11 CLIMATE (CLIMATE CHANGE)

11.1 INTRODUCTION

This chapter assesses the likely climate impacts associated with the proposed Kishoge Part 10 residential development, which spans three sites within the Clonburris SDZ (Strategic Development Zone). These sites are defined as Site 3, Site 4 and Site 5. A full description of the development is available in Chapter 3 (Description of the Proposed Development).

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 greenhouse gas (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 project's vulnerability to climate change and identifies adaptation measures to increase project resilience.

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11.2 ASSESSMENT METHODOLOGY

11.2.1 Relevant Guidance, Legislation and Policy

11.2.1.1 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 EPA Guidelines) (Environmental Protection Agency, 2022); and
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (hereafter referred to as the EU Guidance) (European Commission, 2017).

The assessment has made reference 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);

- TII GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2024a);
- Institute of Environmental Management & Assessment (IEMA) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the IEMA 2022 GHG Guidance) (IEMA, 2022);
- IEMA Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the IEMA 2020 EIA Guide) (IEMA, 2020a);
- IEMA GHG Management Hierarchy (hereafter referred to as the IEMA 2020 GHG Management Hierarchy) (IEMA, 2020b);
- IEMA Principles Series: Climate Change Mitigation & EIA (IEMA, 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).

11.2.1.2 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (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*" (section 3(1)). 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 CAP 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 CAP 2019 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 Government published the second CAP in November 2021 (Government of Ireland, 2021a) and a third update in December 2022 (Government of Ireland, 2022) with an Annex of Action published in March 2023. The current Climate Action Plan is CAP24, published in December 2023 (DECC, 2023a).

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 Climate Action and Low Carbon Development (Amendment) Act 2021 (Government of Ireland, 2021) (hereafter referred to as the 2021 Climate Act) was enacted on 23 July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act also provides for "*carbon budgets and a decarbonisation target range for certain sectors of the economy*". The 2021 Climate Act defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period*".

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'*)". The carbon budget is to be produced for three sequential budget periods, as shown in Table 11.1. 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 ceilings, 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 published in CAP24 (DECC, 2023a) and are shown in Table 11.1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025

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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 11.1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025

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
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 11.2 Sectoral Emissions Ceilings 2030

11.2.1.3 Policy

11.2.1.3.1 Greenhouse Gas Policy

As noted above, CAP24 was published in December 2023 (DECC, 2023a). CAP25, which will update CAP24, is due to be published in 2025. CAP24 builds on the progress of CAP23, which first published carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030 and 2050 net zero goal. The CAP has six vital

high impact sectors where the biggest savings can be made. These sectors are: renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business, and change of land-use. CAP24 states that the decarbonisation of Ireland's manufacturing industry is key for Ireland's economy and future competitiveness. There is a target to reduce the embodied carbon in construction materials by 10% for materials produced and used in Ireland by 2025 and by at least 30% for materials produced and used in Ireland by 2030. CAP24 states that these reductions can be brought about by product substitution for construction materials and reduction of clinker content in cement. Cement and other high embodied carbon construction elements can be reduced by the adoption of the methods set out in the Construction Industry Federation 2021 report *Modern Methods of Construction* (Construction Industry Federation, 2021). The IDA Ireland will also seek to attract businesses to invest in decarbonisation technologies to ensure economic growth can continue alongside a reduction in emissions.

In 2024, the Government published its *Long-Term Strategy on Greenhouse Gas Emissions Reductions* (DECC, 2024). 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.

The South Dublin County Council (SDCC) Climate Action Plan 2024 – 2029 (SDCC & Codema, 2024) outlines SDCC's goals to mitigate GHG emissions and plans to prepare for and adapt to climate change. The Climate Action Plan sets out a range of actions across the six theme areas of Energy & Buildings; Transport; Flood Resilience; Nature Based Solutions; Circular Economy & Resource Management; and Citizen Engagement. This is aligned to the Government's overall National Climate Objective, which seeks to pursue and achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy. The SDCC Climate Action Plan states that SDCC aims to reduce car dependency by encouraging modal shifts from cars to active travel and more sustainable modes, including public transport and cycling. SDCC states that it wishes to work with the relevant transportation bodies to introduce measures to achieve modal shifts.

The SDCC Climate Action Plan highlights the risks that climate change poses to infrastructure, individuals, communities, and business sectors (such as agriculture, tourism and transport), with risks mainly associated with extreme weather events. The SDCC Climate Action Plan notes that extreme temperature and flooding and erosion (pluvial and fluvial) have the greatest future risk when both the likelihood and consequence are accounted for. Increases in extreme rainfall and flooding will cause inundation of residential properties, damage to commercial buildings and premises, and disruption of transport networks.

11.2.1.3.2 Climate Change Vulnerability Policy

The second National Adaptation Framework (NAF) (DECC, 2024) was published in June 2024, in line with the five-year requirement of the 2015 Act, as amended. 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. Similar to 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).

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 therefore the greatest requirement for adaptation.

These scenarios align with a conservative approach to the assessment of risks to Ireland and assume that 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); and
- Long term (~2100).

11.2.2 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 11.3.1).

11.2.2.1 Construction Phase

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 reference study period (i.e. the assumed building life expectancy) for the purposes of the assessment is 50 years. Embodied carbon emissions are attributed to four main categories, taken from BS EN 15978. The categories are:

- **Product Stages (Category A1 to A3)** The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to a point of manufacture and then the primary energy used (and the associated carbon impacts that arise) from transforming the raw materials into construction products.
- **Construction (Category A4 to A5)** These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building.

- **Use Stage (Category B1 to B7)** This covers a wide range of sources from the GHG emissions associated with the operation of the building (B1), maintenance (B2), repair (B3), refurbishment (B4) and replacement (B5) of materials, and operational energy use (B6) and water use (B7).
- **End of Life Stages (Category C1 to C4)** The eventual deconstruction and disposal of the existing building at the end of its life takes account of the on-site activities of the demolition contractors. No "credit" is taken for any future carbon benefit associated with the reuse or recycling of a material into new products.

PE-ENV-01104 (TII, 2022a) recommends the calculation of the construction stage embodied carbon using the TII Online Carbon Tool (TII, 2024a). Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The purpose of the embodied carbon assessment is to engage the design team in the consideration of embodied carbon at an early stage in the development and mitigate embodied carbon. This engagement aims to ensure carbon savings are made and to assist in aligning the project to Ireland's CAP goal of Net Carbon Zero by 2050.

The TII Online Carbon Tool (TII, 2024a) has been commissioned by TII to assess GHG emissions associated with road or rail projects in Ireland. The TII Carbon Tool (TII, 2024a) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013), which can be applied to a variety of developments, not just road or rail. The tool aligns with PAS 2080.

The use of the TII Carbon Tool was not considered suitable for the building elements of the proposed development. As the TII Carbon Tool was developed for road and infrastructure projects, the material types within the tool are specific to these types of developments. These material types are not fully appropriate for assessing the embodied carbon associated with the construction of buildings. Therefore, the carbon impact of the buildings was carried out using an alternative tool: the Carbon Designer for Ireland tool.

The Irish Green Building Council in partnership with One Click LCA Ltd have developed the Carbon Designer for Ireland tool (One Click LCA Ltd, 2023) for use on Irish specific building projects. The Carbon Designer tool is promoted by the EPA and the Land Development Agency. OneClickLCA is certified to EN 15978, EN 15978, ISO 21931 – 1 & ISO 21929, and data requirements of ISO 14040 & EN 15804, and is LEED, BREEAM and PAS 2080 aligned. It allows users to assess the carbon impact of buildings at an early stage using typical default materials and values. Inputs to the tool include the gross floor area and number of stories above ground level along with the building frame type. Once the baseline is established using generic data, the tool allows for optioneering and optimization of the carbon impact. It highlights the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials. The Carbon Designer for Ireland tool was utilised by the project architects, with the outputs provided to AWN Consulting to assess the GHG impact of the building elements of the proposed development. The TII Carbon Tool was utilised to estimate the GHG emissions associated with the non-building elements of the proposed development including construction activities, construction site electricity use, landscaping and infrastructure elements, and construction worker travel to site.

Reasonable conservative estimates have been used in this assessment where necessary to provide an estimate of the GHGs associated with the proposed development.

11.2.2.2 Operational Phase

11.2.2.2.1 Traffic Emissions

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

The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022b), states that road links meeting one or more of the following criteria can be defined as being

"affected" by a proposed development and should be included in the local air quality assessment, and also the climate assessment:

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5 m or greater.

While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

The traffic data provided for the operational phase assessment has included traffic associated with Site 3, Site 4, and Site 5 of the Kishoge development. While the traffic associated with each individual site in isolation is below the above screening criteria, when assessed in combination with all proposed sites, there is a greater than 1000 AADT increase on a small number of road links. As a result, a detailed assessment of traffic related carbon dioxide equivalent (CO_2e) emissions was conducted. Additionally, traffic associated with other cumulative developments in the vicinity of the proposed development was included in the figures supplied to ensure a full cumulative assessment was conducted. See Traffic and Transport Assessment and Chapter 13 (Material Assets – Transportation) for further details.

PE-ENV-01104 (TII, 2022a) states that road traffic related emissions information should be obtained from an Air Quality Practitioner (i.e. the air quality EIAR chapter author) to show future user emissions during operation without the development in place. The Air Quality Practitioner calculated the traffic related emissions through the use of the TII REM tool (TII, 2024b) which includes detailed fleet predictions for age, fuel technology, engine size and weight based on available national forecasts. The *Default* fleet mix option was selected along with the *Intermediate Case* fleet data base selection, as per TII Guidance (TII, 2024b). The Intermediate Case assumes a linear interpolation between the Business as Usual case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs.

The output is provided in terms of CO_2e for the base year 2023, Opening Year 2027, and Design Year 2042. Both the Do Nothing (i.e. assuming the proposed development is not in place in future years) and Do Something (i.e. assuming the proposed development is constructed) scenarios are quantified in order to determine the degree of change in emissions as a result of the proposed development. Traffic data was obtained from the traffic consultant on the project for the purpose of this assessment. Inputs include light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, and project county location. The traffic data used in the operational phase modelling assessment is detailed in Table 11.3 and in Chapter 10 (Air Quality).

Road Name	**Speed (kph)**	**Base Year**	**Opening Year**		**Design Year**	
			Do Nothing	**Do Something**	**Do Nothing**	**Do Something**
		LDV AADT (HDV AADT)	**LDV AADT (HDV AADT)**	**LDV AADT (HDV AADT)**	**LDV AADT (HDV AADT)**	**LDV AADT (HDV AADT)**
A: CNLS (Between J27 & J4)	30	-	3,412 (87)	6,358 (90)	7,008 (92)	9,959 (90)
J: R136 (South of J4)	80 Base Year 50 Future Years	19,974 (618)	17,491 (2,052)	19,597 (2,057)	19,532 (2,050)	21,632 (2,061)
W: R136 (South of CSLR)	80 Base Year 50 Future Years	19,975 (618)	18,833 (2568)	22,536 (2,560)	22,609 (2,568)	24,977 (2,561)

Table 11.3 Traffic Data used in Operational Phase GHG Assessment

11.2.2.2.2 Operational Phase Energy Use

The EU Guidance (European Commission, 2013) also states that indirect GHG emissions as a result of a development must be considered, which include emissions associated with energy usage. A Climate Action and Energy Statement was prepared by M and E Consulting Engineers in relation to Site 3. Metec Consulting Engineers prepared the Climate Action and Energy Statement in relation to Site 4. OCSC prepared the Energy and Sustainability Report in relation to Site 5. These documents are submitted separately with this planning application. These reports outline a number of measures which have been incorporated into the overall design of the development, which will have the benefit of reducing the impact to climate where possible during operation.

11.2.2.3 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 IEMA guidance (IEMA, 2022), which is consistent with the terminology contained within Figure 3.4 of the EPA Guidelines (EPA, 2022).

The 2022 IEMA Guidance (IEMA, 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. The significance of a project's emissions should therefore 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.
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

Determining the significance of effects is 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 or National Climate Objective). 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 taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state 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 11.4 (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
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 has 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 11.4 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, 2023a). With the publication of the Climate Action Act in 2021 and the Climate Action Plan 2024, 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.

11.2.3 Climate Change Risk Assessment

The Climate Change Risk Assessment (CCRA) involves determining the vulnerability of the proposed development to climate change. This requires 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) (IEMA, 2020).

The baseline environment information provided in Section 11.3, 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. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type. 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.

11.2.3.1 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 11.5 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 can be considered to be 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. According to the TII guidance (TII, 2022a), an assessment of construction phase CCRA impacts is only required if a detailed CCRA is required.

		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 11.5 Vulnerability Matrix

The screening CCRA, detailed in Section 11.5.2, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase was scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 11.6.1.1.

11.3 RECEIVING ENVIRONMENT

The receiving environment in terms of climate is the same each of the individual sites: Site 3, Site 4, and Site 5 of the proposed development. Therefore, the following sections detail the existing climate environment and do not differentiate between the overall cumulative development or the individual sites of the proposed development.

PE-ENV-01104 (TII, 2022a) states that a baseline climate scenario should identify GHG emissions without the project for both the current and future baseline, consistent with the study area for the project.

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.

Climate impacts are assessed at a national level and in relation to national targets and sectoral emission ceilings. The study area for climate is the Republic of Ireland and the baseline is determined in relation to this study area.

11.3.1 Current GHG Baseline

Data published in July 2024 (EPA, 2024), indicates that Ireland exceeded, without the use of flexibilities, its 2023 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 2.27 Mt CO_2e. However, the 2023 was the first time that Ireland's emissions were below (-1.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-17.0%) and ESR (Effort Sharing Regulation) emissions decreased (-3.4%). 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 2023 total national GHG emissions, excluding Land Use, Land-use Change and Forestry (LULUCF), have decreased by 6.8% on 2022 levels to 55.01 Mt CO_2e, with a 2.2 Mt CO_2e (-21.6%) reduction in electricity industries alone. This was driven by a 40.7% share of energy from renewables in 2023 and by increasing our imported electricity. Manufacturing combustion and industrial processes decreased by 5.1% to 6.3 Mt CO_2e in 2023 due to declines in fossil fuel usage. The sector with the highest emissions in 2023 was agriculture at 37.6% of the total, followed by transport at 21.4%. For 2023, total national emissions (including LULUCF) were 60.62 Mt CO_2e (EPA, 2024), as shown in Table 11.6.

The provisional 2023 figures indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025.

Sector *Note 1*	2021	2022	2023	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2022 to 2023
Electricity	9.893	9.694	7.558	40.0	67.9%	-22.0%
Transport	11.089	11.760	11.791	54.0	64.1%	0.3%
Buildings (Residential)	6.868	5.753	5.346	29.0	62.0%	-7.1%
Buildings (Commercial and Public)	1.444	1.447	1.409	7.0	61.4%	-2.6%
Industry	7.093	6.622	6.288	30.0	66.7%	-5.0%
Agriculture	21.940	21.795	20.782	106.0	60.9%	-4.6%
Other *Note 2*	1.864	1.931	1.832	9.0	62.5%	-5.1%
LULUCF	4.628	3.983	5.614	–	–	40.9%
Total including LULUCF	64.819	62.986	60.620	295.0	63.9%	-3.8%

Note 1 Reproduced from latest emissions data on the EPA website July 2024 (EPA, 2024).
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 11.6 Trends in Total National GHG Emissions 2021 – 2023

11.3.2 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 IEMA Guidance (IEMA, 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 CAP24, 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 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 June 2024, the EPA released the report *Ireland's Greenhouse Gas Emissions Projections 2023-2050* (EPA, 2024d), 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 under the "With Existing Measures" scenario, Ireland will achieve a reduction of 11% on 2018 levels by 2030. A reduction of 29% by 2030 can be achieved under the "With Additional Measures" scenario, which is still short of the 42% reduction target set out in the carbon budgets.

11.3.3 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 Dublin Airport 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 historical regional weather data for Dublin Airport meteorological station is representative of the current climate in the region of the proposed development. The data for the 30-year period from 1991 to 2020 indicates that the wettest months at Dublin Airport meteorological station were November and December, and the driest month on average was June (Met Éireann, 2023a). July was the warmest month with a mean temperature of 15.4 Celsius. January was the coldest month with a mean temperature of 5.2 Celsius.

Met Éireann's 2023 Climate Statement (Met Éireann, 2024b) 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 (see Figure 11.1).

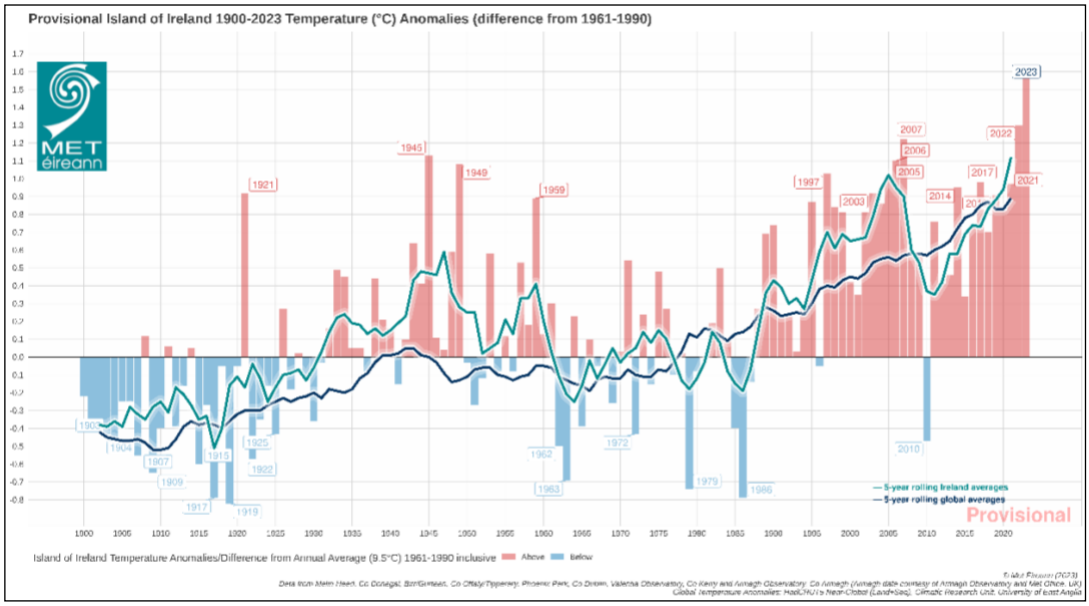


Figure 11.1 1900-2023 Temperature (°C) Temperature Anomalies (differences from 1961-1990)

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 June 2023. This marine heatwave contributed to the record rainfall in July.

Met Éireann's 2024 *Climate Statement* (Met Éireann 2025) states that 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 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 will occur 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.

11.3.4 Future CCRA Baseline

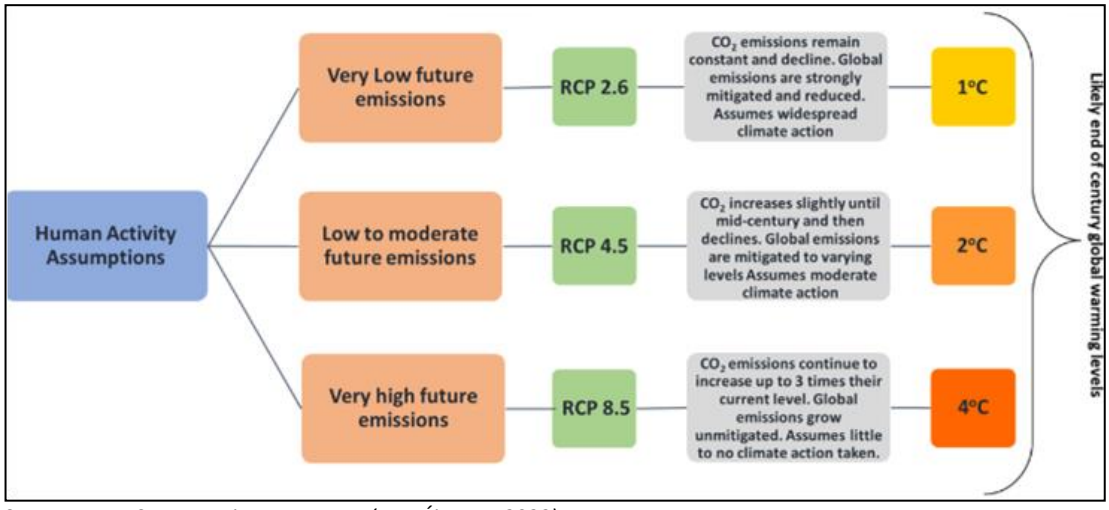
Impacts as a result of climate change will evolve with a changing future baseline. Changes have the potential to include increases in global temperatures and increases in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration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

Ireland has seen increases in 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 as a result of 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.

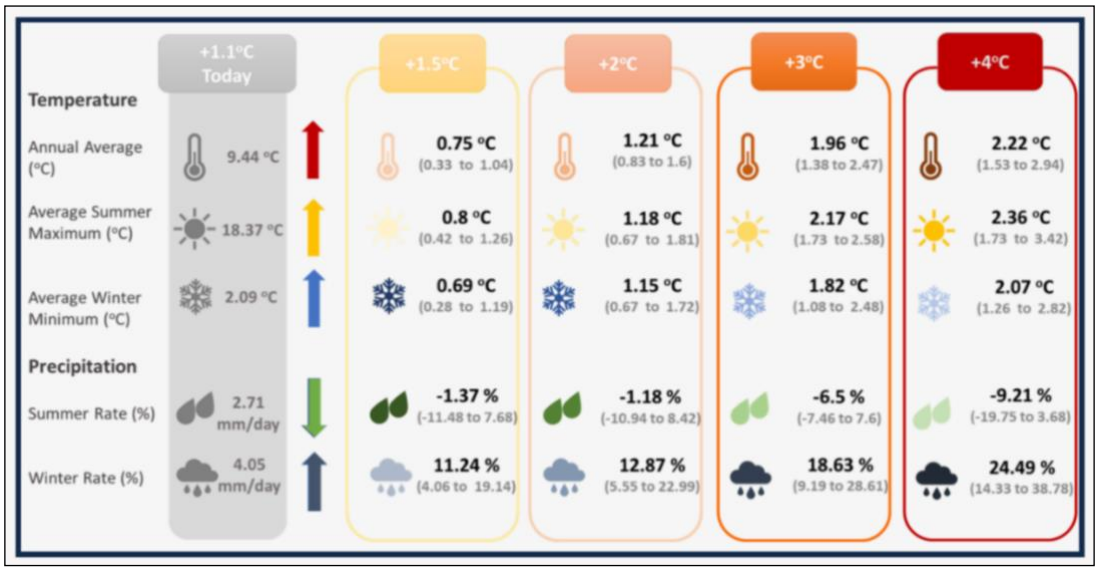
The National Framework for Climate Services (NFCS) was founded in June 2022 to streamline the provision of climate services in Ireland and will be led by Met Éireann. The aim of the NFCS is to enable the co-production, delivery and use of accurate, actionable and accessible climate information and tools 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, 2023b) 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, see Figure 11.2.



*Source: TRANSLATE project storymap (*Met Éireann *2023)*

Figure 11.2 Representative Concentration Pathways associated emission levels

TRANSLATE (Met Éireann, 2023b) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (for example, 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, 2023b). 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% (See Figure 11.3). 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.



*Source: TRANSLATE project storymap (*Met Éireann, *2023b)*

Figure 11.3 Change of climate variables for Ireland for different global warming thresholds

The TRANSLATE research report (Met Éireann 2024d) finds that night-time temperatures will warm more than day-time temperatures, with temperature 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

- 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 affecting 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 and 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.

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development comprises a number of sites within the Clonburris SDZ (Strategic Development Zone) in Dublin. These sites are defined as Site 3, Site 4, and Site 5. A full description of the development is available in Chapter 3 (Description of the Proposed Development).

11.4.1.1 Construction Stage

During the construction stage the main source of climate impacts will be as a result of GHG emissions and embodied carbon associated with the proposed construction materials and activities for the proposed development.

11.4.1.2 Operational Stage

During the operational phase vehicle emissions from traffic accessing the site have the potential to release CO_2 and other GHGs which will impact climate. In addition, operational energy use will result

in GHG emissions. The vulnerability of the proposed development in relation to future climate change must also be considered during the operational phase.

11.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

11.5.1 Proposed Development – Greenhouse Gas Assessment

11.5.1.1 Construction Phase

The most significant proportion of GHG emissions tends to occur during the construction phase as a result of embodied carbon in construction materials and emissions from construction activities. Therefore, the assessment has been included in the construction phase assessment for the purposes of the EIAR. The assessment is broken down into the following stages as per Section 11.2.2.1:

- Product stage (A1 – A3);
- Transportation to site (A4);
- Site operations (construction activities) (A5); and
- Material replacement and refurbishment (B4 – B5).

The construction phase GHG emissions comprise stages A1 – A5, which include the construction materials, the transport of the materials to site, and the construction activities or site operations. Ongoing material refurbishment and replacement throughout the lifetime of the development is included within category B4 – B5; these are default values based on the typical maintenance requirements for the chosen material types over the assumed 50 year lifetime.

The carbon assessment highlights the areas where the highest embodied carbon emissions occur, specifically as a result of building materials. Where material types were not known, as these will not be selected until detailed design stage, the standard default material type was used within the Carbon Designer for Ireland tool. Additionally, where the specific material type was not available within the tool, as the tool does not currently contain all possible material types, a conservative alternative material type was chosen which allowed for a best representation of the embodied carbon associated with the material.

The below sections detail the results of the GHGA for each of the proposed development sites (Site 3, Site 4, and Site 5). The outputs from the Carbon Designer for Ireland tool and the TII Carbon Tool have been combined for each site.

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, which are detailed in Table 11.7, Table 11.8, Table 11.9, and Table 11.10. The relevant sectoral emissions for the proposed development comparison include the Industry sector, Transport sector, Electricity sector, and Waste sector. The predicted emissions for the proposed development are annualised over the assumed 50-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.

11.5.1.1.1 Site 3

The results of the GHGA for Site 3 are shown in Table 11.7. This includes both the outputs from the Carbon Designer for Ireland tool and the TII Carbon Tool. Construction materials make up the majority of GHG emissions for the proposed development, accounting for approximately 71% of the total construction phase GHG emissions. Material replacement makes up the second highest contribution at 17% of the total. Material transport and construction activities make up the remainder of the construction GHG emissions. The A5 and B4-B5 categories include carbon savings associated with waste material recycling or re-use.

It has been calculated that the total construction phase embodied carbon (including maintenance and replacement of materials over the development lifetime) for Site 3 will be 166,189 tonnes CO_2e (see Table 11.7).

Stage	GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Predicted GHG Emissions as % of Project Total	Relevant Sector for Carbon Budget Comparison
A1-A3	Materials	120,057	72%	Industry
A4	Material Transport	2,344	1%	Transport
A5	Site Clearance and Demolition	5	0.003%	Industry
	Excavations	13	0.01%	Industry
	Construction/Installation Process	671	0.4%	Electricity
	Construction site material waste	5,341	3%	Waste
	Construction site material waste transport	95	0.06%	Transport
	Construction site waste	442	0.27%	Waste
	Construction Worker Travel to Site	1,005	0.60%	Transport
B4 - B5	Maintenance Material	28,632	17%	Industry
	Maintenance Material Transport	40	0.02%	Transport
	Maintenance Material Waste	7,544	5%	Waste
Total		**166,189**		

Table 11.7 GHG Assessment Results – Site 3

11.5.1.1.2 Site 4

The results of the GHGA for Site 4 are shown in Table 11.8. This includes both the outputs from the Carbon Designer for Ireland tool and the TII Carbon Tool. Construction materials make up the majority of GHG emissions for the proposed development, accounting for approximately 84% of the total construction phase GHG emissions. Material replacement, material transport and construction activities make up the remainder of the construction GHG emissions. The A5 and B4-B5 categories include carbon savings associated with waste material recycling or re-use.

It has been calculated that the total construction phase embodied carbon (including maintenance and replacement of materials over the development lifetime) for Site 4 will be 21,024 tonnes CO_2e (see Table 11.8).

Stage	GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Predicted GHG Emissions as % of Project Total	Relevant Sector for Carbon Budget Comparison
A1-A3	Materials	17,587	84%	Industry
A4	Material Transport	623	3%	Transport
A5	Site Clearance and Demolition	13	0.1%	Industry
	Excavations	52	0.2%	Industry
	Construction/Installation Process	671	3%	Electricity
	Construction site material waste	558	3%	Waste
	Construction site material waste transport	91	0.4%	Transport
	Construction site waste	25	0.1%	Waste
	Construction Worker Travel to Site	620	3%	Transport
B4 - B5	Maintenance Material	762	4%	Industry
	Maintenance Material Transport	2	0.01%	Transport
	Maintenance Material Waste	20	0.1%	Waste
Total		**21,024**		

Table 11.8 GHG Assessment Results – Site 4

11.5.1.1.3 Site 5

The results of the GHGA for Site 5 are shown in Table 11.9. This includes both the outputs from the Carbon Designer for Ireland tool and the TII Carbon Tool. Construction materials make up the majority of GHG emissions for the proposed development, accounting for approximately 81% of the total construction phase GHG emissions. Material replacement, material transport and construction activities make up the remainder of the construction GHG emissions. The A5 and B4-B5 categories include carbon savings associated with waste material recycling or re-use.

It has been calculated that the total construction phase embodied carbon (including maintenance and replacement of materials over the development lifetime) for Site 5 will be 32,990 tonnes CO_2e (see Table 11.9).

Stage	GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Predicted GHG Emissions as % of Project Total	Relevant Sector for Carbon Budget Comparison
A1-A3	Materials	26,793	81%	Industry
A4	Material Transport	701	2%	Transport
A5	Site Clearance and Demolition	3	0.01%	Industry
	Excavations	73	0.2%	Industry
	Construction/Installation Process	1,218	4%	Electricity
	Construction site material waste	1,088	3%	Waste
	Construction site material waste transport	22	0.1%	Transport
	Construction site waste	45	0.1%	Waste
	Construction Worker Travel to Site	767	2%	Transport
B4 - B5	Maintenance Material	2,213	7%	Industry
	Maintenance Material Transport	4	0.01%	Transport
	Maintenance Material Waste	62	0.2%	Waste
Total		**32,990**		

Table 11.9 GHG Assessment Results – Site 5

11.5.1.2 Construction Phase GHGA Summary

Figure 11-4 shows the GHG emissions for the proposed development (including Site 3, Site 4, and Site 5) per life-cycle stage based on the output from the Carbon Designer for Ireland tool and the TII Carbon Tool combined.

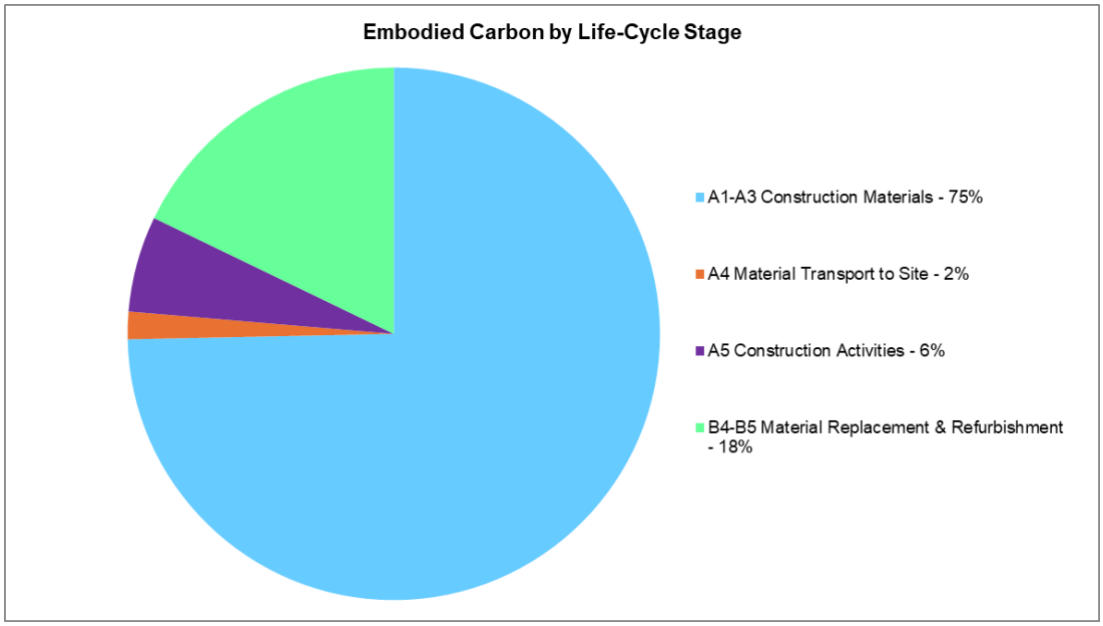


Figure 11-4 Embodied Carbon by Life-Cycle Stage

The total predicted GHG emissions (as shown in Table 11.7, Table 11.8 and Table 11.9) can be averaged over the full lifespan of the proposed development to give the predicted annual emissions to allow for direct comparison with national annual emissions and targets.

In Table 11.10, GHG emissions have been compared against the carbon budget for the industry, transport, electricity and waste sectors in 2030 (DECC, 2024), against Ireland's total GHG emissions in 2023, and against Ireland's EU 2030 target of a 42% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO_2e) (set out in Regulation EU 2018/842).

The estimated total GHG emissions, when annualised over the 50-year proposed development lifespan, are equivalent to 0.007% of Ireland's total GHG emissions in 2023 and 0.016% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with transport-related activities are 0.002% of the 2030 Transport budget, construction waste GHG emissions are 0.03% of the Waste budget, industry-related activities are 0.1% of the 2030 Industry budget, and electricity use emissions are 0.002% of the Electricity sector budget.

Target/Sectoral Budget (tCO_2e)		**Annualised Development GHG Emissions (tCO_2e)**		**% of Relevant Target/Budget**
Ireland's 2023 Total GHG Emissions (existing baseline)	60,620,000	4,404	Total GHG Emissions	0.007%
Non-ETS 2030 Target	27,722,000	4,404	Total GHG Emissions	0.016%
2030 Sectoral Budget (Industry Sector)	4,000,000	3,923	Total Industry Emissions	0.10%
2030 Sectoral Budget (Transport Sector)	6,000,000	126	Total Transport Emissions	0.002%
2030 Sectoral Budget (Waste Sector)	1,000,000	302	Total Waste Emissions	0.03%

Target/Sectoral Budget (tCO_2e)		Annualised Development GHG Emissions (tCO_2e)		% of Relevant Target/Budget
2030 Sectoral Budget (Electricity Sector)	3,000,000	51	Total Electricity Emissions	0.002%

Table 11.10 Estimated GHG Emissions Relative to Sectoral Budgets and GHG Baseline

11.5.1.3 Operational Phase

11.5.1.3.1 Operational Energy Usage

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. The primary elements with respect to reducing climate impacts and optimising energy usage are summarised in Section 11.6.1.2 and are based on information provided within the various Climate Action and Energy Statements prepared in relation to the proposed development.

11.5.1.3.2 Operational Traffic Emissions

There is the potential for increased traffic volumes to impact climate during the operational phase. To provide for a worst-case assessment and to assess potential cumulative impacts, the traffic data has included traffic associated with Site 3, Site 4, and Site 5 of the proposed development as well as specific cumulative developments within the area (see Chapter 13 (Material Assets – Transportation) and Traffic & Transportation Assessment for further details).

The predicted concentrations of CO_2e for the future years of 2027 and 2042 are detailed in Table 11.11. These are significantly less than Ireland's national 2027 and 2030 targets set out under EU legislation (targets beyond 2030 are not available) and the 2030 sectoral emissions ceilings. It is predicted that in 2027 the proposed development will increase CO_2 emissions by 138 tonnes CO_2e. This equates to 0.0004% of the 2027 national emission ceiling or 0.002% of the 2030 Transport sector emissions ceiling (see Table 11.11). Similarly, low increases in CO_2 emissions are predicted to occur in 2042, with emissions increasing by 88 tonnes CO_2e. This equates to 0.0003% of the 2030 national emission ceiling or 0.001% of the 2030 Transport sector emissions ceiling (see Table 11.11).

In addition, bicycle parking as well as EV charging points will be provided as part of the proposed development. The development is also located in close proximity to a number of public transport links including rail and bus. This will promote the use of more sustainable methods of transport and reduce the need for private vehicle trips.

Year	Scenario	CO_2e (tonnes/annum)
2027	Do Nothing	1,216
	Do Something	1,353
2042	Do Nothing	1,153
	Do Something	1,240
Increment Change in 2027		138
National Emission Ceiling 2027 (Tonnes) Note 1		**36,747,342**
Impact in 2027 (as % of national emissions ceiling)		0.0004%
Transport Sector 2030 Emission Ceiling		**6,000,000**
Impact in 2027 (as % of transport sector emissions ceiling)		0.002%
Increment Change in 2042		88
National Emission Ceiling 2030 (Tonnes) Note 1		**27,722,000**
Impact in 2042 (as % of national emissions ceiling)		0.0003%
Impact in 2042 (as % of transport sector emissions ceiling)		0.001%

Note 1 Target under Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council.

Table 11.11 Traffic Emissions GHG Impact Assessment

11.5.1.4 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 11.6 has been taken into account when determining the significance of the proposed development's GHG emissions. According to the TII significance criteria described in Section 11.2.2.3 and Table 11.4, the significance of the GHG emissions during the construction and operational phase is minor adverse. The proposed development has mitigated some GHG impacts where possible.

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

11.5.2 Proposed Development – Climate Change Risk Assessment

11.5.2.1 Construction Stage

A detailed CCRA of the construction phase has been scoped out, as discussed in Section 11.2.3, on the basis that there are no residual medium or high-risk vulnerabilities to climate change hazards. Therefore, a detailed CCRA is not required (TII, 2022a). However, consideration has been given to the proposed development's vulnerability to the following climate change hazards, with best practice mitigation measures proposed in Section 11.6.1.1:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow; and
- Major Storm Damage including wind damage.

11.5.2.2 Operational Phase

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 11.12 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 11.5. The results of the vulnerability assessment are detailed in Table 11.12.

As Site 3, Site 4 and Site 5 of the proposed development are located in close proximity to one another, a separate vulnerability assessment for each site was not deemed necessary as each site has similar vulnerabilities.

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Coastal, Pluvial, Fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Wildfire	1 (Low)	1 (Low)	1 (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)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

Table 11.12 Climate Change Vulnerability Assessment

The sensitivity and exposure of the area was determined with reference to a number of 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.

Flooding

Increased rainfall in future years as a result of climate change has the potential to result in flooding. A Flood Risk Assessment (FRA) for each site, Site 3, Site 4 and Site 5, of the proposed development was undertaken.

In relation Site 3 and Site 5, the FRA for each states that the proposed development is located within Flood Zone C and as such is not at risk of flooding. An additional 20% rainfall depth is included in the modelling and design of the proposed sites' surface water drainage systems to allow for future climate change effects on rainfall volume. This additional 20% aligns with the medium RCP4.5 scenario; allowing an additional 30% would align with the high end RCP8.5 scenario. However, the risk remains "low" as the drainage design is considered sufficient to account for future climate change.

The FRA for the Site 4 of the proposed development indicates that the site is partially at risk from fluvial flooding due to the presence of the Kilmahuddrick Stream. The detailed hydraulic and hydrological modelling conducted by JBA in the FRA has identified localised flood risks in the southeastern part of the site, where a small part falls within Flood Zone B. Given the proximity to the Kilmahuddrick Stream and the influence of climate change, the design approach has adopted a precautionary methodology. The finished floor levels (FFL) have been set in accordance with SDCC SFRA requirements, incorporating freeboard allowances to mitigate against extreme events. The proposed flood mitigation measures, including a lateral storage area, have been designed to compensate for the loss of floodplain storage and prevent an increase in downstream flood risk on the Kilmahuddrick Stream. With the mitigation measures implemented, it can be concluded that the flood risk at the Site 4 location is mitigated and the risk can be classed as "low".

Extreme Wind, Fog, Lightning & Hail

In relation to extreme winds, the buildings shall be designed to the appropriate standards to account for the relevant wind loadings events for RCP4.5 and RCP8.5 for up to 2100. If required as part of the building design, lightning protection shall be provided for. Hail and fog are not predicted to significantly affect the buildings due to their design.

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 low for the Dublin area. This means that there is between a 4% to 10% chance of experiencing weather that may cause disruptions and low but tangible 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, due to the project location in a built-up, suburban area, the risk of wildfire is significantly lessened and it can be concluded that the proposed development is of low vulnerability to wildfires.

Landslides

The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2025) was reviewed to determine the risk from landslides at the proposed development. There have not been any historical landslide events in the vicinity of the proposed development and the area is of low susceptibility to future landslides. Therefore, landslides are not a risk for the proposed development site.

Extreme Temperatures (Heat & Cold) & Drought

In relation to extreme temperatures, both extreme heat and extreme cold, these have the potential to impact the building materials and some related infrastructure. However, the building materials selected at the detailed design and will be done with consideration of the likely future temperature ranges Ireland will experience under RCP4.5 and RCP8.5 up to 2100. Therefore, extreme temperatures are not considered a significant risk.

Summary

Overall, the proposed development has at most low vulnerabilities to the identified climate hazards provided detailed design includes for the impact of climate change under both RCP4.5 and RCP8.5 up to 2100. Therefore, no detailed risk assessment is required.

11.5.2.3 CCRA Significance of Effects

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

11.5.3 Cumulative Development

The cumulative impact of all sites within the proposed development has been considered in the above sections. With respect to the requirement for a cumulative assessment with additional developments the IEMA (IEMA, 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 to be inherently cumulative*".

The traffic data used for the operational phase assessment included cumulative traffic from existing and permitted developments in the surrounding area. Therefore, this impact assessment is 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.

11.5.4 Do-Nothing Impact

In the Do-Nothing scenario, the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc). The Do-Nothing scenario is considered neutral in terms of the climate assessment.

As the site is zoned for development, in the absence of the proposed development it is likely that a development of a similar nature would be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future even in the absence of the implementation of the proposed development.

11.6 MITIGATION MEASURES (AMELIORATIVE, REMEDIAL OR REDUCTIVE MEASURES)

11.6.1 Proposed Development

11.6.1.1 Construction Stage

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- Ensure all plant and machinery are well maintained and inspected regularly.
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site. A construction waste management plan will be implemented to minimise construction waste sent to landfills. Recycling of materials will be promoted to and reduce the environmental footprint of the site.
- Sourcing materials locally will be prioritised. This will help to reduce transport related CO_2 emissions and helps support local suppliers, further promoting economic sustainability.
- Material choices and quantities will be reviewed during detailed design, to identify and implement any lower embodied carbon options, where feasible. For example a 30% minimum clinker replacement in cement may be utilised in line with the requirements for public bodies.

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

11.6.1.2 Operational Stage

A number of mitigation measures have been incorporated into the design of the development to reduce the impact on climate wherever possible. A Climate Action and Energy Statement was prepared by M and E Consulting Engineers in relation to Site 3. Metec Consulting Engineers prepared the Climate Action and Energy Statement in relation to Site 4. OCSC prepared the Energy and Sustainability Report in relation to Site 5.

Site 3

The Climate Action and Energy Statement in relation to Site 3 states that the development will be a Nearly Zero Energy Building (NZEB) in accordance with the 2022 Part L requirements and the relevant sustainability policies within the South Dublin County Development Plan 2022-2028.

The residential units will aim to achieve a Building Energy Ratio (BER) of A2/A3. The dwellings shall include several energy conservation measures to achieve a high energy rating for each dwelling:

- High-performance thermal envelope with low U-values for the fabric.
- Low thermal bridging construction details.
- Airtight construction.
- Energy efficient ventilation system.
- Energy efficient heating and hot water generation system.
- Energy efficient lighting to be used throughout.

Additionally, the following measures will be reviewed at the detailed design stage:

- It is proposed to consider the use of Air Source Heat Pump units and Exhaust Air Heat Pump (EAHP) units in individual heating systems subject to further assessment at the detailed design stage.
- It is proposed to use Solar PV collectors for this project subject to further assessment at the detailed design stage.
- The requirements for low flow sanitary ware (water restrictors) in each dwelling shall be considered during the detailed design stage to allow for water conservation.

Site 4

As per the Climate Action and Energy Statement, the development will be a Nearly Zero Energy Building (NZEB) in accordance with the 2022 Part L requirements and the relevant sustainability policies within the South Dublin County Development Plan 2022-2028.

The residential units and commercial spaces will aim to achieve a Building Energy Ratio (BER) of A3 or better. The residential units will have an energy performance coefficient (EPC) that complies with NZEB (maximum permitted under NZEB requirements is <0.3). The units will also have a carbon performance coefficient (CPC) and renewable energy ratio (RER) that comply with NZEB requirements (maximum permitted CPC under NZEB requirements is <0.35 and RER is 0.20). Similar to the residential units, the non-domestic spaces will also comply with the NZEB requirements. The EPC will comply with the NZEB requirements (maximum permitted under NZEB requirements is <1.0). The units will also have a CPC and RER that comply with NZEB requirements (maximum permitted CPC under NZEB requirements is <1.15 and RER is 0.20).

The Climate Action and Energy Statement outlines that the design of the development has incorporated the principles of the energy hierarchy which are:

1. Be Lean – this encourages a passive strategy whereby space heating, cooling and lighting energy demand is minimised through a fabric first approach.
2. Be Clean – this stage encourages that energy supplied to the development, such as heating or domestic hot water is delivered efficiently through communal or highly efficient systems.
3. Be Green – this stage ties in with the Renewable Energy Ratio requirement of Part L 2022, whereby any remaining requirements are addressed through on-site renewable energy or low zero carbon technologies.

The following measures will ensure the development minimises the impact to climate during its operation: -

- The fabric specification will ensure compliance with the NZEB and Part L requirements for thermal bridging, air permeability and thermal comfort.
- Centralised Heating with Air Source Heat Pumps (ASHP), ASHP and EAHP options.
- Energy efficient LED lighting.
- The feasibility and appropriateness of PV solar panels will be investigated at the detailed design stage.
- Efficient water fittings to sanitaryware such as flow restrictors will be investigated as to their feasibility to reduce water consumption.
- Electric vehicle (EV) charging points will be incorporated into the parking areas for the proposed development.

Site 5

The Energy and Sustainability Report in relation to Site 5 states that the proposed development will be NZEB compliant in line with the Part L requirements. A BER of A2/A3 has been targeted.

The residential units will have an energy performance coefficient (EPC) that complies with NZEB (maximum permitted under NZEB requirements is <0.3). The units will also have a carbon performance coefficient (CPC) and renewable energy ratio (RER) that comply with NZEB requirements (maximum permitted CPC under NZEB requirements is <0.35 and RER is 0.20). Similar to the residential units, the non-domestic spaces will also comply with the NZEB requirements. The EPC will comply with the NZEB requirements (maximum permitted under NZEB requirements is <1.0). The units will also have a CPC and RER that comply with NZEB requirements (maximum permitted CPC under NZEB requirements is <1.15 and RER is 0.20).

The Climate Action and Energy Statement outlines that the design of the development has incorporated the principles of the energy hierarchy which are:

1. Be Lean – this encourages a passive strategy whereby space heating, cooling and lighting energy demand is minimised through a fabric first approach.
2. Be Clean – this stage encourages that energy supplied to the development, such as heating or domestic hot water is delivered efficiently through communal or highly efficient systems.
3. Be Green – this stage ties in with the Renewable Energy Ratio requirement of Part L 2022, whereby any remaining requirements are addressed through on-site renewable energy or low zero carbon technologies.

Additionally the development will incorporate the following measures:

- Energy efficient LED lighting.
- The proposed ventilation strategy for the non-residential areas will be natural ventilation where possible and/or mechanical ventilation. The mechanical ventilation system will be a high efficiency, variable speed drive system that also incorporates heat recovery and CO_2 control.
- The feasibility and appropriateness of PV solar panels will be investigated at the detailed design stage.
- The feasibility of air source heat pumps and exhaust air heat pumps will be investigated at the detailed design stage.
- the proposed development will incorporate measures to reduce water usage through the appropriate selection of low consumption sanitary fittings, leak detection systems and water monitoring facilities.
- The development will incorporate bicycle parking and E.V charging facilities to promote more sustainable transport methods.

The above measures for Site 3, Site 4 and Site 5 will assist in optimising the energy consumed by the development and will also have the benefit of reducing the impact to climate during the operational phase of the development.

Some measures have been incorporated into the design of the development to mitigate the impacts of future climate change. For example, adequate attenuation and drainage have been incorporated to avoid potential flooding impacts due to increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the proposed development to climate change (see Section 11.5.2).

11.6.2 Cumulative

No specific mitigation is proposed for the cumulative assessment.

11.7 RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

11.7.1 Proposed Development

The impact to climate as a result of 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 IEMA 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 some best practice mitigation measures and is committing to reducing climate impacts where feasible and will continue to investigate further measures during detailed design. As per the assessment criteria in Table 11.4, the residual 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.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of 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.

11.7.2 Cumulative

With respect to the requirement for a cumulative assessment the IEMA (IEMA, 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 to be inherently cumulative*".

The traffic data used for the operational phase assessment included cumulative traffic from existing and permitted developments in the surrounding area. Therefore, this impact assessment is 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.

11.7.3 Worst Case Impact

Conservative assumptions have been made throughout the assessment. Specifically, as part of the GHG assessment, where specific materials were not available conservative equivalent material types were used instead. Additionally, in places, where exact material types were not known for the GHG

assessment, the standard average material was assumed which can have a higher embodied carbon associated with it. Therefore, the assessment has been conservative in nature and is likely worst-case.

11.8 MONITORING

There are no monitoring requirements in relation to climate.

11.9 REINSTATEMENT

Not applicable to climate.

11.10 DIFFICULTIES ENCOUNTERED

There were no difficulties in compiling this assessment.