14. Climate Change and Carbon

Executive Summary

An initial, high level assessment of potential changes in greenhouse gas (GHG) emissions as a result of the proposed development has been undertaken, which indicates that such changes are likely to be negligible in comparison to UK and Welsh carbon budgets. Furthermore, a number of design interventions and controls will be implemented to reduce the magnitude of GHG emissions generated as a result of the construction and operation of the proposed development. On this basis, the proposed developments GHG impacts are considered to be fully consistent with applicable policy requirements and good practice design standards for projects of this type and fully in line with measures necessary to achieve the UK's trajectory towards net zero. As such, the impact of the proposed development on climate is considered to be a minor adverse not significant effect.

Furthermore, while elements of the proposed development have the potential to be adversely affected by future changes in climate, by applying design interventions, this assessment suggests it is unlikely the potential climate-related risks identified would result in significant impacts during the operational phase of the proposed development.

14.1. Introduction

14.1.1. This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017[325]. As part of the Environmental Impact Assessment (EIA) process, this Environmental Statement (ES) chapter reports the potential significant effects for climate change as a result of the proposed development. This assessment includes a review of the existing baseline conditions, consideration of the potential impacts and identification of proportionate mitigation for likely significant adverse effects resulting from the proposed development.

14.1.2. The approach to this assessment follows the EIA Scoping Report (March 2023) submitted to Pembrokeshire County Council (PCC) and has been prepared in accordance with the EIA Scoping Opinion (May 2023) for the proposed development from PCC.

14.1.3. This chapter considers both:

- The potential impact of the proposed development on climate (for example, the nature and magnitude of greenhouse gas (GHG) emissions); and
- The potential vulnerability of the proposed development to future changes in climate.

14.1.4. The assessment of GHG emissions has been prepared with reference to the Institute of Environmental Management & Assessment (IEMA) Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance[326] (hereon referred to as "IEMA GHG guidance").

14.1.5. As GHGs have a different Global Warming Potential (GWP), emissions of GHGs have been expressed throughout this chapter as emissions of carbon dioxide equivalent (CO_2e) i.e. the equivalent amount of CO_2 with the same GWP. Furthermore, as emissions of GHGs (expressed as CO_2e) are often referred to as 'carbon' emissions (e.g. within national, regional and local policy), the terms "GHG emissions" and "carbon" have been used interchangeably within this chapter.

14.1.6. The assessment of vulnerability has been prepared with reference to the IEMA Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation[327] (hereon referred to as "IEMA Climate Change Resilience guidance").

14.1.7. Chapter 3 (Proposed Development) contains a detailed description of the proposed development.

Potential Impact of Proposed Development on Climate

14.1.8. The proposed development has the potential to affect Earth's climate by causing (either directly or indirectly) the emission of GHGs into the atmosphere, both as a result of its construction and, throughout its operational life. Earth absorbs energy from the Sun and re-emits this energy as thermal infrared radiation. The GHGs in the atmosphere absorb this radiation, preventing it from escaping into space. The higher the concentration of GHGs in the atmosphere, the more heat energy is retained, and the higher global temperatures become. Due to human activities, the concentration of GHGs in the atmosphere has increased

[325] Welsh Government (2017) The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.

[326] Institute of Environmental Management & Assessment (2022). Institute of Environmental Management & Assessment (IEMA) Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance.

[327] Institute of Environmental Management and Assessment (IEMA). (2020). Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation, June 2020.

dramatically, leading to global warming. This warming leads to numerous indirect impacts (including hotter, drier summers; warmer, wetter winters; and more frequent and intense extreme weather events) as the climate responds to the increased atmospheric temperature.

14.1.9. As a result, the UK has entered into international obligations including the Paris Agreement[328], which was ratified by the UK Government in 2016. In June 2019 the Government announced its 2050 'Net Zero target', which was a significant step towards carbon reduction and alignment with the Paris Agreement and enacted via the Climate Change Act 2008 (2050 Target Amendment) Order 2019[329]. This is a legally binding target for the Government to cut carbon emissions to net zero, against the 1990 baseline, by 2050. The Climate Change Act 2008[330] requires five-yearly carbon budgets to be set 12 years in advance so as to meet the 2050 target. Six carbon budgets have been adopted to-date, of which three are still current, which are enshrined into law through the implementation of the Carbon Budget Orders[331,332,333]. These orders serve as legislative mechanisms that enshrine the carbon budgets, ensuring their legal enforceability and accountability. The time periods covering the fourth, fifth and sixth budgets are 2023-2027, 2028-2032 and 2033-2037, respectively. Achieving net zero will require the UK's future GHG emissions to be aligned with these budget targets and any future new or revised carbon budget targets that may be set out by the UK Government to achieve net zero carbon by 2050, i.e. a 100% reduction in the UK's carbon emissions by 2050 compared with those in 1990.

14.1.10. The Environment (Wales) Act 2016[334] sets the framework for the Welsh Government to address climate change. Emissions in Wales are covered by both Wales' targets, set under The Environment (Wales) Act 2016, and UK-wide targets, set under the Climate Change Act 2008. The Environment (Wales) Act 2016 has a target to reach net zero GHG emissions by 2050 and sets out decadal targets and five-yearly carbon budgets for Wales (as annual percentage reductions in emissions below a 1990 baseline).

14.1.11. Initial, high level estimates of GHG emissions associated with the proposed development have therefore been compared to and assessed against relevant carbon budgets for the UK and Wales (see Section 14.5 of this chapter). The only statutory carbon targets are the carbon budget targets and the Net Zero 2050 target that are set at a national level i.e. they are targets for the UK and Wales as a whole. There are no sectoral targets (e.g. for defence, transport, industry etc.), nor any statutory targets set at a sub-national geographic scale.

[328] United Nations Framework Convention on Climate Change (2016). Paris Agreement. [online]. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement. Accessed November 2025.

[329] Climate Change Act 2008 (2050 Target Amendment) Order 2019. [online]. Available at: https://www.legislation.gov.uk/uksi/2019/1056/contents/made. Accessed December 2025.

[330] Climate Change Act 2008. [online]. Available at: https://www.legislation.gov.uk/ukpga/2008/27/contents. Accessed November 2025.

[331] Carbon Budget Order 2011. [online]. Available at: https://www.legislation.gov.uk/uksi/2011/1603/contents/made Accessed November 2025.

[332] Carbon Budget Order 2016. [online]. Available at: https://www.legislation.gov.uk/uksi/2016/785/contents/made. Accessed November 2025.

[333] Carbon Budget Order 2021. [online]. Available at: https://www.legislation.gov.uk/uksi/2021/750/contents/made. Accessed November 2025.

[334] The Environment (Wales) Act 2016. [online]. Available at: https://www.legislation.gov.uk/anaw/2016/3/contents. Accessed November 2025.

14.1.12. The Ministry of Defence (MOD) is, however, committed to contributing to the achievement of the UK's Net Zero 2050 GHG emissions target, as set out within its Climate Change and Sustainability Strategic Approach[335].

Vulnerability of Proposed Development to Changes in Climate

14.1.13. It is important that UK infrastructure and development projects are designed to be resilient to projected future changes in climate (e.g. higher temperatures, heavier rainfall and more extreme weather events).

14.1.14. As a result, this chapter identifies and assesses potential climate change related risks relevant to the proposed development during its operation.

14.2. Legislation and Policy

14.2.1. The regulatory frameworks, legislation and policy applicable in this assessment for climate change are summarised in Table 14.1.

Table 14.1: Summary of relevant legislation and policy for the assessment of climate change

Source	Summary and Implications for Assessment
Legislation	
United Nations Framework Convention on Climate Change, 2016	The United Nations Framework Convention on Climate Change (UNFCCC) is the parent treaty of the Paris Agreement, which was adopted in 2015 and entered into force in 2016. Its goal is to limit global warming to well below 2 degrees Celsius (°C), with all efforts made to limit warming to 1.5°C, compared to pre-industrial levels. Each signatory to the Paris Agreement has a duty to produce a Nationally Determined Contribution (NDC), indicating how state-level transformations will contribute to climate action. On 12 December 2020, the UK communicated its 2030 NDC under the Paris Agreement to the UNFCCC. The 2030 NDC commits the UK to reducing economy-wide GHG emissions by at least 68% by 2030, compared to 1990 levels[336] . The UK's 2035 NDC emissions reduction target under the Paris Agreement[337] commits the UK to reducing economy-wide GHG emissions by at least 81% by 2035, compared to 1990 levels.
Climate Change Act 2008	The Climate Change Act 2008 commits the UK to reducing carbon emissions to net zero by 2050. The Act also requires the government to set legally binding carbon budgets limiting the amount of carbon emitted in the UK over five-year periods. These budgets currently cover the period up to 2037. The Sixth Carbon Budget, enshrined in law in June 2021, is the first budget to take account of the UK Government's 2050 net zero target. The Act also introduced new powers and duties on climate change adaptation. It established a UK-wide Climate Change Risk Assessment that must take place every

[336] Department for Business, Energy and Industrial Strategy (2020). UK's 2030 Nationally Determined Contribution (NDC) emissions reduction target under the Paris Agreement. [online]. Available at: https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc. Accessed November 2025.

[337] Department for Energy Security and Net Zero (2025). UK's 2035 Nationally Determined Contribution (NDC) emissions reduction target under the Paris Agreement. [online]. Available at: https://www.gov.uk/government/publications/uks-2035-nationally-determined-contribution-ndc-emissions-reduction-target-under-the-paris-agreement. Accessed November 2025.

Source	Summary and Implications for Assessment
	five years. It also required a National Adaptation Programme which must be put in place and reviewed every five years to address the most pressing climate change risks.
The Environment (Wales) Act 2016	The Environment (Wales) Act 2016 sets the framework for the Welsh Government to address climate change. Emissions in Wales are covered by both Wales' targets, set under the Act, and UK-wide targets, set under the Climate Change Act 2008. The Act has a target to reach net zero GHG emissions by 2050 and sets out decadal targets and five-yearly carbon budgets (as annual percentage reductions in emissions below a 1990 baseline).
Planning (Wales) Act 2015[338]	The relevant provision within the Act is Part 2 Sustainable Development, which seeks to encourage sustainable development in accordance with the Well-being of Future Generations (Wales) Act 2015 and by doing so that development and use of land contribute to improving the economic, social, environmental and cultural well-being of Wales.
Well-being of Future Generations (Wales) Act 2015[339]	The well-being goals listed in the Act include: A prosperous Wales - An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change). A resilient Wales - A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).
Policy	
Planning Policy Wales (PPW) 2024	Planning Policy Wales (PPW) 2024[340] sets out the Government's planning policy framework for the whole of Wales, including the Government's expectation for the content and quality of planning applications and local plan policy. The PPW sets out the policy which the proposed development should comply with. It is also the basis for informing a judgement on the impacts of a development, for example whether the proposed development is consistent with the requirements of the PPW. PPW requires all new development to mitigate the causes of climate change by following the energy hierarchy (i.e. first reduce energy demand, then optimize the use of renewable and low-carbon sources on-site) and to actively contribute to the achievement of Wales's statutory net-zero carbon emissions targets. PPW also requires climate change resilience to be built into all new developments to withstand current and future climate impacts, such as increased flooding, heatwaves, and extreme weather. PPW is supported by Technical Advice Note (TAN) 12: Design[341], of which the sections on Environmental Sustainability and Climate Responsive Development and Sustainable Buildings are of relevance to climate change and the proposed development. For example, TAN 12 advises incorporating "*sustainability measures*

[338] Planning (Wales) Act 2015. [online]. Available at: https://www.legislation.gov.uk/anaw/2015/4/contents. Accessed November 2025.

[339] Well-being of Future Generations (Wales) Act 2015. [online]. Available at: https://www.legislation.gov.uk/anaw/2015/2/contents. Accessed November 2025.

[340] Welsh Government, 2024. Planning Policy Wales. [online]. Available at: https://www.gov.wales/sites/default/files/publications/2024-02/planning-policy-wales-edition-12_1.pdf. Accessed November 2025.

[341] Welsh Government (2016). Technical Advice Note (TAN) 12: Design. [online]. Available at: https://www.gov.wales/technical-advice-note-tan-12-design. Accessed November 2025.

Source	Summary and Implications for Assessment
	to reduce the environmental impact associated with buildings and minimising the demand for energy (low and zero carbon sources), water, and materials and creation of waste" and "*adaptable and flexible development that can respond to social, technological, economic and environmental conditions/changes (e.g. the current and future effects of climate change) over time to minimise the need to demolish and rebuild*".
Pembrokeshire County Council Local Plan (Adopted 2013)[342]	The site lies within the administrative boundary of Pembrokeshire County Council (PCC). The relevant policy within the adopted Pembrokeshire County Council Local Plan is as follows: "Policy GN.2 Sustainable Design *Development will be permitted where … It incorporates a resource efficient and climate responsive design through location, orientation, density, layout, land use, materials, water conservation and the use of sustainable drainage systems and waste management solutions"*

14.3. Methodology

14.3.1. The following section describes the methodology used to determine the likely significant effects for climate change as a result of the construction and operation of the proposed development.

Guidance

14.3.2. The guidance and industry standards listed in Table 14.2 have been used in the assessment of climate change.

Table 14.2: Guidance and Industry Standards

Guidance	Reasons for use
IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance	Best practice guidance for assessing changes in GHG emissions and evaluating their significance in EIA projects.
IEMA (2020) Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation	Best practice guidance for assessing climate change risk and adaptation in EIA projects.
PAS 2080:2023 Carbon Management in Buildings and Infrastructure343	A globally applicable standard for managing carbon in buildings and infrastructure, focusing on a whole-life approach to carbon reduction across the entire value chain, from design and construction to operation and end-of-life.

[342] Pembrokeshire County Council (2013). Local Development Plan. [online]. Available at: https://www.pembrokeshire.gov.uk/adopted-local-development-plan. Accessed November 2025.

[343] PAS 2080:2023 Carbon Management in Infrastructure and Built Environment (2023). [online]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/. Accessed November 2025.

Consultation

14.3.3. An EIA Scoping Report was submitted to PCC in March 2023. A Scoping Opinion was received in response to the EIA Scoping Report. The applicant's responses to the Scoping Opinion are contained in the Scoping Opinion Response, Appendix 2.1 (Scoping Opinion Response).

General Approach and Data Sources

Potential Impact of Proposed Development on Climate

14.3.4. In the absence of a detailed Bill of Quantities (BoQ) at this stage, an initial, high-level assessment of the potential net change in GHG emissions associated with the proposed development (in metric tonnes of carbon dioxide equivalent (tCO_2e)) against UK and Welsh Government carbon budgets has been undertaken in accordance with IEMA GHG guidance[326], where appropriate.

14.3.5. Such an approach is considered proportionate, in accordance with Section 4.1 of the IEMA GHG guidance[326], based on (a) the type, size, location and temporal scale of the proposed development, (b) the fact that a more detailed embodied carbon assessment will be undertaken going forwards and a whole life carbon management plan produced and implemented prior to construction (see Section 14.6), and (c) the proposed design interventions and controls (see Section 14.4).

14.3.6. As the construction and operational phases of the proposed development would extend over three UK carbon budget periods and two Welsh carbon budget periods, GHG emissions have been reported against each relevant carbon budget, for the construction and operation phases respectively, and in total. An assessment has then been made, based on professional judgement, as to whether changes in GHG emissions as a result of the proposed development would have a material impact on the ability of the UK or Welsh Governments to meet their carbon reduction targets (and would therefore potentially be significant).

14.3.7. IEMA GHG guidance[326] notes that while the starting point for contextualising changes in GHG emissions is the percentage contribution to national carbon budgets, the contribution of most individual projects to national-level budgets will be small and so this context will have limited value. As such, the IEMA GHG guidance[326] suggests that it is good practice to also compare estimated changes in GHG emissions to local or regional carbon budgets developed by local authorities (where these exist), as these may provide a more pertinent scale for individual projects and local decision-making. No such local or regional carbon budgets relevant to the proposed development have, however, been identified.

14.3.8. GHG emissions would be generated during the construction and operational phases of the proposed development as a result of various activities. The activities considered within this assessment are summarised below with reference to the life cycle stages identified in Whole Life Carbon Assessment for the Built Environment[344] (see Image 14.1):

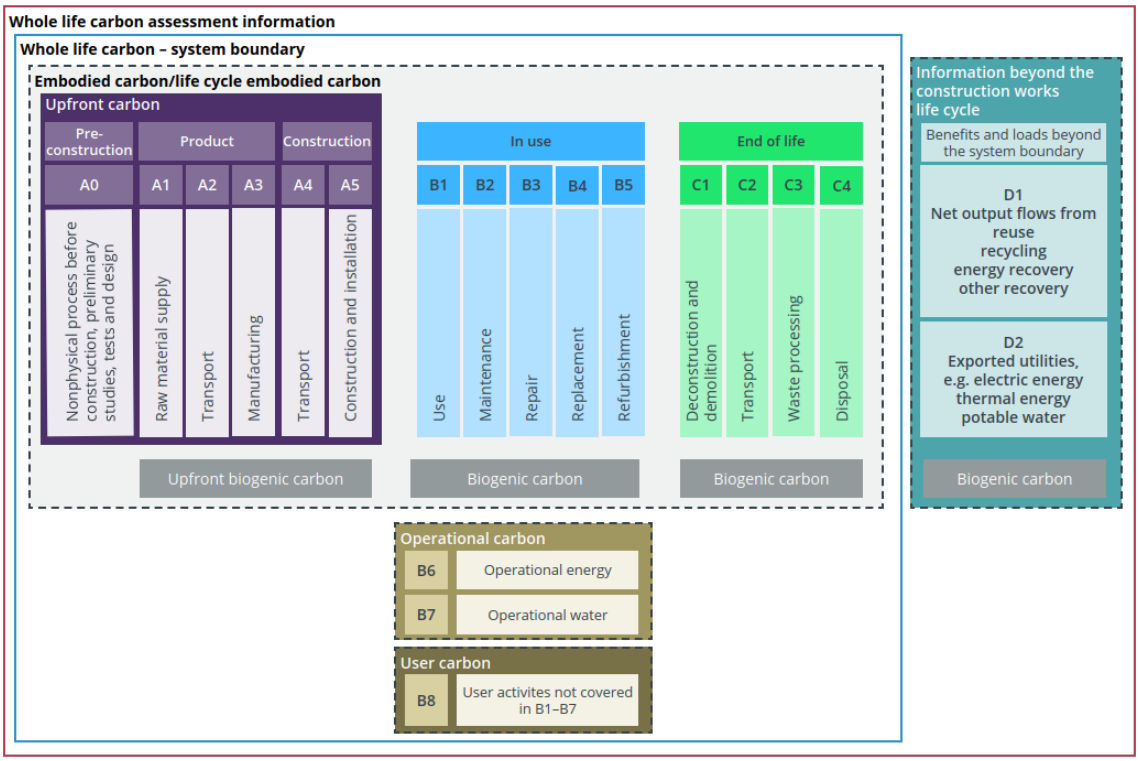
- Embodied GHG emissions associated with the required raw materials (Product stage (modules A1 – A3));
- Transport of materials to the construction site (Construction stage (module A4));

[344] Royal Institution of Chartered Surveyors (2024). Whole life carbon assessment for the built environment. [online]. Available at: https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment. Accessed November 2025.

- Transport of waste from the construction site and subsequent treatment (Construction stage (module A5));
- Transport of construction workers and on-site staff to and from the construction site (Construction stage (module A5));
- Operation of construction plant and equipment (Construction stage (module A5));
- Fuel consumption (operational staff vehicles) (module B1);
- Embodied GHG emissions associated with operational maintenance, repair and replacement of assets (In use stage (modules B2-B4)); and
- Emissions from energy use on site (In use stage (module B6)); and
- Deconstruction, demolition and transport (End of life stage (modules C1 and C2)).

14.3.9. As discussed in Chapter 3: Proposed Development, decommissioning of the proposed development has been scoped out, therefore GHG emissions associated with deconstruction and demolition, transport, waste processing and disposal (End of life stage (modules C1, C2, C3 and C4)) have not been considered.

Image 14.1: Building and infrastructure life cycle stage and information modules (RICS, 2024)



14.3.10. GHG emissions associated with the proposed development have been estimated during the construction phase (approximately 2027-2028) and over a 17-year operational period from the assumed proposed development opening year (2029) up to and including 2045 using the methods and data sources summarised in Table 14.3.

Table 14.3: Summary of GHG emissions estimation methods by source

Stage	Emissions Source	Emissions Estimation Methodology	Data Sources
Construction	Embodied carbon in construction materials (modules A1-A3)	Inventory of Carbon and Energy (ICE) emission factors[345]	Estimated types and quantities of construction materials / items (see Assumptions & Limitations).
	Transport of construction materials to site (module A4)	UK Government GHG Conversion Factors for Company Reporting (2025)346, Freighting goods - HGVs - Rigid (>17tonnes) - Average laden	Forecast number of deliveries to site. Assumed transportation distance (see Assumptions & Limitations)
	Fuel consumption (on-site plant and machinery) (module A5)	UK Government GHG Conversion Factors for Company Reporting (2025)[346], Fuels – Liquid fuels - Diesel (100% mineral diesel)	Anticipated type, number and operating hours of construction plant. Assumed fuel usage rates for different types of equipment based on projects of similar type (see Assumptions & Limitations).
	Fuel consumption (construction staff vehicles) (module A5)	UK Government GHG Conversion Factors for Company Reporting (2025)[346], Business travel-land – Cars (by size) – Average car	Forecast number of staff movements. Assumed travel distance and vehicle fuel type (see Assumptions & Limitations)
	Transportation, treatment and disposal of waste materials during construction (module A5)	Estimated as proportion of total embodied carbon in construction materials and transport of construction materials to site.	Assumed proportion based on typical wastage rates for construction projects and Royal Institution of Chartered Surveyors (RICS) guidance[344] (see Assumptions & Limitations).
Operation	Fuel consumption (operational staff vehicles) (module B1)	UK Government GHG Conversion Factors for Company Reporting (2025)[346], Business travel-land – Cars (by size) – Average car	Forecast number of staff movements. Assumed travel distance and vehicle fuel type (see Assumptions & Limitations)

[345] Circular Ecology (2025). ICE Database v4.1. [online]. Available at: https://circularecology.com/embodied-carbon-footprint-database.html. Accessed November 2025.

[346] Department for Energy Security and Net Zero (2025). Greenhouse gas reporting: conversion factors 2025. [online]. Accessed November 2025.

Stage	Emissions Source	Emissions Estimation Methodology	Data Sources
	Maintenance activities (module B2)	Estimated as proportion of embodied carbon in construction materials	Assumption regarding likely magnitude of GHG emissions associated with maintenance activities as per RICS guidance[344] (see Assumptions & Limitations).
	Repair activities (module B3)	Estimated as proportion of maintenance emissions	Assumption regarding likely magnitude of GHG emissions associated with repair activities as per RICS guidance[344] (see Assumptions & Limitations).
	Replacement of assets (module B4)	Estimated as proportion of embodied carbon in construction materials	Assumptions regarding likely replacement frequencies of assets and materials as per RICS guidance[344] (see Assumptions & Limitations).
	Electricity consumption (operation) (module B6)	Electricity emission factors[347]	Estimated electricity consumption (e.g. for lighting and operations) based on assumptions regarding operating hours of items of equipment and Energy Use Intensity targets for buildings.
	Fuel consumption (operation) (module B6)	UK Government GHG Conversion Factors for Company Reporting (2025)[346], Fuels – Liquid fuels - Diesel (100% mineral diesel)	Estimated diesel consumption for standby generators based on assumed operating hours per year.

Vulnerability of Proposed Development to Changes in Climate

14.3.11. A qualitative assessment of potential climate change related risks relevant to the proposed development has been undertaken with reference to IEMA Climate Change Resilience guidance[327].

14.3.12. This assessment has included:

- Analysis of past climate related impacts within the proposed development site and existing and projected baseline climate conditions to identify any likely significant climate

[347] Department for Business, Energy & Industrial Strategy (2023). Green Book Supplementary Guidance: Valuation of Energy Use and Greenhouse Gas Emissions for Appraisal. November 2023. Data Table 1. [online]. Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal. Accessed November 2025.

changes and likely project exposure to these changes (as per Step 2 of the IEMA Climate Change Resilience guidance[327]);

- Identification of potential climate change risks to the proposed development based on consideration of the projected changes to relevant climate parameters and the types of proposed development receptors which could be impacted by these projected changes (as per Step 3 of the IEMA Climate Change Resilience guidance[327]);
- For each climate change related risk identified, consideration of probability and consequence, taking into account proposed design interventions and controls (see Section 14.4), to determine the potential risk of impact (as per Step 4 of the IEMA Climate Change Resilience guidance[327]).

Assessment Criteria

14.3.13. This section describes the criteria used for the assessment of climate which may affect, or be affected by, the construction and operation of the proposed development.

Potential Impact of Proposed Development on Climate

14.3.14. The assessment of significance has been undertaken in accordance with IEMA GHG guidance[326] as was set out in the EIA Scoping Report.

14.3.15. There are, however, no defined magnitude of impact criteria for changes in emissions of GHGs. Instead, the IEMA GHG guidance[326] states that "*the crux of significance therefore is not whether the 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*".

14.3.16. Therefore, whilst most projects will result in an increase in GHG emissions compared to the baseline, when determining significance, it is important to consider this impact in the context of the net zero trajectory set in line with the Paris Agreement's 1.5°C pathway (as defined by UK and Welsh carbon budgets). As such, the IEMA GHG guidance[326] proposes five different categories of effect with varying levels of significance, these are illustrated in Image 14.2 and defined in Table 14.4.

14.3.17. In this regard, once the baseline conditions and potential impact of the proposed development on GHG emissions were identified, the assessment of significance of estimated changes in GHG emissions and the suitability of proposed design interventions and controls (see Section 14.4) has been undertaken with reference to the significance criteria outlined in the IEMA GHG guidance[326].

Image 14.2: IEMA GHG guidance[326] significance against the 1.5-degree limit compliant trajectory

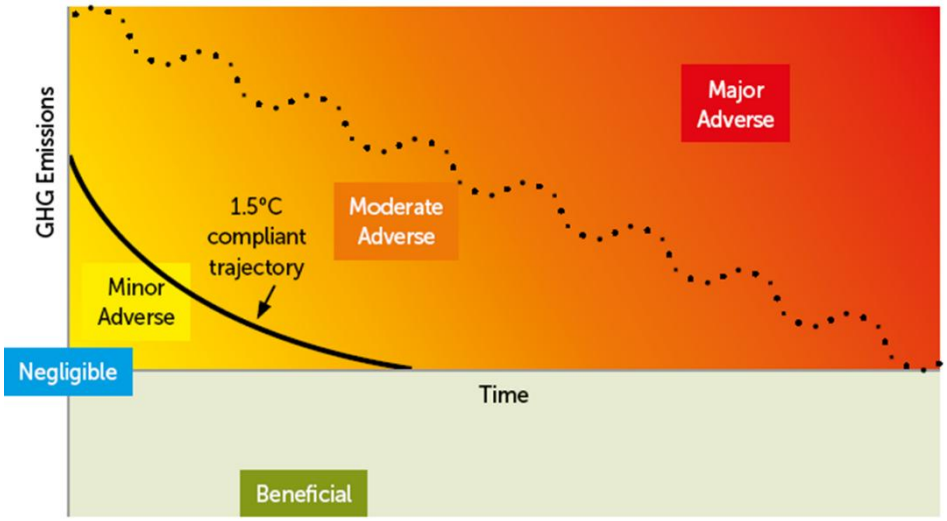


Table 14.4: IEMA GHG guidance[326] definitions of significance for GHG impacts

Effect	Significance	Description
Major Adverse	Significant	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate Adverse	Significant	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor Adverse	Not Significant	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible	Not Significant	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	Significant	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Vulnerability of Proposed Development to Changes in Climate

14.3.18. Vulnerability has been assessed based on the potential for climate change-related impacts to occur (likelihood) and their impact magnitude (consequence). The criteria which have been used to assess the likelihood and consequence of each climate change related risk to the

proposed development during the operational phase are shown in Table 14.5 and Table 14.6, respectively.

Table 14.5: Likelihood categories for the identification of climate change related risk

Likelihood	Description (probability and frequency of occurrence)
Very high	The event occurs multiple times during the expected operational life of the proposed development, e.g. approximately annually.
High	The event occurs several times during the expected operational life of the proposed development, e.g. approximately once every 2-3 years.
Medium	The event occurs limited times during the expected operational life of the proposed development, e.g. approximately once every five years, typically five events.
Low	The event is only likely to occur once during the expected operational life of the proposed development.
Very low	The event is unlikely to occur during the expected operational life of the proposed development.

Table 14.6: Consequence criteria for risks as a result of climate change

Consequence	Operational impact	Health and safety	Damage
Very high	Site-wide disruption/loss of function and usability that is permanent or irreversible	One or more fatalities – emergency response	Permanent damage. Retreat and translocation of development
High	Site-wide disruption/loss of function and usability lasting more than one week	Multiple long-term injuries – emergency response	Extensive damage requiring extensive repair
Medium	Partial site-wide disruption/loss of function and usability lasting more than one day and less than one week	Long-term injury or illness, prolonged hospitalisation or inability to work.	Widespread damage. Damage recoverable by maintenance and minor repair. Partial loss of local infrastructure.
Low	Partial site-wide disruption/loss of function and usability lasting less than one day	Lost time injury or medical treatment, short-term impact on people affected	No permanent damage. Some restoration work required.
Very low	Disruption to site negligible causing no disruption in function and usability	Minor harm or near miss – no adverse human health effects or complaints.	No damage to proposed development assets.

14.3.19. The significance of each climate change risk has then been assessed by combining the likelihood and consequence scores derived using the matrix provided Table 14.7. Negligible and minor risks have been deemed as a 'Not significant' effect and moderate and major risks have been deemed as a 'Significant' effect.

Table 14.7: Climate change risk significance scoring matrix

		Measure of likelihood				
		Very low	Low	Medium	High	Very high
Mea	Very low	Negligible	Negligible	Negligible	Minor	Moderate

	Measure of likelihood				
	Very low	**Low**	**Medium**	**High**	**Very high**
Low	Negligible	Negligible	Minor	Moderate	Moderate
Medium	Negligible	Minor	Moderate	Moderate	Major
High	Minor	Moderate	Moderate	Major	Major
Very high	Minor	Moderate	Major	Major	Major

Assumptions & Limitations

14.3.20. The construction phase and operational phase assessments have been based on the proposed development description presented in Chapter 3 (Proposed Development) to establish a realistic worst-case assessment scenario.

Potential Impact of Proposed Development on Climate

14.3.21. In accordance with IEMA GHG guidance[326], a proportionate approach has been used to identify the main factors contributing to GHG emissions associated with the proposed development. Consequently, some minor sources of GHG emissions have not been included within the assessment. These include GHG emissions associated with:

- Land use, land use change and forestry, which have not been considered at this stage due to a lack of data and also based on the assumption that due to the proposed development being redevelopment of an existing (brownfield) site, changes in land use and forestry will be minimal.
- Refurbishment activities, as no major refurbishment activities are planned to occur over the operational period assessed.
- Changes in operational water use, which were assumed to be minimal (i.e. less than 1,000,000 litres per year).

14.3.22. A number of assumptions have been made during the assessment when estimating GHG emissions (e.g. regarding likely maintenance activities and replacement frequencies for assets and materials). These assumptions were made due to the lack of available data for various proposed development elements but is common practice and industry recognised standards such as RICS guidance[344] have been used to inform these assumptions.

14.3.23. As a detailed BoQ for the proposed development is not available at this design stage, a simplified top-down approach has been used to estimate material quantities based upon the estimated numbers of deliveries to site during the construction phase associated with different elements of the proposed development. For example, data has been provided to show how many deliveries will likely be made to site over the proposed development timeframe associated with certain activities e.g. a total of 444 lorry movements for Antenna Foundations over a 12 month period. In order to use this data to estimate GHG emissions associated with carbon embodied in construction materials (for product (A1-A3) emissions), the following method was used:

- Each logistics category was assigned to an assumed material type using professional judgement e.g. Bulk Earthworks & Roads was assigned to aggregate and Antenna Foundations to concrete.
- Associated material volumes were then estimated based on an assumed maximum payload per trip (a volume of 9 m^3) and a worst case percentage loading based on likely

material types and their associated bulk density (e.g. aggregate was assumed to fit with less void space and assigned a 90% loading factor, whereas pre-made items like fencing were assumed to leave more void space and were assigned a 50% loading factor).

- Estimated material volumes were then converted to a mass in tonnes based on likely material density and relevant ICEv4.1 emission factors[345] applied to estimate GHG emissions.

14.3.24. While a simplified top-down approach is less accurate than a detailed bottom-up calculation approach (i.e. based on a detailed design and associated BoQ), it is considered proportionate at this stage (in accordance with IEMA GHG Guidance[326]) and sufficiently accurate to gauge the potential magnitude of GHG emissions associated with the raw materials required to construct the proposed development.

14.3.25. For each material type, a transportation distance of 200 km was assumed, which is considered to be a reasonable worst case assumption but reflective of the relatively remote location of the construction site.

14.3.26. In order to estimate GHG emissions associated with fuel consumed by construction plant and equipment (module A5), the number and type of different plant and equipment and an assumed '% on time' were used to estimated operating hours per day for each item of plant and equipment. This information was then used to estimate a total number of operating hours for each item of plant and equipment using the expected proposed development timeframes, average working days per month and a 12 hour working day. An assumed fuel use per hour (in litres) for each item of plant and equipment, informed by research based on publicly available information, was then used to estimate total fuel consumption. Estimated fuel consumption was then used to estimate GHG emissions using the emission factor for diesel from the UK Government GHG Conversion Factors for Company Reporting 2025[346].

14.3.27. GHG emissions associated with the transport and treatment of waste materials (module A5) were not estimated explicitly but instead were estimated as 5% of the GHG emissions associated with the production and transport of construction materials (based on experience from other similar projects).

14.3.28. GHG emissions associated with the transport of construction staff (module A5) were estimated based on the total estimated number of construction staff movements and an assumed travel distance of 100 km (each way). It was further assumed that 50% would travel by private car, with an average occupancy of two staff per vehicle (25 vehicles) and 50% would travel as gangs in minibuses, with an average occupancy of five staff per vehicle (10 vehicles). Assumptions regarding the proportion of different fuel types used (e.g. diesel, petrol, hybrid, electric) were taken from the National Atmospheric Emissions Inventory[348] for the year 2027.

14.3.29. GHG emissions associated with the transport of operational staff (module B1) were estimated based on the estimated number of operational staff movements per year and an assumed travel distance of 50 km (each way). Assumptions regarding the proportion of different fuel types used (e.g. diesel, petrol, hybrid, electric) were taken from the National Atmospheric Emissions Inventory for the years 2029 and 2045, with emissions in each intervening year estimated via interpolation.

[348] National Atmospheric Emissions Inventory (2025). Basic Fleet Projections - Proportion of VKM by Vehicle Type, Road Type and Devolved Government regions. [online]. Available at: https://naei.energysecurity.gov.uk/emission-factors/emission-factors-transport. Accessed November 2025.

14.3.30. GHG emissions associated with operational maintenance (module B2) were estimated as 1% of embodied GHG emissions associated with the required raw materials (i.e. product stage (modules A1 – A3)) emissions (in accordance with RICS guidance[344]).

14.3.31. GHG emissions associated with operational repair activities (module B3) were estimated as 25% of operational maintenance emissions described above (again, in accordance with RICS guidance[344]).

14.3.32. In terms of GHG emissions associated with the periodic replacement of assets and materials (module B4), most of the assets/materials used were assumed to have a longer lifespan than 17 years and hence would not be replaced over the operational period assessed. For example, as the antenna foundations would be concrete, no replacement has been assumed, as the anticipated lifespan for this material is 60 years. For some assets, however, such as electrical and mechanical equipment and lighting, it was considered that these could potentially be replaced after 15 years, therefore assumptions were made (as a percentage of the embodied carbon in construction materials, product (A1-A3) emissions) to represent GHG emissions associated with such replacement.

14.3.33. Operational energy consumption (in kWh/yr) was estimated based on the power demands of various items of equipment (such as air condition units and chillers) and assumed operating hours per year, along with building floor areas and energy usage intensity targets for different building types (in kWh/m^2/yr) within Building Performance Standards (BPS) 0.1 – Energy and Carbon (version 9), hereon referred to as "JSP 850 BPS 0.1 (v9)", which forms part of the Joint Service Publication (JSP) 850: Infrastructure and Estate Policy, Standards and Guidance[349]. GHG emissions associated with energy consumption were then estimated using year specific emission factors taken from the UK Government Green Book[347].

14.3.34. Operational fuel consumption for standby diesel generators (in L/yr) was estimated based on fuel consumption rates per hour reported by the relevant manufacturer and a reasonable worst case assumption of 168 hours per year (7 days) of operation (i.e. periods with no main grid power) per year, plus 12 hours per year for testing. It is anticipated, however, that the run times, on average, will be significantly less than 168 hours, and will likely be less than 50 hours per year. GHG emissions associated with diesel consumption were then estimated using an emission factor taken from the UK Government GHG Conversion Factors for Company Reporting 2025[346].

14.3.35. It was assumed the proposed development would be constructed between 2027 and 2028, becoming operational from 2029.

14.3.36. Due to the limited information available at the current design stage and use of generic data/benchmarks, a 15% contingency factor has been applied to estimated GHG emissions for all life cycle stages based on RICS guidance[344].

Vulnerability of Proposed Development to Changes in Climate

14.3.37. There is inherent uncertainty in the climate models which form the basis of the climate projections used to inform this assessment (i.e. the climate models used in the UK Climate Projection 2018 (UKCP18) datasets[350]. However, the use of the UKCP18 High Emissions RCP8.5 projections dataset[350] is likely to provide a more conservative estimate of future climate change, as it represents the highest modelled GHG emissions scenario.

[349] Ministry of Defence (2023). JSP 850. Building Performance Standards (BPS). Estate Wide Standards and Guidance. BPS 0.1 – Energy and Carbon.

[350] Met Office (2020). UK Climate Projection 2018 (UKCP18) datasets.

14.3.38. Given the number of different variables involved, there is substantial uncertainty regarding the likelihood and consequence of climate change related impacts on the performance of UK infrastructure and development projects in response to a certain change in climate. A qualitative, risk-based approach has therefore been used, supported by professional judgement, where relevant, which is standard industry practice.

14.3.39. Where relevant, aspect-specific measures to mitigate the vulnerability of the proposed development to climate change are detailed in the corresponding chapters of this ES. For example, design interventions with regards to increased flood risk as a result of climate change is addressed in Appendix 12.4 (Drainage strategy).

Identified Sensitive Receptors

Potential Impact of Proposed Development on Climate

14.3.40. The global climate has been identified as the receptor for the purposes of the GHG emissions assessment. The receptor has a high sensitivity, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources. However, to enable the evaluation of significance of the estimated GHG emissions arising from the proposed development, the 5-year UK and Welsh carbon budgets were used as a proxy for the global climate.

Vulnerability of Proposed Development to Changes in Climate

14.3.41. Receptors which form part of the proposed development which are considered potentially vulnerable to changes in climate (e.g. higher temperatures and increased precipitation), include:

- Mechanical and electrical equipment, including the proposed antennae;
- Buildings;
- Foundations;
- On-site access roads and areas of hardstanding;
- Above ground fuel storage tanks;
- Electrical substations / grid connections; and
- Site users.

Baseline

Potential Impact of Proposed Development on Climate

14.3.42. While some GHG emissions occur as a result of the existing use of the application site (e.g. energy consumption associated with existing buildings), these emissions are not expected to change as a result of the proposed development. On this basis, baseline emissions within the area of the application site affected by the proposed developed have been assessed as zero.

Vulnerability of Proposed Development to Changes in Climate

14.3.43. The UK's Third Climate Change Risk Assessment (CCRA3)[351], notes that the UK is likely to experience an approximate additional 0.5°C increase in annual average temperature by 2050, even under ambitious global scenarios for cutting GHG emissions. The general pattern of change in the UK is towards warmer and wetter winters, hotter and drier summers, with high levels of variability. These changes will increase the UK's exposure to weather-related hazards including:

- Increases in average and extreme temperatures, in winter and summer;
- Changes to rainfall patterns, leading to flooding in some places and water scarcity and drought in others;
- Increased coastal flooding and erosion, alongside increasing sea temperatures and ocean acidification;
- Increased frequency and intensity of wildfire; and
- Potential changes to other weather variables including wind strength and direction, sunshine and ultraviolet (UV) levels, cloudiness, and sea conditions such as wave height.

14.3.44. Current and projected future changes in climate for the Pembrokeshire region, in terms of temperature and precipitation, are presented in Table 14.8. This data utilises the 25 km spatial resolution UKCP18 probabilistic dataset for the grid cell centred at 187500N 212500E, which covers the application site. The current climate conditions (i.e. observed baseline) refer to the most recent historic climate dataset of 1981– 2010. The future climate conditions (i.e. climate projections) refer to projections made under the high emissions scenario (i.e. RCP8.5) based on a 50% probability of occurrence and for the 2030s (2020–2049). This 30-year period covers the operational assessment period of the proposed development.

Table 14.8: Baseline and future climate projections for the south-west of Wales region

Climate Variable	Baseline (1981 – 2010)	Projected change under the high emissions scenario (i.e. RCP8.5) and for 50% probability of the value occurring 2020 – 2049 (the 2030s)
Temperature		
Mean summer maximum air temperature at 1.5 m (°C)	18.4	+1.0
Mean winter minimum air temperature at 1.5 m (°C)	3.1	+0.8
Annual mean air temperature at 1.5 m (°C)	10.2	+0.9
Precipitation		
Summer mean accumulated precipitation (mm)	235.9	-9.2%
Winter mean accumulated precipitation (mm)	325.3	+7.3%

[351] Department for Environment, Food & Rural Affairs (2022). UK Climate Change Risk Assessment 2022. [online]. Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022. Accessed November 2025.

14.3.45. Based on the UKCP18 data for the period up to 2049, under the high emissions (RCP8.5) scenario and for a 50% probability of occurrence, average maximum summer, minimum winter and annual daily temperatures are projected to increase by 1.0°C, 0.8°C and 0.9°C, respectively, whereas total precipitation is projected to decrease by 9.2% during summer and increase by 7.3% during winter.

14.3.46. Overall, climatic changes in the region of the proposed development are projected to result in increasingly wetter and warmer winters and drier and warmer summers, supporting the scientific consensus for the UK[352].

14.3.47. With regard to wind speed, the Met Office states within the 'UKCP18 Factsheet: Wind'[353] that:

> *"There are no compelling trends in storminess, as determined by maximum gust speeds, from the UK wind network over the last four decades".*

14.3.48. Furthermore, the factsheet indicates that while projections over the UK show an increase in near surface wind speeds over the UK for the second half of the 21st century for the winter season, accompanied by an increase in frequency of winter storms over the UK, the increase in wind speeds is modest compared to interannual variability and there is no clear projected trend in the wind speed over the UK. As such, whist there may be more storms and more frequent periods with higher wind speeds, the resulting maximum wind speeds experienced are projected to be similar to those experienced currently.

14.3.49. Over the anticipated lifetime of the proposed development, changes to the flood risk baseline as a consequence of climate change could occur, including potentially an increase in the frequency and magnitude of flood events. This issue has been assessed within Chapter 12 (Water Environment, Flood Risk and Drainage) by including relevant climate change allowances within their assessment. In terms of flood risk, Appendix 12.3 (Flood Consequences Assessment) concludes that:

- There is a very low risk of flooding from fluvial and tidal sources;
- Small areas of low topography within the application site are at a medium and high risk of pluvial flooding;
- There is potential for groundwater flooding to occur below ground level (buried infrastructure) and at surface at the south of the airfield and at the north-eastern boundary of Cawdor Barracks and limited potential for groundwater flooding to occur at the technical area and other sections at the south of the airfield; and
- There is no reported flood risk from sewer networks within the application site.

[352] Climate Change Committee (2025). Progress in adapting to climate change: 2025 report to Parliament (2025). [online]. Available at: https://www.theccc.org.uk/publication/progress-in-adapting-to-climate-change-2025/. Accessed November 2025.

[353] Met Office (2019). UKCP18 Factsheet: Wind. [online]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-wind_march21.pdf. Accessed November 2025.

14.3.50. The Geo-Index Onshore map viewer[354] and the British Geological Survey Geo-Climate UKCP18 dataset[355] for the 2030s (2025 – 2035) and 2070s (2065 – 2075) indicates that it is improbable that climate change will affect clay shrink-swell susceptibility and change the likelihood of ground movement causing subsidence or landslides within the application site, based on average soil humidity conditions.

14.3.51. The CCRA3 Summary for Wales[356] notes that there is increasing evidence that risks from extreme heat in Wales are likely to affect health, infrastructure and the natural environment. The potential for water scarcity and subsidence also appears to be a significant issue, together with flooding (coastal and inland), storms, lightning and high winds also playing their part in the present and future climate related risks across the whole of Wales. In particular, the following headline issues are relevant to the proposed development:

- The risk of climate change impacts, especially more frequent flooding and coastal erosion, causing damage to infrastructure services, including energy, transport, water and Information and Communication Technologies;
- The impact of increasing high temperatures on people's health and wellbeing;
- Increased severity and frequency of flooding of homes, communities and businesses; and
- The impact on coastal businesses due to sea level rise, coastal flooding and erosion.

14.4. Design Interventions and Controls

Design Interventions

14.4.1. The development of the proposed design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the proposed development design. This is referred to as design interventions. The principles of the design and mitigation hierarchy outlined in Chapter 2 (Methodology) have been followed. The first principle being to avoid potential adverse effects, if at all feasible, before seeking to minimise or mitigate for any unavoidable impacts. Design interventions for the proposed development are reported in Chapter 3 (Proposed Development). Chapter 4 (Alternatives and Design Evolution) details the design alternatives that have been considered, including the environmental factors which have influenced the decision-making.

Potential impact of Proposed Development on Climate

14.4.2. JSP 850 BPS 0.1 (v9) is a standard established by the MOD that applies to the whole estate to influence the design, operation and construction of all MOD buildings. Developed in alignment with the UK government's objective to achieve net zero carbon emissions by 2050, JSP 850 BPS 0.1 (v9) sets out benchmarks for energy performance, requirements for compliance with building regulations, and the transition to nearly zero-energy buildings and principal asset types, by specified deadlines.

[354] British Geological Survey (BGS) (2022). Geo-Index (onshore). [online]. Available at https://www.bgs.ac.uk/map-viewers/geoindex-onshore/. Accessed November 2025.

[355] British Geological Survey (BGS) (2020). Geo-Climate Open. [online]. Available at: https://www.bgs.ac.uk/datasets/geoclimateukcp18-open/. Accessed November 2025.

[356] UK Climate Risk (2021). Evidence for the third UK Climate Change Risk Assessment (CCRA3). Summary for Wales. [online]. Available at: https://www.ukclimaterisk.org/publications/summary-for-wales-ccra3-ia/. Accessed November 2025.

14.4.3. The policy states that the following design principles should be applied across MOD projects covered by JSP 850 BPS 0.1 (v9):

- Reuse/refurbishment: seeks to maximise the use of existing assets;
- Design in; the use of low carbon materials and eliminate waste to maximise efficient use of construction materials, promote use of sustainably sourced materials, and promote local sourcing where possible. Ensure compliance with Government standards for construction;
- Design for flexibility and longevity considers options and the ability for buildings to have other uses to deliver whole-life solution;
- Minimise energy requirements of the build: considers building orientation, glazing, use of natural light, solar gain, passive ventilation, shading requirements, efficient lighting / heating options and controls;
- Maximise renewable energy provision: consider options such as solar, wind and ground source heat pumps, which provide non-fossil fuel alternatives;
- Energy systems: consider the use of smart grid technology, integrated energy systems, secondary power sources to improve security of supply and demand; and
- Specification of low energy/water goods: procurement in line with specification of goods with low usage of energy/water as part of the building design.

14.4.4. The proposed development has sought to maximise the use of existing assets where possible. This has included the use of existing hardstanding for new roads within the application site.

14.4.5. Through design workshops and engagement with MOD stakeholders, design elements have been removed where not required for safety and security, including patrol roads, secondary fence lines and operational lighting. While in most cases these design changes have been made other reasons, removing these elements has also reduced GHG emissions associated with their construction and operation.

14.4.6. GHG emissions associated with operational energy consumption will be reduced by meeting the energy use intensity targets for buildings set out in JSP 850 BPS 0.1 (v9).

Vulnerability of Proposed Development to Changes in Climate

14.4.7. As described in Appendix 12.4 (Drainage strategy), a surface water drainage strategy has been produced, which provides details relating to the management of surface water drainage on the application site (including suitable allowances for climate change and the use of Sustainable Drainage Systems where appropriate).

14.4.8. All mechanical and electrical equipment and materials which form part of the proposed development will be designed, procured and installed and/or appropriately protected so as to be suitably resilient to projected increases in summer temperature and winter precipitation over the operational lifetime of the proposed development.

14.4.9. All equipment will also be designed, procured, and installed to meet relevant standards for design wind speed loads that are based on a 24.5 m/s base wind speed, which is then factored for location, elevation, and a number of other factors.

14.4.10. All critical equipment will be monitored either by the Building Management System (BMS) or (Supervisory Control & Data Acquisition) SCADA system for functional abnormalities. All critical systems are also being designed/built to a N+1 level of redundancy/resiliency (i.e. so the systems have the minimum components needed for operation (N) plus one extra,

independent backup component (+1), ensuring they can survive a single failure or maintenance without downtime).

Controls

14.4.11. Controls are included in the Environmental Management Measures table within Annex A of the Framework Construction Environmental Management Plan (CEMP). The Framework CEMP has been produced in support of the planning application to present the controls and mitigation identified in this assessment. The controls include best practice measures for climate change to achieve compliance with any relevant legislation. The Framework CEMP will be developed into the Detailed CEMP for implementation during construction and is secured by an appropriately worded planning condition. Further information on the Framework CEMP is provided in Chapter 3 (Proposed Development).

14.4.12. Proposed controls during construction include:

- Consideration of modular / off-site build, where practicable;
- Use of locally available materials to reduce transport related carbon, where practicable;
- Assessing the expected waste streams and setting out targets to reduce these;
- Consideration given to material procurement and construction methodology that reduces deliveries required to site and minimizes the waste created during construction;
- Use of materials with Environmental Product Declarations where possible;
- Development and implementation of a sustainable travel plan to minimise emissions from transport of materials and labour to site;
- Mandating that the contractor connects to the mains power grid as early as possible and procuring 100% renewable energy and to submeter renewable energy supply;
- 100% electric plant should be procured wherever possible. Where it is not available in the size or module required for the specific construction, the contractor should provide robust justification. Hybrid modules should again be given priority over diesel plant. All contractors should target 100% diesel free construction;
- All site welfare cabins and offices should implement energy efficient practices including LED lighting, daylight sensors or timers on external lighting, A++ rated appliances, low flow water fittings (taps, showers, toilets etc.); and
- Natural ventilation should be implemented and due consideration to cabin heating requirements in winter. Space heaters are to be avoided.

14.4.13. Controls set out within other discipline chapters will also reduce GHG emissions associated with the proposed development, for example:

- Measures to minimise the volume of construction traffic movements associated with the proposed development, as set out in Section 5.5: Design Interventions and Controls of Chapter 5: Transport and Access.
- Measures to minimise the volume of materials consumed and waste materials generated as a result of the proposed development, and their subsequent transportation to/from site, as set out in Section 11.5: Design Interventions and Controls of Chapter 11 (Ground Conditions and Contaminated Land).

14.4.14. As part of standard operational maintenance procedures, visual inspections will be undertaken after extreme climate events to ensure that appropriate repair and maintenance is undertaken, if and where necessary.

14.5. Potential Significant Effects

14.5.1. This section considers the potential impacts on climate change with design interventions and controls described in Section 14.4 considered but without any additional mitigation.

Potential Impact of Proposed Development on Climate

14.5.2. Estimated Whole Life Carbon (WLC) emissions associated with the proposed development are summarised in Table 14.9.

14.5.3. GHG emissions from the construction phase are estimated to total 19,064 tCO_2e, with over half of these emissions associated with the carbon embodied in construction materials. The transport of construction materials to site and construction process emissions are, however, both estimated to make a sizeable contribution to WLC emissions.

14.5.4. GHG emissions from the operational phase are estimated to total 17,162 tCO_2e, with approximately 70% of these emissions associated with the operation of standby generators.

Table 14.9: Estimated GHG emissions associated with proposed development

Phase	Module	tCO_2e	% of Whole Life Carbon
	A1: Raw material supply		
	A2: Transport		
	A3: Manufacture	9,746	26.9%
	A4: Transport to works site	4,646	12.8%
Construction	A5: Construction/installation processes	4,673	12.9%
	B1: Use	1,100	3.0%
	B2: Maintenance	97	0.3%
	B3: Repair	24	0.1%
	B4: Replacement	3,526	9.7%
Operation	B6: Operational energy uses	12,415	34.3%
Total		**36,226**	

14.5.5. Estimated WLC emissions associated with the proposed development are compared to relevant UK and Welsh carbon budgets in Table 14.10 and Table 14.11, respectively.

Table 14.10: Estimated GHG emissions associated with proposed development compared to UK carbon budgets

	Estimated total carbon over UK carbon budget periods (tCO_2e) and proportion of relevant carbon budget (%)		
Phase	4th Carbon Budget (2023 to 2027)	5th Carbon Budget (2028 to 2032)	6th Carbon Budget (2033 to 2037)
Construction	9,532 (0.0005%)	9,532 (0.0006%)	-

Phase	Estimated total carbon over UK carbon budget periods (tCO_2e) and proportion of relevant carbon budget (%)		
	4th Carbon Budget (2023 to 2027)	**5th Carbon Budget (2028 to 2032)**	**6th Carbon Budget (2033 to 2037)**
Operation	-	4,174 (0.0002%)	5,072 (0.0005%)
Total	9,532 (0.0005%)	13,706 (0.0008%)	5,072 (0.0005%)

Table 14.11: Estimated GHG emissions associated with proposed development compared to Welsh carbon budgets

Phase	Estimated total carbon over Welsh carbon budget periods (tCO_2e) and proportion of relevant carbon budget (%)	
	3rd Carbon Budget (2026 to 2030)	**4th Carbon Budget (2031 to 2035)**
Construction	19,064 (0.0162%)	-
Operation	2,102 (0.0018%)	5,126 (0.0068%)
Total	21,166 (0.0180%)	5,126 (0.0068%)

14.5.6. The results in Table 14.10 and Table 14.11 indicate that the estimated changes in GHG emissions as a result of the proposed development are negligible in comparison to UK and Welsh carbon budgets, respectively, and as such are unlikely to have a material impact on these being met.

14.5.7. With reference to the IEMA GHG guidance[326] assessment criteria in Table 14.4, JSP 850 BPS 0.1 (v9) is considered to be an up-to-date standard, reflective of 'good practice' and aligned with the budgeted, science-based 1.5˚C trajectory (in terms of rate of emissions reduction). As the proposed development is required under MOD guidance to meet this standard, the proposed development meets the criteria in Table 14.4 for a minor adverse impact which is not significant.

Vulnerability of Proposed Development to Changes in Climate

14.5.8. The potential climate change related risks identified which are relevant to receptors forming part of the proposed development are assessed in Table 14.12, taking into account the design interventions and controls set out in Section 14.4.

Table 14.12: Climate change vulnerability assessment

Climate related risk	Likelihood (see Table 14.5)	Consequence (see Table 14.6)	Significance (see Table 14.7)
Potential overheating of / damage to electrical and mechanical equipment as a result of projected increases in maximum summer temperatures.	**Medium** – Very high temperatures with the potential to cause overheating of / damage to electrical and mechanical equipment are considered likely to occur a limited number of times during the expected operational life of the proposed development, e.g. approximately once every five years.	**Low** – Specifying equipment and/or appropriately protecting equipment so as to be suitably resilient to projected increases in summer temperature, is expected to limit impacts to partial site-wide disruption/loss of function and usability lasting less than one day. There may be some lost time injuries or medical treatment (e.g. heatstroke), with a short-term impact on people affected. No permanent damage is expected, albeit some restoration work may be required.	**Minor – Not significant**
Extreme temperatures / heatwaves placing additional stresses on cooling equipment (e.g. chillers and air conditioning systems) resulting in reduced cooling capacity / increased risk of degradation or failure;	**Medium** – Very high temperatures with the potential to cause overheating of / damage to electrical and mechanical equipment are considered likely to occur a limited number of times during the expected operational life of the proposed development, e.g. approximately once every five years.	**Low** – Specifying equipment and/or appropriately protecting equipment so as to be suitably resilient to projected increases in summer temperature, is expected to limit impacts to partial site-wide disruption/loss of function and usability lasting less than one day. There may be some lost time injuries or medical treatment (e.g. heatstroke), with a short-term impact on people affected. No permanent damage is expected, albeit some restoration work may be required.	**Minor – Not significant**
Increased risks of surface water and groundwater flooding which could potentially result in damage to / failure of electrical equipment and / or damage to / increased degradation of buildings and other infrastructure (e.g. site access roads);	**Low** – As a result of the proposed drainage strategy (which includes an appropriate allowance for climate change), surface water or groundwater flooding is considered (on a conservative basis) to have the potential to occur once during the	**Medium** – Surface water or groundwater flooding could cause partial site-wide disruption/loss of function and usability lasting more than one day and less than one week. While such flooding could cause widespread damage, this damage would be recoverable by maintenance and minor	**Minor – Not significant**

Climate related risk	Likelihood (see Table 14.5)	Consequence (see Table 14.6)	Significance (see Table 14.7)
	expected operational life of the Project (e.g. during an exceptional rainfall event).	repair, albeit with some partial loss of local infrastructure.	
Increased precipitation resulting in damage to buildings and other infrastructure (e.g. site access roads) and electrical and mechanical equipment (e.g. through water ingress, weathering and / or corrosion);	**Medium** – Extended periods of heavy rainfall and / or intense rainfall events with the potential to damage buildings and other on-site infrastructure are considered likely to occur a limited number of times during the expected operational life of the proposed development, e.g. approximately once every five years.	**Low** – Specifying materials and/or appropriately protecting assets so as to be suitably resilient to projected increases in winter rainfall is expected to limit impacts to partial site-wide disruption/loss of function and usability lasting less than one day. No permanent damage is expected, albeit some restoration work may be required.	**Minor – Not significant**
High wind speeds resulting in physical damage to buildings and other infrastructure (e.g. fencing) and electrical and mechanical equipment; and	**Medium** – Storms with very high winds with the potential to damage buildings and other on-site infrastructure are considered likely to occur a limited number of times during the expected operational life of the proposed development, e.g. approximately once every five years.	**Low** – Designing and specifying assets so as to be suitably resilient to high wind speeds is expected to limit impacts to partial site-wide disruption/loss of function and usability lasting less than one day. No permanent damage is expected, albeit some restoration work may be required.	**Minor – Not significant**
Extended periods of drought which could result in local water shortages / water scarcity (potentially affecting on site planting and vegetation) and an increased risk of wildfire.	**Medium** – Extended periods of drought with the potential to result in local water shortages are considered likely to occur a limited number of times during the expected operational life of the proposed development, e.g. approximately once every five years.	**Low** – Impacts are expected to be limited to partial site-wide disruption/loss of function and usability lasting less than one day. No permanent damage is expected, albeit some restoration work may be required.	**Minor – Not significant**

14.6. Mitigation and Enhancement

14.6.1. No significant effects have been identified, and no mitigation and enhancement measures have been identified to-date beyond the design intervention and control measures already embedded in the proposed development.

Potential Impact of Proposed Development on Climate

14.6.2. Going forwards, a more detailed embodied carbon assessment will be undertaken and a whole life carbon management plan produced and implemented, prior to construction, as part of the detailed design stage (post-planning consent), as required by JSP 850 BPS 0.1 (v9).

14.6.3. Should additional opportunities to reduce GHG emissions be identified, as part of this process, these will be taken forwards where practicable to do so in line with applicable guidance / MOD policies.

14.7. Cumulative Effects

14.7.1. As part of the EIA process, the environment teams have undertaken a coordinated, multidiscipline approach to ensure cumulative effects are considered across disciplines and influenced design where appropriate.

14.7.2. The assessment on cumulative effects is presented in Chapter 17 (Cumulative Effects Assessment).

14.7.3. No significant intra-cumulative or inter-cumulative effects for this environmental topic are anticipated as a result of the proposed development.

14.8. Residual Significant Effects

Potential Impact of Proposed Development on Climate

14.8.1. The proposed development's impact on climate change is assessed to be minor adverse and not significant. As defined within IEMA GHG guidance[326], the effect is defined as minor adverse when "*A project … is compatible with the budgeted, science-based 1.5˚C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures*". This is achieved through the design interventions and controls set out in Section 14.4 and the proposed development's compliance with JSP 850 BPS 0.1 (v9), which is considered good practice.

Vulnerability of Proposed Development to Changes in Climate

14.8.2. Elements of the proposed development have the potential to be adversely affected by future changes in climate. However, by applying appropriate design interventions, in this case those set out in Section 14.4, this assessment suggests it is unlikely the potential climate-related risks identified would result in significant impacts during the operational phase of the proposed development.

14.9. Monitoring

14.9.1. Based on the anticipated impacts and non-significant effects of the proposed development, monitoring is not considered necessary

14.10. Summary and Conclusions

14.10.1. This chapter has considered both:

- The potential impact of the proposed development on climate (for example, the nature and magnitude of GHG emissions); and
- The potential vulnerability of the proposed development to future changes in climate.

Potential Impact of Proposed Development on Climate

14.10.2. The MOD as the applicant acknowledges the significant threat climate change poses and has committed to adapting its strategies to meet the legal commitment of achieving net zero by 2050.

14.10.3. An initial, high level assessment of potential changes in GHG emissions as a result of the proposed development has been undertaken, which indicates that such changes are likely to be negligible in comparison to UK and Welsh carbon budgets. Furthermore, a number of design interventions and controls will be implemented to reduce the magnitude of GHG emissions generated as a result of the construction and operation of the proposed development.

14.10.4. On this basis, the proposed development's GHG impacts are considered to be fully consistent with applicable policy requirements and good practice design standards for projects of this type and fully in line with measures necessary to achieve the UK's trajectory towards net zero. As such, the impact of the proposed development on climate is considered to be minor adverse, and a not significant effect.

Vulnerability of Proposed Development to Changes in Climate

14.10.5. The MOD acknowledges that it is important that UK infrastructure and development projects are designed to be suitably resilient to projected future changes in climate (e.g. higher temperatures, heavier rainfall and more extreme weather events).

14.10.6. While elements of the proposed development have the potential to be adversely affected by future changes in climate, by applying appropriate design interventions, this assessment suggests it is unlikely the potential climate-related risks identified would result in significant impacts during the operational phase of the proposed development.