annual mean background has been used for all short-term (<annual mean) pollutants, due to the existing standard of air quality in the study area. Background nitrogen deposition values were sourced from the APIS (UK Centre for Ecology and Hydrology, 2024), which provides background nitrogen deposition rates and acid deposition rates for designated nature conservation sites across Ireland.

### Table 8.8: Background Pollutant Concentration Data

| Pollutant | Averaging Period | Zone D Average Concentration (µg/m$^3$ unless stated)) | Zone D Rural Average Concentration (µg/m$^3$ unless stated) |
|---|---|---|---|
| **Ambient Air Quality Standards** | | | |
| Nitrogen dioxide ($NO_2$) | Annual mean | 5.7 | 3.9 |
| | Hourly mean | 11.4 | 7.9 |
| Particulate matter ($PM_{10}$) | Annual mean | 12.4 | 10.2 |
| | Daily mean | 24.8 | 20.5 |
| Fine particulate matter ($PM_{2.5}$) | Annual mean | 8.4 | 6.6 |
| Carbon monoxide (CO) | Rolling 8-hour mean | 867 | 200 |
| Sulphur dioxide ($SO_2$) | Daily mean | 10.1 | 8.5 |
| | Hourly mean | 10.1 | 8.55 |
| Benzene ($C_6H_6$) | Annual mean | 0.2 | 0.2 |
| Oxides of nitrogen ($NO_X$) – for the protection of ecosystems | Annual mean | 14.0 | 3.6 |
| Sulphur dioxide ($SO_2$) – for the protection of ecosystems | Annual mean | 5.0 | 4.2 |
| **UK EA Environmental Assessment Levels** | | | |
| Carbon monoxide (CO) | Hourly maximum | 867 | 200 |
| Sulphur dioxide ($SO_2$) | 15-minute mean | 10.1 | 8.5 |
| Benzene ($C_6H_6$) | Hourly maximum | 0.4 | 0.4 |
| Oxides of nitrogen ($NO_X$) – for the protection of ecosystems | Daily mean | 28.0 | 7.2 |
| **Convention on Long-Range Transboundary Air Pollution Critical Loads** | | | |
| Nitrogen deposition | Annual mean | 3.9 to 5.1 kg N/ha/yr | |
| Acid deposition | Annual mean | 0.3 keq/ha/yr | |

*Determination of Air Quality Sensitive Receptors*

The impact of operational Site emissions has been predicted at a series of discrete receptors, which represent locations of human exposure to the pollutants of concern in the vicinity of the Proposed Development.

Air quality sensitive receptors typically include residential dwellings, schools and medical facilities. In this instance, they represent residential dwellings and are summarised in **Table 8.10** and shown on **Figure F8.1** of Volume 3. Discrete receptors have been selected from review of aerial photography and represent both worst-case impacts and the spatial variation in impacts across the area. Each selected receptor is considered to be representative of other sensitive receptors in their vicinity.

### Table 8.9: Human Health Sensitive Receptors

| Receptor ID[1] | Location | | Receptor ID[1] | Location | | Receptor ID[1] | Location | |
|---|---|---|---|---|---|---|---|---|
| | x | Y | | x | y | | x | y |
| **R1** | 99123 | 146816 | R17 | 102452 | 147480 | R33 | 104028 | 147867 |
| **R2** | 100485 | 146548 | R18 | 102487 | 147709 | R34 | 104232 | 148110 |
| **R3** | 100942 | 146667 | R19 | 102666 | 148243 | R35 | 104459 | 147372 |
| **R4** | 101122 | 147146 | R20 | 102692 | 147715 | R36 | 104539 | 147613 |
| **R5** | 101122 | 146825 | R21 | 102766 | 146841 | R37 | 104551 | 151739 |
| **R6** | 101500 | 148159 | R22 | 102838 | 147819 | R38 | 104600 | 147821 |
| **R7** | 101561 | 152352 | R23 | 102996 | 147572 | R39 | 104829 | 147623 |
| **R8** | 101576 | 147554 | R24 | 103018 | 147337 | R40 | 105292 | 147729 |
| **R9** | 101612 | 147192 | R25 | 103150 | 147787 | R41 | 105742 | 147799 |
| **R10** | 101776 | 147423 | R26 | 103209 | 148311 | R42 | 105774 | 149111 |
| **R11** | 101823 | 145949 | R27 | 103407 | 147690 | R43 | 105844 | 148323 |
| **R12** | 102061 | 152465 | R28 | 103450 | 148059 | R44 | 105889 | 147796 |
| **R13** | 102079 | 147620 | R29 | 103460 | 148143 | R45 | 105973 | 152137 |
| **R14** | 102144 | 147683 | R30 | 103528 | 147333 | R46 | 106177 | 147864 |
| **R15** | 102257 | 147666 | R31 | 103577 | 147106 | R47 | 107245 | 148435 |
| **R16** | 102264 | 147753 | R32 | 103703 | 147307 | R48 | 106736 | 147702 |

The impact of operational Site emissions has also been predicted at a series of discrete nature conservation receptors to represent sensitive ecological exposure to the pollutants of concern in the vicinity of the Proposed Development. The EPA's Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (EPA, 2020) does not provide guidance on what nature conservation sites should be included, beyond that they should be local and designated. The UK EA's air emissions risk assessment for your environmental permit guidance (Environment Agency, 2016) requires consideration of internationally designated sites within 10km of a facility and nationally designated sites within 2 km of a facility. In response to an RFI Question 10, raised following the submission of the Shannon Technology and Energy Park (STEP) EIAR (2021) (PA08.311233), a precautionary assessment of nature conservation receptors, this assessment considers air quality impacts at habitats up to 15 km from the Site.

Nature conservation receptors that are within these distances from the Proposed Development are listed in **Table 8.11** and shown on **Figure F8.3** of Volume 3. Air quality impacts have the potential to harm flora within habitat that is sensitive to changes in loads of nitrogen and / or sulphur. Fauna is not impacted directly, but indirectly as a consequence of the potential harm to the habitat they may rely on. Habitat information has been sourced from the National Parks and Wildlife Service (NPWS) Conservation Objectives report (2012). Critical Load data has been sourced from the APIS (2024).

The closest nature conservation designations to the Proposed Development are the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. Whilst the SAC and SPA cover the majority of the entire Shannon Estuary and a number of adjoining habitats, only some of the qualifying features that led to their designation are sensitive to the effects of air pollution and deposition. In response to an RFI Question 10, raised following the submission of the Shannon Technology and

Energy Park EIAR (2021) (PA08.311233), Moanveanlagh Bog SAC and Tullaher Lough and Bog SAC are also considered in the assessment.

Discrete receptors have been selected to represent both worst-case impacts and the spatial variation in impacts across the habitats within the SACs and SPA that are sensitive to air quality. Again, each selected receptor is considered to be representative of other sensitive receptors in their vicinity.

### Table 8.10: Ecologically Sensitive Receptors

| Receptor ID | Location | | Habitat ID | Habitat Description | Distance from Site (km) | Critical Loads | |
|---|---|---|---|---|---|---|---|
| | X | Y | | | | Nitrogen Deposition (kg N/ha/yr) | Acid Deposition (keq/ha/yr) |
| **River Shannon SAC / SPA** | | | | | | | |
| E1 | 100487 | 146450 | 1140 | Mudflats | 2.7 | 20 - 30[1] | Not sensitive |
| E2 | 100142 | 146783 | | | 2.8 | | |
| E3 | 99344 | 147393 | | | 3.1 | | |
| E4 | 99180 | 148139 | 1140 and 1330 | Mudflats and Saltmarsh | 3.1 | 20 - 30[1] | Not sensitive |
| E5 | 96324 | 154503 | 1140 | Mudflats | 8.3 | 20 - 30[1] | Not sensitive |
| E6 | 108374 | 152272 | | | 6.1 | | |
| E7 | 107535 | 149167 | | | 4.5 | | |
| E8 | 107597 | 148426 | | | 4.8 | | |
| E9 | 106810 | 147717 | | | 4.2 | | |
| E10 | 97494 | 152631 | 1150 | Coastal lagoon | 6.3 | 20-30[2] | Not sensitive |
| E11 | 95341 | 147141 | 1220 | Perennial vegetation on stony banks | 7.0 | 8-15 | CLminN: 0.223<br>CLmaxN: 0.568<br>CLmaxS: 0.202 |
| E12 | 102319 | 152410 | | | 3.1 | | |
| E13 | 106974 | 152264 | 1230 | Vegetated sea cliffs | 5.0 | 5-15[1] | Not sensitive |
| E14 | 100953 | 147779 | 1130, 1330 and 1410 | Estuary and Saltmarsh | 1.5 | 20-30[3] | Not sensitive |
| E15 | 100612 | 147428 | | | 2.0 | | |
| E16 | 100360 | 146849 | | | 2.5 | | |
| E17 | 100596 | 146344 | | | 2.8 | | |
| E18 | 99988 | 147121 | | | 2.7 | | |
| E19 | 98570 | 153207 | | | 5.8 | | |
| E20 | 97484 | 154407 | | | 7.4 | | |
| E21 | 106355 | 152093 | | | | | |
| E22 | 108980 | 152786 | | | 6.9 | | |
| E23 | 107481 | 147597 | | | 4.8 | | |
| **Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA** | | | | | | | |
| E24 | 111302 | 143099 | 4010 | Northern wet heath | >10km | 10-20 | CLminN: 0.499<br>CLmaxN: 0.842<br>CLmaxS: 0.2 |
| E25 | 111831 | 143906 | | | >10km | | |
| E26 | 114279 | 143179 | | | >10km | | |
| E27 | 115165 | 145362 | | | >10km | | |
| E28 | 110945 | 142293 | | | >10km | | |
| E29 | 110654 | 140480 | | | >10km | | |
| E30 | 110733 | 138787 | | | >10km | | |
| **Bunnaruddee Bog NHA** | | | | | | | |

| Receptor ID | Location | | Habitat ID | Habitat Description | Distance from Site (km) | Critical Loads | |
|---|---|---|---|---|---|---|---|
| | X | Y | | | | Nitrogen Deposition (kg N/ha/yr) | Acid Deposition (keq/ha/yr) |
| E31 | 104486 | 135648 | 7110 | Active raised bogs | >10km | 5-10 | CLminN: 0.321<br>CLmaxN: 0.683<br>CLmaxS: 0.362 |
| **Moanveanlagh Bog SAC** | | | | | | | |
| E32 | 104513 | 135659 | 2351 | Active raised bogs | >10km | 5-10 | CLminN: 0.321<br>CLmaxN: 0.683<br>CLmaxS: 0.362 |
| E33 | 104574 | 135522 | | Active raised bogs | >10km | | |
| **Tullaher Lough and Bog SAC** | | | | | | | |
| E34 | 95156 | 161320 | 2343 | Active raised bogs | >10km | 5-10 | CLminN: 0.321<br>CLmaxN: 0.683<br>CLmaxS: 0.362 |
| E35 | 95390 | 162966 | | Active raised bogs | >10km | | |

Notes:
[1] Habitat considered low sensitivity to nitrogen deposition, but no Critical Load estimate available from APIS because of limited data. Critical Load for Saltmarsh used as a proxy.
[2] APIS provides the Saltmarsh Critical Load as being of representative sensitivity at this habitat.
[3] Whilst the Estuary habitat covers large sections of the SAC and SPA, APIS states that only sections of Estuary habitat that are Saltmarsh are sensitive to air quality impacts.

In addition to the discrete receptors listed in **Table 8.10** and **Table 8.11** above, operational process emissions have also been modelled on a receptor grid of variable spacing, in order to determine the location and magnitude of maximum ground level impacts, and to enable the generation of key pollutant isopleth plots.

A nested grid has been used. The inner grid extends 1000 m from the centre of the Site in each direction, at a resolution of 20 m x 20 m. The middle grid extends from 1,000 m to 3,000 m in each direction, at a resolution of 50 m x 50 m. The outer grid extends from 3,000 m to 6,000 m in each direction, at a resolution of 200 m x 200 m. Details of the receptor grid are summarised in **Table 8.12.**

**Table 8.11: Modelled Nester Receptor Grid**

| Grid Spacing (m) | Dimensions (km) | Number of Nodes in Each Direction | National Grid Reference of South-West Corner |
|---|---|---|---|
| 20 | 2 x 2 | 100 | 96368,142613 |
| 50 | 6 x 6 | 120 | 99368,145613 |
| 200 | 12 x 12 | 60 | 101368,147613 |

#### 8.3.2.5 Operational Phase Traffic Emissions Assessment

Like the assessment of construction phase traffic emissions, operational phase traffic data will be screened against relevant air quality guidance. Should the screening exercise and professional judgement identify the potential for significant effects, a detailed modelling of road traffic emissions shall be undertaken.

### 8.3.3 Describing Significant Effects

The EPA Guidelines on the *'Information to be contained in Environmental Impact Assessment Reports'* (2022) does contain a method to determine and describe the effect of a development, but that approach is not wholly appropriate for air quality assessment. This is because the relationship between magnitude

of change in air quality conditions and receptor sensitivity is not linear. Receptor sensitivity to air quality impacts does not have a graded scale and instead, receptors are considered either sensitive to air quality impacts or not sensitive. Furthermore, the impact description of a change in pollutant concentration is not based on the magnitude of change alone, but that change relative to the pollutant concentration experienced at a receptor once the Proposed Development is in operation. The reason for this is to take account that smaller changes in air quality conditions can constitute a greater level of impact than a large change in conditions, where they occur at receptors that are predicted to experience pollutant concentrations close to or in excess of an Air Quality Standard or Environmental Assessment Level.

For this reason, the EPA AG4 guidance and guidance published by the IAQM / EPUK (Moorcroft and Barrowcliffe *et al.*, 2017) and the UK EA (2016) have developed approaches to determine whether or not an air quality effect is considered significant or not, and these have been utilised in this assessment. Where possible, the approaches described in the air quality specific guidance have been reported in a manner that is compatible with the requirements of the EPA guidance (2022).

#### 8.3.3.1 Construction Phase Dust and Particulate Matter Assessment

For amenity effects from dust and particulates associated with construction activities, the aim of the guidance document referred to (IAQM, 2024) is to bring forward a scheme, including additional mitigation measures where necessary, that will control impacts so that they give rise to negligible or minor effects (at worst) at the closest sensitive receptors. Determination of whether an effect is likely to be significant or not is based on professional judgement (from experience of similar projects), taking account of whether effects are permanent or temporary, direct or indirect, constant or intermittent and whether any secondary effects are caused (in this instance, secondary effects refer to dust that is generated and deposited (primary impact) and then re-suspended and deposited again by further activity).

The classification of amenity impacts (from dust soiling) and health effects on receptors exposed to impacts has been assessed using the relationship between the magnitude of impacts identified, in combination with receptor sensitivity and other related factors where appropriate (as described in the relevant guidance (IAQM, 2024), which results in a classification of effects as defined in **Table 8.14**.

**Table 8.12: Definition in Significance of Fugitive Dust and $PM_{10}$ Effects**

| Magnitude of Impact[1] | Change in dust deposition and short-term $PM_{10}$ Concentrations | Significance of Effects |
|---|---|---|
| **High** | Dust impact is likely to be intolerable for any more than a very brief period of time and is very likely to cause complaints from local people. Increase in $PM_{10}$ concentrations at a location where concentrations are already elevated and to the extent that the short term $PM_{10}$ air quality objective is likely to be exceeded. | **Significant to Profound:** A significant Impact that is likely to be a material consideration in its own right. |
| **Medium** | Dust impact is likely to cause annoyance and might cause complaints but can be tolerated if prior warning and explanation has been given. Increase in $PM_{10}$ concentrations at a location where concentrations are already elevated and to the extent that the short term $PM_{10}$ air quality objective is at risk of being exceeded. | **Moderate:** A significant effect that may be a material consideration in combination with other significant impacts but is unlikely to be a material consideration in its own right. |
| **Low** | Dust impact may be perceptible, but of a magnitude or frequency that is unlikely to cause annoyance to a reasonable person or to cause complaints. Limited increase in $PM_{10}$ concentrations. | **Not Significant to Slight:** An impact that is not significant but that may be of local concern. |
| **Negligible** | Dust impact is unlikely to be noticed by and / or have an effect on sensitive receptors. Negligible increase in $PM_{10}$ concentrations. | **Imperceptible:** An impact that is not significant. |

*Notes: [1] Terminology adapted to align with EPA Guideline (2022)*

#### 8.3.3.2 Operational Phase Emissions

##### 8.3.3.2.1 EPA AG4 Approach

The EPA AG4 guidance document on dispersion modelling (EPA, 2020) does not attempt to describe the significance of effects from air quality impacts because of new emissions. It is, after all, a document to guide assessment for industrial licence applications rather than planning applications. However, it does provide the following approach to determining if an impact is acceptable or not from a licensing perspective. This approach is often referred to in EIAR air quality assessments in the absence of specific significance criteria:

> *"…the process contribution (PC) should be less than 75% of the ambient air quality standard and less than this where background levels account for a significant fraction of the ambient air quality standard based on the formula:*
>
> **Maximum Allowable PC = 0.75*(AQS)**
> where there is no significant background concentration
>
> **Maximum Allowable PC = 0.75*(AQS – BC)**
> where there is a significant background concentration

##### 8.3.3.2.2 UK Environmental Agency Approach

This assessment also refers to guidance published by the UK Environment Agency (Environment Agency, 2016) to determine whether the impact of the Proposed Development has an effect that is potentially significant or not. It is noted that the UK Environment Agency guidance is intended for use in areas of the UK where pollutant concentrations are elevated close to or above the Air Quality Standards. For application in rural Ireland, it can be considered a conservative means of determining potential significance.

According to the UK EA guidance, an impact on human health sensitive receptors may be considered insignificant where:

- The short-term Process Contribution (PC – impact) is <=10% of the Air Quality Standard or Environmental Assessment Level.
- The long-term Process Contribution (impact) is <=1% of the Air Quality Standard or Environmental Assessment Level.

Where an impact on human health sensitive receptors cannot be screened out at this stage, additional criteria are provided, including consideration of the Predicted Environmental Concentration (PEC – total pollutant concentration), where the PC is added to the background (or ambient) concentrations. The impact may be considered insignificant where:

- The short-term PC is <20% of the Air Quality Standard or Environmental Assessment Level minus the short-term background.
- The long-term PEC is <70% of the Air Quality Standard or Environmental Assessment Level.

Where an impact on human health sensitive receptors still cannot be screened as insignificant at this stage, it does not necessarily mean that the effect is now significant. At this stage, model inputs are reviewed, and detail enhanced where it can be. The predicted PC and PEC are then reviewed relative to the appropriate Air Quality Standards and Environmental Assessment Levels and the headroom (gap between the PEC and the Standards and Assessment Levels) that remains once the Proposed Development is in operation – *i.e.* is there a risk of an exceedance of an Air Quality Standard and

Environmental Assessment Level and / or does the operation of the Proposed Development constrain future development of the area.

For this assessment, the 'insignificant' terminology used in the UK Environment Agency guidance applies to effects that can be described as 'Imperceptible' to 'Slight' in the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022). It may also apply to effects that can be described as 'Moderate' in the EPA Guidelines, where such effects relate to a limited number of sensitive receptors and / or the Air Quality Standards and Environmental Assessment Levels remain not at risk of any exceedance.

#### 8.3.3.2.3 Institute of Air Quality Management Approach

This assessment also refers to guidance published by the IAQM (Moorcroft and Barrowcliffe *et al.,* 2017) to determine whether the impact of the Proposed Development has an effect that is potentially significant or not. It is noted that the IAQM guidance is predominantly for urban development projects where road traffic emissions are often the biggest contributor to air quality impacts, rather than industrial installations, although there is no reason why the significance criteria described within it cannot be adopted for industrial sites.

Like the UK Environment Agency guidance, the IAQM approach does not define a graduating scale of human health receptor sensitivity. Instead, human health receptors are considered either sensitive or not, depending on the period of time for which they are exposed to emissions. The absolute magnitude of change in pollutant concentrations between the baseline and operational phase scenarios, in relation to the Air Quality Standards and Environmental Assessment Levels, is described and this is used to consider the risk of those Standards and Levels being exceeded.

For a change in annual mean concentrations of a given magnitude, IAQM have published recommendations for describing the impacts at individual receptors, as set out in **Table 8.15**. The description of impacts referred to in the IAQM guidance (Moorcroft and Barrowcliffe *et al.,* 2017).

**Table 8.13: IAQM Air Quality Impact Descriptors[1]**

| Long term average concentration at receptor in assessment year | % change in concentration relative to Air Quality Assessment Level (AQAL)[2] | | | | |
|---|---|---|---|---|---|
| | <1 (Imperceptible) | 1-2 (Very Low) | 2-5 (Low) | 6-10 (Medium) | >10 (Large) |
| **75% or less of AQAL** | Negligible | Negligible | Negligible | Slight | Moderate |
| **76% - 94% of AQAL** | Negligible | Negligible | Slight | Moderate | Moderate |
| **95% - 102% of AQAL** | Negligible | Slight | Moderate | Moderate | Substantial |
| **103% - 109% of AQAL** | Negligible | Moderate | Moderate | Substantial | Substantial |
| **110% or more of AQAL** | Negligible | Moderate | Substantial | Substantial | Substantial |

*Notes:*

*[1] For this assessment, IAQM effect descriptions are aligned with EPA Guidelines as follows:*

*Negligible = Imperceptible; Slight = Not Significant to Slight; Moderate = Moderate; and Substantial = Significant to Profound*

*[2] For this assessment, IAQM magnitude of change, descriptions are now aligned with EPA Guidelines as magnitude of effect as follows:*

*Imperceptible = Negligible; Very Low = Low; Low = Low; Medium = Medium; and Large = High.*

The IAQM guidance states that the descriptors are for individual receptors only and that overall significance is determined using professional judgement. It also states that it is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important

when total concentrations are close to the objective value. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the objective value, rather than being exactly equal to it.

A change in predicted long-term (annual mean) concentrations of less than 0.5% of an Air Quality Standard or Environmental Assessment Level is considered to be 'imperceptible'. A PC (impact) that is 'Negligible', given normal bounds of variation, will not be capable of having a direct effect on local air quality that could be considered to be significant.

The guidance suggests the potential for 'Low' air quality impacts as a result of changes in pollutant concentrations between 2% and 5% of relevant Air Quality Standards and Environmental Assessment Levels. For example, for long-term $NO_2$ concentrations, this relates to changes in concentrations ranging from 0.6 – 2.1 µg/m$^3$. In practice, changes in concentration of this magnitude, and in particular changes at the lower end of this band are likely to be very difficult to distinguish due to the inter-annual effects of varying meteorological conditions. Therefore, in the overall evaluation of significance the potential for impacts to have significant air quality effect within this band will be considered in this context and will not be capable of having a direct effect on local air quality that can be considered to be significant.

Changes in concentration of more than 5% ('Medium' and 'High', the two highest bands) are considered to be of a magnitude which is far more likely to be discernible above the natural variation in baseline conditions and, as such, carry additional weight within the overall evaluation of significance for air quality. Stated within IAQM guidance, a 'Moderate' impact description does not necessarily constitute a significant effect, where they do not contribute to an exceedance or risk of an exceedance of an Air Quality Standard or Environmental Assessment Level, particularly where such impacts relate to a small minority of receptors with the majority experiencing lesser impacts. Stated within IAQM guidance, a 'substantial' ('significant' to 'Profound') impact description will almost certainly constitute a significant effect that will require additional mitigation to address.

The IAQM guidance (Moorcroft and Barrowcliffe *et al.,* 2017) also provides thresholds for determining whether short-term impacts on human health sensitive receptors have the potential to cause a significant effect or not. Again, it is noted that the IAQM guidance is not specific to industrial facilities, but still provides a useful guide to scale the severity of impacts. This guidance deviates from the UK EA guidance in that the criteria it provides do not take account of background concentrations, although the guidance does state that this is not intended to play down the importance of total short-term concentrations; the IAQM guidance indicates that severity of peak short-term concentrations can be described without the need to reference background concentrations as the PC is used to measure impact, not the overall concentration at a receptor. The peak short-term PC from an elevated source has been adopted for this assessment as follows:

- PC <=10% of the Air Quality Standard or Environmental Assessment Level represents an impact that is 'Imperceptible' to 'Not significant'.
- PC 11-20% of the Air Quality Standard or Environmental Assessment Level is small in magnitude representing a 'Slight' impact.
- PC 21-50% of the Air Quality Standard or Environmental Assessment Level is medium in magnitude representing a 'Moderate' impact.

- PC >51% of the Air Quality Standard or Environmental Assessment Level is large in magnitude representing a ‘Significant’ to ’Profound’ impact.

For impacts in nature conservation receptors, the UK EA guidance states that they may be considered insignificant (‘not significant’) where:

- The short-term PC is less than 10% of the short-term environmental standard for protected conservation areas.
- The long-term PC is less than 1% of the long-term environmental standard for protected conservation areas.

Where the long-term process contribution exceeds this criteria, ecologically sensitive receptors may also be considered insignificant (‘not significant’) where:

- The long-term PEC is <70% of the Air Quality Standard, Environmental Assessment Level or Critical Load.

Where an impact on nature conservation sensitive receptors still cannot be screened as insignificant at this stage, again it does not necessarily mean that the effect is now significant. Model inputs and assumptions shall be reviewed, and detail enhanced where it can be. The predicted PC and PEC are then reviewed relative to the appropriate Air Quality Standards and Environmental Assessment Levels and the headroom that remains once the Proposed Development is in operation – *i.e*. is there a risk of an exceedance of an Air Quality Standard and Environmental Assessment Level and / or does the operation of the Proposed Development constrain future development of the area.

Again, the ‘insignificant’ terminology used in the UK Environment Agency guidance applies to effects that can be described as ‘Imperceptible’ to ‘Slight’ in the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022). It may also apply to effects that can be described as ‘Moderate’ in the EPA Guidelines, where such effects relate to a limited number of sensitive receptors and / or the Air Quality Standards and Environmental Assessment Levels remain not at risk of any exceedance. The significance of effects reported in this chapter for the nature conservation sensitive receptors has been informed by the air quality impacts predicted by the air quality assessment and the professional opinion of the project's ecology expert.

#### 8.3.3.3 Significance of Effects

Following the assessment of each individual air quality effect (construction dust, traffic and operational plant), the significance of all of the reported effects is then considered for the Proposed Development in overall terms The potential for the Proposed Development to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principal focus is any change to the likelihood of future achievement of the Air Quality Standards and Environmental Assessment Levels (which also relate to compliance with Council goals for local air quality management and objectives are set for the protection of human health).

In terms of the significance of the effects (consequences) of any adverse impacts, an effect is reported as being either significant or not. If the overall effect of the Proposed Development on local air quality or on amenity is found to be ‘Moderate’ (where a large proportion of sensitive receptors are affected and / or there is risk of Air Quality Standards and Environmental Assessment Levels being exceeded) or ‘Significant’ to ‘Profound’, this is deemed to be significant for EIAR purposes. Effects found to be

'Moderate' (where limited sensitive receptors are affected and there is no risk of exceedance of an Air Quality Standard or Environmental Assessment Level) to 'Imperceptible' are not considered to be significant.

### 8.3.4 Limitations and Assumptions

The air quality assessment has followed an industry standard approach, with reference to relevant guidance documents and methodologies, to provide the best possible means of predicting potential air quality impacts associated with the Proposed Development at offsite receptors, and the determination of significance. However, it is inevitable that there are limitations associated with any approach, and those relevant to this assessment are summarised below:

- Inherent uncertainties with dispersion modelling:
  - The dispersion model can only be as accurate as the data inputted into it, including the source emissions data. To minimise the uncertainties associated with such data, the assessment has used emissions information provided directly from the design team that has fed into the current version of the Proposed Development design.
  - The same can also be said of the meteorological data used to inform the assessment. Meteorological data has been sourced from Shannon Airport, the nearest meteorological station to the Site with the complete dataset required for dispersion modelling. It is located approximately 35 km to the east-northeast of the Site. To reduce the uncertainty in the representativeness of the meteorological data, the assessment has modelled five years of meteorological data and reported the worst impact for each pollutant and averaging period over the five-year period for each receptor. The assessment has also accounted for the influence in varying terrain and surface roughness, to better represent local conditions in the vicinity of the Site.
- Uncertainties in baseline conditions:
  - The assessment refers to background air quality monitoring data reported by the EPA, in line with the approach set out in EPA guidance (2020). However, no current or recent EPA air quality monitoring has been undertaken in the vicinity of the Site and the data used and referred to is gathered by the EPA from rural locations across the country. There is some uncertainty into how representative this data is of background pollutant concentrations.

The air quality assessment has also made a number of assumptions where precise information or data is not available. Where possible, assumptions are informed by relevant guidance. Assumptions based on operational characteristics are precautionary. Key assumptions are summarised below:

- It is assumed in the assessment that the CCGT plant will be operational for all hours of the year. This is precautionary as in reality it will operate for less than that and the hours of operation will decrease year on year. The actual operation of the plant will be determined by many factors such as power demand itself from the grid which varies hour by hour, the amount of renewable generation on the system, its bid price into the market compared to other generators, and the rules of the grid to ensure priority is given to renewable generation. The grid also needs to remain stable and secure with increased high levels of renewable generation.

- In line with EPA guidance (2020), in the absence of a species information for THC and VOC, all such emissions have been assumed to be as benzene, for comparison against the benzene Air Quality Standard. Again, this is precautionary as only a proportion of these compounds will actually be benzene.
- Various precautionary assumptions have been made for the assessment scenarios to demonstrate compliance with the Air Quality Standards and Environmental Assessment Levels even with unlikely and/ or impossible operating conditions (e.g. for scenario Sc2, the assumption that the limited hours of liquid-fuel operation will coincide with the 19 worst meteorological hours at each receptor).
- The rate of conversion of $NO_X$ to $NO_2$ from modelled emissions sources has been assumed to be 100% for annual mean $NO_2$ and 50% for hourly mean $NO_2$ across the study area, in the absence of $NO_X$, $NO_2$ and $O_3$ data. In reality, at locations close to the source, the conversion of $NO_X$ to $NO_2$ is likely to be less efficient than that.

## 8.4 Baseline Environment

### 8.4.1 Existing Baseline

The existing environment has been described with reference to the most recently published EPA Air Quality Report and supplementary data (EPA, 2023).

The EPA manages the national ambient air quality network, which consists of 107 monitoring stations located across the country that monitor a range of pollutants, including some of those of relevance to this assessment. The most recent EPA Air Quality Report available was published in 2023 and refers to monitoring data gathered in 2022 and earlier.

EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. The zones in place in Ireland during the most recently available report of monitoring (EPA, 2023) are:

- Zone A – Dublin conurbation.
- Zone B – Cork conurbation.
- Zone C – Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.
- Zone D – Rural Ireland (*i.e.* the remaining area of Ireland).

The EPA operate a network of air quality monitoring across the country. Data gathered by the nearest air quality monitoring undertaken to the Site is summarised in **Table 8.16.** Data is also presented as the average across the representative Zone D sites.

## Table 8.14: Air Quality Monitoring Data

| Monitoring Station | Distance and Orientation from Site | Pollutant | Reported Concentration (µg/m³)[1] | | | | Relevant Air Quality Standard (µg/m³) |
|---|---|---|---|---|---|---|---|
| | | | 2019 | 2020 | 2021 | 2022 | |
| **Askeaton, Co. Limerick (Zone D)** | 31 km E | $SO_2$ | - | 1.6 | 1.6 | 6.3 | 20[3] |
| | | $PM_{2.5}$ | - | 4 | 5.7 | 5.5 | 25[2] |
| **Birr, Co. Offaly (Zone D)** | 117 km NE | $NO_2$ | - | 9 | 12.8 | 12.4 | 40[2] |
| | | NOx | - | 23.2 | 31.5 | 29.8 | 30[3] |
| | | $PM_{10}$ | - | 10 | 12.2 | 14.5 | 40[2] |
| | | $PM_{2.5}$ | - | 6 | 7.9 | 9.5 | 25[2] |
| | | CO | - | 400 | 300 | 800 | 10,000[2] |
| **Ennis, Co. Clare (Zone C)** | 42 km NE | $PM_{10}$ | 18 | 20 | 19 | 20.0 | 40[2] |
| | | $PM_{2.5}$ | 14 | 14 | 14.7 | 15.6 | 25[2] |
| | | $SO_2$ | 3.6 | 4.4 | 5.9 | 4.7 | 20[3] |
| **Henry Street, Limerick (Zone C)** | 55 km NE | $NO_2$ | - | - | 14.8 | 15.2 | 40[2] |
| | | NOx | - | - | 27.1 | 28.5 | 30[3] |
| | | $O_3$ | - | - | 48.4 (0) | 49.8 (0) | 120[2] |
| | | $PM_{10}$ | - | - | 11.1 | 13.9 | 40[2] |
| | | $PM_{2.5}$ | - | - | 6.7 | 8.4 | 25[2] |
| **People's Park, Limerick (Zone C)** | 55 km E | $NO_2$ | 13 | 10 | 9.8 | 10.2 | 40[2] |
| | | NOx | - | 15.7 | 15.9 | 15.8 | 30[3] |
| | | $PM_{10}$ | 13 | 13 | 12.6 | 13.9 | 40[2] |
| | | $PM_{2.5}$ | 9 | 9 | 8.8 | 9.3 | 25[2] |
| | | $O_3$ | - | - | 52.2 (0) | 55.9 (1) | 120[2] |
| **Zone D Average (all sites)** | | $NO_2$ | 5.6 | - | 7.5 | 7.4 | 40[2] |
| | | $NO_X$ | 7.8 | - | 14.2 | 14.0 | 30[3] |
| | | $PM_{10}$ | 14.3 | - | 11.9 | 12.7 | 40[2] |
| | | $PM_{2.5}$ | 9.3 | - | 8.7 | 8.4 | 25[2] |
| | | $O_3$ | 64.1 | - | 60.2 | 61.7 | 120[2] |
| | | $SO_2$ | 3.1 | - | 4.2 | 5.0 | 20[3] |
| | | CO | 100 | - | 300 | 800 | 10,000[2] |

*Notes:*
*[1] Values as reported by the EPA in the Supplementary Tables to Support the annual Air Quality in Ireland reports.*
*[2] For the protection of human health*
*[3] For the protection of ecosystems (nature conservation receptors)*

The EPA data summarised in **Table 8.16** demonstrates that the existing airshed in the vicinity of the Proposed Development is unlikely to be constrained and concentrations are generally well below the respective Air Quality Standards and Environmental Assessment Levels for the protection of human health and ecosystems.

In addition to the monitoring data made available by the EPA, there is also data available from other air quality assessments undertaken in the vicinity of the Proposed Development, including the EIAR for the Foynes to Limerick Road (including Adare Bypass) project. That report included $NO_2$ concentration data measured at several locations in Co. Limerick, to the east of the Proposed Development, over a period of 2 winter months. Whilst a 2-month survey of data cannot be directly comparable to the annual mean,

measured roadside concentrations of 5.7 to 12.8 µg/m$^3$ and background concentrations of 1.9 to 6.7 µg/m$^3$ over winter months continue to demonstrate that existing local air quality in the vicinity of the Proposed Development is unconstrained.

### 8.4.2 Future Baseline

Future Baseline conditions during the construction phase and operational phase of the Proposed Development are not expected to be a much different to that of the existing baseline. Whilst baseline traffic data on the local road network is likely to increase to some extent, this will be offset by the reduction in vehicle emissions associated with the evolution of the national vehicle fleet.

The EPA Air Quality in Ireland reports, the most recent of which was published in 2023, have identified that concentrations of the key pollutants associated with poor air quality have been generally reducing year on year (even without the effect of the Covid-19 pandemic). This is again due to the evolving vehicle fleet, with improving emissions technology and decarbonisation, as well as the evolution of the power sector away from the dirtier carbon-based fuels.

## 8.5 Embedded Mitigation

The Proposed Development includes a number of embedded mitigation measures that will likely reduce the impact of emissions on nearby air quality sensitive receptors. Some of these measures are designed with the specific purpose of controlling emissions to air, and others are included primarily for other purposes, but have an additional benefit of reducing air quality impacts. These measures are summarised below.

- Emission release heights for the largest and most frequent sources of emissions to air have been designed to encourage good dispersion, through height above ground level and height above nearby buildings and structures.
- The layout of the Site maximises distance between the main continuous sources of emissions to air and the nearest air quality sensitive receptors.
- Whilst the air quality assessment has assumed continuous operation of the power plant (CCGT) throughout the year, in reality the power plant will only operate for the energy demand required at any given time. The actual operation of the plant will be determined by many factors such as power demand itself from the grid which varies hour by hour, the amount of renewable generation on the system, its bid price into the market compared to other generators, and the rules of the grid to ensure priority is given to renewable generation. The grid also needs to remain stable and secure with increased high levels of renewable generation.
- The majority of plant and all continuous and frequently operational plant will be fuelled by natural gas. Liquid fuel will only be used for start-up, maintenance, gas supply issues and emergency purposes.
- Start-up and emergency plant will only operate with use of low and ultra-low sulphur liquid fuel.

# 8.6 Assessment of Impact and Effect

## 8.6.1 Construction Phase Dust and Particulate Matter Assessment

As described in **Section 8.3**, the construction dust and particulate matter assessment follows the step-by-step approach set out in relevant IAQM guidance (2024). This process is summarised in the sub-sections below.

### 8.6.1.1 Identify Receptors within the Screening Distance of the Site Boundary

The screening distances set by the IAQM guidance are:

- Receptors sensitive to amenity and human health impacts within 250 m of the construction Site boundary and / or within 50 m of a public road used by construction traffic that is within 250 m of the Site entrance.
- Nature conservation receptors located within 50 m of the construction Site boundary and / or within 50 m of a public road used by construction traffic that is within 250 m of the Site entrance.

There are a limited number of amenity and human health sensitive receptors within 250 m of the construction Site boundary. There are more amenity and human health sensitive receptors within 50 m of a public road used by construction traffic that is within 250 m of the Site entrance, including residential dwellings adjacent to the L1010 road.

The Shannon Estuary SAC / SPA is also within 50 m of the construction Site boundary, although the aquatic elements of the SAC / SPA are not considered sensitive to dust impacts.

### 8.6.1.2 Identify the Magnitude of Impacts

The magnitude of impact is informed by the scale of works associated with the following activities: demolition; earthworks; construction (*i.e.* the building and erection of structures); and trackout (the deposition of dust and particulate matter onto public roads by construction vehicles). A detailed description of the construction works is provided in **Chapter 02** (Description of the Proposed Development).

### 8.6.1.3 Demolition

The Proposed Development includes minimal demolition and the emissions magnitude of impact from this activity is considered **Negligible**.

### 8.6.1.4 Earthworks

The Site will require extensive earthworks associated with levelling and also regrading to mitigate visual and noise-related impacts. For the purposed of this assessment, the area of earthworks is considered to exceed 110,000 $m^2$ criteria set in the IAQM construction dust guidance (2024) and require the use of more than 10 earthmoving vehicles (also criteria set by the IAQM criteria) at any one time. As such, the dust emissions magnitude of impact for earthworks is **High**.

### 8.6.1.5 Construction

The Proposed Development includes a number of buildings and structures (as described in **Chapter 02** (Description of the Proposed Development)). For the purpose of this assessment, the combined volume of these is considered to be in excess of the >75,000 $m^3$ criteria set by the IAQM construction

dust guidance (2024). It is also considered that onsite concrete batching maybe required (also criteria set by the IAQM criteria). As such, the dust emissions magnitude of impact for construction is **High**.

#### 8.6.1.6 Trackout

Track-out is the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the local road network. The peak number of daily outward HGV construction vehicle movements associated with the Site will be greater than the 50 set by the IAQM construction dust guidance (2024). There is also anticipated to be periods when onsite haul routes are not surfaced (also criteria set by the IAQM criteria), particularly during the earlier phases of construction. As such, the dust emissions magnitude of impact for trackout is **High**.

#### 8.6.1.7 Establish the Sensitivity of the Area

The sensitivity of the area is determined by the sensitivity, number and proximity of amenity, human health and nature conservation receptors to the construction Site boundary and access roads.

In this instance, there are no single High sensitivity amenity and human health receptors within 250 m of the construction Site boundary, and 1 High sensitivity receptors within between 25 m and 50 m of a public road used by construction traffic that is with 250 m of the Site access (off the L1010 road). There are no amenity and human health sensitive receptors of Medium or Low sensitivity.

This equates to a **Low** sensitivity for amenity impacts. Coupled with low ambient background $PM_{10}$ concentrations (<24 µg/$m^3$), this also equates to a **Low** sensitivity for human health impacts.

With regards to dust impacts on nature conservation receptors, the adjacent SAC / SPA is classed as a High sensitivity receptor, due to its international level of designation, and is located within 20 m of the construction Site boundary. The sensitivity of the area to nature conservation impacts is classed as **High**.

#### 8.6.1.8 Determine the Risk of Significant Effects

The risk of dust impacts occurring is determined by comparison of the potential dust emission magnitude and the sensitivity of the area. For dust soiling and human health impacts, the High dust emission magnitude identified for earthworks, construction and trackout is offset by the Low sensitivity of the area and equates to an **Imperceptible** to **Slight** risk of dust impact that is **Not Significant**.

For dust impacts on ecology the High dust emission magnitude identified combined with the Low sensitivity of the area equates to a **Moderate** to **Significant** risk of dust impacts. However, it is noted that the majority of the SAC / SPA within 50 m of the construction Site boundary is tidal estuary and should dust deposit beyond the Site boundary, it is likely to be washed away naturally.

#### 8.6.1.9 Determine the Level of Mitigation Required

The classification of dust impact risk is then used to inform the level of mitigation required to ensure the impact risk identified can be sufficiently mitigated, to the extent that a significant effect does not occur. The IAQM guidance relevant to the construction dust assessment lists measures that should be applied, if practical, relative to the risk identified.

In this instance, a high risk of dust impacts was identified due the potential dust emission magnitude and the ecological sensitivity of the area. Therefore, the list of IAQM recommended mitigation measures to be implemented at the Site are set out below. These measures are proportionate to the risk identified and are considered practical for use at the Site. The list of mitigation and monitoring measures to be

taken forward during the construction works will also be set out within the Proposed Development's CEMP application document, refer to **Appendix A2.3**, Volume 4.

The IAQM recommended Dust (and particulate matter) mitigation measures for High-risk sites to be taken forward are as follows:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences onsite.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the Site boundary.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP).
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Record any exceptional incidents that cause dust and / or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook.
- Undertake daily onsite and offsite inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues onsite when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree a proportionate level of Site boundary dust monitoring, relative to the risk of offsite dust impacts occurring and the potential for harm to amenity, with the Planning Authority. This could include passive dust deposition monitoring at potential locations shown on **Figure 8.5**, the data gathered by which could be used to inform the effectiveness of dust control measures and substantiate potential complaints.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens / barriers or enclose site or specific operations where there is a high potential for dust production and the Site is active for an extensive period.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Cover, seed or fence long-term stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost maximum-speed-limits on surfaced and unsurfaced haul roads and work areas.

- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression technique.
- Ensure an adequate water supply on the Site for effective dust / particulate matter suppression / mitigation.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment if it is fitted.
- Ensure equipment is readily available onsite to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Avoid bonfires and burning of waste materials.
- Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable, or Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove vegetation cover in small areas during work and not all at once.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect onsite haul routes for integrity, make a record and instigate necessary repairs to the surface as soon as reasonably practicable.
- Install hard surfaced haul routes, which are regularly damped down.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the Site where reasonably practicable). Ensuring that there is an adequate area of hard surfaced road between the wheel wash facility and the Site exit, wherever Site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

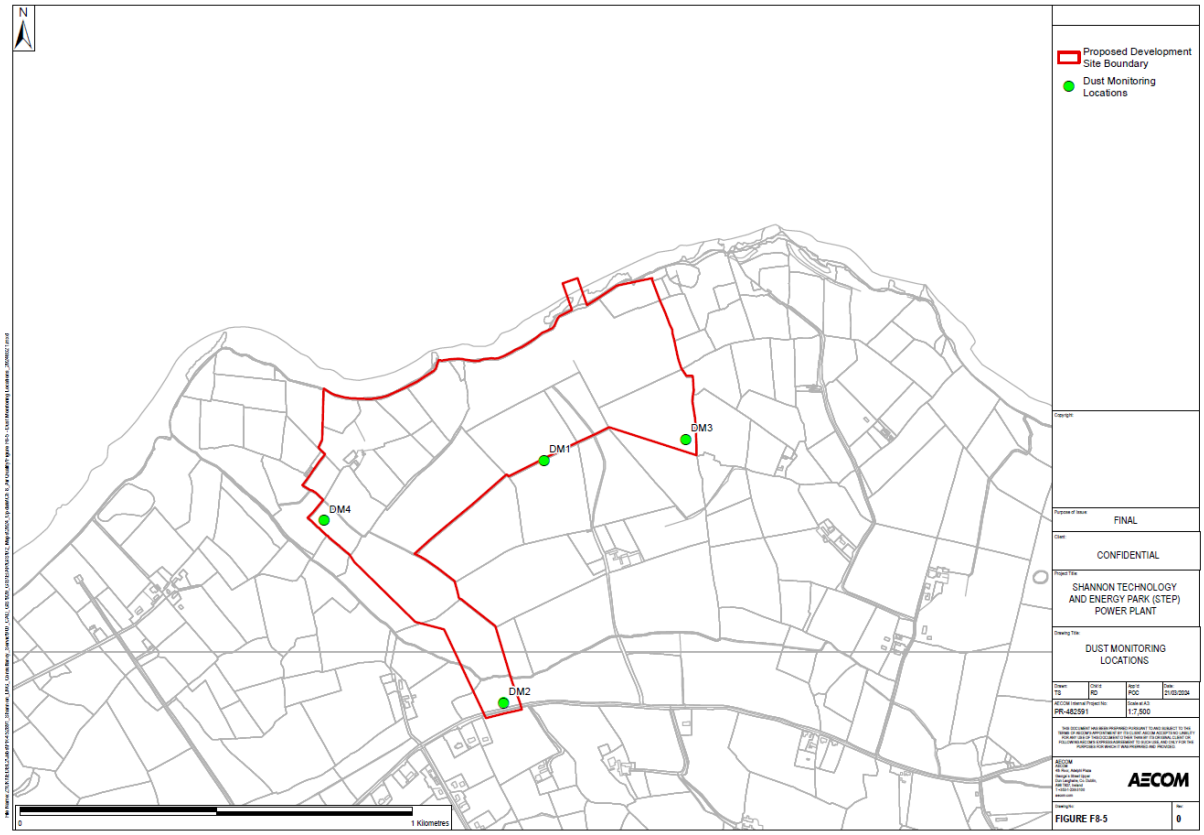


**Figure 8.5: Dust Monitoring Locations**

#### 8.6.1.10 Summarise the Potential Residual Effects

In line with IAQM construction dust guidance, providing adequate dust mitigation measures are implemented onsite, all of which are common practice on all well managed construction sites across the country, then impacts can be adequately controlled to the extent that any effect is **Not Significant** (‘**Imperceptible’** to ‘**Slight’**).

### 8.6.2 Construction Phase Road Traffic Emissions Assessment

During the construction phase, an increase in vehicles of more the screening criteria set out in Section 8.3.2.3.2 will occur on sections of the L1010 road, between the Site and Tarbert (+1,430 two-way 24-hour AADT and +241 two-way 24-hour HGV), Bridewell Street, in Tarbert (+1,364 two-way 24-hour AADT and +234 two-way 24-hour HGV), and the N69, between Tarbert and Limerick (+1,009 two-way 24-hour AADT and +177 two-way 24-hour HGV).

The air quality impact from this increase in traffic is summarised in **Table 8.19**, for annual mean concentrations on $NO_2$ and PM ($PM_{10}$ and $PM_{2.5}$) at the worst affected human health and nature conservation receptors.

**Table 8.15: Predicted Process Contribution of Road Traffic Emissions and Predicted Environmental Concentration at Selected Receptors – Construction Phase Scenario**

| Pollutant and Averaging Period | AQ Standard (µg/m$^3$) | Road Traffic Emissions Process Cont. (µg/m$^3$)[1] | Road Process Cont. as proportion of AQ Standard (%) | Background (Ambient) Cont. (µg/m$^3$)[2] | Predicted Env. Conc. (µg/m$^3$) | Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|
| **Human Health Receptor – worst affected receptor located 5m from the L1010 between the Site and Tarbert** | | | | | | |
| Annual Mean Nitrogen Dioxide ($NO_2$) | 40 | 0.8 | 2.1 | 3.9 | 4.7 | 11.9 |
| Annual Mean Particulate Matter ($PM_{10}$) | 40 | 0.3 | 0.8 | 10.2 | 10.5 | 26.3 |
| Annual Mean Fine Particulate Matter ($PM_{2.5}$) | 20 | 0.3 | 1.6 | 6.6 | 6.9 | 34.6 |
| **Human Health Receptor – worst affected receptor located 5m from Bridewell Street, Tarbert** | | | | | | |
| Annual Mean Nitrogen Dioxide ($NO_2$) | 40 | 0.9 | 2.2 | 5.7 | 6.6 | 16.4 |
| Annual Mean Particulate Matter ($PM_{10}$) | 40 | 0.3 | 0.8 | 12.4 | 12.7 | 31.8 |
| Annual Mean Fine Particulate Matter ($PM_{2.5}$) | 25 | 0.3 | 1.6 | 8.4 | 8.7 | 43.6 |
| **Nature Conservation Site Receptor[3] – worst affected receptor located 5m from N69 Tarbert to Limerick** | | | | | | |
| Annual Mean Oxides of Nitrogen ($NO_X$) | 30 | 1.1 | 3.6 | 3.6 | 4.7 | 15.6 |
| Nutrient Nitrogen Deposition | 20 (kg N/ha/yr) | 0.1 | 0.4 | 5.1 (kg N/ha/yr) | 5.5 (kg N/ha/yr) | 27.7 |
| Acid Deposition[4] | N/A | N/A | N/A | N/A | N/A | N/A |

*Notes:*

*[1] Predicted using the National Highways DMRB screening tool.*

*[2] Rural zone D backgrounds applied to receptors adjacent to the L1010 and N69. All Zone D average applied to the receptor adjacent to Bridewell Street.*

*[3] Worst affected receptor is E09 – mudflats habitat.*

*[4] No nature conservation site receptor within 200m of a road that is sensitive to acid deposition.*

The magnitude of change in annual mean $NO_2$ concentrations at the worst affected human health receptors is described as Low, based on the IAQM planning guidance (2017). A low magnitude of change where total concentrations with the Proposed Development under construction are less than 75% of the air quality standard equates to a **Negligible** or **Imperceptible** impact that is **Not Significant**. The magnitude of change in annual mean $PM_{10}$ and $PM_{2.5}$ concentrations is described as **Very Low**. A very low magnitude of change where total concentrations with the Proposed Development under construction are less than 75% of the air quality standard also equates to a **Negligible** or **Imperceptible** impact that is **Not Significant**.

The impact at the worst affected nature conservation receptor is greater than 1% of the air quality standard for annual mean $NO_X$ concentrations. However, with the Proposed Development under construction, total annual mean $NO_X$ concentrations account for just 16% of the air quality standard. This leaves a headroom between the total concentration and the air quality standard of 84% of the

standard, meaning the risk of an exceedance of the standard is very low. The impact on nitrogen deposition is **Imperceptible** or **Negligible** and again, the risk of an exceedance of the Critical Load due to the construction of the Proposed Development is very **Low.**

## 8.6.3 Operational Phase Site Emissions Assessment

### 8.6.3.1 Sc1: Normal Operational Scenario

The PC (impact) and PEC (total pollutant concentration with Proposed Development in operation) as a result of site emissions under normal operations are presented in **Table 8.20** for the worst affected human health and worst affected nature conservation receptors (for each pollutant and averaging period). The PC and PEC for all receptors considered in the assessment are provided in **Appendix A8.3**, Volume 4.

Contour plots showing the spatial variation of predicted impacts for key pollutants across the study area are provided in Volume 3 for annual mean $NO_2$ (**Figure F8.1**), hourly mean $NO_2$ (**Figure F8.2**), annual mean $NO_X$ (**Figure F8.4**) and annual nitrogen deposition rates (**Figure F8.4**).

Scenario Sc1: Normal Operational Scenario is based on the assumption that the CCGT plant, water bath heaters and AGI boilers are operational on natural gas constantly throughout the year, and startup and backup plant is operational for 52 hours per year for testing and maintenance. For the short-term PC, it has been assumed that testing of the backup plant could occur on any hour of the year and coincide with the worse meteorological conditions at each receptor. In reality, this is highly and statistically unlikely and represents a precautionary approach.

**Table 8.16: Predicted Process Contribution and Predicted Environmental Concentration at Worst Affected Receptors – Sc1: Normal Operational Scenario**

| Pollutant and Averaging Period | AQ Standard (µg/m³) | Process Cont. (µg/m³) | Process Cont. as proportion of AQ Standard (%) | Background (Ambient) Cont. (µg/m³) | Predicted Env. Conc. (µg/m³) | Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|
| **Human Health Receptors** | | | | | | |
| Annual Mean Nitrogen Dioxide ($NO_2$) | 40 | 4.4 | 11 | 3.9 | 8.3 | 20 |
| Hourly Mean Nitrogen Dioxide ($NO_2$) | 200 | 60.8 | 30 | 7.9 | 68.7 | 34 |
| Annual Mean Particulate Matter ($PM_{10}$) | 40 | <0.1 | <1 | 10.2 | 10.2 | 26 |
| Daily Mean Particulate Matter ($PM_{10}$) | 50 | <0.1 | <1 | 20.5 | 20.5 | 41 |
| Annual Mean Fine Particulate Matter ($PM_{2.5}$) | 2 | <0.1 | <1 | 6.6 | 6.6 | 33 |
| Rolling 8-hour Maximum Carbon Monoxide (CO) | 10,000 | 224.9 | 2 | 200.0 | 424.9 | 4 |
| Maximum Hourly Carbon Monoxide (CO) | 30,000 | 264.6 | 1 | 200.0 | 464.6 | 2 |
| Daily Mean Sulphur Dioxide ($SO_2$) | 125 | <0.1 | <1 | 8.5 | 8.5 | 7 |
| Hourly Mean Sulphur Dioxide ($SO_2$) | 350 | <0.1 | <1 | 8.5 | 8.5 | 2 |
| 15-Minute Sulphur Dioxide ($SO_2$) | 266 | <0.1 | <1 | 8.5 | 8.5 | 3 |
| Annual Mean Benzene ($C_6H_6$)[1] | 5 | 1.9 | 37 | 0.2 | 2.1 | 42 |
| Hourly Maximum Benzene ($C_6H_6$)[1] | 195 | 58.8 | 30 | 0.4 | 59.2 | 30 |
| **Nature Conservation Site Receptors** | | | | | | |

| Pollutant and Averaging Period | AQ Standard (µg/m$^3$) | Process Cont. (µg/m$^3$) | Process Cont. as proportion of AQ Standard (%) | Background (Ambient) Cont. (µg/m$^3$) | Predicted Env. Conc. (µg/m$^3$) | Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|
| Annual Mean Oxides of Nitrogen ($NO_X$) | 30 | 0.8 | 3 | 3.6 | 4.4 | 15 |
| Maximum Daily Oxides of Nitrogen ($NO_X$)[2] | 75 | 28.1 | 37 | 7.2 | 35.3 | 47 |
| Annual Mean Sulphur Dioxide ($SO_2$) | 20 | <0.1 | <1 | 4.2 | 4.2 | 21 |
| Nutrient Nitrogen Deposition[3] | 20 kg N/ha/yr | 0.1 | 2 | 4.3 | 4.1 | 4.4 |
| Acid Deposition[4] | CLminN: 0.223 (keq/ha/yr) CLmaxN: 0.568 (keq/ha/yr) CLmaxS: 0.202 (keq/ha/yr) | 0.01 | 1.8 | 0.4 | 0.4 | 72 |

*Notes:*

*[1] Assumed all THC and VOC emissions are as benzene ($C_6H_6$) (which is standard practice when THC/VOC composition is unknown). In reality, $C_6H_6$ is only likely to make up a proportion of total THC and VOC emissions amongst numerous other compounds. Where the conservative assumption that all THC and VOC emissions are $C_6H_6$ does not lead to an exceedance of the relevant Air Quality Standards for this pollutant, it is unlikely considered to represent a significant effect.*

*[2] Research cited in IAQM guidance (2020) states that the daily $NO_X$ standard is of less importance than the annual $NO_X$ standard at nature conservation sites. The daily $NO_X$ standard is typically only of concern at a nature conservation site when $SO_2$ and $O_3$ concentrations are elevated close to or in excess of their Air Quality Standards for the protection of ecosystems. The $SO_2$ concentrations reported in this table and the $O_3$ data reported in Table 8.14 demonstrate that concentrations of neither $SO_2$ or $O_3$ are elevated close to those standards and as such, the nature conservation receptors included in this assessment are not considered sensitive to the daily $NO_X$ impacts reported.*

*[3] Worst affected receptor is E09 – mudflats habitat.*

*[4] Worst affected receptor is E12 – perennial vegetation on stony banks habitat.*

#### 8.6.3.1.1 EPA AG4 Approach

Following the EPA guidance, the PC should be less than 75% of the ambient air quality standard for an impact to be considered acceptable, where the background concentration does not account for a significant proportion of the ambient air quality standard. In this instance, the background concentrations at all receptors do not account for a significant proportion of the ambient air quality standards and the PC of all pollutants considered at all human health and nature conservation receptors is less than 75% of the standards. As such, under normal operations, the Proposed Development complies with the criteria published in EPA guidance AG4.

#### 8.6.3.1.2 UK Environment Agency Approach

Following UK Environment Agency guidance, all long-term impacts at human health receptors are screened as insignificant because the PEC for all pollutants is below 70% of the air quality standards. However, short-term hourly $NO_2$ impacts at the human health receptors cannot be screened as insignificant at 8 of the 47 human health receptors considered, because at these locations, the PC is greater than 20% of the air quality standard (or Environmental Assessment Level) minus the short-term background concentration. This is also the case for hourly VOC (as benzene impacts), which exceed this criterion at 18 of the 47 human health receptors.

Long-term impacts at the nature conservation receptors are screened as insignificant for some locations considered, where the PC is less than 1% of the relevant air quality standards or Critical Loads. This is the case at all habitats considered in the Stack's to Mullaghareirk Mountains, West Limerick Hills and

Mount Eagle SPA (E24 to E30), Bunnaruddee Bog NHA (E31), Moanveanlagh Bog SAC (E32 and E33) and Tullaher Lough and Bog SAC (E34 and E35).

However, annual mean $NO_X$ impacts at 22 of the 35 nature conservation receptors considered cannot be screened as insignificant because the PC is greater than 1% of the air quality standard for annual mean $NO_X$ (River Shannon SAC: receptors E01 to E10 and E12 to E23). A PC of more than 1% of the Critical Load for annual nitrogen deposition rates is predicted at 2 of the 35 receptors considered (River Shannon SAC: receptors E12 and E13), and a PC of more than 1% of the lower Critical Load function for acid deposition is predicted to occur at just 1 of the 35 receptors (River Shannon SAC: receptor E12). Short-term daily $NO_X$ impacts cannot be screened out as insignificant at 7 of the 35 nature conservation receptors, because the PC is greater than 10% of the Environmental Assessment Level at these locations, which are all nature conservation receptors in close proximity of the Site and within the River Shannon SAC.

Where pollutants and averaging periods cannot be screened as insignificant (*i.e.* 'Imperceptible' to 'Slight' effects and 'Moderate' where those effects relate to a limited number of sensitive receptors and / or the Air Quality Standards and Environmental Assessment Levels remain not at risk of any exceedance), the UK Environment Agency recommends that detailed modelling is undertaken to accurately reflect anticipated conditions at the Site and further analysis of the PC and PEC then undertaken. This chapter already describes and reports the results of detailed modelling that is based on the current design information and precautionary assumptions where required. It is considered that the model is already fit for purpose and does not require any more detail than that already included and described in this chapter. Instead, further analysis of the PC and PEC has been undertaken for these pollutants and averaging periods.

The footnotes provided for **Table 8.20** describe why neither the hourly $C_6H_6$ PC nor the daily $NO_X$ PC should be considered potentially significant. The $C_6H_6$ values reported are overly conservative in that it has been assumed that all THC and VOC emissions are as that pollutant, rather than the usual suite of various compounds that make up those THC and VOC emissions. The daily $NO_X$ Environmental Assessment Level is only considered to be a concern to nature conservation receptors where they are already under stress from elevated concentrations of $SO_2$ and $O_3$. In this instance, none of the nature conservation receptors experiences such conditions.

The hourly mean $NO_2$ PC and PEC at the worst affected human health sensitive receptor (R19) could not be screened as insignificant – with PC that is both in excess of 10% of the Air Quality Standard and 20% of the Air Quality Standard minus the short-term background. The same was also the case for the next seven worst affected receptors ((R6, R13-R16, R26 and R29) (refer to **Appendix A8.3**, Volume 4)), but not the remaining 39 receptors considered, who experienced an hourly $NO_2$ impact (PC) of less than the criteria given in the UK Environment Agency guidance. Further review of the impact (PC) and total pollutant concentrations (PEC) at these worst affected receptors shows that with the Proposed Development in operation, there remains a headroom (the gap between the total pollutant concentration (PEC) and the Air Quality Standard) of at least 66% of the Air Quality Standard for that pollutant. It can therefore be said with much confidence that the operation of the Proposed Development does not give rise to any risk of exceedance of the hourly mean $NO_2$ Air Quality Standard in the Normal Operational Scenario, nor is it likely to constrain any future development of the area.

The annual nitrogen deposition rate PC and PEC at the worst affected nature conservation sites (River Shannon SAC: receptors E12 and E13)) could not be screened as insignificant (*i.e*. 'Imperceptible' to 'Slight' effects and 'Moderate' effects where those effects relate to a limited number of sensitive receptors and / or the Air Quality Standards and Environmental Assessment Levels remain not at risk of any exceedance) – with a PC in excess of 1% of the lower Critical Load thresholds and a PEC within 16% and 7% of the same thresholds respectively. It should be noted that the PC predicted at both receptors E12 and E13 is less than 1% of the upper Critical Load thresholds for these habitats, and the PEC less than 50% of the upper Critical Load thresholds.

With regards to the single receptor that experiences a PC of more than 1% of the minimum Critical Load function for acid deposition (River Shannon SAC: receptor E12), that same PC accounts for less than 1% of the maximum Critical Load function. It is also noted that at this and all other locations, the PEC predicted is dominated by the background contribution, which at E12 accounts for 82% of the minimum Critical Load function.

With the exception of receptors E12 and E13, no other nature conservation receptors sensitive to nitrogen or acid deposition considered in this assessment experience an PC of 1% or more of their respective lower and minimum Critical Loads. It should also be noted that the Critical load range against which the PC and PEC are being compared to is the lower (most precautionary) end of a Critical Load Range. The PC and PEC will account for a smaller proportion of the upper Critical Load Range. Considering the above, it is determined that the operation of the Proposed Development will not contribute significantly to any exceedance of the Critical Loads for acid and nitrogen deposition and that the impact will not have a significant effect.

It is also noted that nature conservation receptors E31, E32 and E33 experience a PEC that is in excess of their habitat's Critical Load for nitrogen deposition, and receptors E11, E34 and E35 experience a PEC that is over 80% of the Critical Load. The reason for elevated PEC at these locations is due to the nitrogen sensitivity of the habitats that these receptors represent, which include bogs (E31 to E35) and perennial vegetation on stony banks (E11). These habitats have low Critical Load thresholds that are either exceeded or are close to an exceedance due to the background nitrogen deposition rate contribution alone. However, the PC from the Proposed Development contributes less than 1% of the Critical Load at receptors E31, E32 and E33, and less than 1% of the Critical Load at receptors E11, E34 and E35.

#### 8.6.3.1.3 IAQM Approach

The impact of the Proposed Development has also been evaluated against the IAQM guidance criteria (Morrow and Barrowcliffe *et al.,* 2017). Whilst primarily intended for use with development planning for non-industrial sites, it still provides a useful gauge for estimating significance, as the criteria is based on the magnitude of impact and the risk of impacts causing an exceedance of an Air Quality Standard. The IAQM guidance applies to human health receptor impacts only.

In this instance and following this guidance, long-term PC are described as slight-adverse to negligible for all pollutants and receptors (discounting the conservative $C_6H_6$ predictions) with the exception of annual mean $NO_2$ impacts at receptors R19 and R26, which are described as moderate adverse. In some circumstances, moderate adverse impacts can represent a significant effect, typically when there are numerous receptors predicted to experience such an impact and / or the impact contributes to an Air Quality Standard being at risk of an exceedance. In this instance, the moderate adverse impact

affects just 2 receptors, which, with the addition of the contribution from the Proposed Development, experience total annual mean $NO_2$ PEC that account for less than 50% of the Air Quality Standard (it is also the case that the PEC for the conservative $C_6H_6$ predictions accounts for less than 50% of the Air Quality Standard). With reference to the IAQM guidance, the impacts on long-term pollutant concentrations, therefore, will not have a significant effect.

Following the IAQM guidance for short-term impacts, potential significant effects are considered by the PC relative to the Air Quality Standard. The effect of short-term impacts is described as **Imperceptible** to **Slight Adverse** at 41 of the 47 human health receptors considered for all pollutants, and **Moderate Adverse** at the remaining 6 receptors for hourly mean $NO_2$. However, even with this magnitude of impact, total hourly mean $NO_2$ concentrations remain well below the Air Quality Standard for that pollutant (34% at most) to the extent that the effect is not considered to be significant.

#### 8.6.3.2 Sc2: Gas Shortage Operation

The impact as a result of Site emissions under gas shortage operations are presented in **Table 8.21** for the worst affected human health and worst affected nature conservation receptors (for the appropriate pollutant and averaging periods). The PC and PEC for all receptors considered in the assessment are provided in **Appendix A8.3**, Volume 4.

Scenario Sc2: Gas Shortage Scenario is based on the assumption that the CCGT plant is operational on liquid fuel. Such an event is unlikely to occur beyond the infrequent periodic short duration testing that is planned for a limited number of hours per year. The liquid fuel-fired operation of the CCGT is considered against short-term air quality standards and Environmental Assessment Levels only, as the limited hours of operation will have a negligible impact on long-term concentrations. The Sc2 scenario model includes short-term emissions associated with the other Proposed Development emission sources that could be operational at the same time. For the short-term PC, it has been assumed that operation of the liquid fuel-fired CCGT plant could occur on any hour of the year and coincide with the worst hourly and daily meteorological conditions at each receptor. In reality, this is highly and statistically unlikely to occur, and represents a precautionary approach.

**Table 8.17: Predicted Process Contribution and Predicted Environmental Concentration at Worst Affected Receptors – Sc2: Gas Shortage Scenario**

| Pollutant and Averaging Period | AQ Standard (µg/m³) | Process Cont. (µg/m³) | Process Cont. as proportion of AQ Standard (%) | Background (Ambient) Cont. (µg/m³) | Predicted Env. Conc. (µg/m³) | Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|
| **Human Health Receptors** | | | | | | |
| Hourly Mean Nitrogen Dioxide ($NO_2$) | 200 | 85.8 | 43 | 7.9 | 93.0 | 46 |
| Daily Mean Particulate Matter ($PM_{10}$) | 50 | 0.7 | 1 | 20.5 | 21.1 | 42 |
| Rolling 8-hour Maximum Carbon Monoxide (CO) | 10,000 | 25.0 | <1 | 200 | 225.0 | 2 |
| Maximum Hourly Carbon Monoxide (CO) | 30,000 | 37.0 | <1 | 200 | 237.0 | 1 |
| Daily Mean Sulphur Dioxide ($SO_2$) | 125 | 0.5 | <1 | 8.5 | 9.0 | 7 |
| Hourly Mean Sulphur Dioxide ($SO_2$) | 350 | 1.1 | <1 | 8.5 | 9.6 | 3 |
| 15-Minute Sulphur Dioxide ($SO_2$) | 266 | 1.2 | <1 | 8.5 | 9.6 | 4 |
| Hourly Maximum Benzene ($C_6H_6$)[1] | 195 | 21.1 | 11 | 0.4 | 21.6 | 11 |

| Pollutant and Averaging Period | AQ Standard (µg/m³) | Process Cont. (µg/m³) | Process Cont. as proportion of AQ Standard (%) | Background (Ambient) Cont. (µg/m³) | Predicted Env. Conc. (µg/m³) | Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|
| **Nature Conservation Site Receptors** | | | | | | |
| Maximum Daily Oxides of Nitrogen ($NO_X$)[2] | 75 | 40.1 | 54 | 7.2 | 47.3 | 63 |

*Notes:*

*[1] Assumed all THC and VOC emissions are as benzene ($C_6H_6$) (which is standard practice when THC/ VOC composition is unknown). In reality, $C_6H_6$ is only likely to make up a proportion of total THC and VOC emissions amongst numerous other compounds. Where the conservative assumption that all THC and VOC emissions are $C_6H_6$ does not lead to an exceedance of the relevant Air Quality Standards for this pollutant, it is unlikely considered to represent a significant effect.*

*[2] Research cited in IAQM guidance (2020) states that the daily $NO_X$ standard is of less importance than the annual $NO_X$ standard at nature conservation sites. The daily $NO_X$ standard is typically only of concern at a nature conservation site when $SO_2$ and $O_3$ concentrations are elevated close to or in excess of their Air Quality Standards for the protection of ecosystems. The $SO_2$ concentrations reported in this table and the $O_3$ data reported in Table 8.14 demonstrate that concentrations of neither $SO_2$ or $O_3$ are elevated close to those standards and as such, the nature conservation receptors included in this assessment are not considered sensitive to the daily $NO_X$ impacts reported.*

#### 8.6.3.2.1 EPA AG4 Approach

With the operation of scenario Sc2, the PC of all pollutants considered at all human health and nature conservation receptors is less than 75% of the standards. As such, under gas shortage operations, the Proposed Development complies with the criteria published in EPA guidance AG4.

#### 8.6.3.2.2 UK Environment Agency Approach

Whilst the short-term UK Environment Agency screening criteria is exceeded for hourly mean $NO_2$ (and daily mean $NO_X$), meaning that impacts cannot be screened as insignificant, total concentrations (PEC) remain well below the air quality standards to the extent that sufficient headroom remains to not constrain future development. Given the precautionary assumption that liquid-fuelled operation will coincide with the worst meteorological hours at each receptor, this impact is not considered to be significant.

#### 8.6.3.2.3 IAQM Approach

Following the IAQM guidance for short-term (<annual mean) impacts, potential significant effects are considered by the impact (PC) relative to the Air Quality Standard. The effect of short-term impacts is described as Imperceptible to Slight Adverse at 33 of the 47 human health receptors considered for all pollutants, and Moderate Adverse at the remaining 14 receptors for hourly mean $NO_2$. However, even with this magnitude of impact, total hourly mean $NO_2$ concentrations (PEC) remain well below the Air Quality Standard for that pollutant (46% at most) to the extent that the effect is not considered to be significant.

### 8.6.4 Operational Phase Road Traffic Emissions Assessment

During the operational phase, traffic impact on sections of the L1010 road, between the Site and Tarbert (+115 two-way 24-hour AADT and +6 two-way 24-hour HGV), Bridewell Street, in Tarbert (+109 two-way 24-hour AADT and +6 two-way 24-hour HGV), and the N69, between Tarbert and Limerick (+81 two-way 24-hour AADT and +4 two-way 24-hour HGV), fall well below the screening criteria set out in **Section 8.3.2.3.2**.

In line with the relevant guidance described in **Section 8.3.2.3.2**, traffic impacts of this magnitude will not be capable of contributing to a significant effect.

## 8.7 Cumulative Impacts and Effects

### 8.7.1 Construction Phase Dust and Particulate Matter Assessment

Cumulative construction impacts are possible where the construction of the Proposed Development coincides with the construction of any one of the proposed Strategic Gas Reserve Facility, 220 kV connection, medium voltage (or 10 / 20 kV) connection, SLNG Gas Pipeline, potential data centre projects or the L1010 road widening works. Due to the distance of the limited number of receptors to the main construction activities associated with the Proposed Development, and the commitment of the Applicant to control dust emissions as far as reasonably practicable, the risk of the Proposed Development to contribute to cumulative dust effect is considered **Low** and **Not Significant**.

### 8.7.2 Operational Phase Emissions Assessment

For the cumulative assessment of the Sc1: Normal Operational scenario, the PC from the Proposed Development is added to a cumulative baseline contribution, which is the ambient background plus the contribution of emissions from Moneypoint and Tarbert Power Stations to calculate the PEC. As such, the actual PC from the Proposed Development remains unchanged to that reported in **Section 8.6** for the Normal Operational Scenario. However, the PEC may be higher than that reported in **Section 8.6**, due to the additional contribution from those cumulative sources.

**Table 8.23** provides a breakdown of the contributions associated with the Proposed Development (scenario Sc1: Normal Operation) and the ambient background plus cumulative sources, for the pollutants for which emissions data was available for those cumulative sources. The cumulative PC and cumulative PEC are provided for the following selected receptors (cumulative impacts and concentrations for all receptors are provided in **Appendix A8.3**, Volume 4):

- worst affected human health and nature conservation site receptors following the addition of the cumulative source contribution; and
- human health and nature conservations receptors with the largest contribution from cumulative sources.

**Table 8.18: Predicted Cumulative Process Contribution and Cumulative Predicted Environmental Concentration at Worst Affected Receptors – Sc1: Normal Operational Scenario**

| Pollutant and Averaging Period | AQ Standard (µg/m$^3$) | Proposed Dev. Process Cont. (µg/m$^3$) | Cumulative Dev. Process Cont. (µg/m$^3$) | Combined Process Cont. (µg/m$^3$) | Combined Process Cont. as a Proportion of AQ Standard (%) | Back-ground (Ambient) Cont. (µg/m$^3$) | Combined Predicted Env. Conc. (µg/m$^3$) | Combined Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|---|---|
| **Human Health Receptor – largest contribution from Proposed Development** | | | | | | | | |
| Annual Mean Nitrogen Dioxide ($NO_2$) | 40 | 4.4 | 0.3 | 4.7 | 12 | 3.9 | 8.6 | 22 |
| Hourly Mean Nitrogen Dioxide ($NO_2$) | 200 | 60.8 | <0.1 | 60.8 | 30 | 7.9 | 68.7 | 34 |

| Pollutant and Averaging Period | AQ Standard (µg/m$^3$) | Proposed Dev. Process Cont. (µg/m$^3$) | Cumulative Dev. Process Cont. (µg/m$^3$) | Combined Process Cont. (µg/m$^3$) | Combined Process Cont. as a Proportion of AQ Standard (%) | Back-ground (Ambient) Cont. (µg/m$^3$) | Combined Predicted Env. Conc. (µg/m$^3$) | Combined Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|---|---|
| Annual Mean Particulate Matter ($PM_{10}$) | 40 | <0.1 | <0.1 | <0.1 | <1 | 10.2 | 10.2 | 26 |
| Daily Mean Particulate Matter ($PM_{10}$) | 50 | <0.1 | 0.4 | 0.4 | 1 | 20.5 | 20.9 | 52 |
| Annual Mean Fine Particulate Matter ($PM_{2.5}$) | 25 | <0.1 | <0.1 | <0.1 | <1 | 6.6 | 6.6 | 33 |
| Daily Mean Sulphur Dioxide ($SO_2$) | 125 | <0.1 | 5.4 | 5.4 | 4 | 8.5 | 13.9 | 11 |
| Hourly Mean Sulphur Dioxide ($SO_2$) | 350 | <0.1 | 21.9 | 21.9 | 6 | 8.5 | 30.4 | 9 |
| 15-minute Mean Sulphur Dioxide ($SO_2$) | 266 | <0.1 | 37.3 | 37.3 | 14 | 8.5 | 45.8 | 17 |
| **Human Health Receptor – largest contribution from cumulative sources** | | | | | | | | |
| Annual Mean Nitrogen Dioxide ($NO_2$) | 40 | 0.8 | 0.9 | 1.7 | 4 | 3.9 | 5.6 | 14 |
| Hourly Mean Nitrogen Dioxide ($NO_2$) | 200 | 20.6 | 3.3 | 23.9 | 12 | 7.9 | 31.8 | 16 |
| Annual Mean Particulate Matter ($PM_{10}$) | 40 | <0.1 | 0.1 | 0.1 | <1 | 10.2 | 10.3 | 26 |
| Daily Mean Particulate Matter ($PM_{10}$) | 50 | <0.1 | 0.4 | 0.4 | 1 | 20.5 | 20.9 | 52 |
| Annual Mean Fine Particulate Matter ($PM_{2.5}$) | 25 | <0.1 | 0.1 | 0.1 | 1 | 6.6 | 6.7 | 34 |
| Daily Mean Sulphur Dioxide ($SO_2$) | 125 | <0.1 | 5.4 | 5.4 | 4 | 8.5 | 13.9 | 11 |
| Hourly Mean Sulphur Dioxide ($SO_2$) | 350 | <0.1 | 21.9 | 21.9 | 6 | 8.5 | 30.4 | 9 |
| 15-minute Mean Sulphur Dioxide ($SO_2$) | 266 | <0.1 | 37.3 | 37.3 | 14 | 8.5 | 45.8 | 17 |
| **Nature Conservation Receptor – largest contribution from Proposed Development** | | | | | | | | |
| Annual Mean Oxides of Nitrogen ($NO_X$) | 30 | 0.8 | 0.6 | 1.4 | 5 | 3.6 | 5.0 | 17 |
| Daily Maximum Oxides of Nitrogen ($NO_X$) | 75 | 28.1 | 0.7 | 28.8 | 38 | 7.9 | 36.7 | 49 |
| Annual Mean Sulphur Dioxide ($SO_2$) | 20 | <0.1 | 0.5 | 0.5 | 3 | 4.2 | 4.7 | 24 |

| Pollutant and Averaging Period | AQ Standard (µg/m³) | Proposed Dev. Process Cont. (µg/m³) | Cumulative Dev. Process Cont. (µg/m³) | Combined Process Cont. (µg/m³) | Combined Process Cont. as a Proportion of AQ Standard (%) | Back-ground (Ambient) Cont. (µg/m³) | Combined Predicted Env. Conc. (µg/m³) | Combined Predicted Env Conc. as a Proportion of AQ Standard (%) |
|---|---|---|---|---|---|---|---|---|
| Nutrient Nitrogen Deposition[2] | 20 (kg N/ha/yr) | 0.1 | 0.1 | 0.2 | 1 | 4.3 | 4.5 | 23 |
| Acid Deposition[3] | CLminN: 0.223 (keq/ha/yr) CLmaxN: 0.568 (keq/ha/yr) CLmaxS: 0.202 (keq/ha/yr) | 0.01 | 0.08 | 0.09 | 16 | 0.4 | 0.5 | 86 |
| **Nature Conservation Receptor – largest contribution from cumulative sources** | | | | | | | | |
| Annual Mean Oxides of Nitrogen ($NO_X$) | 30 | 0.8 | 0.8 | 1.6 | 5 | 3.6 | 5.2 | 17 |
| Daily Maximum Oxides of Nitrogen ($NO_X$) | 75 | 6.8 | 1.7 | 8.5 | 11 | 7.9 | 16.4 | 22 |
| Annual Mean Sulphur Dioxide ($SO_2$) | 20 | <0.1 | 0.7 | 0.7 | 4 | 4.2 | 4.9 | 25 |
| Nutrient Nitrogen Deposition[2] | 20 (kg N/ha/yr) | 0.1 | 0.1 | 0.2 | 1 | 4.3 | 4.5 | 23 |
| Acid Deposition[3] | CLminN: 0.223 (keq/ha/yr) CLmaxN: 0.568 (keq/ha/yr) CLmaxS: 0.202 (keq/ha/yr) | 0.01 | 0.08 | 0.09 | 16 | 0.4 | 0.5 | 86 |

Notes:

[1] The Predicted Cumulative Environmental Concentration for short-term pollutants is not the sum of all contributions. Short-term pollutant impacts are calculated based on conditions at a certain point in each meteorological year considered (i.e. the 19th worst hour of the year for hourly mean $NO_2$ at each receptor). When emissions from sources are modelled individually, the 19th worst hour at each receptor will almost most certainly be different for each source. Therefore, the Predicted Cumulative Environmental Concentration is based on a model run that includes both Proposed Development sources and cumulative sources together.

[2] Research cited in IAQM guidance (2020) states that the daily $NO_X$ standard is of less importance than the annual $NO_X$ standard at nature conservation sites. The daily $NO_X$ standard is typically only of concern at a nature conservation site when $SO_2$ and $O_3$ concentrations are elevated close to or in excess of their Air Quality Standards for the protection of ecosystems. The $SO_2$ concentrations reported in this table and the $O_3$ data reported in Table 8.14 demonstrate that concentrations of neither $SO_2$ or $O_3$ are elevated close to those standards and as such, the nature conservation receptors included in this assessment are not considered sensitive to the daily $NO_X$ impacts reported.

[3] Worst affected receptor is E09 – mudflats habitat.

[4] Worst affected receptor is E12 – perennial vegetation on stony banks habitat.

#### 8.7.2.1 EPA AG4 Approach

Following the EPA guidance, the cumulative PC should be less than 75% of the ambient air quality standard for an impact to be considered acceptable, where the background concentration does not account for a significant proportion of the ambient air quality standard. In this instance, the background concentrations at all receptors do not account for a significant proportion of the ambient air quality standards and the cumulative PC of all pollutants considered at all human health and nature

conservation receptors is less than 75% of the standards. As such, under normal operations, the Proposed Development and cumulative emissions sources comply with the criteria published in EPA guidance AG4.

#### 8.7.2.2 UK Environment Agency Approach

Following UK Environment Agency guidance, all long-term cumulative impacts at human health receptors are screened as insignificant because the cumulative PEC for all pollutants is below 70% of the air quality standards. However, cumulative short-term hourly $NO_2$ impacts at human health receptors cannot be screened as insignificant, because at some locations the cumulative PC is greater than 20% of the air quality standard minus the short-term background concentration.

Long-term cumulative impacts at the nature conservation receptors are screened as insignificant for locations where the cumulative PC for all pollutants considered is less than 1% of the relevant air quality standards or Critical Loads. This is the case at receptors E26 (Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA: Northern wet heath), E31 (Bunnaruddee Bog NHA: Active raised bog), and E32 and E33 (both at the Moanveanlagh Bog SAC: Active raised bog).

At the remaining 30 nature conservation receptors considered, 29 experience a PC of more than 1% of the air quality standard for NOx, including sections of the northern wet heath habitat in the Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (E27 to E29) and sections of active raised bog habitat at Tullaher Lough and Bog SAC (E34 and E35).

The cumulative PC on annual nitrogen deposition rates is greater than 1% of the lower Critical Load thresholds at 4 of the nature conservation receptors, these being sections of perennial vegetation on stony banks (E12) and vegetated sea cliffs (E13), both in the River Shannon SAC, and active raised bog habitat at Tullaher Lough and Bog SAC (E34 and E35). It is noted, however, that the cumulative nitrogen deposition impact at Tullaher Lough and Bog SAC (E34 and E35) is less than 1% of the upper Critical Load threshold for that habitat.

The cumulative acid deposition impact is greater than 1% of the minimum Critical Load function at receptors within the Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (E24, E25, and E27 to E30) Moanveanlagh Bog SAC (E32 and E33) and Tullaher Lough and Bog SAC (E34 and E35) but remains less than 1% of the maximum Critical Load function at all receptors. It should also be noted that the largest contribution to acid deposition at the nature conservation receptors listed is from $SO_2$ concentrations, of which the contribution from the Proposed Development is negligible.

Short-term cumulative daily $NO_X$ impacts on nature conservation receptors cannot be screened out as insignificant at 20 of the 35 nature conservation receptors, due to the cumulative PC being greater than 10% of the Environmental Assessment Level at locations within the River Shannon SAC (E01 to E10, E12 to E20 and E22). However, the footnotes provided for **Table 8.23** describe why the daily $NO_X$ Environmental Assessment Level is only considered to be a concern to nature conservation receptors where they are already under stress from elevated concentrations of $SO_2$ and $O_3$. In this instance, none of the nature conservation receptors experiences such conditions, based on the EPA monitoring data available.

Where pollutants and averaging periods cannot be screened as insignificant (*i.e.* 'Imperceptible' to 'Slight' effects and 'Moderate' where those effects relate to a limited number of sensitive receptors and / or the Air Quality Standards and Environmental Assessment Levels remain not at risk of any

exceedance), the UK Environment Agency recommends that detailed modelling is undertaken to accurately reflect anticipated conditions at the Site and further analysis of the PC and PEC is undertaken. This chapter already describes and reports the results of detailed modelling that is based on the current design information and precautionary assumptions where required. It is considered that the cumulative model is already fit for purpose and does not require any more detail than that already included and described in this chapter. Instead, further analysis of the cumulative PC and PEC has been undertaken for these pollutants and averaging periods.

Hourly mean cumulative $NO_2$ PC and PEC at the worst affected human health sensitive receptor (R19) could not be screened as insignificant – with a cumulative PC that is in excess of 10% of the Air Quality Standard and of 20% of the Air Quality Standard minus the short-term background. The same was also the case for the next seven worst affected receptors (refer to **Appendix A8.3**, Volume 4)), but not for the remaining 39 receptors considered, who experienced an hourly $NO_2$ PC of less than the criteria given in the UK EA guidance. Further review of the cumulative PC and PEC at these worst affected receptors shows that with the Proposed Development in operation, there remains a headroom (the gap between the PEC and the Air Quality Standard) of at least 66% of the Air Quality Standard for that pollutant. It can therefore be said with much confidence that the cumulative impact of the Proposed Development does not give rise to any risk of exceedance of the hourly mean $NO_2$ Air Quality Standard in the Normal Operational Scenario, nor is it likely to constrain any future development of the area.

The cumulative annual nitrogen deposition rate impacts at receptors E12 and E13 (River Shannon SAC) and receptors E34 and E35 (Tullaher Lough and Bog SAC) could not be screened as insignificant (*i.e.* 'Imperceptible' to 'Slight' effects and 'Moderate' effects where those effects relate to a limited number of sensitive receptors and/ or the Air Quality Standards and Environmental Assessment Levels remain not at risk of any exceedance) with PCs in excess of 1% of the lower Critical Load thresholds. No other nature conservation receptors sensitive to nitrogen deposition considered in this assessment experience a PC of more than 1% of their respective lower Critical Load thresholds, and it is again noted that the nitrogen deposition rate at receptors within the Tullaher Lough and Bog SAC is less than 1% of the upper Critical Load threshold for that habitat.

With regards to acid deposition, the PC predicted at sensitive habitat within the Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA, Moanveanlagh Bog SAC and Tullaher Lough and Bog SAC could not be screened as insignificant, with them being more than 1% of the minimum Critical Load function for those habitats. However, further analysis has confirmed the PC is less than 1% of the maximum Critical Load function at locations where the PEC does not exceed either the minimum or the maximum Critical Load function.

It is noted that the more elevated PECs reported are primarily due to the ambient background contribution. This is particularly the case for nitrogen deposition rates at receptors at the Moanveanlagh Bog SAC, where the background contribution alone accounts for 100% of the lower Critical Load threshold for that habitat. It should also be noted that the Critical load against which the cumulative PC and PEC are being compared to is the lower (precautionary) end of a Critical Load Range. The cumulative PC and PEC will account for a smaller proportion of the upper Critical Load Range. Considering the above, it is determined that the operation of the Proposed Development will not contribute significantly to any exceedance of the Critical Loads for acid and nitrogen deposition and that the impact will not have a significant effect.

It is also noted that nature conservation receptors E31, E32 and E33 experience a cumulative PEC that is in excess of their habitat's Critical Load for nitrogen deposition, and receptors E11, E34 and E35 experience a PEC that is over 80% of the Critical Load. The reason for elevated cumulative PEC at these locations is due to the nitrogen sensitivity of the habitats that these receptors represent, which include bogs (E31 to E35) and perennial vegetation on stony banks (E11). These habitats have low Critical Load thresholds that are either exceeded or are close to an exceedance due to the background nitrogen deposition rate contribution alone. However, the cumulative PC from the Proposed Development contributes less than 1% of the Critical Load at receptors E31, E32 and E33, and less than 1% of the Critical Load at receptors E11, E34 and E35.

#### 8.7.2.3 IAQM Approach

The cumulative impact of the Proposed Development has also been evaluated against the IAQM guidance criteria (Morrow and Barrowcliffe *et al.,* 2017). The IAQM guidance applies to human health receptor impacts only.

The long-term cumulative impacts are described as slight-adverse to negligible for all pollutants and receptors except for annual mean $NO_2$ at receptors R19 and R26, which are described as moderate adverse. This is because both receptors experience a cumulative PC of more than 10% of the air quality standard, but a cumulative PEC that is less than 75% of the air quality standard. In some circumstances, moderate adverse impacts can represent a significant effect, typically when there are numerous receptors predicted to experience such an impact and / or the when the PC contributes to a PEC that exceeds an Air Quality Standard. In this instance, the moderate adverse impact affects just 2 receptors, which, with the addition of the contribution from the Proposed Development and cumulative sources, experience a cumulative PEC that accounts for less than 50% of the Air Quality Standard. With reference to the IAQM guidance, the cumulative impacts on long-term pollutant concentrations will not have a significant effect.

Following the IAQM guidance for short-term impacts, potential significant cumulative effects are considered by the PC relative to the Air Quality Standard. The effect of short-term impacts are described as **Imperceptible** to **Slight Adverse** at 41 of the 47 human health receptors considered for all pollutants, and **Moderate Adverse** at the remaining 6 receptors for hourly mean $NO_2$. However, even with this magnitude of impact, total hourly mean $NO_2$ concentrations remain well below the Air Quality Standard for that pollutant (34% at most) to the extent that the effect is not considered to be significant.

Cumulative operational phase impacts are also possible where the operation of the Proposed Development coincides with the operation of the potential Data Centre Campus. No operational emissions associated with the 220 kV connection, medium voltage (10 / 20 kV) connection and SLNG Gas Pipeline or L1010 road widening are considered likely. The design of the potential Data Centre Campus is not advanced to the stage where the quantity of emissions and impact / effect of those emissions is known. It is therefore not possible to confirm the cumulative effect of this source alongside the Proposed Development at this time. The cumulative effects of these two developments will therefore need to be accounted for in the assessment to accompany the Data Centre Campus planning application.

The cumulative impact of the Proposed Development and the Strategic Gas Reserve Facility was represented by the cumulative assessment as reported in the Shannon Technology and Energy Park (STEP) EIAR published in 2021 (ABP Ref: PA08.311233). The cumulative impact of the Proposed

Development, the Strategic Gas Reserve Facility (as represented by sources associated with the LNG facility as described in the 2021 EIAR), and Moneypoint and Tarbert Power Stations reported in that assessment did not give rise to a significant effect on local air quality and there is no reason why that would not be the case now.

It should also be noted that a proposal has been submitted to the planning authority for the conversion of Moneypoint Power Station from coal-fired operation to oil-fired operation. Table 7.4 of the EIAR for that proposal (Electricity Supply Board (ESB), 2024) demonstrates that following conversion, the oil-fired plant will release less emissions than are currently generated by the coal-fired power station, and less emissions than that which have been modelled to inform this cumulative assessment. The cumulative assessment reported here therefore presents a precautionary estimate of cumulative impacts, should the ESB proposal be approved.

## 8.8 Do Nothing Scenario

In the Do Nothing Scenario no element of the Proposed Development will occur. In such a scenario air quality will remain similar to that described in **Section 8.4** and listed in **Table 8.16** to **Table 8.18**. Air quality concentrations for all pollutants and averaging periods of reference to this assessment will remain well below their respective Air Quality Standards and Environmental Assessment Levels. This will however, likely decrease is future years with the proposed changes to Moneypoint Power Station and Tarbert Power Station.

## 8.9 Residual Impacts

### 8.9.1 Construction Phase Dust and Particulate Matter Assessment

In line with IAQM construction dust guidance, providing adequate dust mitigation measures are implemented onsite, all of which are common practice on all well managed construction sites across the country, then impacts can be adequately controlled to the extent that any effect is **Not Significant**.

In line with EPA guidelines (2022), construction phase effects are described as **Negative** / **Adverse**, **Not Significant** and limited to locations within 250 m of the construction Site boundary. They are considered transient and intermittent in nature and unlikely, due to the distance from dust generating activities to the nearest receptors. They are also considered short-term – only having the potential to occur during the construction phase, only likely during working hours onsite, when construction activities are being undertaken within the Site at locations closest to a receptor, and when the wind is blowing from the activity towards the receptors, at a speed that can transport the dust from the activity to the receptor.

### 8.9.2 Operational Phase Site Emissions Assessment

The assessment of operational phase emissions has identified that whilst the Proposed Development will have some impact on local air quality, the extent of that effect is either **Slight** to **Imperceptible**, or **Moderate** at limited locations, where that impact does not put compliance with an Air Quality Standard or Environmental Assessment Level at risk.

In light of the above, no additional mitigation is suggested as being required beyond that inherent within the Proposed Development design (source release height) and compliance with the Emission Limits

that will be set by the EPA within the facility's IE licence. Impacts and associated effects are as reported in **Section 8.6** and **Section 8.7**.

In line with EPA guidelines (2022), operational phase effects will be described as **Negative** / **Adverse**, **Not Significant** at the majority of receptors, but with **Significant** to **Moderate** effects at limited individual receptors closest to the Site boundary. Overall, the effect is considered to be **Slight**, **continuous**, **likely** to occur and **Long-Term**, for the duration of the Proposed Development's operation.

## 8.10 Decommissioning

As outlined in **Chapter 02** (Description of the Proposed Development), in the event of decommissioning, measures will be undertaken by the Applicant to ensure that there will be **Not Significant**, **Negative** environmental effects during the decommissioning phase.

Examples of the measures that will be implemented are outlined in Section 2.11, **Chapter 02** (Description of the Proposed Development). As a result, additional potential impacts and associated effects arising during the decommissioning phase are not anticipated above and beyond those already assessed during the construction phase.

## 8.11 Summary

Air quality dispersion modelling of emissions from the Proposed Development has been undertaken. The Process Contribution (PC) (impact) and Predicted Environmental Concentration (PEC) (total pollutant concentrations) have been quantified at a number of receptors, including nearby (air quality sensitive) human health receptors (residential dwellings) and the nearest nature conservation habitats sensitive to air quality impacts (including habitats within the Shannon Estuary SAC and SPA).

Existing air quality has been reviewed and it is considered that the standard of baseline air quality is likely to be good with no risk of exceedance of than Air Quality Standard or Environmental Assessment Level (set for the protection of human health or sensitive habitat) for the vast majority of pollutants and averaging periods included in this assessment. It is considered that there is the potential for elevated baseline conditions for the annual mean rate of acid deposition. There is some uncertainty in the existing rate of acid deposition, due to an absence of site or even regional-specific baseline data. It is also noted that the annual mean rate of acid deposition is likely to fall within the study area over coming years, as will deposition rates and airborne concentrations of other pollutants, with the cessation of coal and Heavy Fuel Oil-fired operations at Moneypoint Power Station and Tarbert Power Station respectively.

A construction dust assessment has considered the risk of dust impacts occurring and has suggested a level of mitigation required to ensure any effect is **Not Significant**. The assessment is precautionary and likely over-estimates the level of mitigation required.

Dispersion modelling of operational emissions considered a number of scenarios based on various modes of operation of the Proposed Development, with the anticipated typical mode of operation forming the main assessment and subsequent sensitivity scenarios considering various alternative modes of operation and / or precautionary assumptions.

The assessment of normal operation identified limited impacts at the vast majority of receptors considered for the majority of pollutants and averaging periods. Elevated impacts (PC) were identified for hourly mean nitrogen dioxide, hourly maximum benzene and daily maximum oxides of nitrogen at the worst affected receptor locations. Of those, hourly maximum benzene impacts were screened out,

due to the precautionary assumption that all total hydrocarbon and volatile organic compound emissions were released as that compound, when in reality, benzene will form only a proportion of such emissions and actual benzene impacts will likely be much lower. As was the daily maximum oxides of nitrogen impact, due to this pollutant and averaging period being of concern for nature conservation sites only where those sites are already constrained by other pollutants (sulphur dioxide and ozone), which in this instance, they were not.

At the limited receptor locations where hourly mean nitrogen dioxide impact (PC) was elevated, some receptors also experienced elevated total pollutant concentrations (PEC) above levels that air quality assessment guidance suggests can be screened as insignificant. However, review of hourly mean nitrogen dioxide impacts (PC) and total concentrations (PEC) at these locations, relative to the Air Quality Standard, identified that total concentrations (PEC) arising from the Proposed Development in operation were well below the relevant Air Quality Standard at the worst-affected receptor and, therefore, there was no risk of an exceedance and it will not constrain future development in the area.

Impacts on nature conservation sites to nitrogen deposition and acid deposition rates was also quantified. Whilst the impact (PC) was greater than 1% of the Critical Loads at a limited number of receptors, the PEC never exceeded those Critical Loads and therefore the impact is not considered to be significant.

The consideration of an alternative mode of operation to account for a gas supply shortage identified no additional issues and did not worsen the limited and not significant issues identified in the assessment of normal mode of operation to the extent that they become a constraint to the development.

The assessment has also considered the cumulative impact and effect of the Proposed Development alongside emissions from Moneypoint and Tarbert Power Stations, and has considered the cumulative impact of emissions from the proposed Strategic Gas Reserve Facility. The cumulative assessment identified the same issues highlighted during the assessment of the normal mode of operation. Total pollutant concentrations (PEC) were slightly more elevated, but not to the extent that they became a constraint to the development.

Overall, it is considered that the Proposed Development will impact on local air quality in the study area and have an adverse effect. However, this will not contribute to an exceedance of an Air Quality Standard or Environmental Assessment Level, and pollutant concentrations will remain well below the limits set by the Government for the protection of human health. Concentrations are below the Air Quality Standards and Environmental Assessment Levels to the extent that the operation of the Proposed Development will not constrains future development of the area. The effect of the Proposed Development is considered **Not Significant** overall and is compliant with local and national planning policy.

## Table 8.19: Summary

| Proposed Development Phase | Aspect / Impact Assessed | Existing Environment / Receptor Sensitivity | Impact / Magnitude | Significance (Prior to Mitigation) | Mitigation and Monitoring Measures (the Proposed Development design embedded environmental controls and all mitigation and monitoring measures detailed herein are included in the CEMP) | Residual Impact Significance |
|---|---|---|---|---|---|---|
| **Construction** | Dust | High | Negligible | Slight | Standard practice dust mitigation measures as recommended by the Institute of Air Quality Management and listed in Section 8.6.1 (excluding those that are not practical for this Site) and in the CEMP, Appendix A2.3, Volume 4. These include, but are not limited to:<br>• Production of and adherence to a site-specific dust minimisation control plan (AKA Dust Management Plan), setting out the control measures to implemented across the Site and associated procedures.<br>• A proportionate level of dust monitoring relative to the risk of dust impacts, to ascertain the effectiveness of measures included with in the CEMP and dust minimisation control plan.<br>Dust deposition monitoring will be in place during construction. This could include passive dust deposition monitoring at potential locations shown on Figure 8.5. | **Negligible** or **Imperceptible** |
| **Operational** | Site and road traffic emissions | High | Negligible to Moderate | Negligible to Slight Adverse | Design embedded mitigation measures including:<br>• Emission release heights for the largest and most frequent sources of emissions to air have been designed to encourage good dispersion, through height above ground level and height above nearby buildings and structures.<br>• The layout of the onshore site maximises distance between the main continuous sources of emissions to air and the nearest air quality sensitive receptors.<br>• The layout of the offshore site also provides a good setback distance between sources of emissions to air and the nearest air quality sensitive receptors.<br>• Whilst the air quality assessment has assumed continuous operation of the Power Plant throughout the year, in reality the CCGT plant will only operate for the energy demand required at the time.<br>• The majority of plant and all continuous and frequently operational plant will be fuelled by natural gas. Liquid fuel will only be used for start-up, maintenance and emergency purposes.<br>• Start-up and emergency plant will only operate with use of low and ultra-low sulphur liquid fuel. | **Negligible** or **Imperceptible** to **Slight Adverse** |

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