10.0 CLIMATE

10.1 Introduction

This chapter assesses the likely climate impacts associated with the continuation of an existing quarry and a proposed extension of that quarry 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, under ownership of the applicant, Milford Quarries Ltd. The land 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 is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- **Greenhouse Gas Emissions Assessment (GHGA)** – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- **Climate Change Risk Assessment (CCRA)** – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies appropriate adaptation and mitigation measures to increase project resilience.

The greenhouse gas assessment has focussed on GHG emissions associated with site activities and traffic emissions.

The vulnerability of the proposed development in relation to future climate change must be considered during the operational phase. Due to the nature of the proposed development, it is not considered overly susceptible to future climate change hazards.

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) PE-ENV-01105: Climate Assessment Standard for Proposed National Roads (TII, 2022b);
- 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 Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the ISEP 2020 EIA Guide) (ISEP, 2020a);
- 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);
- Carbon Management in Infrastructure and Built Environment - PAS 2080 (BSI, 2023); and
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a).

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 first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also 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 fifth and most recent climate action plan, CAP25, was published in April 2025 (Government of Ireland, 2025).

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

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		
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
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 Greenhouse Gas Policy

In 2024, the Government published its *Long-Term Strategy on Greenhouse Gas Emissions Reductions* (DECC, 2024a). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the CAP.

In December 2023, CAP24 was published, establishing key actions to deliver a 51% reduction in GHG emissions by 2030 (compared to 2018 levels) and achieve climate neutrality by 2050 (DECC, 2023a). The updated and current CAP25, published in April 2025, builds on the progress of the previous four iterations of the CAP, with CAP23 first publishing carbon budgets and sectoral emission ceilings. It also reaffirms Ireland's climate ambition, with a focus on delivery, implementation and measurable outcomes, particularly ahead of the second carbon budget period (2026–2030). 2025 is the last year in the first 5-year carbon budget period. During the initial 5-year budget period the average annual reduction required was 4.8%, this increases to 8.3% in the second budget period (2026-2030). CAP25 retains the high-impact sectors where the biggest savings can be achieved, while emphasising public sector leadership and green procurement. These sectors include renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and land-use change.

CAP25 also includes targeted actions to decarbonise industrial heat and support the transition to carbon-neutral manufacturing processes. Public sector leadership is strengthened through a new Buying Greener: Green Public Procurement Strategy and Action Plan (2024–2027), the development of mandatory Climate Action Roadmaps, and enhanced emissions monitoring and reporting across government operations. To support innovation and ensure future economic resilience, IDA Ireland continues to attract and support businesses investing in climate technologies and low-carbon solutions.

CAP25 highlights a significant 17% reduction in electricity emissions in early 2024, with wind power supplying nearly 40% of Ireland's total electricity demand and over 100,000 rooftop microgenerators

connected to the grid. Investments are ongoing in grid reinforcement, offshore wind development, and interconnectors with France and the UK to enhance renewable generation capacity. EirGrid, Enterprise Ireland and IDA Ireland have recently signed an MoU to collectively support offshore wind development in Ireland.

CAP25 also reinforces targets first outlined in CAP24 to reduce the embodied carbon of construction materials, with a 10% reduction by 2025 and 30% reduction by 2030 for materials produced and used in Ireland. Cement and high embodied carbon construction materials can be reduced through product substitution, reduced clinker content in cement and uptake of low-carbon construction methods, including those outlined in the Construction Industry Federation 2021 report Modern Methods of Construction (Construction Industry Federation, 2021). There also remains scope for the construction industry to use more timber in construction. In 2022, 24% of new construction in Ireland was built using timber frames to satisfy the demand for housing. Public bodies are now required under the Public Sector Mandate to use best practice project design to reduce embodied carbon; procure concretes with clinker replacements (lower carbon); and require that large construction projects produce a whole life cycle GHG emissions assessment.

Furthermore, CAP25 advances sector-specific measures in green procurement, electrification of transport and heat, and just transition (with the introduction of a Just Transition Commission) to support vulnerable communities. Transport emissions increased by 0.3%. Electric vehicles and the use of biofuels are stated as the best means of transport emission reductions in the medium term.

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.

10.1.3.3.2 Climate Change Vulnerability Policy

The second National Adaptation Framework (NAF) (DECC, 2024b) was published in June 2024 in line the five-year requirement of the 2015 Climate and Low Carbon Development Act. The plan provides a whole of government and society approach to climate adaptation in Ireland to reduce Irelands vulnerability to climate change risks including extreme weather events, flooding, drought, loss of biodiversity, sea level rise and increased temperatures. Like the *"Just Transition"* when considering carbon emissions, the NAF aims for *"Just Resilience"* stating that *"a climate resilient Ireland will have a reduced reliance on fossil fuel; it will have widely accessible electrified public transport and will have transitioned towards sustainable agricultural practices such as agroforestry and organic farming".*

In relation to the built environment the NAF states in Chapter 3 "*deepening of adaptation considerations in the planning and building standards processes is considered the most appropriate way of increasing the resilience of the built environment*". Within the NAF it mentions that there is a risk of damage to buildings and structures from severe weather events such as high winds and intense rainfall. New development should accommodate predicted future climate change impacts without requiring major redesign or

redevelopment in the future which may be costly and inefficient. This will require facilitating innovative building design, new materials and standards (to accommodate hotter summers while withstanding changes in precipitation patterns and more intense storms for example) according to the NAF (DECC, 2024). The National Climate Change Risk Assessment (NCCRA) was published in May 2024 (EPA, 2024a). The NCCRA was required to be developed under Action 457 from the 2021 CAP (Government of Ireland 2021). Action 457 seeks to "*further develop Ireland's national climate change risk assessment capacity to identify the priority physical risks of climate change to Ireland*". The NCCRA uses definitions of the risk determinants from the Intergovernmental Panel on Climate Change (IPCC) Risk Framework (IPCC 2023):

- **Hazard** - the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources
- **Exposure** - the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected
- **Vulnerability** - the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity
- **Risk** - the potential for adverse consequences for human or ecological systems.

When considering risk, the NCCRA assesses exposure and vulnerability for two future climate change scenarios or Representative Concentration Pathways (RCPs):

- RCP4.5 was selected as it represents a scenario aligned with the global temperature trajectory
- RCP8.5 was selected as it represents a high-emissions scenario and achieves the highest level of modelled temperature increases by the end of the century. Consequently, this scenario will result in the highest level of physical risk for Ireland, and the greatest requirement for adaptation.

These scenarios align with a conservative approach to assess risks to Ireland and assumes global emission reduction targets are not met. This aligns with the principle of precaution as stated in the NAF (DECC 2024). In addition to the future climate scenarios, the NCCRA assesses the risk from the future climate during the following timeframes:

- Present (~2030)
- Medium term (~2050)
- Long term (~2100).

The *Carlow Local Authority Climate Action Plan 2024-2029* (Carlow County Council, 2024) highlights the increasing risks posed by climate change to the county's infrastructure, residents, and businesses. The primary risks for county Carlow are from river flooding, extreme precipitation and drought. Extreme windstorms have also been identified as a future risk. Drought events will impact agriculture and crop growing. The *Carlow Local Authority Climate Action Plan 2024-2029* aims to make Carlow a climate-resilient region by reducing the impacts of future climate change-related events and actively engaging and informing communities on climate action.

Protecting the built environment, such as public infrastructure, from the impact of climate change hazards is a key priority, this will involve appropriate planning, asset management and preparedness as well as liaison with other key stakeholders, such as the OPW on flood risk.

10.2 Methodology

10.2.1 Greenhouse Gas Assessment

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 GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The proposed operational period in relation to the proposed development is for 20 years. The 20 year total has been used as the assessment period for the purposes of the GHG assessment.

The greenhouse gas assessment has focussed on GHG emissions associated with site activities and traffic emissions.

10.2.1.1 Site Activities

There will be some GHG emissions associated with 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 be 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).

10.2.1.2 Traffic Emissions

Emissions from road traffic associated with the proposed 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, the proposed development will result in a total of 6 no. staff trips per day (i.e. two LV trips per staff member) and 29 no. HGVs arriving and 29 no. HGVs departing totalling 58 no. HGV trips per day (see Table 10.3 reproduced from Table 13.6 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 proposed 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	29	58
Total	32	64

Table 10.3: Proposed Development Traffic (taken from Table 13.6 of Chapter 13 – Material Assets: Traffic and Transport)

10.2.1.3 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 10.4 (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
	Major adverse	• The project's GHG impacts are not mitigated.

Effects	Significance Level	Description
Significant adverse		• 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. • 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 10.4: 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.

10.2.2 Climate Change Risk Assessment (CCRA)

The assessment involves determining the vulnerability of the proposed development to climate change. This involves an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability.

PE-ENV-01104 (TII, 2022a) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (ISEP, 2020).

The baseline environment information provided in Section 10.3.3, future climate change modelling and input from other experts working on the proposed development (i.e. hydrologists) should be used to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The proposed development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022a) provides the list of asset categories and climate hazards to be considered. The asset categories will vary for development type and need to be determined on a development-by-development basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2**.**
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken (European Commission, 2021a; TII, 2022a). The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type. Current and future climate hazards are discussed in Section 10.3. For example, flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location, i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location, i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location, i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

10.2.2.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the proposed development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the proposed development to various climate hazards.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 10.5 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. Therefore, the impact from climate change on the proposed development is considered not significant.

However, where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks.

		Exposure		
		High (3)	**Medium (2)**	**Low (1)**
Sensitivity	**High (3)**	9 - High	6 – High	3 - Medium
	Medium (2)	6 - High	4 - Medium	2 - Low
	Low (1)	3 - Medium	2 – Low	1 - Low

Table 10.5: CCRA Vulnerability Matrix

The screening CCRA, detailed in Section **Error! Reference source not found.**, did not identify any residual m edium or high risks to the proposed development due to climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

10.3 Baseline Environment

PE-ENV-01104 (TII, 2022a) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline. As impacts are assessed against compliance with national targets the study area for climate is the Republic of Ireland.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

10.3.1 Current GHG Baseline

Data published in July 2025 (EPA, 2025a), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 1.03 Mt CO_2e. However, the 2024 emissions represent the second consecutive year in which Ireland's emission were below (-4.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-7.4%) and ESR (Effort Sharing Regulation) emissions decreased (-0.5%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018.

The EPA estimate that 2024 total national GHG emissions, excluding LULUCF, have decreased by 2.0% on 2023 levels to 53.75 Mt CO_2e, with a 0.7 Mt CO_2e (-8.9%) reduction in electricity industries alone. This was driven by a 39.6% share of energy from renewables in 2024 and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.6% to 6.0 Mt CO_2e in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was

agriculture at 38% of the total, followed by transport at 21.7%. For 2024, total national emissions (including LULUCF) were 57.65 Mt CO_2e (EPA, 2025a) (Table 10.6).

The current estimates of national greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the national climate ambition of a 51% reduction by 2030. The data indicate 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 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Sector [Note 1]	2021	2022	2023	2024	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2023 to 2024
Electricity	9.89	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.09	11.76	11.8	11.65	54	85.74%	-1.27%
Buildings (Residential)	6.87	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.44	1.45	1.39	1.49	7	82.43%	7.19%
Industry	7.09	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.94	21.78	20.72	20.41	106	80.05%	-1.50%
Other [Note 2]	1.86	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	4.63	3.98	3.89	3.89	–	–	0
Total including LULUCF	64.81	62.96	58.84	57.64	295	82.81%	-2.04%

Note 1: Reproduced from latest emissions data on the EPA website (EPA, 2025a).
Note 2: Other includes Petroleum refining, F-Gases and Waste (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: Trends in Total National GHG Emissions 2021 – 2024

10.3.2 Future GHG Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022a) and ISEP Guidance (ISEP, 2022) the future baseline is a trajectory towards net zero by 2050, "*whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP25, and future CAPs, alongside binding 2030 EU targets. The European Union (EU) enacted *'Regulation (EU) 2018/842 on binding annual GHG 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'* (hereafter referred to as the Regulation) (European Union, 2018) to meet the commitments under the Paris Agreement. The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its ETS and non-ETS greenhouse gas emissions by at least 42% by 2030.

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and includes GHG emissions from transport, residential and commercial buildings and agriculture.

In May 2025, the EPA released the report *Ireland's Greenhouse Gas Emissions Projections 2024-2055* (EPA, 2025b), which includes total projected emissions and a breakdown of projected emissions per sector under the 'With Existing Measures' and 'With Additional Measures' scenarios. The EPA 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.

10.3.3 Current CCRA Baseline

The region of the proposed development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement Aerodrome is the nearest, representative, weather and climate monitoring station to the proposed development with meteorological data recorded for the 30-year period from 1991 to 2020. The data for the 30-year period from 1991 to 2020 indicates that the wettest months at Casement Aerodrome Metrological Station were October and November, and the driest month on average was March (Met Éireann, 2025a). 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.

Met Éireann's 2023 Climate Statement (Met Éireann, 2024a) states 2023's average shaded air temperature in Ireland is provisionally 11.20°C, which is 1.65°C above the 1961-1990 long-term average. Previous to this 2022 was the warmest year on record; however, 2023 was 0.38°C warmer (Figure 10.1).

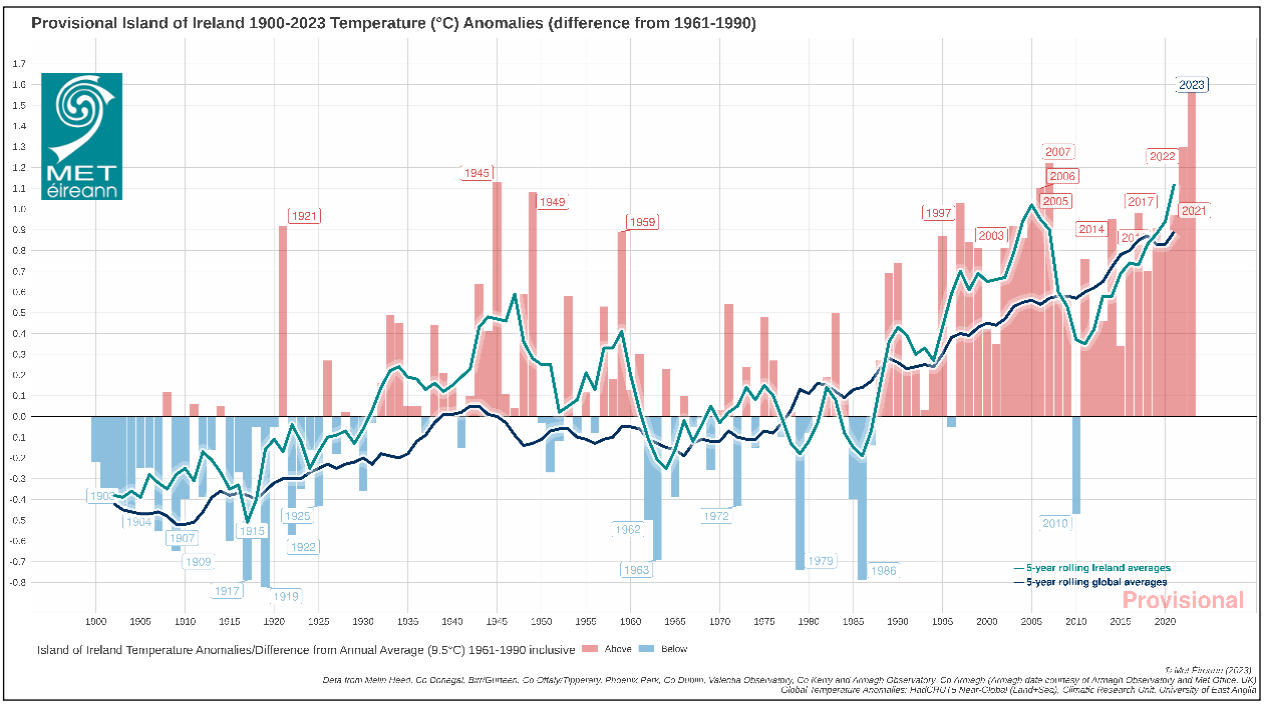

Figure 10.1: 1900-2023 Temperature (°C) Temperature Anomalies (differences from 1961-1990)

2023 also had above average rainfall. This included the warmest June on record and the wettest March and July on record. Record high sea surface temperatures (SST) were recorded since April 2023 which included

a severe marine heatwave to the west of Ireland during the June 2023. This marine heatwave contributed to the record rainfall in July.

Met Éireann's 2024 *Climate Statement* (Met Éireann, 2025b) states 2024's average shaded air temperature in Ireland is provisionally 10.72°C, which is 1.17°C above the 1961-1990 long-term average or 0.55°C above the most recent 1991-2020 long-term average. This is the 4th warmest year on record with 2023 breaking previous records. Seven of the top ten warmest years have occurred since 2005. Record high sea surface temperatures (SST) were recorded in 2022, and in 2024 continued at or near record high levels. 2024 was overall drier than average; however, there were many instances of heavy or intense rainfall which led to flooding events. This trend is predicted to continue with climate change with an increase in both dry periods and heavy rainfall events. Considering the extraordinary data, Met Éireann states that the latest Irish climate change projections indicate further warming in the future, including warmer winters. The record temperatures mean that the likelihood of extreme weather events occurring has increased. This will result in longer dry periods and heavy rainfall events. Storm surges and coastal flooding due to sea level rise. Compound events, where coastal surges and extreme rainfall events occur simultaneously will also increase. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

10.3.4 Future CCRA Baseline

Impacts due to climate change will evolve with a changing future baseline, changes have the potential to include increases in global temperatures and increases in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration is needed with respect to this within the design of the proposed development.

Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the proposed development will be located (EPA, 2021b). The EPA have compiled a list of potential adverse impacts due to climate change including the following which may be of relevance to the proposed development (EPA, 2021b):

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

TII's Guidance document PE-ENV-01104 (TII, 2022a) states that for future climate change a moderate to high Representative Concentration Pathways (RCP) should be adopted. RPC4.5 is considered moderate, while RPC8.5 is considered high. Representative Concentration Pathways (RCPs) describe different 21st century pathways of GHG emissions depending on the level of climate mitigation action undertaken.

National Framework for Climate Services (NFCS) was founded in June 2022 to streamline the provision of climate services in Ireland and will be led by Met Éireann. The aim of the NFCS is to enable the co-production, delivery and use of accurate, actionable and accessible climate information and tools to support climate resilience planning and decision making. In addition to the NFCS, further work has been ongoing into climate projects in Ireland through research under the TRANSLATE project. TRANSLATE (Met Éireann, 2023) has been led by climate researchers from University of Galway – Irish Centre for High End Computing (ICHEC), and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI), supported by Met Éireann climatologists. TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and CMIP5. Representative

Concentration Pathways (RCPs) provide a broad range of possible futures based on assumptions of human activity. The modelled scenarios include for "least" (RCP2.6), "more" (RCP4.5) or "most" (RCP8.5) climate change (Figure 10.2).

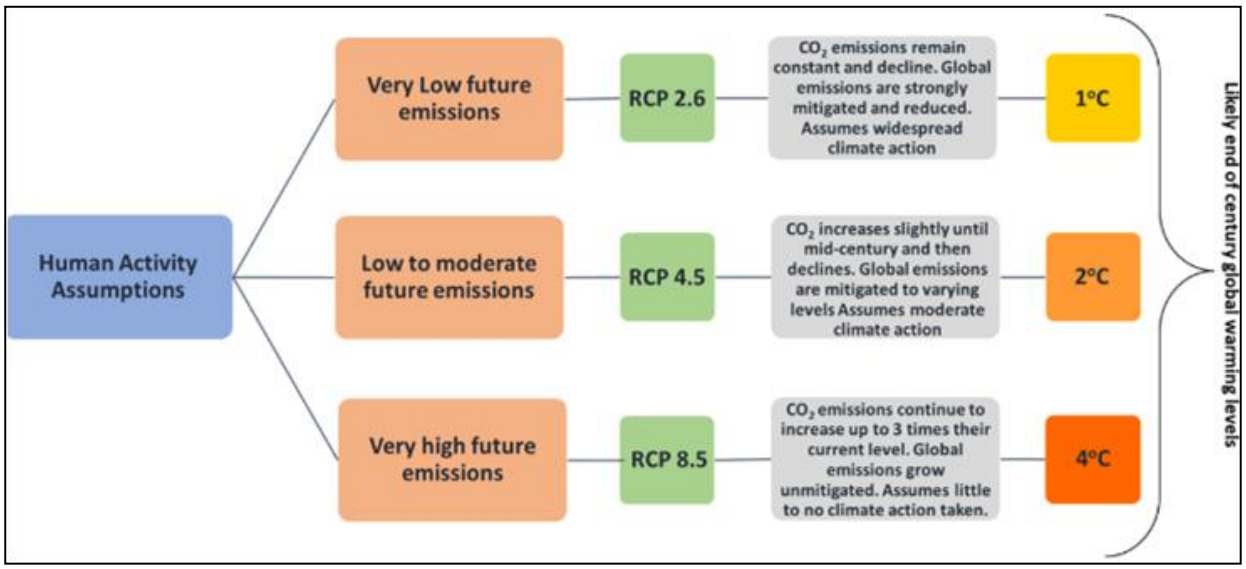

Figure 10.2: Representative Concentration Pathways associated emission levels (Source: TRANSLATE Project Storymap, Met Éireann 2023)

TRANSLATE (Met Éireann, 2023) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (e.g. transport, energy, water), by providing information on how Ireland's climate could change as global temperatures increase to 1.5°C, 2°C, 2.5°C, 3°C or 4°C. Projections broadly agree with previous projections for Ireland. Ireland's climate is dominated by the Atlantic Meridional Overturning Circulation (AMOC), a large system of ocean currents, including the Gulf Stream, characterised by a northward flow of warm water and a southward flow of cold water. Due to the AMOC, Ireland does not suffer from the extremes of temperature experienced by other countries at a similar latitude. Recent studies have projected that the AMOC could decline by 30 – 40 % by 2100, resulting in cooler North Atlantic Sea surface temperatures (SSTs) (Met Éireann, 2023). Met Éireann projects that Ireland will nevertheless continue to warm, although the AMOC cooling influence may lead to reduced warming compared with continental Europe. AMOC weakening is also expected to lead to additional sea level rise around Ireland. With climate change Ireland's temperature and rainfall will undergo more and more significant changes, e.g. on average summer temperature could increase by more than 2°C, summer rainfall could decrease by 9% while winter rainfall could increase by 24% (Figure 10.3). Future projects also include a 10-fold increase in the frequency of summer nights (values > 15°C) by the end of the century, a decrease in the frequency of cold winter nights and an increase in the number of heatwaves. A heatwave in Ireland is defined as a period of 5 consecutive days where the daily maximum temperature is greater than 25°C.

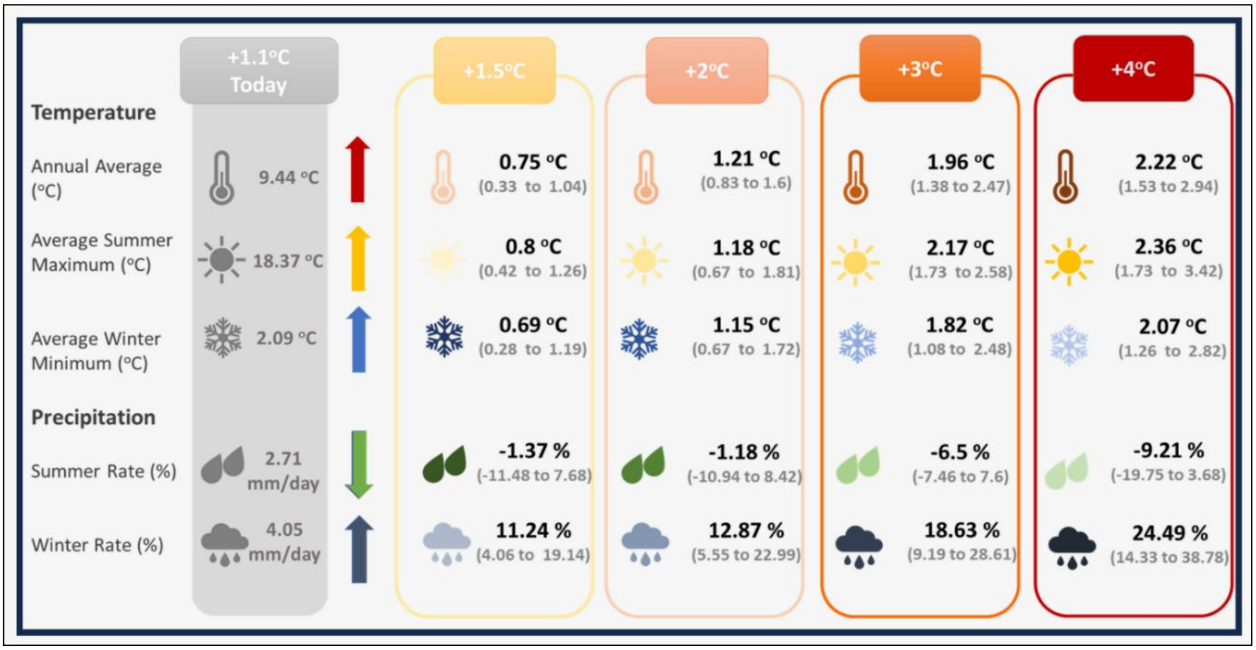

Figure 10.3: Change of climate variables for Ireland for different Global warming thresholds (Source: TRANSLATE Project Storymap, Met Éireann, 2023)

The TRANSLATE research report (Met Éireann, 2024d) finds that night-time temperatures will warm more than day-time temperatures, with temperatures increases across all seasons but the highest in the summer (with an increase of 0.5°C to 3.5°C). Autumn is projected to have the highest increase in average minimum temperatures (with an increase of 1.1°C to 4.4°C). The variance is dependent on the scenario that is being reviewed. While these temperatures are projected across all of Ireland, they increase most in the east of the country compared to the west. With respect to rainfall, increases of 4% to 38% are projected. However, this will not be spread across the year as during summer months there are projected decreases in rainfall beyond the 2°C warming scenario.

In January 2024 the EPA published *Ireland's Climate Change Assessment Synthesis Report* (EPA, 2024e) which contained four volumes:

- Volume 1: Climate Science: Ireland in a Changing World;
- Volume 2: Achieving Climate Neutrality by 2050;
- Volume 3: Being Prepared for Ireland's Future Climate; and
- Volume 4: Realising the Benefits of Transition and Transformation.

This report reinforces the existing and future risks arising from climate change. Volume 1 (EPA, 2024e) states that under early action, the temperature increase averaged across the island of Ireland relative to the recent past (1976 to 2005) would reach 0.91°C (0.44 to 1.10°C) by mid-century before falling back to 0.80°C (0.34 to 1.07°C) at the end of the century. Whereas under Late action, by the end of the century it is projected that the temperature increases could be 2.77°C (2.02 to 3.49°C). Heat extremes will become more frequent and more severe and cold extremes will become less frequent and less severe with further warming.

Precipitation was 7% higher over the period 1991 to 2020 than over the 1961 to 1990 period. The average future predicted increase in precipitation is <10% in annual mean accumulated. By 2100 projected additional rises in sea level range from 0.32 to 0.6m under early action to 0.63 to 1.01m under late action scenarios, with greater storm surges potentially effecting critical infrastructure along the coastline. Projections of changes in storminess are highly uncertain and translate into large uncertainties in future frequency and intensity of extreme waves.

Volume 3 (EPA, 2024e) discusses how water supplies will face growing pressures resulting in increased water demand and how options need to be developed, including potential new sources. The report states the key role of critical infrastructure for delivering public services, economic development and a sustainable environment. These are exposed to a range of climate extremes. Failures in critical infrastructure can cascade across other sectors and present a multi-sector risk due to climate change.

The report references the EPA's *Critical Infrastructure Vulnerability to Climate Change* report (EPA, 2021a) as the most substantial research project in Ireland to date on climate change and critical infrastructure which assesses the future performance of Ireland's critical infrastructure when climate is considered. The *Critical Infrastructure Vulnerability to Climate Change* report states with respect to water availability and quality, that flood risk and heatwaves have a medium vulnerability index and the underground supply network has a high vulnerability to snowstorms and cold spells. However, while the vulnerability is high, the exposure is likely to reduce due to future climate change resulting in less cold weather events. The risk assessment highlights the co-dependence of the water sector to the energy sector, and how vulnerability in the energy sector may have cascading impacts.

Volume 4 (EPA, 2024e) calls for system change, including a transformation of urban settings. Stating that meaningful urban transformation can create a better living environment while simultaneously reducing emissions.

The projections were echoed by the *Updated High-resolution Climate Projections for Ireland Research Report: 471* (EPA, 2024f) which was in broad agreement with previous research. The future autumn and winter months are projected to be up to 10% wetter, while summer is projected to be up to 8% drier. This information has been used in determining the exposure analysis (see Section 10.4.3).

10.4 Impact Assessment

10.4.1 Do Nothing Scenario

The Do Nothing scenario will see the site remain as is with no quarrying operations taking place. There are no predicted impacts to climate under this scenario. The climate baseline will continue to develop in line with current trends as per Section 10.3. The Do Nothing scenario is considered neutral in relation to climate.

10.4.2 Greenhouse Gas Assessment

10.4.2.1 Construction Phase

There are no significant construction works associated with the proposed development.

The proposed development will involve blasting, extraction and processing of rock using mobile primary crushing / screening and associated plant on the proposed quarry floor. The proposed development will include for construction of earthen screening berms, soil storage areas and will utilise existing quarry entrance from the northern boundary linking to the L7130 local road to the east. Existing and proposed access tracks and existing settlement ponds will be utilised as part of the proposed development. These works will take place over the operational lifetime of the proposed development and no specific construction works are required.

As a result significant impacts to climate are not predicted and they have not been considered further. The primary impacts to climate will occur as part of the day-to-day operational activities on site.

10.4.2.2 Operational Phase

Site fuel usage and vehicle emissions were identified as the primary sources of GHG emissions for the proposed development. The estimated fuel usage on site is c. 213,160 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 712 tCO_2e per year associated with fuel usage on site (see Table 10.7). Traffic movements include 58 no. HGV trips per day as well as 6 no. staff vehicle trips per day (assumed by car), traffic emissions are predicted to result in 3,494 tCO_2e.

Activity		tCO_2e	Sector for Emissions Comparison	Sectoral Budget (tCO_2e)	Site GHG Emissions as % of Relevant Budget
Fuel Usage	c. 213,160 litres diesel/yr	712	Industry	4,000,000	0.018%
Traffic	vehicle movements to/from site	1,747	Transport	6,000,000	0.03%
Total	total site GHG emissions	2,459	National Non-ETS 2030 Target	27,721,670	0.009%
			Ireland's 2024 Total GHG Emissions (existing baseline)	57,640,000	0.004%

Table 10.7: 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 10.7). The relevant sectoral emissions for the proposed development comparison include the Industry sector and Transport sector. The predicted emissions for the proposed development are annualised over the assumed 20-year lifespan and then compared to the relevant sector 2030 carbon budgets. Annualising the full carbon emissions over the lifetime of the development allows for appropriate comparison with annual GHG targets.

In Table 10.7, 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 0.004% of Ireland's total GHG emissions in 2024 and 0.009% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with transport-related activities are 0.03% of the 2030 Transport budget, and fuel usage is 0.018% of the 2030 Industry budget.

10.4.2.3 GHGA Significance of Effects

The TII guidance states that the following two factors should be considered when determining significance:

- 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.

The level of mitigation described in Section **Error! Reference source not found.** and Section 10.6 has been c onsidered when determining the significance of the proposed development's GHG emissions. According to the TII significance criteria described in Section 10.2.1.3 and Table 10.4, the significance of the GHG emissions is minor adverse. The proposed development has mitigated some GHG impacts where possible.

In accordance with the EPA guidelines (EPA, 2022), this equates to a ***direct, long-term, negative*** and ***slight*** effect, which is overall a ***not significant*** effect of GHG emissions during the construction and operational phase.

10.4.3 Climate Change Risk Assessment

The sensitivity and exposure of the development to various climate hazards must first be determined to then determine the vulnerability of the proposed development to climate change. Flooding (coastal, pluvial, fluvial), extreme heat, extreme cold, wildfire, drought, extreme wind, lightning, hail, landslides and fog have been considered as climate hazards in the context of the proposed development.

The sensitivity of the proposed development to the climate hazards is assessed irrespective of the project location. Table 10.8 details the sensitivity of the proposed development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been established the exposure of the proposed development to each of the climate hazards is determined, this is the likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the proposed development to each of the climate hazards as per Table 10.5. The results of the vulnerability assessment are detailed in Table 10.8.

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Coastal, Pluvial, Fluvial)	1 (Low)	1 (Low)	1 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Wildfire	1 (Low)	2 (Medium)	2 (Low)
Drought	1 (Low)	1 (Low)	1 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Landslides	1 (Low)	2 (Medium)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

Table 10.8: Climate Change Vulnerability Assessment

The sensitivity and exposure of the proposed development area was determined with reference to several online tools and with input from the various discipline specialists on the project team. It was concluded that the proposed development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low.

10.4.3.1 Flooding

A Site-Specific Flood Risk Assessment (SSFRA) was undertaken Hydro Environmental Services and is submitted as part of this planning application. This document was reviewed to inform the climate change vulnerability assessment and assess the potential for flooding at the proposed development site.

The SSFRA conclusions state:

- *"No instances of historical flooding were identified in historic OS maps for the Development;*
- *No instances of recurring or historic flooding were identified on OPW maps within the Proposed Development Site;*
- *No GSI Winter 2015/2016 Surface Water Flooding recorded within the Proposed Development Site;*
- *The GSI Groundwater flood mapping does not record any groundwater flood zones within the Proposed Development Site;*
- *No CFRAM Fluvial Flood Zones is mapped within the Proposed Development Site;*
- *No NIFM fluvial flood zones are mapped within the Proposed Development Site.*

As per the FRA, no parts of the Proposed Development Site are mapped within any fluvial flood zones (Flood Zones A - B). The Proposed Development Site is located above the mapped 1,000-year flood level and therefore all infrastructure are located in Flood Zone C (Low Risk). The Proposed Development Site will not contribute to the flooding as discharges from the quarry will be attenuated, and will occur at greenfield runoff rates.

In relation to climate change, the SSFRA has reviewed modelled flood extents mapping for the Mid-Range and High-End Future Scenarios in relation to fluvial flooding. The Mid-Range scenario accounts for a 20% increase in rainfall rates due to climate change in future years while the High-End scenario accounts for a 30% increase. Modelling for both the Mid-End and High-End scenarios indicated flood extents that align with the present day scenario and therefore, future climate change related rainfall was not considered a risk in relation to flooding.

Based on the information provided in the SSFRA it can be concluded that overall, the proposed development has low vulnerability to flood risk.

10.4.3.2 Extreme Wind, Fog, Lightning & Hail

Due to the nature of the proposed development extreme winds, fog, lightning and hail are unlikely to pose a significant risk. The Applicant will ensure adequate safety protocols are in place which ensure site safety and prevent site activities in extreme wind conditions, such as storms.

It can be concluded that overall, the proposed development has low vulnerability to extreme wind, fog, lightning and hail.

10.4.3.3 Wildfires

In relation to wildfires, the Think Hazard! tool developed by the Global Facility for Disaster Reduction and Recovery (GFDRR, 2025), indicates that the wildfire hazard is classified as medium for the Carlow area. This means that there is between a 10% and 50% chance of experiencing weather that could support a hazardous wildfire that may poses some risk of life and property loss in any given year. Future climate modelling indicates that there could be an increase in the weather conditions which are favourable to fire conditions. These include increases in temperature and prolonged dry periods. However, based on the predominant land-use in the vicinity of the site being managed agricultural land, the risk of wildfire is significantly lessened. Additionally, the Applicant will ensure adequate safety protocols are in place which

ensure site safety in relation to potential wildfire events. It can be concluded that the proposed development is of low vulnerability to wildfires.

10.4.3.4 Landslides

The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2025) was reviewed to inform the risk from landslides at the proposed development. There have not been any historical landslide events in the vicinity of the proposed development and most of the site area is classed as low vulnerability to landslides according to the GSI landslide susceptibility mapping database (GSI, 2025). Therefore, the vulnerability of the proposed development to landslides is classed as low.

10.4.3.5 Extreme Temperatures (Heat & Cold) & Drought

Extreme temperatures, both extreme heat and extreme cold, have the potential to impact site buildings and some related infrastructure. However, high quality, durable building materials are proposed for the development. There is a low risk of damage to the structure from extreme heat.

Drought conditions are unlikely to pose a risk to the proposed development. The water demands on site will be relatively low, primarily for dust suppression. Therefore, drought is not considered a risk for the proposed development.

10.4.3.6 Summary

Overall, the proposed development has at most low vulnerabilities to the identified climate hazards. Therefore, no detailed risk assessment is required.

10.4.4 CCRA Significance of Effects

With design mitigation in place, there are no significant risks to the proposed development due to climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the proposed development due to climate change during the operational phase are direct, long-term, negative and imperceptible, which is overall not significant in EIA terms.

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 ***slight***, which is overall ***not 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 is proposed. The primary impacts to climate will occur as part of the day-to-day operational activities on site.

10.6.2 Operational Phase

A key target in CAP25 is reducing the embodied carbon of construction materials.

The Applicant (Milford Quarries) are actively engaged with the Sustainable Energy Authority Ireland (SEAI). under its Excellence in Energy Efficient Design (ExEED) program to support the electrification of the aggregate production process. The Applicant has completed a trial project with SEAI which was very successful and indicated energy reduction intensities of 30%. This project will be audited by NSAI in February 2026 and it is envisaged that the project will be certified to ExEED Designed Certification. Subsequently as a result of the success of this project two further ExEED projects have been approved by the SEAI. It is anticipated that further carbon reduction projects will be implemented at Milford Quarries. These measures will include the addition of renewable technologies such as solar.

The above indicates that at a company level the Applicant has a commitment to reducing its climate impact and the effects of their identified strategies through the ExEED projects can apply to the proposed development where appropriate.

These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Climate Action Plan.

10.7 Monitoring

Monitoring and reporting of the embodied carbon in the operational phase is recommended and the reporting of these as part of annual Scope 1, 2 and 3 GHG emissions. The aim of monitoring will be to seek further ways to minimise climate impacts. Monitoring will include contractual obligations, in line with the most recent Climate Action Plan and sectoral targets, to ensure that the proposed development stays in line with updated aims. Monitoring will include water usage, power and fuel usage, and waste generation (including reuse and recycling rates). Where monitoring shows that the proposed development is not meeting its targets, further mitigation will be put in place.

Monitoring shall also include reviewing potential for extreme weather events which may cause damage during operations. The applicant site's Environmental Management System (EMS) will include measures to address risks during such events i.e. flooding.

10.8 Residual Impacts

The impact to climate due to a proposed development must be assessed as a whole for all phases. The proposed development will result in some impacts to climate through the release of GHGs. TII reference the ISEP guidance 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*". The proposed development has proposed best practice mitigation measures and is committing to reducing climate impacts where feasible. The mitigation measures in relation to the proposed development are detailed in Section 10.6. As per the assessment criteria in Table 10.4 the residual impact of the proposed development in relation to GHG emissions is considered minor adverse. The proposed development is aligned with the following assessment criteria as per Table 10.4:

- 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.

The 'minor adverse' impact rating equates to a ***direct, long-term, negative*** and ***slight***, impact which is overall ***not significant*** in EIA terms.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development due to climate change. The residual effect of climate change on the proposed development is considered ***direct, long-term, negative*** and ***imperceptible***, which is overall ***not significant*** in EIA terms.

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.
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