10.0 CLIMATE

10.1 Introduction

This chapter assesses the likely climate impacts associated with historical quarrying extraction activities at a site in the townland of Clogrennan, Bilboa, Co. Carlow. A full description of the development can be found in Chapter 3.

The subject site encompasses a total area of approximately c. 41.86 hectares and was registered by a previous owner in 2005. Historical excavation has removed materials over an area of approximately 8.66 hectares. The site is located within the townland of Clogrennane, Co. Carlow and sits directly along the Co. Laois/Co. Carlow border. The site is approximately 6 km south west of Carlow town and approximately 3 km north-west of Ballinabranna.

Within the overall landholding is the subject site, which consists of a sandstone rock quarry, Redrock. The site is bounded by a private rural road that is connected to the L7129 Road to the west and the L7134 Road to the east. The M9 motorway can be accessed via junction 6 approximately 5.5km to the south east of the site. There has been no commercial extraction taking place at the quarry since 2014, see Chapter 2 for further details.

10.1.1 Statement of Authority

This chapter was completed by Ciara Nolan. Ciara is a Principal Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Sciences (MIEnvSc). She has over 8 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takeda, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

10.1.2 Aspects Relevant to this Assessment

The climate assessment focuses on greenhouse gas (GHG) emissions associated with site activities, fuel usage and traffic emissions as these have been identified as the primary sources of GHG emissions from the site. GHG emissions will be compared against national GHG emissions, carbon budgets and targets to contextualise magnitude.

The baseline environment has been prepared with reference to published climate data from the Environmental Protection Agency (EPA) and Met Éireann. For the purposes of this assessment, while the activities assessed have occurred over the past decades, until quarrying ceased in 2014, impacts have been assessed against the most recently published climate guidance and policies which are likely more stringent

than historical policies from previous years. Therefore, if it can be determined that, based on the most recent standards, no significant effects occurred as a result of the development, then it is unlikely that significant impacts occurred based on historical standards.

10.1.3 Relevant Guidance, Legislation & Policy

10.1.3.1 Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on climate are summarised below. In addition to specific climate guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022); and
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).

The assessment has referred to national guidelines where available, in addition to international standards and guidelines relating to the assessment of climate impacts. These are summarised below:

- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2025);
- The Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as IEMA) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the ISEP 2022 GHG Guidance) (ISEP, 2022);
- ISEP GHG Management Hierarchy (hereafter referred to as the ISEP 2020 GHG Management Hierarchy) (ISEP, 2020b);
- ISEP Principles Series: Climate Change Mitigation & EIA (ISEP, 2010);

10.1.3.2 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (as amended) (Government of Ireland, 2015) was enacted (the 2015 Act). The purpose of the 2015 Act was to enable Ireland *"to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050"* (3.(1) of No. 46 of 2015). This is referred to in the 2015 Act as the 'National Transition Objective'. The 2015 Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the 2015 Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The key duty imposed on planning authorities by Section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended) is:

> *"1) A relevant body [a planning authority] shall, in so far as practicable, perform its functions in a manner consistent with—*
> *(a) the most recent approved climate action plan,*
> *(b) the most recent approved national long term climate action strategy,*

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
(d) the furtherance of the national climate objective, and
(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) in March 2021. The Climate Act was signed into Law on the 23rd of July 2021, giving statutory effect to the core objectives stated within the CAP.

In relation to carbon budgets, the 2015 Act (as amended) states "*a carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'Budget Period')*".

A carbon budget is defined as the total amount of greenhouse gas emissions that are permitted during the budget period. The carbon budget is to be produced for 3 sequential budget periods (Table 10.1). The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were first published in the Climate Action Plan 2023 (CAP23) and are reproduced in Table 10.2.

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 10.1: 5-Year Carbon Budgets

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025 – 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment – Residential	7	29	23	4	40
Built Environment – Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025 – 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

Table 10.2: Sectoral Emission Ceilings 2030

10.1.3.3 Policy

10.1.3.3.1 National Policy

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The CAP 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture. It also outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. CAP 2019 detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second CAP (CAP21) in November 2021 (Government of Ireland, 2021a) with further updates in 2022 (CAP23) and 2023 (CAP24). The current CAP is CAP25 published in April 2025 (DECC, 2025).

CAP25 is the fourth plan to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The plan follows on from CAP23 and CAP24 with the implementation of the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to reach net zero no later than 2050, as committed to in the Programme for Government. CAP25 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

A key target in CAP25 is to reduce the embodied carbon of construction materials. Section 12 of CAP25 outlines the following target for 2030 in relation to construction materials -

- Decrease by at least 30% embodied carbon for materials produced and used in Ireland.

Quarrying activities directly provide construction materials or provide the raw material to be used in construction materials.

10.1.3.3.2 Regional Policy

The specific objectives and policies relating to quarrying activities in the Carlow County Development Plan 2022 – 2028 are discussed in Chapter 2.

In addition to the County Development Plan, Carlow County Council have also produced the *Carlow Local Authority Climate Action Plan 2024–2029* (Carlow County Council, 2024) which outlines how the council will align with Government's national climate objectives, which seeks to transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy by 2050.

The *Carlow Local Authority Climate Action Plan 2024–2029* (Carlow County Council, 2024) outlines Carlow County Council's objectives to mitigate greenhouse gas emissions and strategies to prepare for and adapt to climate change. The plan outlines the sectors with the highest GHG emissions in Carlow, which are agriculture; transport; manufacturing & commercial; and residential. All actions to reduce GHG emissions will be measured with Key Performance Indicators (KPIs). The plan encompasses actions across several thematic areas, including Governance & Leadership; Built Environment & Transport; Natural Environment & Green Infrastructure; Communities: Resilience & Transition; and Sustainability & Resource Management. The Plan aligns with the Government's National Climate Objective, which aims to achieve, by no later than 2050, a transition to a climate-resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy. The Carlow Local Authority Climate Action Plan sets ambitious targets, including a 51% reduction in the Council's GHG emissions by 2030.

10.2 Methodology

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section **10.3.1.**).

The assessment accounts for various components relating to the development during different life stages to determine the total impact of the development on climate. The assessment has focussed on estimated annual GHG emissions associated with site activities and traffic emissions.

10.2.1 Site Activities

GHG emissions would have occurred due to on-site plant and machinery use, these have been quantified by calculating the GHG emissions from the annual fuel (diesel) usage on site. GHG emissions from vehicles accessing the site delivering and collecting materials are likely to have been the dominant source of vehicle-related GHG emissions.

The carbon emissions associated with the fuel usage on site have been quantified using the TII Carbon Tool (TII, 2025). The TII Carbon Tool (TII, 2025) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013). The carbon emissions are calculated by multiplying the emission factor by the quantity of the material. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

The type of plant and daily fuel usage are detailed in Table 10.3.

Plant	Fuel usage (litres / day)
Crusher	200
Loader	470
Digger	470
Rigid truck	13.2

Table 10.3: **Plant Fuel Usage**

10.2.2 Traffic Emissions

Emissions from road traffic associated with the development have the potential to emit carbon dioxide (CO_2) which will impact climate.

Chapter 13 – Material Assets: Traffic and Transport prepared by Transport Insights was reviewed in order to gather the necessary information for the climate assessment. As per Chapter 13, due to the unavailability of historic traffic survey data, and information relating to how much development traffic would have been generated, the traffic assessment was completed using the latest traffic survey data (from 2025).

According to Chapter 13, based on the number of staff expected to work on site i.e. 3 no., a total of 6 no. staff trips are generated i.e. two LV trips per staff member. Regarding HV movements, the historic site may have had an extraction output of 300-500,000 tonnes of material per annum. It is assumed for calculation purposes a figure of 400,000 tonnes per annum. It is noted that a typical payload departing site would have been 25 tonnes. This equates to an average of 58 no. HVs arriving and 58 no. HVs departing the site each day (including ad hoc HV trips) (see Table 10.4 reproduced from Table 13.5 of Chapter 13).

The exact distances travelled by each vehicle was not specified within the traffic assessment. For the purposes of this assessment a total round trip distance of 200 km was assumed for HGV trips and a total round trip distance of 100 km was assumed for staff vehicle trips. It was assumed that all staff travelled by private car. The site was assumed to be operational for a maximum of 312 days per year.

The vehicle trips and assumed distances were multiplied by the relevant emission factors in the TII Carbon Tool in order to quantify the GHG emissions as a tCO_2e.

Further detail on the traffic generated by the development can be found in Chapter 13 – Material Assets: Traffic and Transport prepared by Transport Insights.

	One-way Flows	Two-way Flows
Staff (LVs)	3	6
HVs	58	116
Total	61	122

Table 10.4: Development Traffic (taken from Table 13.5 of Chapter 13 – Material Assets: Traffic and Transport)

10.2.3 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document* (TII, 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development.

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on ISEP guidance (ISEP, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The 2022 ISEP Guidance (ISEP, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a

higher GHG profile. Therefore, the significance of a project's emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended TII significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII 2022a) states that professional judgement must be considered when contextualising and assessing the significance of a project's GHG impact. TII reference the ISEP guidance (ISEP, 2022) which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".*

Significance is determined using the criteria outlined in Table 10.5 (derived from Table 6.7 of PE-ENV-01104 (TII 2022a)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Effects	Significance Level	Description
Significant adverse	Major adverse	• The project's GHG impacts are not mitigated. • The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and • No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	• The project's GHG impacts are partially mitigated. • The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	• The project's GHG impacts are mitigated through 'good practice' measures. • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	• The project's GHG impacts are mitigated beyond design standards. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration.

Effects	Significance Level	Description
		• The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Table 10.5: Significance Criteria for GHGA

Ireland's carbon budgets can also be used to contextualise the magnitude of GHG emissions from the proposed development (TII, 2022a). The approach is based on comparing the net proposed development GHG emissions to the relevant carbon budgets (DECC, 2025). With the publication of the Climate Action Act in 2021 and the Climate Action Plan 2025, sectoral carbon budgets have been published for comparison with the net GHG emissions from the proposed development over its lifespan. The aim of the carbon budgets is to ensure we are on a trajectory to meet the National Climate Objective of Net Zero by 2050.

10.3 Baseline Environment

The site was first registered in 2005 with quarrying activities taking place up until 2014. A small gravel pit is indicated on historic maps dated 1913, and evidence of a quarry is shown on a map dated 1906 which accompanied the registration application. This indicates that quarrying activities may have been occurring at the site as far back as 1906.

Historical data for climate was investigated in order to establish the relevant baseline for the purposes of the assessment. Data for the full time period was not available however, data from as far back as possible has been used in establishing the baseline. 1990 is typically taken as the historical baseline year by countries when reporting GHG emissions under the United Nations Framework Convention on Climate Change (UNFCCC). Detailed emissions inventories for the full period from pre-1990 to present are not available for the purposes of establishing the full climate baseline for this assessment. Data from 1990 are considered representative of the baseline conditions prior to 1990. Trends in GHG emissions for the period 1990 – 2024 have been discussed in the following section.

10.3.1 GHG Emissions

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of GHGs in the atmosphere. These GHGs come primarily from the combustion of fossil fuels in energy use. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of GHGs and combat climate change.

For the purposes of this assessment, the definition for GHGs outlined in Council *Directive 2009/28/EC* on the promotion of the use of energy from renewable sources and amending and subsequently repealing *Directives 2001/77/EC* and *2003/30/EC* (European Parliament and Council of Europe 2009) has been used. In *'Annex V, C. Methodology Point 5'* the relevant GHGs are defined as Carbon Dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) which are also the most significant GHGs. Climate is defined as the average weather over a period of time, whilst climate change is a significant change to the average weather. In recent years human activities, which have resulted in the release of GHGs, have impacted on climate causing climate change. The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'.

Trends in GHG emissions at a national level are available in annual reports by the EPA. The most recent EPA report entitled '*Ireland's Provisional Greenhouse Gas Emissions 1990 – 2024* [1] (EPA, 2025) reviews national emissions in 2024 and trends in emissions from 1990.

The EPA reported that GHG emissions in 2024 are -3.4% less than emissions in 1990, which is the second consecutive year that emissions are below the 1990 historic baseline. Between 1990 and 2024 the greatest overall increase in emissions is from the Transport sector which has shown a 126.6% increase in emissions, particularly in relation to road transport which in large part is attributable to increasing population and economic prosperity. The Energy Industries have shown a decrease in emissions of 36.9% over the 1990 – 2024 period. This decrease reflects the improvement in efficiency of modern gas fired power plants replacing older peat and oil-fired plants and the increased share of renewables, primarily wind power, along with increased interconnectivity. The Agricultural sector has shown a 0.8% decrease in emissions over the 1990 – 2024 period. Agriculture sector emissions decreased between 1998 until 2011 but since 2011 emissions have been on an upward trend. Emissions from the Residential sector showed a general upward trend in emissions after 1997 due to increased housing stock and growing population. Emissions remained relatively stable over the 2015 to 2021 period despite an increasing population. Emissions from the Residential sector in 2024 were 25.8% lower than in 1990.

Figure 10.1 taken from the EPA report (2025) shows the trend in emissions from the largest sectors over the 1990 – 2024 period.

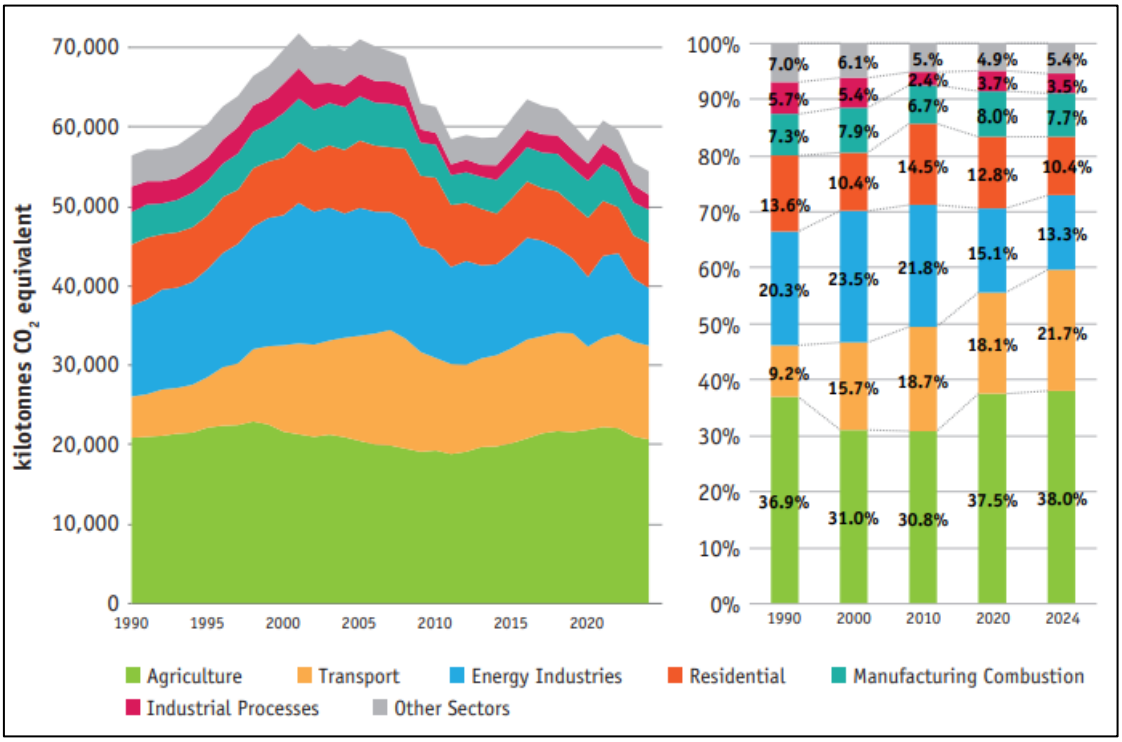

Figure 10.1: Trend in Emissions for Largest Sectors 1990-2024 (Source: Figure 25 EPA (2025) Ireland's Provisional Greenhouse Gas Emissions 1990 – 2024)

In relation to the current climate GHG emissions baseline, and in order to frame the historic baseline against a current climate context, Ireland's compliance with the EU Effort Sharing Regulation (ESR) (EU 2018/842)

[1] https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Provisional-GHG-Report-Jul24-v6.pdf

and the published carbon budgets (Table 10.1 (ESR)), data published in July 2025 (EPA, 2025) predicts that Ireland exceeded (without the use of flexibilities) its 2024 annual limit set under EU's Effort Sharing Regulation (ESR) by 3.74 MtCO2e. Cumulatively from 2021-2024 and after using the ETS flexibility, Ireland is not in compliance with the ESR by a net distance to target of -1.03 Mt CO2e, there is an exceedance of 1.83 Mt CO2e above its Annual Emissions Allocation with the ETS flexibility. Agriculture and Transport accounted for 75.4% of total ESR emissions in 2024. The sectoral breakdown of 2024 GHG emissions is shown in Table 10.6. The sector with the highest emissions in 2024 was Agriculture at 35.22% of the total, followed by transport at 20.1%.

The EPA report (EPA, 2025) states that the latest projections indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 22% by 2030, still short of the 42% reduction target.

The current estimates of National greenhouse gas emissions (including LULUCF) in 2024 are 12% below 2018, well off the National Climate ambition of a 51% reduction by 2030. The data indicates that from 2021-2024 Ireland has used 82.5% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025. This leaves 17% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Sector	2024 Emissions (Mt CO_2e)	% Total 2024 (including LULUCF)
Agriculture	20.408	35.40%
Transport	11.652	20.21%
Energy Industries	7.157	12.42%
Residential	5.615	9.74%
Manufacturing Combustion	4.13	7.16%
Industrial Processes	1.88	3.26%
F-Gases	0.581	1.01%
Commercial Services	0.771	1.34%
Public Services	0.721	1.25%
Waste Note 2	0.837	1.45%
Land Use, Land-use Change and Forestry (LULUCF)	3.895	6.76%
National total excluding LULUFC	**53.752**	-
National total including LULUFC	**57.646**	-

Note 1: Reproduced from Latest emissions data on the EPA (EPA, 2025)

Note 2: Waste includes emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste.

Table 10.6: Total National GHG Emissions in 2024

10.3.2 Meteorological Data

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement Aerodrome is the nearest weather and climate monitoring station to the site that has meteorological data recorded for the 30-year period from 1991 to 2020. The monitoring station is located approximately 65 km northeast of the development site. Meteorological data recorded at Casement Aerodrome meteorological station over the 30-year period is shown in Table 10.7. The wettest months were October and November, and the driest month on average was March (Met Éireann, 2025). July was the warmest month with a mean temperature of 15.7 Celsius. January was the coldest month with a mean

temperature of 5.2 Celsius. This meteorological data can be considered representative of the weather conditions for the historic baseline.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
mean daily max	8	8.5	10.3	12.4	15.4	18	19.8	19.4	17	13.7	10.3	8.3	13.4
mean daily min	2.4	2.2	3.1	4.5	6.9	9.6	11.6	11.4	9.6	7.2	4.4	2.6	6.3
mean temperature	5.2	5.3	6.7	8.5	11.2	13.8	15.7	15.4	13.3	10.4	7.4	5.4	9.9
absolute max.	15	17.2	19.8	22.4	25.7	27.6	30.9	28.9	25.2	20.2	17	14.8	30.9
min. maximum	-1.9	-0.7	-0.6	3.8	7	10.2	10.7	12.8	9.5	5.1	-3.1	-4.7	-4.7
max. minimum	12.1	13	11.5	12.7	14.1	17.2	18.1	18.3	18.4	15.5	13.8	12.7	18.4
absolute min.	-12.4	-8.1	-9	-5.9	-3.6	0.3	4.5	2.2	-0.7	-4.3	-9.1	-15.7	-15.7
mean num. of days with air frost	6.8	7.1	5	2.9	0.8	0	0	0	0.1	1.1	3.7	7.3	34.8
mean num. of days with ground frost	13.9	13.6	12.8	10.3	4.6	0.7	0	0	1.1	4.7	8.8	13.8	84.5
mean 5cm soil	3.9	3.9	5.5	8.9	13	16	17.3	16.2	13.1	9.4	6.2	4.3	9.8
mean 10cm soil	4.1	4	5.3	8	11.7	14.8	16.2	15.3	12.8	9.4	6.4	4.6	9.4
mean 20cm soil	4.7	4.8	6	8.4	11.7	14.7	16.3	15.7	13.5	10.3	7.3	5.3	9.9
RELATIVE HUMIDITY (%)													
mean at 0900UTC	88.1	88	85.1	80.2	77.4	77.6	80.2	82.6	85.4	87.1	89.4	89	84.2
mean at 1500UTC	82.8	77.9	71.7	67.9	66.8	67.6	69.3	69.7	71.9	76.6	82.3	84.8	74.1
SUNSHINE (hours)													
mean daily duration	1.7	2.6	3.4	5.2	6.1	5.6	4.9	5	4.2	3.3	2.2	1.5	3.8
greatest daily duration	8.1	10	11.5	13.8	15.3	16	15.5	14.4	12.3	10.2	8.8	7.3	16

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mean num. of days with no sun	8.7	5.5	4.4	2.5	1.7	2.2	1.6	1.2	2.3	4.1	6.5	9.1	49.8
RAINFALL (mm)													
mean monthly total	65	55.2	51.8	55.3	59.1	65.7	59.4	71.2	61.6	81.6	81.9	75.7	783.5
greatest daily total	30	35.6	34.18	41.54	36	98.48	33.7	36	51.1	86.1	82	46.8	98.48
mean num. of days with >= 0.2mm	17.6	15.8	15.5	14.8	15.4	14.8	16.3	16.8	14.9	16.7	17.8	17.5	193.9
mean num. of days with >= 0.1mm	12.3	11.4	10.2	10.9	10.5	10.1	11.9	11.5	10	12	12.4	13.2	136.4
mean num. of days with >= 5.0mm	4.7	3.4	3.3	3.8	3.6	3.9	3.7	4.5	4.1	4.7	5.1	5.1	49.9
WIND (knots)													
mean monthly speed	12.4	12	11.1	9.5	9	8.4	8.4	8.7	9	10.1	10.9	11.7	10.1
max. gust	80	74	71	59	62	55	45	53	59	64	64	82	82
max. mean 10-minute speed	57	47	47	43	43	41	31	34	41	46	41	54	57
mean num. of days with gales	3.6	2.2	2.4	0.3	0.4	0.1	0.1	0.2	0.5	1.3	1.9	3.1	16
WEATHER (mean no. of days with..)													
snow or sleet	3.2	3.1	2.2	0.7	0.1	0	0	0	0	0	0.6	2	11.9
snow lying at 0900UTC	1	0.9	0.6	0	0	0	0	0	0	0	0.1	0.7	3.4
hail	1.1	1.8	2.3	2.7	1.5	0.3	0.2	0	0.1	0.1	0.5	0.7	11.3
thunder	0.1	0.1	0.2	0.6	0.8	0.9	1.2	1.1	0.4	0.4	0.1	0	6.1
fog	1.7	1.4	1.8	1.3	1.1	1.1	0.9	1.4	2.6	2.3	1.8	2.2	19.8

Table 10.7: Data from Met Éireann Weather Station at Casement Aerodrome 1991 - 2020: Monthly and Annual Mean and Extreme Values

10.4 Impact Assessment

10.4.1 Do Nothing Scenario

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing Effects' relates to the environment as it would be in the future should the project not be carried out. Had quarrying activities at the site not taken place, the identified impacts to climate would not have occurred. The Do Nothing scenario is considered neutral in relation to climate.

10.4.2 Construction Phase

Full details of the historic development are not currently available, however given the land use, it is assumed that construction phase impacts would have been minimal. As a result significant impacts to climate are not predicted and they have not been considered further. The primary impacts to climate have occurred as part of the day-to-day operational activities on site.

10.4.3 Operational Phase

Site fuel usage and vehicle emissions were identified as the primary sources of GHG emissions for the development. The estimated fuel usage on site is c. 359,800 litres of diesel per year. Using the carbon emission factor for diesel fuel usage from the TII carbon tool it has been calculated that there will be 1,202 tCO_2e per year associated with fuel usage on site (see Table 10.8). Traffic movements include 58 no. HGV trips per day as well as 3 no. staff vehicle trips per day (assumed by car), traffic emissions are predicted to result in 3,477 tCO_2e.

Activity		tCO_2e	Sector for Emissions Comparison	Sectoral Budget (tCO_2e)	Site GHG Emissions as % of Relevant Budget
Fuel Usage	c. 359,800 litres diesel/yr	1,202	Industry	4,000,000	0.03%
Traffic	vehicle movements to/from site	3,477	Transport	6,000,000	0.06%
Total	total site GHG emissions	4,679	National Non-ETS 2030 Target	27,721,670	0.017%
			Ireland's 2024 Total GHG Emissions (existing baseline)	57,640,000	0.008%

Table 10.8: Predicted Annual GHG Emissions from Site Activities

The GHG emissions from the development as a total cannot be compared against one specific sector 2030 carbon budget, the emissions are broken down into different assessment categories and these must be compared separately to the relevant sectoral emissions budgets (see Table 10.8). The relevant sectoral emissions for the proposed development comparison include the Industry sector and Transport sector.

In Table 10.8, GHG emissions have been compared against the carbon budget for the industry and transport sectors in 2030 (DECC, 2024), against Ireland's total GHG emissions in 2024 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO_2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total annual GHG emissions are equivalent to 0.008% of Ireland's total GHG emissions in 2024 and 0.017% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with

transport-related activities are 0.06% of the 2030 Transport budget, and fuel usage is 0.03% of the 2030 Industry budget.

Quarrying activities ceased on site by 2014 and there are no activities taking place on site at present, as a result, there are currently no impacts to climate associated with the development site.

In relation to future climate impacts from the development site, if the subject application is not approved, no activities on site will occur and therefore, there will be no impact to climate. Should quarrying activities recommence on site following grant of a relevant planning permission, impacts to climate similar to those identified herein would likely occur.

The historic quarrying activities resulted in some GHG emissions which impacted climate. Based on the quantified GHG emissions and, using the assessment criteria from Section 10.2.3 and Table 10.5, the significance of the GHG emissions is considered moderate adverse, as per Table 10.5 this includes a project which:

- The project's GHG impacts are partially mitigated.
- The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and
- Falls short of full contribution to Ireland's trajectory towards net zero.

In accordance with the EPA guidelines (EPA, 2022), this equates to a ***direct, long-term, negative***, ***significant*** effect.

10.5 Cumulative Impacts

With respect to the requirement for a cumulative assessment the ISEP (ISEP, 2022) and TII (TII, 2022a) guidance on which the assessment is based states that "*the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered inherently cumulative*".

As per the above, the cumulative impact of the proposed development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***significant*** in EIA terms.

10.6 Mitigation Measures

10.6.1 Construction Phase

Due to the minimal nature of the construction works significant impacts to climate are not predicted and no mitigation was necessary.

10.6.2 Operational Phase

The information available indicates that there were no specific mitigation measures implemented on site in relation to reducing emissions or climate impacts.

10.7 Monitoring

There is no information available on any monitoring measures in relation to climate.

10.8 Residual Impacts

The historic quarrying activities resulted in some GHG emissions which impacted climate. Based on the quantified GHG emissions and, using the assessment criteria from Section 10.2.3 and Table 10.5, the significance of the GHG emissions is considered moderate adverse, as per Table 10.5 this includes a project which:

- The project's GHG impacts are partially mitigated.
- The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and
- Falls short of full contribution to Ireland's trajectory towards net zero..

In accordance with the EPA guidelines (EPA, 2022), this equates to a ***direct, long-term, negative***, ***significant*** effect.

10.9 References

Carlow County Council (2024) Carlow Local Authority Climate Action Plan 2024 – 2029

Civil Engineering Standard Method of Measurement (CESMM) (2013) Carbon and Price Book database.
Construction Industry Federation (2021) Modern Methods of Construction

Department of Environment, Climate and Communications (DECC) (2023) Long-term Strategy on Greenhouse Gas Emissions Reductions (draft)

Department of Environment, Climate and Communications (DECC) (2024a) Climate Action Plan (CAP) 2025

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Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Environmental Protection Agency (2025a) Ireland's Provisional Greenhouse Gas Emissions 1990-2024

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European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report

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European Commission (2021b) 2030 EU Climate Target Plan

European Union (2018) Regulation 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013

Government of Ireland (2015) Climate Action and Low Carbon Development Act

Government of Ireland (2019) Climate Action Plan 2019

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Government of Ireland (2023) Long-term Strategy on Greenhouse Gas Emissions Reductions

The Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as IEMA) (2020b) GHG Management Hierarchy

The Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as IEMA) (2022) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance

Met Éireann (2025) Ireland's 30-year Climate Averages. Available from: https://www.met.ie/climate/30-year-averages

Transport Infrastructure Ireland (2022a) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document

Transport Infrastructure Ireland (2025) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document