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7.0 AIR QUALITY AND CLIMATE

7.1 Introduction

7.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) addresses the likely significant effects of the Proposed Development on air quality and climate.

7.1.2 A full description of the existing Site is presented in Chapter 4 of this EIAR, while details of the Proposed Development are presented in Chapter 5 of this EIAR.

7.1.3 Emissions associated with combustion plant in the operational phase have the potential to affect human health and ecological receptors, and the construction phase could give rise to potential localised air quality effects from traffic and dust generation if not appropriately managed.

7.1.4 This chapter assesses the potential environmental effects, including those that are likely to be significant, associated with releases to atmosphere during the construction, operation (including maintenance) and decommissioning of the Proposed Development.

7.1.5 This assessment considers:

- The potential for particulate matter (dust deposition and PM_{10} size fractions, which is particulate matter of 10µm diameter or less), related amenity issues and dust deposition on sensitive ecological features within designated habitat sites, to arise during construction and decommissioning.
- The effects on air quality from traffic movements related to the construction and decommissioning of the Proposed Development;
- The effects from the Proposed Development during operation, with consideration of potential impacts at sensitive human and ecological receptors; and
- Identification of suitable stack heights that avoid likely significant effects to air quality at identified sensitive resources/ receptors.

7.1.6 Road traffic associated with the operation of the Proposed Development is expected to be minimal and would not meet the criteria (see section 7.2) to be considered in an assessment. This chapter has therefore not considered air quality impacts from the operational traffic of the Proposed Development.

7.1.7 This chapter also considers the likely effect of greenhouse gas (GHG) emissions arising from the Proposed Development and the impact this will have on the climate, and the resilience of the Proposed Development to climate change. The full assessment is presented in Technical Appendix 7B (refer to EIAR Volume II). A summary of the assessment is provided within this chapter in Section 7.9.

7.2 Methodology

Introduction

7.2.1 The air quality assessment has been undertaken with reference to the Environmental Protection Agency's (EPA) 'Guidelines on the information to be contained in environmental impact assessment reports' (EPA, 2022).

7.2.2 Full details of the methodology and approach taken in respect of this assessment are provided within Appendix 7A in EIAR Volume II.

7.2.3 The technical assessment report within EIAR Appendix 7A (refer to EIAR Volume II) provides a detailed description of the definition of sensitive human and ecological receptors as well as justification for the selected emissions stack height.

7.2.4 The impact of the Proposed Development on GHG and climate change is assessed in EIAR Appendix 7B (refer to EIAR Volume II).

7.2.5 In November 2021, a planning application and EIAR were submitted to Galway County Council, subsequently appealed and approved by ABP under Ref. PL07.313538) – that is a separate 299MW OCGT development and project primarily to the west of the existing Tynagh Power Station to that of the Proposed Development which is for a 350MW facility to the north. Planning approval was obtained for the Approved Development Ref: 21/2192 however the Applicant will be unable to implement it (i.e. will not build/operate the Approved Development Ref: 21/2192') for the foreseeable future due to a range of viability constraints. For robust EIA assessment it is nonetheless assumed that the Approved Development may proceed at some point in the future. As such, to ensure the Approved Development Ref: 21/2192' is adequately considered cumulatively in the EIAR, a 'future baseline' scenario is assessed where appropriate rather than an existing baseline scenario.

Assessment of Potential Construction Dust Impacts

7.2.6 The construction phase for the Proposed Development is 18-24 months. There is the potential for impacts on local air quality and public amenity from emissions generated during the construction phase of the Proposed Development. A qualitative risk-based assessment will be undertaken to assess the significance of any effects on sensitive receptors associated with the construction phase. The assessment is consistent with the framework approach developed by the Institute of Air Quality Management's (IAQM) guidance on the assessment of dust from demolition and construction (IAQM, 2016). The IAQM's approach is not prescriptive but provides examples of how impacts could be reported, and the terminology to be applied. The potential dust emissions magnitude for each construction activity is used as a relative measure of the scale of fugitive emissions that could potentially occur from a small, medium, or large site. The assessment considers the risk of dust impacts to sensitive receptors resulting from potential emissions from earthworks, construction and trackout activities (HGV movements on unpaved roads and offsite mud on the highway), by taking into account the nature and scale of works, the location of receptors relative to the works, and the local meteorological conditions.

7.2.7 Based on the level of risk of dust impacts identified in the assessment, mitigation measures to reduce the risk of dust impacts from the Proposed Development can be identified. For the proposed activities and mitigation in place, the potential for significant effects from dust impacts on human health, amenity or ecological receptors is determined.

7.2.8 The Study Area for the assessment of construction dust has been applied, using criteria proposed within with the IAQM guidance on the assessment of dust from demolition and construction (IAQM, 2016), and extends:

- Up to 350m beyond the Site boundary and 50m from the construction traffic route (up to 500m along a hard surfaced road from the Site entrances), for human health receptors; and
- Up to 50m from the Site boundary and/ or construction traffic route (up to 500m from the Site entrance) for ecological receptors.

7.2.9 The potentially dust generating activities would occur to the north of the existing Tynagh Power Station Site, approximately 330m from the closest residential property and to the north-east of a galvanising company, but well over 50m from any designated ecological receptors. Due to the nature of the work undertaken in the Sperrin Galvanising process, dust soiling from the construction of the Proposed Development would not generate a perceptible environmental impact at that industrial site. The nearest water bodies to the site are outside of the 50m screening distance (lagoon located 40m to the east of the Site) for potentially significant effects due to emissions of dust and particulate matter during construction, as defined in the IAQM assessment guidance. The nearest water courses are approximately 40m to Lisduff and Cloonprask/ Barnacullia Stream The internal Site access road is approximately 210m away from the LP4310 Gurtymadden to Tynagh Road.

7.2.10 The movement and handling of soils and spoil during the Proposed Development construction activities will lead to the generation of some short-term airborne dust emissions. The occurrence and significance of dust generated by earth moving operations (note: no excavated material from the brownfield Site will be removed off site) is impractical to quantify as the magnitude of emissions depends heavily upon the meteorological and ground conditions at the time and location of the work within the Site, and the nature of the actual activity being carried out.

7.2.11 At present, there are no statutory Ireland or EU standards relating to the assessment or control of dust.

7.2.12 The emphasis of the regulation and control of construction dust is therefore through the adoption of good working practice on Site, formalised for example within a Construction Environmental Management Plan (CEMP) (an outline CEMP is included within Appendix 5A of this EIAR, refer to EIAR Volume II). It is intended that significant adverse environmental effects are avoided at the design stage and through embedded mitigation where practical, including the use of good working practices to minimise dust formation which is detailed further in Section 7.6 of this chapter.

7.2.13 The IAQM provides guidance for good practice qualitative assessment of risk of dust emissions from construction and demolition activities (IAQM, 2016). 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.

7.2.14 The assessment undertaken for this chapter is consistent with the overarching approach to the assessment of the impacts of construction of the Proposed Development as outlined in EIAR Chapter 1: Introduction (Section 2.3 ‘The Assessment Approach and Methods’), and the application of example descriptors of impact and risk set out in IAQM guidance. It considers the significance of potential impacts with no mitigation and recommends

mitigation measures appropriate to the identified risks to receptors. 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 construction activities being carried out;
- Establish the sensitivity of the area through determination of the sensitivity of receptors and their distance from construction activities;
- Determine the risk of significant 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; and
- Summarise the potential residual effects of the mitigated works.

7.2.15 The criteria for assessment of magnitude, sensitivity and risk are summarised in Appendix 7A in EIAR Volume II.

Assessment of Construction Road Traffic

7.2.16 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, as well as the typical combustion products of CO, PM_{10} and $PM_{2.5}$ in exhaust emissions. Similarly, but to a lesser extent, any sulphur in the fuel can be converted to sulphur dioxide (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 (NO_X), mainly in the form of nitric oxide (NO), which is then converted to nitrogen dioxide (NO_2) in the atmosphere. NO_2 is associated with adverse respiratory effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

7.2.17 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 the Proposed Development. This is because the release concentrations of these pollutants are low enough so as to not be likely to give rise to significant effects. In addition, no areas within the local area are considered to be at risk of exceeding relevant air quality standards for these pollutants, and the risks to achievement of the relevant standards 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.

7.2.18 Exhaust emissions from road vehicles may affect the ambient concentrations of the principal road traffic pollutants, NO_2, PM_{10} and $PM_{2.5}$, at sensitive receptors in the vicinity of the Proposed Development. Therefore, these pollutants are the focus of the assessment of the significance of road traffic air quality impacts.

7.2.19 The assessment methodology follows the guidance set out within TII's (formerly NRA) document 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes', 2011 'TII Guidance'. In particular, the guidance study area for the assessment of potential impacts from construction vehicle emissions is set to roads with a 10% change in annual average daily traffic flows (AADT).

7.2.20 The TII criteria means an assessment of construction traffic impacts needs to be undertaken as a minimum along the LP4310 Gurtymadden to Tynagh Road (note – some public documents refer to this road as Gortymadden), however the N65 East and West Bound of the junction with the LP4310 Gurtymadden to Tynagh Road is also included in the model as this is the route most of the construction vehicles will use.

7.2.21 Predicted vehicle movements during the construction phase of the Proposed Development are detailed in EIAR Chapter 14: Traffic. The change in vehicle movements is predicted to peak at 80 –LGV (light goods vehicles) movements and 128 HGV (heavy goods vehicles) movements accessing the Proposed Development site via the LP4310 Gurtymadden to Tynagh Road, from the N65 East and West Bound. There are several identified sensitive receptors within 200m of affected links, and therefore a detailed assessment of construction traffic impacts has been conducted.

7.2.22 This assessment has used the dispersion modelling software 'ADMS-Roads' (v5.0 which was the current version at time of modelling and is a validated model) to quantify baseline pollution levels at selected receptors due to road traffic emissions. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK and Ireland for the assessment of local air quality impacts, including model validation and verification studies (Cambridge Environmental Research Consultants (CERC), 2018).

7.2.23 The derivation of the traffic data used in this assessment is set out in EIAR Chapter 14: Traffic. The data used in the road traffic dispersion modelling has been provided for the following scenarios:

- 2021 surveyed baseline traffic (for model verification process);
- 2024 baseline traffic (uplifted to reflect pre-covid flows) + committed development traffic (the total future baseline traffic flows for the Construction assessment); and
- 2024 baseline traffic (uplifted to reflect pre-covid flows) + committed development traffic + peak construction traffic from the Proposed Development (the total traffic flows with the Proposed Development for the Construction assessment) and Tynagh Approved Development Ref: 21/2192.

7.2.24 The future decommissioning baseline scenario has not been assessed due to the lack of future traffic projections for when the Proposed Development is likely to be decommissioned after 2052 (25-year life).

7.2.25 The traffic data used in the modelling of road traffic emissions are presented in Appendix 7A in EIAR Volume II.

7.2.26 Data in the form of traffic flows, composition (percentage HGV) and speed have been used in modelling of emissions from road traffic during the construction phase of the Proposed Development.

7.2.27 Due to the uncertainty in the rate of general vehicle emissions improvement over the coming years and in the Ireland fleet composition, this assessment has used emission rates (EFT Version 11.0 emission factor dataset) for 2018 (Defra, 2021) to represent the baseline and peak construction assessment year scenarios. This is a conservative assumption as the vehicles' emissions are expected to decrease in the future but, as 2024 is in the close future, it is assumed that vehicles will not have undergone considerable change.

Assessment of Emissions Generated from Construction Site Plant (Non-Road Mobile Machinery (NRMM))

7.2.28 The IAQM guidance on the assessment of dust from demolition and construction dust guidance (IAQM, 2016) 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."

7.2.29 In this instance, the closest human health sensitive receptor is approximately 330m from the nearest point of the Proposed Development.

7.2.30 UK HE guidance (2019) suggests that a source of road traffic emissions that is in excess of 200m 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.

Assessment of Process Emissions from the Operational Development

7.2.31 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), referred to as "EPA AG4 Guidance".

7.2.32 Detailed dispersion modelling using the atmospheric dispersion model ADMS 5.2 has been used to calculate the concentrations of pollutants at identified receptors. These concentrations have been compared with the air quality assessment level for each pollutant species, as summarised in Table 7.5.

7.2.33 Dispersion modelling calculates the predicted concentrations arising from the emissions to atmosphere, based on Gaussian approximation techniques. The model is authorised for use by the EPA.

7.2.34 The Proposed Development includes a flue gas stack (emissions stack) which will be the emissions point for the OCGT Plant. Natural gas will be the primary fuel source for 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 THC, some of which will comprise of volatile organic compounds (VOC), including CH_2O. A Backup fuel (distillate or HVO) will also be stored on Site. This fuel will only ever be used in the event of an emergency and for limited periods of testing and maintenance.

7.2.35 The key emissions scenario has been modelled, as outlined below:

- Full Load continuous operation, running on natural gas fuel.

7.2.36 To provide full assessment of all potential emissions scenarios, the following scenarios have also been modelled (refer to Appendix 7A, EIAR Volume II) as outlined below:

- Backup, running on backup fuel (emergency full load operation);

- Augmented Power, running on natural gas fuel (short-term augmented power mode);
- Low Load, running on natural gas fuel;
- A cumulative impact assessment including the Proposed Development, the existing Tynagh Power Station CCGT unit and Approved Development Ref 21/2192 all running on natural gas fuel; and
- A backup cumulative impact assessment including the Proposed Development, the existing Tynagh Power Station CCGT unit and Approved Development Ref 21/2192 all running on backup fuel.

7.2.37 This chapter focuses on results from the full load continuous scenario with natural gas fuel and the Cumulative scenarios, as they represent the majority of operational conditions.

7.2.38 There is a requirement for a relatively small (no greater than 900 kW) emergency diesel generator (EDG) to allow safe power down of the gas turbine in the event of loss of power to the site. The EDG will be located to the immediate west of the OCGT in a pre-fabricated unit on a concrete plinth, will include a small integral bunded diesel tank and will be for limited and emergency use only (i.e. 15 mins testing per month and 4 hours run time in the event it is required); due to limited use the EDG is therefore scoped out of formal air quality assessment in this EIAR).The cumulative assessments include emissions from the existing Tynagh CCGT Power Station, whose emissions stack is located 370m south of the Proposed Development Tynagh North OCGT emissions stack and Approved Development Ref: 21/2192 OCGT whose emissions stack is located 350m southwest of the Proposed Development OCGT emissions stack.

7.2.39 The assessment of worst-case long-term (annual mean) and short-term emissions resulting from operation of the Proposed Development has been undertaken by comparison of the maximum Process Contribution (PC) at identified sensitive receptors with the annual mean and short-term objectives, and the Critical Loads and Levels set out in Table 7.5 for ecological receptors, taking into consideration the baseline air quality, in accordance with the AG4 Guidance.

7.2.40 An assessment of nutrient nitrogen enrichment has been undertaken by applying published deposition velocities to the predicted annual average NO_X concentrations at the identified ecological receptors, determined through dispersion modelling, to calculate nitrogen deposition rates. These deposition rates have then been compared to the Critical Loads for nitrogen published by UK Air Pollution Information System (APIS) (Centre for Ecology and Hydrology and APIS, 2020) for the most sensitive species in each individual Habitat site, taking into consideration the baseline air quality.

7.2.41 Critical Loads and Critical Levels are tools for assessing air quality impacts on ecological receptors. The Critical Load relates to the quantity of pollutant deposited from air to the ground, whereas the Critical Level is the atmospheric concentration of a pollutant.

7.2.42 Potential increases in acidity on designated ecological receptors from depositional contributions of NO_X from the PC have also been considered. In this assessment, the nitrogen kilo equivalent (Keq/ha/yr), which are the units in which acidity Critical Loads are measured, have been derived from nitrogen deposition modelling values using standard conversion factors. The acidity deposition rates and baseline deposition rates have been used within the Critical Load Function Tool available on the APIS website (Centre for Ecology and Hydrology and APIS, 2020) to determine whether the contribution will result in exceedance of the defined acidity Critical Loads for the most sensitive feature.

Evaluation of Significance – Construction Dust Emissions

7.2.43 For potential amenity effects, such as those related to dust deposition, a scheme would be brought forward within the oCEMP to include mitigation measures as necessary, that minimises the potential for amenity (including dust soiling), human health, and ecological impacts as a result of the Proposed Development construction works.

7.2.44 The IAQM guidance on the assessment of dust from demolition and construction (IAQM, 2016) does not provide a method for the evaluation of impacts on receptors from construction dust, rather a means to determine the level of mitigation required to avoid significant impacts on receptors. The guidance indicates that the application of appropriate mitigation should ensure that residual effects will normally be 'not significant'.

Evaluation of Significance – Construction and Operational Emissions (for the Protection of Human Health)

7.2.45 The EPA Guidance (2022) (identified that significance of effects "is usually understood to mean the importance of the outcome of effects (consequences of the change). In general, impact significance is defined using a combination of sensitivity (e.g., high, medium and low) of the environmental feature and the magnitude of impact (e.g., major, moderate, slight and negligible). The guidance gives definitions for seven generalised degrees of impact significance that are commonly used in EIA: Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. It also states that "*Significance is a concept that can have different meanings for different topics*" and that "*where more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions*".

7.2.46 For air quality, specific sensitivity, magnitude, impact, and significance definitions exist. Common definitions for magnitude and impact can be found both in the TII guidance and the UK's IAQM/ EPUK guidance (IAQM, 2017), with the latter being quoted for reference in the former, although the IAQM guidance doesn't hold any formal or legal status.

7.2.47 The TII guidance offers guidance defining significance of a scheme in terms of change in pollutants related to the main vehicle emissions (i.e., NO_2, PM_{10} and $PM_{2.5}$). The document sets out impact descriptors at each human receptor, which then inform descriptors for change with consideration to EU limit values, this is outlined in Table 7.2 and Table 7.3. The EPA Guidance's equivalent descriptor for each term is outlined in the notes below each table.

Table 7.1: Descriptors for Magnitude by Changes in Ambient Pollutant Concentrations

MAGNITUDE OF CHANGE	ANNUAL MEAN NO_2 AND PM_{10}	NO. DAYS WITH PM_{10} CONCENTRATIONS GREATER THAN 50 $\mu G/m^3$	ANNUAL MEAN $PM_{2.5}$
Large[1]	Increase/ decrease ≥4 $\mu g/m^3$	Increase/ decrease >4 days	Increase/ decrease ≥2.5$\mu g/m^3$
Medium[2]	Increase/ decrease 2-≥4$\mu g/m^3$	Increase/ decrease 3 or 4 days	Increase/ decrease 1.25-<2.5$\mu g/m^3$
Small[3]	Increase/ decrease 0.4-<2 $\mu g/m^3$	Increase/ decrease 1 or 2 days	Increase/ decrease 0.25-<1.25$\mu g/m^3$
Imperceptible[4]	Increase/ decrease <0.4 $\mu g/m^3$	Increase/ decrease <1 day	Increase/ decrease <0.25$\mu g/m^3$
[1]High [2]Medium [3]Low [4]Negligible			

Table 7.2: Impact Descriptors for Change to Annual Mean Pollutant Concentrations

ABSOLUTE CONCENTRATION	SMALL MAGNITUDE OF CHANGE	MEDIUM MAGNITUDE OF CHANGE	LARGE MAGNITUDE OF CHANGE
40 µg/m^3 for NO_2/PM_{10} or 25 µg/m^3 for $PM_{2.5}$	Slight[7]	Moderate[6]	Substantial[5]
36-40 µg/m^3 for NO_2/PM_{10} or 22.5-25 µg/m^3 for $PM_{2.5}$	Slight	Moderate	Moderate
30-36 µg/m^3 for NO_2/PM_{10} or 18.75-22.5 µg/m^3 for $PM_{2.5}$	Negligible[8]	Slight	Slight
<30 µg/m^3 for NO_2/PM_{10} or <18.75 µg/m^3 for $PM_{2.5}$	Negligible	Negligible	Slight
[5]Signficant or above [6]Moderate [7]Slight. [8]Not significant or Negligible			

Table 7.3: Impact Descriptors for Change to the Number of Days with PM10 Concentration Greater than 50 µg/m^3

ABSOLUTE CONCENTRATION	SMALL MAGNITUDE OF CHANGE	MEDIUM MAGNITUDE OF CHANGE	LARGE MAGNITUDE OF CHANGE
Above AQS (≥35 days)	Slight[7]	Moderate[6]	Substantial[5]
Just Below Objective (32- <35 days)	Slight	Moderate	Moderate
Below Objective (26- <32 days)	Negligible[8]	Slight	Slight
Well Below Objective (< 26 days)	Negligible	Negligible	Slight
[5]Signficant or above [6]Moderate [7]Slight. [8]Not significant or Negligible			

7.2.48 When assessing significance of effects on ecological receptors, the TII Guidance states:

"Where a scheme is expected to cause an increase in concentration of more than 2 µg/m^3 and the predicted concentrations (including background) are close to (within 10% of), or exceed the standard then the sensitivity of the habitat to NO_X should be assessed by the project Ecologist."

7.2.49 The guidance also states, with reference to deposition of nitrogen:

"The road contribution to dry deposition should then be calculated and compared with the published critical loads for the selected habitat. The change in deposition due to the scheme should be assessed in relation to the relevant critical load by the project Ecologist."

7.2.50 As the TII Guidance only refers to pollutants of interest in road scheme assessments, the IAQM Guidance can be referred to for all other pollutants, as described below.

7.2.51 For a change of a given magnitude, the IAQM publication 'Land-Use Planning & Development Control: Planning for Air Quality (IAQM, 2017) has published recommendations for describing the magnitude of long-term impacts at individual receptors and describing the significance (Table 7.4) of effects. The EPA Guidance's equivalent descriptor for each term is outlined in the notes below each table.

Table 7.4: Air Quality Effect Descriptor for Long Term Changes in Ambient Pollutant Concentrations

LONG TERM AVERAGING CONCENTRATION AT RECEPTOR	PERCENTAGE CHANGE IN ANNUAL MEAN CONCENTRATIONS			
	< 1% Imperceptible[4]	2-5% Small[3]	6-10% Medium[2]	>10% Large[1]
75% or less of AQAL	Negligible[8]	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight[7]	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate[6]	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial[5]
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
AQAL = Air Quality Assessment Level (which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)) 1. High. 2.Medium. 3.Low. 4.Negligible 5. Significant or above. 6.Moderate. 7.Slight. 8.Not significant or Negligible				

7.2.52 The IAQM guidance (IAQM, 2017) is not explicit in the identification of whether any of the above effect descriptors should be considered 'significant' or 'not significant', rather it indicates that the descriptors should be applied to individual receptors and a 'moderate' adverse effect at one receptor may not mean that the overall effect is significant; other factors need to be considered. However, it indicates further that 'negligible' effects are likely to lead to effects that are 'not significant' and 'substantial' effects describe the potential for 'significant' effects.

7.2.53 For short term changes, the IAQM guidance (IAQM, 2017) indicates that 10% of the short term Air Quality Standard (AQS) is sufficiently small in magnitude to be regarded as having an 'insignificant' effect. 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 is described as follows:

- PC <=10% of the Environmental Standard represents an 'insignificant' (negligible) impact;
- PC 11-20% of the Environmental Standard is small in magnitude representing a 'slight' (minor) impact;
- PC 21-50% of the Environmental Standard is medium in magnitude representing a moderate impact; and
- PC >=51% of the Environmental Standard is large in magnitude representing a 'substantial' (major) impact.

7.2.54 The EPA AG4 guidance document on dispersion modelling (EPA, 2020) does not mention significance as such but defines a maximum allowable PC with respect to the AQS. It is defined as below:

- Maximum Allowable PC = 0.75*(AQS) where there is no significant background concentration; and
- Maximum Allowable PC = 0.75*(AQS – Background) where there is a significant background concentration.

7.2.55 The EPA guidance document on Environmental Impact Assessment (EPA, 2022) does contain a method to determine and describe the effect of a development, but that approach is not wholly appropriate for air quality. 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.

Evaluation of Significance – Operational Emissions (for the Protection of Sensitive Ecosystems)

7.2.56 For the purposes of this assessment, impacts on nature conservation receptors have been considered to be insignificant ('not significant') and therefore screened out from the need for further assessment where the annual mean PC is less than 1% of the relevant environmental standard. This approach is comparable with an approach set out within the UK Environment Agency guidance for assessing emissions to air from combustion processes.

7.2.57 Where an impact on nature conservation receptors cannot be screened out as insignificant using the above criteria, again it does not necessarily mean that the effect is then significant. The predicted PC and predicted environmental concentration (PEC) are then reviewed relative to the appropriate Critical Levels and Critical Loads, and the headroom that remains once the Proposed Development is in operation.

Evaluation of Significance – Proposed Development as a Whole

7.2.58 Following the assessment of each individual air quality effect, 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 (which also relate to compliance with local authority 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 impacts, an effect is reported as being either 'not significant' or as being 'significant'. If the overall effect of the development on local air quality or on amenity is found to be 'moderate' or 'major' this is deemed to be 'significant' for assessment purposes. Effects found to be 'minor' or 'negligible' are considered to be 'not significant'.

Consultations

7.2.59 Wider stakeholder consultations have not been undertaken prior to the submission of this EIAR, however lands in the immediate vicinity of the Proposed Development Site have been the subject of a planning application for separate power related development in recent years, which has included the submission of an EIAR. In the preparation of this EIAR, cognisance has been undertaken of relevant formal consultation, consultee responses and third-party comments in relation to that separate project.

7.3 Regulatory and Policy Framework

Legislative Background

National Air Quality Standards

7.3.1 The National Air Quality Standards (Government of Ireland, 2011) were transcribed from the following EU legislation:

7.3.2 European Union (EU) air quality legislation is provided within Directive 2008/50/EC (Clean Air for Europe (CAFE)), which came into force on 11 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 Directives include:

7.3.3 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});

7.3.4 Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide;

7.3.5 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.

7.3.6 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.

7.3.7 Directive 2008/50/EC has been implemented through the Air Quality Standards Regulations 2011 (S.I. No.180 of 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.

7.3.8 The EU Limit Values and National Air Quality Standards that are of relevance to this assessment are presented in Table 7.5.

7.3.9 Table 7.5 also provides 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 7.5: Air Quality Standards for Human Health and Ecosystems

POLLUTANT	AVERAGING PERIOD	IRISH AIR QUALITY STANDARD/ EU LIMIT VALUE	ALLOWABLE EXCEEDANCE
Irish 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 (99.79th percentile of hours/year)
	Annual mean	40 µg/m^3	No exceedances allowed

POLLUTANT	AVERAGING PERIOD	IRISH AIR QUALITY STANDARD/ EU LIMIT VALUE	ALLOWABLE EXCEEDANCE
Particulate Matter (PM_{10})	Daily mean	50 µg/m^3	35 allowable exceedances (99.41st percentile of days/year)
Fine particulate Matter ($PM_{2.5}$)	Annual mean	25 µg/m^3	No exceedances allowed
Carbon Monoxide (CO)	Rolling 8-hour maximum	10,000 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
Convention on Long-Range Transboundary Air Pollution Critical Loads			
Nutrient Nitrogen deposition	Annual	Habitat specific Critical Loads[1]	No exceedances allowed
Acid Deposition	Annual	Habitat specific Critical Loads[1]	No exceedances allowed
Notes: 1 See ES Appendix 7A (EIAR Volume II) for habitat specific Critical Loads.			

Industrial Emissions Directive (IED)

7.3.10 The installed aggregated thermal capacity of the Proposed Development will exceed 50MW. 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 Directive applies to all large industrial installations and to power plants which are above a certain size threshold. The Directive will apply to the applicable combustion plant associated with the Proposed Development.

7.3.11 The EPA is the statutory body for the regulation of an Industrial Emissions Licence (IEL). The operator will be required to obtain an IEL from the EPA for the proposed OCGT Power Plant; this would be as a new licence. 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 each activity.

Relevant Environmental Legislation

7.3.12 Other national legislation that relates to air quality and is of relevance to this assessment is listed follows:

- European Union (Environmental Impact Assessment) (Environmental Protection Agency Act 1992) (Amendment) Regulations 2020, S.I. No. 191 of 2020;
- European Communities (Birds and Natural Habitats) (Amendment) Regulations 2015 S.I. No. 355/2015;
- European Union (Industrial Emissions) Regulations 2013 S.I. 138 of 2013;
- Environmental Protection Agency (Industrial Emissions) (Licensing) Regulations 2013 S.I. 137 of 2013;
- Environmental Protection Agency (Industrial Emissions) (Licensing) (Amendment) Regulations 2020 (S.I. 190 of 2020); and
- European Communities (Birds and Natural Habitats) Regulations 2011.

Planning Policy Context

National Planning Policy

7.3.13 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 (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.

7.3.14 The National Planning Framework 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."

7.3.15 The National Planning Framework 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."

7.3.16 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.

7.3.17 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 aims and objectives of Project Ireland 2040.

Local Planning Policy

7.3.18 The local development plan policy context is contained within the Galway County Council – County Development Plan 2022-2028 which sets out an overall strategy for the planning and sustainable development of the functional area of Galway County Council. The following policies are relevant to this Chapter:

- **AQ 1 Ambient Air Quality:** To promote the preservation of best ambient air quality compatible with sustainable development in accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC) and ensure that all air emissions associated with new developments are within Environmental Quality Standards as set out in the Air Quality Standards Regulations 2011 (SI No. 180 of 2011) (or any updated/ superseding documents);
- **AQ 2 Assessment of Air Quality**: To require developments which would have the potential to have adverse impacts on air quality to carry out assessments of the impact of the development on air quality;
- **AQ 3 Air Quality Mitigation Measures:** To require the use of appropriate mitigation measures such as dust dampeners to minimise the potential impacts of developments on air quality;
- **AQ 4 Air Purification:** The Council shall encourage landscaping and deciduous tree planting in an environmentally sensitive manner within towns and villages as a means of air purification, the filtering of suspended particles and the improvement of their micro-climate; and
- **AQ 5 Radon**: The Council shall have regard, to the specific guidance on radon prevention measures for new homes as contained within the existing Building Regulations (including any updated/ superseding Regulations that may be published within the lifetime of this Development Plan).

7.4 Baseline Environmental Conditions and Constraints

Sensitive Receptors

7.4.1 During the construction phase of the Proposed Development, based on IAQM guidance (IAQM, 2014), receptors potentially affected by dust soiling and short-term concentrations of PM_{10} generated during construction activities are limited to those located within 350m of the nearest construction activity, and/ or within 50m of a public road used by construction traffic that is within 500m of the construction site entrances. Ecological receptors are limited to those located within 50m of the nearest construction activity and/ or within 50m of a public road used by construction traffic that is within 500m of the construction site entrance. The only human health and amenity receptors falling into those screening distances are two residential properties approximately 330-380m to the south-west from the Proposed Development (R1 and R16 as shown in Figure 7A.1, refer to EIAR Volume III) and the adjacent Sperrin Galvanising Ltd., an Integrated Pollution Prevention and Control (IPPC) licensed facility. However, due to the nature of the work undertaken in the galvanising process, dust soiling would not have any significant environmental impacts at that industrial site, so this receptor is not considered “sensitive”.

7.4.2 Human receptors are selected for the operational phase to represent the locations where the highest effects are anticipated to occur. For an installation of this size, it is considered highly likely that these effects will occur at the most proximal locations: therefore, these locations can be representative of a highest exposure of any human receptor. Ecological

receptors with potential sensitivities to pollutants associated with the operational phase have been selected within a 15km radius of the installation.

7.4.3 Deposition of nutrient nitrogen and acid to waterbodies and watercourses has not been considered as these types of receptors are not considered to be at risk from such emissions. The lagoon and tailing ponds are industrial in nature and would not be considered to be sensitive ecological receptors. Due to this nature, these industrial waterbodies, whilst they may support a limited species range of plant and animal, are considered to be a sub-optimal habitat for both and therefore not significant in EIA terms.

7.4.4 Other watercourses such as rivers are bodies of water which are constantly moving systems, with fresh water flushing out any dissolved air quality contaminants even if they were present in high concentrations, which is not the case for the Proposed Development. On that basis, it is not possible for any air quality contaminants to become dissolved and accumulate in the water to elicit a response from the aquatic habitat.

7.4.5 Identified receptors are detailed in Table 7.6 below for the operational phase. The locations of human receptors are shown on Figure 7.1 in EIAR Volume III. Ecological receptors are shown in Figure 7.2 in EIAR Volume III. The impact of emissions from the Proposed Development emissions stack have been predicted at all of the selected receptors. A number of receptors are also adjacent to roads which could be affected by the change in traffic associated with the construction of the Proposed Development; where this is the case, these receptors have also been included in the road traffic modelling to enable the combined change in NO_2, PM_{10} and $PM_{2.5}$ concentrations to be predicted.

Table 7.6: Selected Sensitive Receptors

ID	RECEPTOR DESCRIPTION	RECEPTOR TYPE	GRID REFERENCE		DIST FROM STACK (M)	ASSESSED FOR IMPACTS FROM:
			X	Y		
R1	Residential Property on LP4310 Gurtymadden to Tynagh Road	Human Health	574021	712888	330	Emissions Stack, Construction Dust and Construction Traffic
R2	Residential Property near LP4310 Gurtymadden to Tynagh Road	Human Health	574004	712716	490	Emissions Stack, Construction Dust and Construction Traffic
R3	Residential Property on LP4310 Gurtymadden to Tynagh Road	Human Health	573809	713366	507	Emissions Stack and Construction Traffic
R4	Equestrian Centre	Human Health	574967	713581	260	Emissions Stack
R5	Residential Houses behind the Equestrian Centre	Human Health	575018	713658	525	Emissions Stack
R6	Residential Property South of Site	Human Health	574495	712384	690	Emissions Stack
R7	Residential Property South of Site	Human Health	575054	712367	965	Emissions Stack

ID	RECEPTOR DESCRIPTION	RECEPTOR TYPE	GRID REFERENCE		DIST FROM STACK (M)	ASSESSED FOR IMPACTS FROM:
			X	Y		
R8	Residential Property on LP4310 Gurtyynagh Road	Human Health	574067	712515	320	Emissions Stack and Construction Traffic
R9	Residential Property East of Site	Human Health	576301	712529	1903	Emissions Stack
R10	Residential Property East-North-East of Site	Human Health	576540	713339	1876	Emissions Stack
R11	Residential Property in Tynagh	Human Health	574692	711428	1667	Emissions Stack
R12	Residential Property in Killimor - N65	Human Health	580483	712843	5934	Emissions Stack and Construction Traffic
R13	Residential Property in Ramore - N65	Human Health	577517	713960	3003	Emissions Stack and Construction Traffic
R14	Residential Porperty North of site - N65	Human Health	576007	714800	2013	Emissions Stack and Construction Traffic
R15	Residential Property near N65/ LP4310 Gurtymadden to Tynagh Road	Human Health	573443	716332	3191	Emissions Stack and Construction Traffic
R16	Residential Property on LP4310 Gurtymadden to Tynagh Road	Human Health	573896	713001	380	Emissions Stack, Construction Dust and Construction Traffic
S1	Kilcooley National School - N65	Human Health	569492	716821	6000	Emissions Stack and Construction Traffic
S2	St Brendans National School	Human Health	572153	710861	3082	Emissions Stack
E5	Capira/Derrew Bog NHA	Ecological	584129	709281	10378	Emissions Stack
E6	Lough Derg SAC and SPA	Ecological	585019	703862	14008	Emissions Stack
E7	Lough Derg SAC	Ecological	582874	703155	13019	Emissions Stack
E8	Barroughter Bog SAC	Ecological	579212	703971	10276	Emissions Stack
E9	Slieve Aughty Mountains SPA	Ecological	574730	704267	8812	Emissions Stack
E10	Slieve Aughty Mountains SPA	Ecological	568679	710645	6104	Emissions Stack

ID	RECEPTOR DESCRIPTION	RECEPTOR TYPE	GRID REFERENCE		DIST FROM STACK (M)	ASSESSED FOR IMPACTS FROM:
			X	Y		
E11	Lough Rea SPA	Ecological	562874	714553	11468	Emissions Stack
E1	Eskerboy Bog NHA	Ecological	578200	716741	4946	Emissions Stack
E2	Cloonoolish Bog NHA	Ecological	581722	714969	7327	Emissions Stack
E3	Moorfield Bog NHA	Ecological	584925	716025	10687	Emissions Stack
E4	Ardgraigue Bog SAC	Ecological	582855	713655	8279	Emissions Stack
E12	Middle Shannon Callows SPA/ SAC	Ecological	587053	705893	14488	Emissions Stack
E13	Middle Shannon Callows SPA/ SAC	Ecological	589198	709514	15142	Emissions Stack
E14	Meeneen Bog NHA	Ecological	588815	712112	14302	Emissions Stack
E15	Cloonmoylan Bog SAC	Ecological	578068	701982	11688	Emissions Stack
E16	Rosturra Wood SAC	Ecological	576628	702144	11157	Emissions Stack
E17	Pollnaknockaun Wood Nature Reserve SAC	Ecological	574463	702012	11059	Emissions Stack
E18	Derrycrag Wood Nature Reserve SAC	Ecological	574242	699813	13259	Emissions Stack
E19	Slieve Aughty Bog NHA	Ecological	572798	702067	1118	Emissions Stack
E20	Slieve Aughty Bog NHA	Ecological	564847	707282	11075	Emissions Stack
E21	Slieve Aughty Bog NHA	Ecological	567985	701970	12811	Emissions Stack
E22	Ancient Woodland: Bog Wood	Ecological	575558	709172	4074	Emissions Stack
E23	Ancient Woodland: Rinmaher Wood	Ecological	582379	704756	11493	Emissions Stack
E24	Ancient Woodland: Derryvunlam	Ecological	575473	702904	10226	Emissions Stack

Existing Air Quality

7.4.6 The existing environment has been described with reference to the most recently published EPA Air Quality Report and supplementary data (EPA, 2022).

7.4.7 The EPA manages the national ambient air quality network, which consists of 116 monitoring stations as of 2022, 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 2022 and refers to monitoring data gathered in 2021 and earlier.

7.4.8 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, 2022) are:

- Zone A – Dublin conurbation;
- Zone B – Cork conurbation;
- Zone C – large towns with a population >15,000; and
- Zone D – the remaining area of Ireland.

7.4.9 The EPA operates 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 7.7. Data is also presented as the average across the representative Zone D sites.

Table 7.7: Air Quality Monitoring Data

MONITORING STATION	POLLUTANT	REPORTED CONCENTRATION (µg/m^3)[1]				AIR QUALITY STANDARD (µg/m^3)
		2018	2019	2020	2021	
Zone D Average[5]	NO_2	4.7	5.7	4.0	7.3	40[2]
	NO_X	6.7	7.8	5.4	14.5	30[3]
	PM_{10}	10.7	12.3	11.9	11.6	40[2]
	$PM_{2.5}$	7.5	9.3	8.3	7.9	25[2]
	CO[4]	400 (0)[6]	100 (0)	400 (0)[6]	300 (0)	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).

4 Rolling 8-hour average – number of exceedances of the rolling 8-hour maximum Air Quality Standard provided in parenthesis).

5 Zone D average data discounts sites with data capture of <50%.

6 Average for Zone C – no Zone D data available.

7.4.10 The EPA data summarised in Table 7.7 above demonstrates that the existing airshed in the vicinity of the Site 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.

7.4.11 Monitored annual mean NO_X concentrations reported by the EPA for Zone D suggest that nature conservation sites considered in this assessment are not currently constrained by the pollutants associated with harm to ecosystems.

AECOM Project Specific Monitoring

7.4.12 To provide further detail on the variation in background NO_2 concentrations throughout the study area, a project specific diffusion tube survey was undertaken. Although the survey was conducted partially during a period when road traffic volumes were reduced by the Coronavirus pandemic, it still provides useful information on the range of conditions in the area around the Site.

7.4.13 Results presented below are based on measurements realised between the 25 June 2021 and the 14 of January 2022. The results from the survey were annualised to 2019 in line with the methodology set out in LAQM.TG (16) (Defra, 2016). The year 2019 has been used to correct any exceptional results (due to Covid-19 impacts) that would not be

representative of the normal situation. The results of the survey are shown in Table 7.8. The raw monitoring data is located in Annex C, Appendix 7A (refer to EIAR Volume II). Monitoring data was annualised using data from the Emo Court, Castlebar and Kilkitt rural monitoring stations. Data for these sites was sourced from the airquality.ie website, operated by the EPA (EPA, 2021).

Table 7.8: AECOM NO_2 Diffusion Tube Concentrations Monitored in 2021 and Annualised to 2019

SITE ID	GRID REF NIOS (M)	SITE TYPE	PERIOD MEAN CONCENTRATION (µg/m³)						BIAS ADJUSTED ANNUALISED MEAN (µg/m³)
			Jul	Aug	Sep	Oct	Nov	Dec	
DT1	572752, 716320	Roadside	7.8	2.3	9.0	5.6	7.6	4.5	8.1
DT2	575589, 715309	Roadside	7.7	6.4	7.7	4.2	5.7	6.2	8.3
DT3	577150, 714268	Roadside	8.9	8.0	11.5	6.7	8.0	7.5	11.1
DT4	580211, 712950	Roadside	5.7	5.3	7.2	4.4	4.9	5.2	7.2
DT5	573545, 716127	Roadside	5.0	4.9	6.8	4.1	2.9	5.8	6.5
DT6	573974, 715285	Roadside	3.7	4.1	4.5	4.2	4.1	3.4	5.3
DT7	574725, 711292	Background	2.2	2.6	2.9	2.5	4.6	2.6	3.8
DT8	576238, 712536	Background	2.0	2.5	2.5	2.3	2.2	I/S	3.2
DT9	574164, 712370	Background	Missing	2.8	3.1	I/S	I/S	2.8	3.6
DT10	575645, 714495	Background	2.5	3.1	3.0	2.8	3.8	2.6	3.9

7.4.14 The project specific NO_2 measurement results are all well below the annual mean NO_2 objectives. The annual mean NO_2 concentrations measured along the N65 (DT1 to DT4) are low at one third or less of the air quality standard value. Concentrations at other less busy roads are markedly lower.

Background Concentrations

7.4.15 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 (2022) and diffusion tube measurements. With the 6 months survey complete, the highest annualised NO_2 concentration measured at a background location (DT10) has been used as a conservative but representative measurement of the local background option. The NO_2 concentration has been calculated assuming a 70% NOx to NO_2 conversation rate, as this is a value commonly agreed in the UK for long-term averaging periods. All other pollutant were sourced from publicly available data.

7.4.16 The background pollutant concentration data is listed in Table 7.8. 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). Background nitrogen deposition values were sourced from EPA Research Report No. 323 (EPA, 2020). No ambient background data could be found for acid deposition rates and a proxy background value has been used as an alternative, as described in Table 7.8. Due to the use of this proxy value, there remains some uncertainty in the annual mean acid deposition rates reported in this chapter. The latest version of the EPA report has been used and values for zone D for 2019 were selected as the most representative year, before any impacts from Covid-19.

Table 7.9: Background Pollutant Concentrations

POLLUTANT	AVERAGING PERIOD	RURAL CONCENTRATION (µg/m^3 UNLESS STATED)
Nitrogen dioxide (NO_2)	Annual mean	3.9
	Hourly mean	7.8
Carbon monoxide (CO)	Rolling 8-hour mean	100
Particulate matter (PM_{10})	Annual mean	12.3
	Daily mean	24.6
Fine particulate matter ($PM_{2.5}$)	Annual mean	9.3
Oxides of nitrogen (NO_X) – for the protection of ecosystems	Annual mean	7.8
Nitrogen deposition	Annual mean	12 kg N/ha/yr
Acid deposition	Annual mean	0.5 (N: 0.4 / S: 0.1) keq/ha/yr[1]
Notes: 1 No acid deposition data for Ireland obtained. Instead, a representative value has been used and obtained from APIS, based on modelled acid deposition rates at a rural location in the west of Wales, at British National Grid reference 214675,325608. However, Predicted Environmental Concentrations of acid deposition reported in this chapter should be treated with caution.		

Baseline

7.4.17 Baseline annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of expected exceedances of the 24-hour 50µg/m^3 PM_{10} air quality objectives at the receptors sensitive to changes in road traffic emissions during the current 2019 baseline scenario are listed in Table 7.10 below.

Table 7.10: Air Quality Statistics Predicted for Baseline Scenario in 2019

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m^3)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 µg/m^3 (DAYS)
		NO_2	PM_{10}	$PM_{2.5}$	
R1	Property on LP4310 Gurtymadden	4.5	12.4	9.4	1
R2	Property on LP4310 Gurtymadden	4.0	12.3	9.3	1
R3	Property on LP4310 Gurtymadden	4.9	12.5	9.4	1
R8	Property on LP4310 Gurtymadden	4.0	12.3	9.3	1
R12	Property in Killimor - N65	9.8	13.1	9.8	0
R13	Property in Ramore - N65	6.4	12.7	9.5	1
R14	Porperty North of site - N65	7.6	12.9	9.7	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m³)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 µg/m³ (DAYS)
		NO_2	PM_{10}	$PM_{2.5}$	
R15	Property near N65/ LP4310 Gurtymadden junction	10.8	13.4	10.0	0
R16	Property on LP4310 Gurtymadden	4.4	12.4	9.3	1
S1	Kilcooley National School - N65	9.6	13.2	9.9	0

7.4.18 In the Baseline scenario the annual mean concentrations of all pollutants near to main roads in the vicinity of the Site are well below the environmental standards, indicating that air quality in the area around the Site is of a very good standard.

Future Construction Baseline

7.4.19 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of exceedances of the 24-hour 50 µg/m³ PM_{10} air quality objective, at the selected receptors during the future 2024 baseline scenario for the Proposed Development are listed in Table 7.11. As described at paragraph 7.2.22 the traffic flows used for the future baseline scenario include other committed developments.

Table 7.11: Air Quality Baseline Statistics Predicted for 2024 Baseline Scenario (including other committed developments)

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m³)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 µg/m³ (DAYS)
		NO_2	PM_{10}	$PM_{2.5}$	
R1	Property on LP4310 Gurtymadden	4.6	12.4	9.4	1
R2	Property on LP4310 Gurtymadden	4.1	12.3	9.3	1
R3	Property on LP4310 Gurtymadden	5.1	12.5	9.4	1
R8	Property on LP4310 Gurtymadden	4.0	12.3	9.3	1
R12	Property in Killimor - N65	11.0	13.3	9.9	0
R13	Property in Ramore - N65	6.9	12.8	9.6	1
R14	Property North of site - N65	8.4	13.0	9.7	1
R15	Property near N65/ LP4310 Gurtymadden junction	12.2	13.6	10.1	0
R16	Property on LP4310 Gurtymadden	4.5	12.4	9.4	1
S1	Kilcooley National School - N65	10.7	13.4	10.0	0

7.4.20 The predicted future baseline scenario for the construction year pollutant concentrations are well below all AQS values for all pollutants, indicating that air quality in the vicinity of the Site will continue to be of a very good standard. Compared to 2019, slightly higher concentrations of NO_2 are predicted alongside the N65, though still within the AQS objective values.

7.5 Predicted Impacts

Construction Phase

Impacts on Amenity

7.5.1 'Dust' is defined in British Standard (BS) 6069-2:1994 (British Standards Institute (BSI), 1994) as particulate matter in the size range 1µm – 75µm (microns) in diameter and is primarily composed of mineral materials and soil particles. This definition is also referred to in NPPF technical guidance (Ministry of Housing, Government & Local Government, 2018b) in the context of dust impacts from mineral extraction operations. The BSI definition has been adopted in this assessment.

Assessment of Construction Dust

7.5.2 The area sensitive to dust soiling and PM_{10} health effects has been assessed, as detailed in Appendix 7A in EIAR Volume II, from the sensitivity of receptors and the proximity of the Proposed Development activities to these receptors.

7.5.3 All local Ramsar sites, SPAs and SACs are further than 50m from the construction works associated with the Proposed Development, the closest being 6.1km away. Potential impacts on water bodies and water courses have been discussed in paragraph 7.4.4. Therefore, an assessment of construction dust on ecological receptors has been screened out.

7.5.4 The scale and nature of activities have been estimated to define the potential uncontrolled dust generation magnitude, according to the criteria outlined in Appendix 7A (refer to EIAR Volume II).

7.5.5 Whilst a detailed CEMP will be developed by the appointed contractor for the Proposed Development, an oCEMP is included in Appendix 5A (refer to EIAR Volume II). Estimates of the likely scale of activities based on the type of structure being built, with reference to the guidance magnitude definitions in Appendix 7A (refer to EIAR Volume II) have been made for the purposes of mitigation definition:

- There could potentially be minor demolition (e.g. there is a disused galvanised shed and hardstanding on the Site), limited excavation and regrading activities to complete prior to the construction of the Proposed Development, therefore the dust emissions magnitude from these activities has been considered medium; and
- The potential for dust emissions from earthwork, construction, and track out from the Proposed Development is considered medium because of the size of the project but for this assessment to be conservative, they will be considered large.

7.5.6 Potential dust impacts (pre-mitigation) have been assessed based on the receptor sensitivity and distance criteria outlined in Appendix 7A (refer to EIAR Volume II) using professional judgment. There would be potentially dusty activities carried out between approximately 330 to 380m from two residential properties and adjacent to a galvanising

company, and 6.1km from the closest designated ecological receptors. Due to the nature of the work undertaken in the adjoining premises galvanising process, dust soiling would not have any economic impacts at that site. The Site access point is 345m from the LP4310 Gurtymadden to Tynagh Road, with only two roadside residential receptors potentially sensitive to dust trackout (note: only outbuildings), within 500m of the Site entrance (located to the north of the Tynagh Power Station site entrance). The sensitivity of the area can be considered "low" both for dust soiling impacts and for human health impacts from PM_{10} releases from all activities, on account of the distance from the activity source to the receptors, and the existing low background concentration particulates (<24µg/m^3).

7.5.7 The potential risks from emissions from construction activities associated with the Proposed Development (i.e., not taking into account the impact avoidance measures) have been defined with reference to the magnitude of the potential emissions and the sensitivity of the impact area, in accordance with the classification defined in Appendix 7A. The results are shown in Table 7.12 below.

Table 7.12: Risk of Dust and Particulate Impacts (Pre-Mitigation)

POTENTIAL IMPACT	RISK OF IMPACT FROM ACTIVITY			
	PRE CONSTRUCTION	EARTHWORKS	CONSTRUCTION	TRACKOUT
Dust Soiling	Low	Low	Low	Low
Human Health	Low	Low	Low	Low
Ecological	Not applicable	Not applicable	Not applicable	Not applicable

7.5.8 Whilst the assessment has identified a "low risk" of impact from construction activities and the IAQM "low risk" mitigation measures would be adequate to reduce dust and particulates enough to avoid significant impacts, there are large dust emission magnitudes and it will be beneficial for both parties if measures from the "medium" level are applied. Indicative measures are outlined in Table 7.13 for the Proposed Development activities and the complete list is available in Appendix 7A (refer to EIAR Volume II).

Table 7.13: Example Mitigation for Dust and Particulate During the Construction Phase

ACTIVITY	EXAMPLE MITIGATION BASED ON RISK LEVEL	CLASSIFICATION OF RESIDUAL RISK OF IMPACT	EFFECT DESCRIPTOR
Demolition	High/ medium/ low risk: ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Negligible	Not significant
Earthworks	Medium/ low risk: re-vegetate earthworks (where relevant) and any soil stockpiles to stabilise surfaces as soon as practicable; minimise working area and use temporary cover or damping down to minimise dust formation during dry and windy conditions.	Negligible	Not significant

ACTIVITY	EXAMPLE MITIGATION BASED ON RISK LEVEL	CLASSIFICATION OF RESIDUAL RISK OF IMPACT	EFFECT DESCRIPTOR
Construction	Medium/ low risk: avoid mechanical roughening of concrete surfaces where possible; store sand and aggregates in bunded areas and finer materials in silos with suitable emission control systems.	Negligible	Not significant
Trackout	Medium/ low risk: use water suppression and regular cleaning to minimise mud on road; cover (with tarpaulin) the load of vehicles leaving the Site with spoil or waste materials; employ wheel wash systems at Site exits; restrict unmade road access where possible.	Negligible	Not significant

7.5.9 The application of good working practice measures and mitigation regularly employed in the construction industry and included within the oCEMP (refer to Appendix 5A, EIAR Volume II) will reduce potential effects at receptors to a not significant level.

Assessment of Construction Traffic

7.5.10 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of exceedances of the 24-hour 50µg/m^3 PM_{10} air quality objective at the selected existing receptors in the 2024 Construction scenario are listed in Table 7.14.

Table 7.14: Air Quality Statistics Predicted for 2024 Construction Scenario

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m^3)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50µg/m^3 (DAYS)
		NO_2	PM_{10}	$PM_{2.5}$	
R1	Property on LP4310 Gurtymadden	4.9	12.5	9.4	1
R2	Property on LP4310 Gurtymadden	4.1	12.3	9.3	1
R3	Property on LP4310 Gurtymadden	5.6	12.6	9.5	1
R8	Property on LP4310 Gurtymadden	4.0	12.3	9.3	1
R12	Property in Killimor - N65	11.7	13.4	10.0	0
R13	Property in Ramore - N65	7.1	12.8	9.6	1
R14	Property North of site - N65	8.7	13.1	9.8	0
R15	Property near N65/ LP4310 Gurtymadden junction	13.0	13.7	10.2	0
R16	Property on LP4310 Gurtymadden	4.7	12.4	9.4	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m³)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50µg/m³ (DAYS)
		NO_2	PM_{10}	$PM_{2.5}$	
S1	Kilcooley National School - N65	11.3	13.5	10.1	0

7.5.11 Predicted pollutant concentrations in the 2024 Construction scenario show that concentrations of all pollutants are below all environmental standard values for all pollutants, indicating that air quality in the vicinity of the Site remains of a good quality.

7.5.12 The changes in air quality statistics between the 2024 future baseline and 2024 Construction scenarios are shown in Table 7.15.

Table 7.15: Air Quality Impacts Predicted for 2024 Construction Scenario

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m³)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50µg/m³ (DAYS)
		NO_2	PM_{10}	$PM_{2.5}$	
R1	Property on LP4310 Gurtymadden	0.3	<0.1	<0.1	<1
R2	Property on LP4310 Gurtymadden	0.1	<0.1	<0.1	<1
R3	Property on LP4310 Gurtymadden	0.5	0.1	0.1	<1
R8	Property on LP4310 Gurtymadden	<0.1	<0.1	<0.1	<1
R12	Property in Killimor - N65	0.7	0.1	0.1	<1
R13	Property in Ramore - N65	0.3	<0.1	<0.1	<1
R14	Property North of site - N65	0.4	0.1	<0.1	<1
R15	Property near N65/ LP4310 Gurtymadden junction	0.8	0.1	0.1	<1
R16	Property on LP4310 Gurtymadden	0.2	<0.1	<0.1	<1
S1	Kilcooley National School - N65	0.6	0.1	0.1	<1

7.5.13 The magnitude of the change in pollutant concentrations due to construction traffic on the road network associated with the Proposed Development is predicted to be imperceptible or low for all pollutants at all receptor locations. A change of this magnitude is considered (see paragraph 7.2.45 and below) to have a negligible effect as the long-term averaging concentrations at all receptors are less than 75% of the Standard, which is considered to be not significant.

Operational Phase

IED/ BAT-AEL Emission Limit Value (ELV) Compliance

7.5.14 The Proposed Development will be designed such that process emissions to air comply with the ELV requirements specified in the IED. The operation of the power plant, Tynagh North, will be regulated by EPA through the IEL required for the operation of the Proposed Development.

Emissions Stack Height

7.5.15 The emissions stack height for the Proposed Development has been determined at 40m (above finished ground level of 67.5mAOD), in order to provide appropriate dispersion of the emitted pollutants. An analysis of the effect of increasing stack height on ground level impacts has been included in Appendix 7A in EIAR Volume II. Emissions from the stack have been modelled at heights between 34m and 70m to find a height that will allow a balance between a release height sufficient to achieve adequate dispersion of pollutants and other constraints such as visual impact. Based on this assessment, a 40m stack is considered appropriate.

Impacts on Human Health and Sensitive Ecosystems

7.5.16 The pollutants considered within the assessment of emissions from the OCGT emissions stack are primarily those prescribed within the IED (European Commission, 2010). These are:

- NO_x, expressed as NO_2 in the case of human health, or NO_x in the case of ecological impacts; and
- Carbon monoxide (CO).

7.5.17 The impact of point source emissions at human health receptors has been determined from isopleth figures of pollutant dispersion and the model output for the selected discrete receptor locations.

7.5.18 The maximum rolling 8-hour mean CO, the 99.79th hourly percentile NO_2, and annual mean NO_2 and NO_x predicted concentrations have been compared with the AQS values, as summarised in Table 7.11 to Table 7.13 below; full concentrations are provided in Appendix 7A in EIAR Volume II. Isopleth figures showing the annual and hourly mean PC of NO_2 are provided in Figures 7.4 to 7.6 of Appendix 7A in EIAR Volume II.

7.5.19 The assessment has been undertaken for the Proposed Development opening year scenario (2026).

7.5.20 The dispersion modelling includes a number of conservative assumptions in combination, including:

- Use of the worst-case year of meteorological data modelled for the emissions stack emissions;
- Operation of the plant at the proposed IED or BAT-AEL emissions limits, whichever is lower (in practice the actual operational emissions will have to be lower than these limits in order to ensure that the limits are adhered to); and
- Conservative estimates of background concentrations at the sensitive receptors.

7.5.21 The Proposed Development is a peaking plant that will have the ability to operate 24 hours a day, seven days a week. It is noted however that, whilst the Proposed Development has the potential to operate in this manner, in reality it is expected to only operate during peak periods for a limited number of hours per year. On a precautionary basis, therefore,

the annual mean results have been based on an assumed continuous operation. Short-term results have also been based on continuous operation throughout the year, in order to ensure meteorological conditions that represent the full range of conditions within the study area are taken into account.

7.5.22 The following abbreviations are used in tables below:

- PC: this is the Process Contribution and represents the change caused by the Proposed Development;
- PEC: this is the Predicted Environmental Concentration and is the PC plus background concentration. It is the concentration expected at a particular receptor once the effect of the Proposed Development is taken into account; and
- AQS: the relevant national air quality standard or environmental standard.

Table 7.16: Annual Mean NO_2 Results at Location of Maximum Predicted Impact and Most Affected Sensitive Receptor

CASE DESCRIPTION	AIR QUALITY STANDARD (AQS) (µg/m³)	PROCESS CONTRIBUTION (PC) (µg/m³)	PC/AQS (%)	BACKGROUND (µg/m³)	PREDICTED ENVIRONMENTAL CONCENTRATION (PEC) (µg/m³)	PEC/AQS (%)	SIGNIFICANCE OF EFFECT
Full Load Continuous Operation, natural gas fuel							
Maximum Anywhere (X575135, Y713656) 800 metres NE of OCGT emissions stack	40	0.2	0.5	3.9	4.1	10.3	Negligible
Most affected receptor (R5, Residential House behind the Equestrian Centre)		0.2	0.5	3.9	4.1	10.3	Negligible

Table 7.17: 99.79th Percentile 1-Hour NO_2 Results at Location of Maximum Predicted Impact and Most Affected Sensitive Receptor

CASE DESCRIPTION	AIR QUALITY STANDARD (AQS) (µg/m³)	PC (µg/m³)	PC/AQS (%)	BACKGROUND (µg/m³)	PREDICTED ENVIRONMENTAL CONCENTRATION (PEC) (µg/m³)	PEC/AQS (%)	SIGNIFICANCE OF EFFECT
Full Load Continuous Operations, natural gas fuel							
Maximum (X574715, Y713456) 350 metres NE of OCGT emissions stack	200	11.2	5.6	7.8	19.0	9	Negligible
Most affected receptor (R4, Equestrian Centre)		9.9	4.9		17.7	8.8	Negligible
Backup (emergency full load operation)							
Maximum (X574715, Y713456) 340 metres NE of OCGT emissions stack	200	28.4	14.2	7.8	36.2	18.1	Slight
Most affected receptor (R4, Equestrian Centre)		26.3	13.3		34.1	17.1	Slight
Augmented Power, natural gas fuel							
Maximum (X574755, Y713496) 400 metres NE of OCGT emissions stack	200	9.1	4.5	7.8	16.9	8.4	Negligible
Most affected receptor (R5, Residential House behind the Equestrian Centre)		8.2	4.1		16.0	8.0	Negligible
Low Load, natural gas fuel							

Maximum (X574575, Y713316) 150 metres NE of OCGT emissions stack	200	27.8	13.9	7.8	35.6	17.8	Slight
Most affected receptor (R4, Equestrian Centre)		9.6	4.8		17.4	8.7	Negligible

Table 7.18: Maximum predicted 8-hour Rolling CO Results at Location of Maximum Predicted Impact and Most Affected Sensitive Receptor

CASE DESCRIPTION	AIR QUALITY STANDARD (AQS) (µg/m^3)	PC (µg/m^3)	PC/AQS (%)	BACKGROUND (µg/m^3)	PREDICTED ENVIRONMENTAL CONCENTRATION (PEC) (µg/m^3)	PEC/AQS (%)	SIGNIFICANCE OF EFFECT
Full Load Continuous Operations , natural gas fuel							
Maximum (X 574715 , Y 713416) 320 metres NE of OCGT emissions stack	10,000	23.9	0.2	100	123.9	1.2	Negligible
Most affected receptor (R4, Equestrian Centre)		18.4	0.2		118.4	1.2	Negligible
Backup (emergency full load operation)							
Maximum (X574735, Y713416) 330 metres NE of OCGT emissions stack	10,000	21.0	0.2	100	121.0	1.2	Negligible
Most affected receptor (R4, Equestrian Centre)		16.4	0.2		116.4	1.2	Negligible
Augmented Power, natural gas fuel							
Maximum (X574755 , Y713436)	10,000	20.5	0.2	100	120.5	1.2	Negligible

360 metres NE of OCGT emissions stack							
Most affected receptor (R4, Equestrian Centre)		16.7	0.2		116.2	1.2	Negligible
Low Load, natural gas fuel							
Maximum (X574515, Y713336) 140 metres N of OCGT emissions stack	10,000	39.0	0.4	100	139	1.4	Negligible
Most affected receptor (R4, Equestrian Centre)		14.5	0.1		114.5	1.1	Negligible

7.5.23 Table 7.16 presents the model results for annual mean concentrations of NO_2. The maximum predicted PC within the model domain is 0.2µg/m^3, such a change can be considered to be not significant.

7.5.24 Table 7.17 presents the model results for 99.79th percentile 1-hour NO_2 concentrations. When operating on both natural gas fuel and backup fuel, an overall effect which is not significant would occur throughout the modelled domain. At the most affected sensitive receptor the predicted impact is 26.3µg/m^3 or 13.2% of the short-term NO_2 air quality standard, when the OCGT is operating at full load with backup fuel.

7.5.25 Table 7.18 presents the model results for 8-hour rolling CO concentrations, the results are considered to be not significant throughout the modelled domain, for all the operating modes and fuels assessed.

7.5.26 Given the worst-case assumptions made in the assessment, the magnitude of the predicted impacts and the predicted NO_2 and CO concentrations with the Proposed Development, it is considered unlikely that the Proposed Development will interfere with policies or plans in place to bring about sustained achievement of the AQS values. The overall effect of changes in NO_2 and CO concentrations due to emissions from the Proposed Development is considered to be not significant.

Impacts on Ecological Receptors

7.5.27 The impact of PC of point source emissions at ecological receptors has been determined from the maximum model output at discrete receptor locations. The PC to Critical Level values (predicted from operation of the plant at BAT-AEL ELVs) have been compared with Critical Level and Critical Load values at each of the identified sensitive ecological receptors. As described before, Critical Levels are atmospheric concentrations and Critical Loads relate the pollutant deposition on the ground.

7.5.28 The significance of effects associated with emissions from the Proposed Development on designated nature conservation sites is discussed in Chapter 9: Biodiversity and the Screening for Appropriate Assessment report (appendix 9D, refer to EIAR Volume II) of this EIAR. In summary, the model predicts that the magnitude of impacts associated with emissions from the Proposed Development:

- Do not exceed the first stage screening threshold of 1% of the environmental standard for annual mean NO_X concentrations;
- Do not exceed the screening threshold of 1% of the environmental standard for annual mean nutrient nitrogen deposition; and
- Do not exceed the screening threshold of 1% of the environmental standard for annual mean acid deposition.

7.5.29 The assessment therefore concludes that the Proposed Development will not give rise to significant adverse air quality effects on sensitive habitats within local SPA, SAC, Ramsar sites and NHAs.

<u>Decommissioning Phase</u>

7.5.30 The relevant best practice mitigation measures will be in place during any decommissioning and demolition works, and the surrounding environment and receptors at the time of decommissioning will be identified through due process and documented in a Demolition Environmental Management Plan. The predicted air quality effects of eventual decommissioning and demolition of the Proposed Development are considered

to be comparable to, or less than, those assessed for construction activities and are therefore not significant.

7.6 Mitigation and Enhancement Measures

Construction Phase

Construction Environmental Management Plan

7.6.1 Emissions of dust and particulates from the construction phase of the Proposed Development will be controlled in accordance with good working practices regularly employed in the construction industry, through incorporation of appropriate control measures according to the risks posed by the activities undertaken, as determined through this assessment process. The management of dust and particulates and application of adequate mitigation measures will be enforced through embedding measures in the CEMP. An oCEMP has been prepared and is included as Appendix 5A in EIAR Volume II. The oCEMP will frame the parameters of the final CEMP.

7.6.2 Based on an initial assessment of the area of sensitivity to dust impacts and the likely risk of impacts arising from each of the key construction activities (demolition, earthworks, construction and trackout of material onto roads) (refer to EIAR Appendix 7A, EIAR Volume II), and as described in section 7.5, appropriate embedded measures to be implemented during construction (good site techniques drawn from the 'medium risk' site schedule in IAQM guidance) that have been identified are:

- Storage of sand and aggregates in bunded areas and storage of cement powder and fine materials in silos;
- Use of water suppression and regular cleaning, as necessary, to minimise mud on roads;
- Covering of vehicles leaving the construction site that are carrying construction waste materials (note: any excavated material will not be exported off site) ;
- Employment of a wheel wash system at exits from the Site during the construction phase;
- Minimising storage duration of spoil during construction as far as is practical; and
- Prohibiting open fires on Site.

7.6.3 Good working practice measures will also be employed for the siting and operation of NRMM to control associated emissions, including:

- Minimising vehicle and plant idling as far as is practical (i.e. when not in use); and
- Locating static plant in a central area of the Site away from sensitive boundaries or receptors.

Operational Phase

7.6.4 The air quality assessment of operational impacts has assumed that the ELVs to be set into the IEL will be met for the operational plant as required under the IED as amended by the revised BREF (the European Commission produces best available technique reference documents or BREF notes) and in accordance with use of BAT under the environmental permitting regime. The environmental effects from operation of the

Proposed Development have been identified as not significant at all human health receptors.

7.6.5 Detailed modelling of predicted impacts at ecological receptors indicates that potential effects at ecological receptors as a result of the operation of the Proposed Development can be screened out. Further assessment of the predicted effects at ecological receptors and the determination of the significance of these effects has therefore not been undertaken. This assessment concludes that the Proposed Development will give rise to no significant adverse air quality effects on sensitive habitats within the local SPAs, SACs, Ramsar sites and NHAs.

7.6.6 No specific additional mitigation has therefore been identified as necessary for the operation or decommissioning phases of the Proposed Development, other than the embedded mitigation measured outlined in this section.

Decommissioning Phase

7.6.7 It is expected that the mitigation measures outlined for the Construction Phase of the Proposed Development would also be suitable to be applied to the decommissioning works. Any additional relevant measures for further mitigation will be agreed with the relevant planning authority and or EPA (as part of site closure works) at the time.

7.7 Residual Effects

Construction Phase

7.7.1 The air quality assessment of construction impacts assumes that the impact avoidance measures outlined within Section 7.5 will be incorporated into the design of the Proposed Development, as they are standard good practice measures that are routinely applied across large construction sites. No specific additional mitigation has been identified as necessary for the construction phase of the Proposed Development. For this reason, the residual effects would be as reported within Section 7.5 of this chapter. No significant effects have been identified.

Operational Phase

7.7.2 The air quality dispersion modelling assessment has concluded that there would be a small increase in ground-level concentrations of NO_2 and CO and that operational concentrations of the modelled pollutants would be well within current Environmental Standards.

7.7.3 The Proposed Development will comply with the requirements of the European Union (Large Combustion Plants) Regulations 2012 S. I. No. 566 of 2012 under an Industrial Emissions (IE) Licence (which is to be applied for) so that any impacts of emissions to air, soil, surface and groundwater, and effects on the environment and human health, will be minimised and avoided where possible.

7.7.4 The air quality assessment of impacts at opening has assumed that the ELVs will be met for the operational plant as required and in accordance with use of BAT under the EPA's environmental permitting regime. No specific additional mitigation has been identified as necessary for the operational phase of the Proposed Development. For this reason, the residual effects would be as reported within Section 7.5 of this chapter. No significant effects have been identified.

Decommissioning Phase

7.7.5 Consistent with construction mitigation, it has been assumed that relevant best practice mitigation measures would be in place during any decommissioning works. No significant effects are anticipated.

7.8 Cumulative Effects

Construction Phase

7.8.1 The dust emissions to air from other committed developments and cumulative emissions sources in the area around the site are not close enough to generate cumulative impacts should they occur at the same time, aside from the Approved Development Ref: 21/2192. While planning approval has been obtained for the Approved Development Ref: 21/2192, the Applicant is unable to implement it (i.e. will not build/operate the approved plant) for the foreseeable future due to a range of viability constraints. For robust EIA assessment purposes it is nonetheless assumed that the Approved Development may proceed at some point in the future. It is assumed in the EIAR that the construction phase of the Approved Development Ref: 21/2192 could have a degree of overlap with the construction of the Proposed Development to enable a realistic worst case scenario to be assessed (however the construction peak periods would not overlap).

7.8.2 The magnitude of effect considered in the non-cumulative assessment of dust emissions would remain the same when considering cumulative effects including the construction phase of the Approved Development Ref: 21/2192, as it was set at the maximum (i.e. large) for construction, earthworks and trackout and at a conservative “medium” for demolition. The risk and associated level of mitigation would therefore be the same as set out in paragraph 7.5.8.

7.8.3 Cumulative traffic levels from both the Approved Development Ref: 21/2192 and the Proposed Development have been considered in the main assessment and a worst-case scenario was used, following sensitivity testing. The effect, as presented in paragraph 7.5.13, is therefore considered to be not significant.

Cumulative Model Results – Human Health

7.8.4 The emissions to air from other committed developments and cumulative emissions sources in the area around the Site have been assessed in this section as separate groups within the dispersion model, one representing sources running on natural gas and the other sources running on backup fuel as an emergency case. The source groups are described below:

- The Proposed Development; and
- The existing Tynagh CCGT Power Station; and
- Approved Development Ref 21/2192.

7.8.5 The results presented in Table 7.19 to Table 7.21 are for human health impacts. The maximum results from the model output that occur at the most affected sensitive discrete receptor are presented for each source. The significance of impacts for the most affected receptor is also included. The full modelled results are available to view in Appendix 7A (refer to EIAR Volume II).

7.8.6 Table 7.9 presents the cumulative model results for annual mean concentrations of NO_2. The maximum predicted PC within the model domain is 1.3 µg/m^3, such a change can be considered to be not significant.

7.8.7 Table 7.20 presents the cumulative model results for 99.79th percentile 1-hour NO_2 concentrations. When operating on both natural gas fuel and backup fuel, an overall effect which is not significant would occur throughout the modelled domain. At the most affected sensitive receptor, the predicted impact is 19.4 µg/m^3 or 9.7% of the short-term NO_2 air quality standard with the sources running on natural gas and 37.0 µg/m^3 or 18.5% of the short-term NO_2 air quality standard with the sources running on backup fuel.

7.8.8 At the maximum anywhere for the backup scenario, the predicted concentration is of 47.2 µg/m^3 or 23.6% of the short-term NO_2 air quality standard. This would be considered a moderate effect according to the IAQM guidance, although it is sitting at the lower end of the moderate bracket (21-50%). Following the Irish AG4 guidance, targeted towards industrial development, this level of concentration would be considered acceptable as it is well below 75% of the standard. Significance of effect can therefore be considered slight. Additionally, the point of maximum impact is not located in a place where humans will regularly be present.

7.8.9 Table 7.21 presents the cumulative model results for 8-hour rolling CO concentrations, the results are considered to be not significant throughout the modelled domain.

7.8.10 For the cumulative emissions modelling assessment, with the magnitude of the predicted impacts and NO_2 and CO concentrations, it is considered unlikely that the Proposed Development will interfere with policies or plans in place to bring about sustained achievement of the AQS values. The overall effect of changes in NO_2 and CO concentrations due to emissions from the Proposed Development is considered to be not significant.

Table 7.19: Annual Mean NO_2 Results at Location of Maximum Predicted Impact and Most Affected Sensitive Receptor for Cumulative Schemes

CASE DESCRIPTION	AIR QUALITY STANDARD (AQS) (µg/m³)	PROCESS CONTRIBUTION (PC) (µg/m³)	PC/AQS (%)	BACKGROUND (µg/m³)	PREDICTED ENVIRONMENTAL CONCENTRATION (PEC) (µg/m³)	PEC/AQS (%)	SIGNIFICANCE OF EFFECT
Cumulative, natural gas fuel (normal full load operation)							
Maximum Anywhere (X575155, Y713336) 680 metres E of the Proposed OCGT emissions stack	40	1.3	3.1	5.7	5.2	12.9	Negligible
Most affected receptor (R4, Equestrian Centre)		1.1	2.7		5.0	12.5	Negligible

Table 7.20: 99.79th Percentile 1-Hour NO_2 Results at Location of Maximum Predicted Impact and Most Affected Sensitive Receptor for Cumulative Schemes

CASE DESCRIPTION	AIR QUALITY STANDARD (AQS) (µg/m³)	PC (µg/m³)	PC/AQS (%)	BACKGROUND (µg/m³)	PREDICTED ENVIRONMENTAL CONCENTRATION (PEC) (µg/m³)	PEC/AQS (%)	SIGNIFICANCE OF EFFECT
Cumulative, natural gas fuel (normal full load operation)							
Maximum (X574575, Y713576) 385 metres N of the Proposed OCGT emissions stack	200	27.9	13.9	11.4	35.7	17.8	Slight
Most affected receptor (R4, Equestrian Centre)		19.4	9.7		27.2	13.6	Negligible

Cumulative, backup fuel (emergency backup operation)							
Maximum Anywhere (X574595, Y713716) 520 metres N of OCGT emissions stack	200	47.2	23.6	11.4	55.0	27.5	Slight (See paragraph 7.8.8)
Most affected receptor (R5,Residential Property behind the Equestrian Centre)		37.0	18.5		44.8	22.4	Slight

Table 7.21: Maximum Predicted 8-hour Rolling CO Results at Location of Maximum Predicted Impact and Most Affected Sensitive Receptor for Cumulative Schemes

CASE DESCRIPTION	AIR QUALITY STANDARD (AQS) (µg/m^3)	PC (µg/m^3)	PC/AQS (%)	BACKGROUND (µg/m^3)	PREDICTED ENVIRONMENTAL CONCENTRATION (PEC) (µg/m^3)	PEC/AQS (%)	SIGNIFICANCE OF EFFECT
Cumulative, natural gas fuel (normal full load operation)							
Maximum (X574175, Y713156) 310 metres W of the Proposed OCGT emissions stack	10,000	51.4	0.5	100	151.4	2	Negligible
Most affected receptor (R4, Equestrian Centre)		27.8	0.3		127.8	1.3	Negligible
Cumulative, backup fuel (emergency backup operation)							
Maximum Anywhere (X574155, Y713216) 330 metres W of OCGT emissions stack	10,000	121.9	1.2	100	221.9	2.2	Negligible
Most affected receptor (R3, Tynagh Road)		68.9	0.7		168.9	1.7	Negligible

Cumulative Model Results – Ecological Receptors

7.8.11 The predicted PC for each of the modelled scenarios, at the selected sensitive ecological receptors:

- Do not exceed the first stage screening threshold of 1% of the environmental standard for annual mean NO_X concentrations;
- Do not exceed the screening threshold of 1% of the environmental standard for annual mean nutrient nitrogen deposition for nationally designated sites; and
- Do not exceed the screening threshold of 1% of the environmental standard for annual mean acid deposition, expect at E1 (Eskerboy Bog NHA), E2 (Cloonoolish Bog NHA) and E3 (Moorfield Bog NHA) where the PC is predicted to reach 2.0%, 1.7% and 1.3% of the critical load (CL). The predicted total deposition rates are, respectively, 354.1%, 353.8% and 353.4% of the CL, which means that the background depositions alone are already well above the CL, and the Proposed Development would not create any new exceedance.

7.8.12 As the screening thresholds were not exceeded except at E1, E2 and E3, where no new exceedances were created, there would not be the need to proceed to a more detailed assessment of the effect of emissions from the cumulative sources on the selected ecological receptors.

7.8.13 To conclude, cumulative impacts on air quality are expected to be negligible. Any other proposed developments which are not accounted for in background pollutant concentrations would be unlikely to cause a significant impact.

7.9 Climate

7.9.1 The impact of the Proposed Development on GHGs and climate change are addressed in Technical Appendix 7B (refer to EIAR Volume II). A summary of the Appendix 7B (refer to EIAR Volume II) report is presented below.

Greenhouse Gas Assessment

7.9.2 The total GHGs from constructing the Proposed Development are estimated to be 8,484 tCO_2e.

7.9.3 The gross GHGs operating the Proposed Development over its (at least) 25-year life are estimated to be 9,203,947 tCO_2e. Annual emissions are expected to be approximately 368,158 tCO_2e.

7.9.4 The Proposed Development would provide additional peak power generation capacity, which would contribute to providing a secure energy supply to the national grid. A key component of ROI's decarbonisation strategy is to target 70% renewable electricity by 2030. To allow this uptake of renewable energy to happen it is necessary to have in place sources of energy generation that can be efficiently dispatched to cover any imbalances in supply and demand. As the use of coal and peat for electricity generation is reduced, natural gas has been identified as a relatively lower-carbon option to provide security of supply.

7.9.5 The Proposed Development can be defined as 'moderate adverse' effect. The plant will continue to operate beyond 2050 and therefore falls short of fully contributing to ROI's net zero trajectory

7.9.6 However, it is also acknowledged that whilst the ROI is moving towards decarbonising the grid, gas-fired peaking plant power stations are required as an important part of the overall transition fuel mix in order to ensure the ROI's energy security. As previously stated, the operational requirements of the Proposed Development will inevitably change during its design life and it will be subject to regular reviews to identify potential modifications and amendments to enable continued alignment with ROI climate goals.

Climate Change Resilience Assessment

7.9.7 Effects on the Proposed Development as a result of Climate Change are likely to be minimal.

7.9.8 The key potential climate change impacts on the Proposed Development and the adaptation methods to increase the resilience of the Proposed Development are detailed in Table 7.22.

Table 7.22: Potential Climate Change Impacts and Relevant Adaptation / Resilience Measures

Climate Hazard Type	Climate Hazard Projection	Sensitive Receptor	Description of Potential Impact	Embedded Design Measure	Likelihood of Impact Occurring	Consequence of Impact Occurring	Resilience Risk Level	Significant?	Additional Mitigation or Monitoring Measures
Increase in annual temperature	Likely	Built terrestrial assets, staff facilities and access routes to sites	See- Increase in summer temperature	See- Increase in summer temperature	Possible	Low	Minor	No	None Required
Increase in summer temperature	Likely	Assets, facilities, roads	Overheating of electrical equipment. Heat damage, deformation, cracking and thermal expansion of surfaces and pavements.	• Electrical connections would be buried underground, insulating against overheating in times of heatwaves. • All structures would be designed to Irish standards and specifications.	Very Unlikely	Medium	Negligible	No	None Required
		Staff, visitors on-site	Impacts on the thermal comfort of site users. Increase in ambient temperature of structures, leading to impacts on the thermal comfort of site users.	• Detailed design development structures would include an allowance for future rise in ambient temperature. • All buildings would be designed to Irish standards and specifications.	Very Unlikely	Low	Negligible	No	None Required

Climate Hazard Type	Climate Hazard Projection	Sensitive Receptor	Description of Potential Impact	Embedded Design Measure	Likelihood of Impact Occurring	Consequence of Impact Occurring	Resilience Risk Level	Significant?	Additional Mitigation or Monitoring Measures
		Function of facility	Reduced efficiency of OCGT operations - An increase in summer temperature could impact the plant efficiency.	• The power plant is designed to operate over a large range of ambient conditions and the plant efficiency difference is less than 1%, therefore Temperature changes would not have a noticeable impact.	Likely	Low	Minor	No	None Required
Increase in winter temperature	Likely	Built terrestrial assets, staff facilities and access routes to sites	None considered.	None considered	Very Unlikely	Very Low	Negligible	No	None Required
Decrease in annual rainfall	Likely	Assets, facilities, roads	See- Decrease in summer rainfall	See- Decrease in summer rainfall	Very Unlikely	Medium	Negligible	No	None Required
Decrease in summer rainfall	Likely	Assets, facilities, roads	Water shortages. Drying out of pavement structures. Deterioration of structures or foundations due to	• The Power Plant utilises air cooled heat exchangers rather than use of cooling water.	Very Unlikely	Low	Negligible	No	None Required

Climate Hazard Type	Climate Hazard Projection	Sensitive Receptor	Description of Potential Impact	Embedded Design Measure	Likelihood of Impact Occurring	Consequence of Impact Occurring	Resilience Risk Level	Significant?	Additional Mitigation or Monitoring Measures
			decrease in soil moisture levels. Insufficient water for plant cooling.	• All structures would be designed to Irish standards and specifications.					
Increase to winter rainfall	Possible	Built terrestrial assets, staff facilities and access routes to sites Staff, contractors and visitors	Surface water flooding and standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to surfaces/ exposed utilities from increased drying/ wetting and increase frost penetration. Loss or damage to materials.	• The FRA considers climate change considerations of the 'mid-range' and 'high end' future scenarios including increases in extreme rainfall, flood flow and flash flood times.	Unlikely	Medium	Minor	No	None Required
Increase to heat waves	Possible	Staff, visitors on-site	See- Increase in summer temperature.	See- Increase in summer temperature.	Very Unlikely	Low	Negligible	No	None Required
		Function of facility	See- Increase in summer temperature.	See- Increase in summer temperature.	Likely	Low	Minor	No	None Required

Climate Hazard Type	Climate Hazard Projection	Sensitive Receptor	Description of Potential Impact	Embedded Design Measure	Likelihood of Impact Occurring	Consequence of Impact Occurring	Resilience Risk Level	Significant?	Additional Mitigation or Monitoring Measures
Increase droughts	Likely	Assets, facilities, roads	See- Decrease in summer rainfall.	See- Decrease in summer rainfall.	Very Unlikely	Low	Negligible	No	None Required
Increase in storm frequency	Very Unlikely	Flooding on site	Increase to rainfall leading to increases in fluvial flows. Greater storm surge generation. Surface water flooding and standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to building surfaces/ exposed utilities from increased drying/ wetting and increase frost penetration.	• The FRA considers climate change considerations of the 'mid-range' and 'high end' future scenarios including increases in extreme rainfall, flood flow and flash flood times. • All structures would be designed to Irish standards and specifications.	Very Unlikely	Medium	Negligible	No	None Required
Increase in storm intensity	Likely	Built terrestrial assets, staff facilities and access routes to sites	Increase to rainfall leading to increases in fluvial flows. Greater storm surge generation. Surface water flooding and	• The FRA considers climate change considerations of the 'mid-range' and 'high end' future scenarios including increases in	Possible	Medium	Moderate	No	None Required

Climate Hazard Type	Climate Hazard Projection	Sensitive Receptor	Description of Potential Impact	Embedded Design Measure	Likelihood of Impact Occurring	Consequence of Impact Occurring	Resilience Risk Level	Significant?	Additional Mitigation or Monitoring Measures
		Staff, contractors and visitors	standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to building surfaces/ exposed utilities from increased drying/ wetting and increase frost penetration.	extreme rainfall, flood flow and flash flood times. • All structures would be designed to Irish standards and specifications.					

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