Morven South Offshore Wind Array Project

Environmental Impact Assessment Report

Volume 2, Chapter 20: Human Health

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20.1 Introduction

20.1.1.1 This chapter of the Morven South Offshore Wind Array Project (hereafter "Morven South") Environmental Impact Assessment (EIA) Report (hereafter, the EIA Report) presents the assessment of the Likely Significant Effects (LSE[1]) (as per the EIA Regulations as defined in Volume 1, Chapter 2: Policy and Legislation) on human health. Specifically, this chapter considers the potential impacts of Morven South seaward of Mean High Water Springs during the construction, Operations and Maintenance (O&M) and decommissioning phases. Where relevant, this chapter also assesses the LSE[1] of Morven South on receptors landward of Mean Low Water Springs (MLWS) during the construction, operation and maintenance (O&M) and decommissioning phases.

20.1.1.2 Human health is a broad topic. The assessment considers how Morven South affects different aspects of the environment that influence population health. This includes changes to the social, economic and bio-physical environment, as well as how the electricity generated by Morven South is a resource that supports society.

20.1.1.3 For the purposes of this chapter, health is defined 'as a state of complete physical, mental and social wellbeing and not merely the absence of disease' (World Health Organization (WHO), 1948). Mental health is defined as a 'state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community'. In this chapter the terms health and wellbeing are used interchangeably, and equal consideration is given to considering both physical and mental health outcomes.

20.1.1.4 The assessment presented in this chapter has relied upon, or informed the following technical chapters and reports:

- Volume 2, Chapter 17: Socio-Economics;
- Volume 2, Chapter 12: Commercial Fisheries;
- Volume 2, Chapter 18: Climate Change.

20.1.1.5 Human health was reported on in the Scoping Report for the Morven Option Lease Agreement Site (hereafter, "the Morven Site Scoping Report") (Morven Offshore Wind Limited (MvOWL), 2023). As described in Volume 1, Chapter 4: Site Selection and Consideration of Alternatives, the Morven Option Lease Agreement Site (hereafter "Morven Site") has since been divided into two smaller projects, Morven South and Morven North Offshore Wind Array Project (hereafter "Morven North").

20.1.1.6 The potential impacts to human health are considered to be generally the same (or less) for Morven South as identified in the Morven Site Scoping Report. Consequently, there has been no change in the methodology or impacts that were scoped in or out in the Morven Site Scoping Report for human health. The advice provided by the Marine Directorate Licensing Operations Team (MD-LOT) in the Morven Option Lease Agreement Site Scoping Opinion (hereafter "Morven Site Scoping Opinion" (MD-LOT, 2023) relevant to Morven South, has therefore been considered for the development of this chapter.

20.1.1.7 This chapter presents and assesses up-to-date parameters for Morven South and explains if and how any assessment aspects differ from the information set out in the Morven Site Scoping Report.

20.2 Study areas

20.2.1.1 The following populations are used in the human health assessment to define the Morven South Human Health Study Areas. These are onshore populations that are most likely to be impacted by the activities of Morven South.

- Regional Population: The 'regional' population is defined using the local authorities of: Aberdeenshire; Angus; City of Aberdeen; City of Edinburgh; Dundee City; East Lothian; Fife; Highland; Moray; Perth and Kinross; and the Scottish Borders;
- National Population: The 'national' population is defined using Scotland and the United Kingdom (with regard to climate change and offshore asset electricity generation impacts see Section 20.11.3 and Section 20.11.4);
- Global Populations: The global population, particularly low- and middle income(LMIC) (with regard to offshore asset climate change impacts see Section 20.11.3).

20.2.1.2 The study areas for human health for the Morven Site were presented and agreed during the scoping process for the Morven Site. The underlying principles used to define the study area for Morven South have not changed. As the port(s) for construction and O&M activities for Morven South have not yet been identified, there is no spatially defined local population. Consequently, the Human Health Study Area relies on Regional and National populations rather than a local population. The nature of the wider health determinants that have been assessed within the human health chapter are likely to result in effects within the regional population, rather than a spatially defined local population. Therefore, this approach is considered proportionate to the determinants scoped into this assessment.

20.2.1.3 The study area for human health is shown in Figure 20.1.

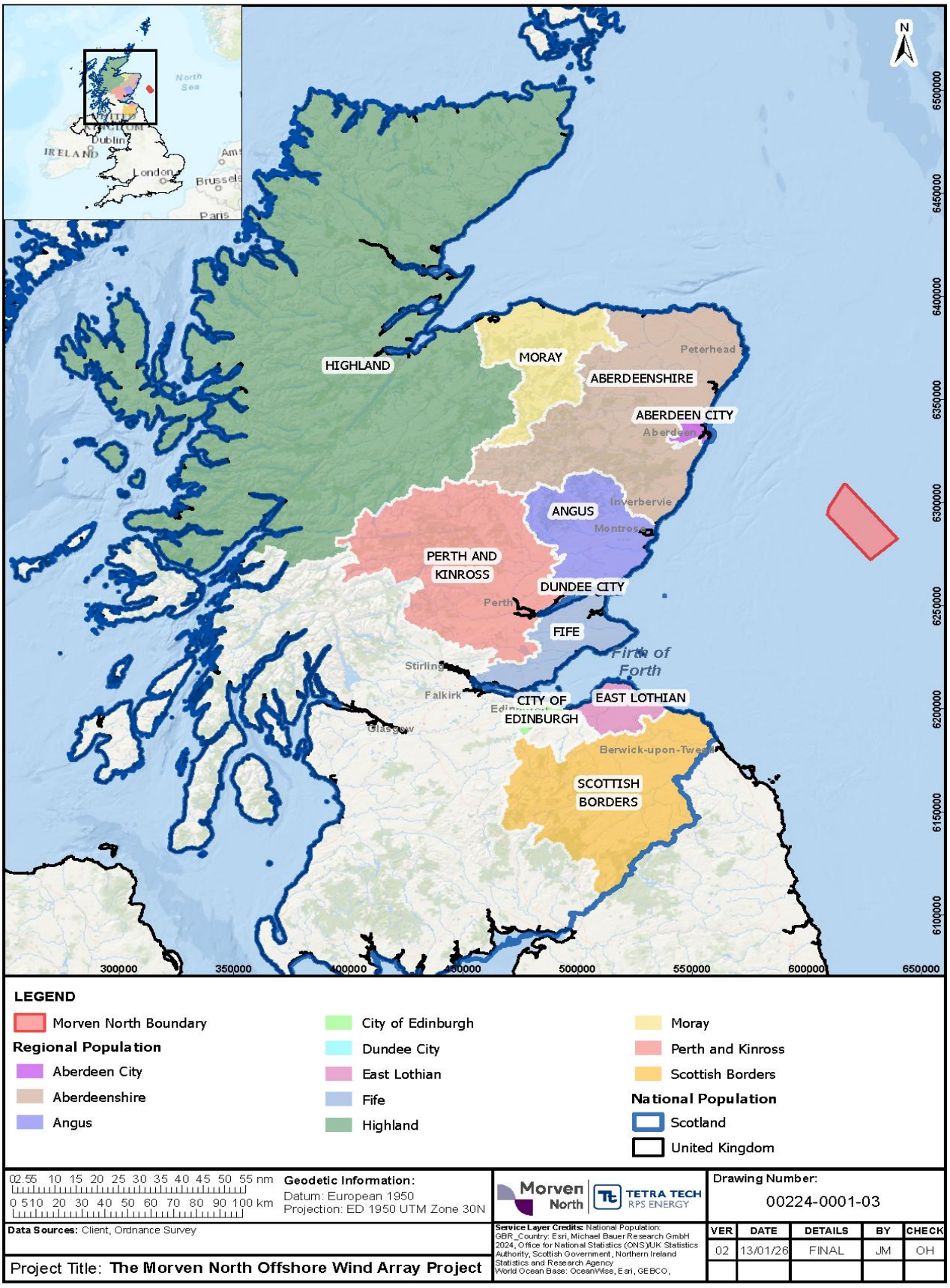

Figure 20.1: Morven South Human Health Study Area

20.2.1.4 The Morven South Human Health Study Area is used to define representative population groups, including in relation to sensitivity, rather than to set localised boundaries on the extent of potential effects. The health assessment has regard to the topic specific study areas defined by other EIA chapters listed in paragraph 20.1.1.4. Those chapters inform the Human Health chapter's consideration of magnitude of impact and extent of effects.

20.2.1.5 The health assessment compares indicators across the 11 local authorities to identify regional variation in health and social outcomes. The comparative approach allows for the identification of areas with the highest sensitivity for both adverse and beneficial health outcomes.

20.2.1.6 The assessment considers local authorities within the Regional Study Area that demonstrate higher levels of health vulnerability. Local authorities demonstrating high employment deprivation represent the most sensitive populations to adverse or beneficial employment and economic effects.

20.3 Legislative and policy context

20.3.1 Legislation

20.3.1.1 The legislative context for Morven South is set out in Volume 1, Chapter 2: Policy and Legislation. In addition, the legislation detailed in Table 20.1 has also been considered.

Table 20.1: Summary of legislation of relevance to human health

Summary of relevant legislation	How and where considered in the EIA Report
Climate Change (Scotland) Act 2009 Set statutory greenhouse gas emission reduction targets and duties to prepare climate change plans and progress reports, with strong emphasis on decarbonising the energy system (United Kingdom (UK) Government, 2009).	Morven South contributes to Scotland's net-zero targets by supplying low-carbon electricity. This chapter recognises that emission reduction has health co-benefits by moderating climate risks and supporting a resilient, low-carbon energy system. This is assessed for the impact of changes to climate change and adaptation on human health (Section 20.11.2.26) and the impact of changes to wider societal infrastructure and resources on human health (Section 20.11.4).
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 Amends the 2009 Act to establish binding national targets: 75% GHG reduction by 2030, 90% by 2050 and net-zero by 2045. Embeds duties on all sectors to contribute to climate mitigation, recognising the health and social benefits of emission reduction (UK Government, 2019).	The human health assessment assesses the associated public health co-benefits of reduced climate-altering emissions and enhanced health resilience to climate impacts, see 'Impact of changes to climate change and adaptation on human health' (Section 20.11.2.26) and 'Impact of changes to wider societal infrastructure and resources on human health' (Section 20.11.4).
Health and Safety at Work etc. Act 1974 Health and Safety at Work etc. Act 1974 is a primary piece of legislation covering occupational health and safety in Great Britain (HM Government, 1974). The Act places duties on employers to ensure, so far as is reasonably practicable, the health, safety and welfare at work of employees, and to ensure persons not in their employment are not exposed to risks to their health or safety (HM Government, 1974).	The human health assessment assumes compliance for managing occupational health and safety during offshore construction, O&M and decommissioning. Population-level health risks are limited.

20.3.1.2 Policy and legislation on renewable energy infrastructure is presented in Volume 1, Chapter 2: Policy and Legislation. A summary of the policies relevant to human health are provided in Table 20.2, along with justification for how these are considered in the assessment.

Table 20.2: Summary of policies of relevance to human health

Summary of relevant policy	How and where considered in the EIA report
National Planning Framework 4 (NPF4) Sets out Scotland's long-term spatial strategy and national planning policies. Promotes a just transition to net-zero, improved health and wellbeing, reduction of inequalities and place-based planning that supports healthy, resilient communities. Supports renewable and low-carbon energy infrastructure (Scottish Government, 2023).	The human health chapter assesses the health and wellbeing effects of Morven South (see Section 20.11.) The assessment includes consideration of differential effects for vulnerable groups which enables the consideration of health inequalities (see Section 20.8.2, Population health approach and vulnerable groups).
Climate Change Plan 2018 – 2032 The Climate Change Plan 2018-2032 (Scottish Government, 2020b) outlines strategies to reduce greenhouse gas emissions and address climate change. The Plan aligns efforts to address climate change with improving public health outcomes in Scotland.	Health co-benefits of climate change mitigation and energy security are recognised in Section 20.11.2.26 and Section 20.11.4. Differential analysis including in relation to fuel poverty and affordability is referenced where relevant in Section 20.11.4.
Scottish Energy Strategy (2017) and Draft Energy Strategy and Just Transition Plan (2023) Emphasises a low-carbon economy, energy security, just transition, fair work, and reduction in fuel poverty, linking clean energy to societal wellbeing (Scottish Government, 2017, 2023a).	The human health assessment considers wider societal infrastructure benefits from secure renewable energy supply. Public health benefits (including affordability and resilience) are assessed in Section 20.11.4). Impact of changes to employment and income on human health is covered in Section 20.7.5.
Scottish National Marine Plan (2015) Policies promote sustainable development, support economic growth and improve wellbeing. National Marine Plan (NMP) general policies (GEN 1, GEN 2, GEN 3, GEN 5) support offshore wind that enhances societal wellbeing and sustainable economic benefits (Scottish Government, 2015).	The human health assessment assesses the economic, climate and wider societal effects from Morven South that influence health outcomes. These are assessed in Section 20.11.
Sectoral Marine Plan for Offshore Wind Energy Draft Updated Consultation (2025) The draft updated Sectoral Marine Plan for Offshore Wind Energy (SMP) sets out an integrated planning framework for the ScotWind and INTOG leasing rounds, alongside additional capacity for test and demonstration (T&D) projects. The Plan updates the 2020 planning baseline, refines offshore wind Option Areas and parameters to guide licensing and consenting in line with the NMP, and brings environmental, social and economic considerations together through an integrated Sustainability Appraisal. It seeks to enable sustainable offshore wind deployment and supply-chain	The human health assessment assesses the health impacts of Morven South with regard to changes to employment and income, including commercial fishing (see Section 20.7.5).

Summary of relevant policy	How and where considered in the EIA report
benefits while managing key constraints and minimising adverse effects on marine birds, fisheries, navigation, landscapes/seascapes, tourism and other sea users through mitigation and monitoring (Scottish Government, 2025b).	
National Strategy for Economic Transformation (2022) Supports a just transition to net-zero, inclusive growth, upskilling, green jobs and regional economic development. The strategy also aims to focus on wellbeing and fair work, delivering higher employment and wage growth, reduce structural poverty and improve health and social outcomes for disadvantaged families and communities. (Scottish Government, 2022b).	The human health assessment reflects that employment and income are core health determinants. Morven South has the potential to contribute to green economy job creation and just-transition objectives. This chapter assesses the impacts of changes to employment and income on human health for Morven South and accounts for distributional considerations, acknowledging that vulnerable groups historically excluded from high-value employment. See Section, 20.8.2, Population health approach and vulnerable groups, and Section 20.7.5.
UK Marine Policy Statement (2011) Provides marine planning framework across UK waters. Emphasises protection of human health, sustainable development of marine resources, co-existence of sea users, and climate change mitigation (Department for Environment, Food & Rural Affairs, 2011).	This chapter provides the health assessment for Morven South. The effects to population health, including the potential for adverse effects and opportunities to enhance health and wellbeing are considered in Section 20.11.
Public Health Priorities for Scotland (PHPS) Public Health Priorities for Scotland (Scottish Government, 2018) sets out the health priorities for Scotland, including, mental health, equality of health outcomes, and physical activity. The following priorities are relevant to this assessment: • "Priority 1: A Scotland where we live in vibrant, healthy and safe places and communities; • Priority 3: A Scotland where we have good mental health; • Priority 5: A Scotland where we have a sustainable, inclusive economy with equality of outcomes for all.	The human health assessment identifies relevant health inequalities through consideration of the differential effect to the 'general population' of the relevant study area and effects to the 'vulnerable population group' (the approach for which is set out in Section 20.8.2). Furthermore, the chapter assesses the impact of changes to employment and income on human health (Section 20.7.5), the impact of changes to climate change and adaptation on human health (Section 20.11.2.26) and the impact of changes to wider societal infrastructure and resources on human health (Section 20.11.4) as wider determinants of health and in doing so, aligns with the PHPS priorities 1, 3 and 5.

20.4 Consultation

20.4.1.1 The approach to consultation for Morven South is set out in Volume 1, Chapter 5: Consultation. A summary of the issues raised during consultation activities undertaken to date specific to human health is presented in Table 20.3, together with how these issues have been considered in the production of this human health EIA Report chapter. Further detail is presented within Volume 3, Annex 5.1: Consultation.

Table 20.3: Summary of key consultation issues raised during consultation activities undertaken for Morven South of relevance to human health

Date	Consultee and type of consultation	Summary of issue(s) raised	Applicant's response to issue raised and, if applicable, where considered in this chapter
30 November 2023	MD-LOT Scoping Opinion	"The Developer presents the range of study areas (Local Health Study Area, Regional Health Study Area, and National Health Study Area) in Section 9.10.2 of the Scoping Report and the data sources considered in Section 9.10.3 of the Scoping Report. The Scottish Ministers are largely content with the study areas and data sources presented."	The Regional and National Study Areas are defined in Section 20.2, and data sources are detailed in Section 20.6.3. These provide the basis for the health baseline (Section 20.7) and inform sensitivity throughout the assessment presented in Section 20.11. As the port(s) for construction and operations and maintenance activities for Morven South have not yet been selected, there is no spatially defined local population. Consequently, the Morven South Human Health Study Area relies on Regional and National populations rather than a local population. Any potential effects previously identified within the local population in the Morven Site Scoping Report are captured within the Regional population in this chapter.
30 November 2023	MD-LOT Scoping Opinion	"The impacts proposed to be scoped into the EIA Report during different phases of the Proposed Development are outlined in Table 9.35 of the Scoping Report, while the impacts proposed to be scoped out are outlined in Table 9.36. The Scottish Ministers are broadly content with the impacts proposed to be scoped in and out of assessment. However, the Scottish Ministers draw the Developer's attention to East Lothian Council's concerns regarding impacts on fishing and additional potential health impacts and request that this is fully considered in the EIA Report."	The assessment of human health effects is presented in Section 20.11. The impacts scoped in and out the assessment are summarised in Section 20.5.1 and Section 20.5.2 respectively. The assessment considers potential health impacts associated with commercial fishing as part of the assessment of employment and income health effects (see Section 20.11.2). Section 20.11 addresses potential health effects during construction, O&M, and decommissioning, including pathways linked to economic activity and access to resources. The assessment also considers cumulative and in-combination effects in Section 20.13.

Date	Consultee and type of consultation	Summary of issue(s) raised	Applicant's response to issue raised and, if applicable, where considered in this chapter
30 November 2023	East Lothian Council - Scoping Consultation Responses	The Scoping Report considers health impacts (Section 9.1). It proposes to Scope out Community identity, culture, resilience and influence. This topic includes those from the visual impact of offshore activity. Although this project is at some distance from East Lothian, the cumulative visual impact of wind turbines 'as far as the eye can see' from most places a person can look out to sea from the east coast may change how people feel about their relation to place, and some may experience this change as a loss. Although this is not an issue for just this windfarm, the potential for cumulative impact should be recognised under this topic.	As reported in Chapter 9.7: Seascape and Visual Impact and Onshore Heritage Assets of the Morven Site Scoping Report, the assessment of visual impacts from Morven South has been scoped out; and this has been agreed by the Scoping Opinion. Visual impacts have been scoped out due to the large, intervening distance (beyond an "accepted" 50km SLVIA Study Area from the Scoping Boundary) and limited visibility of the Morven South (as illustrated in the ZTVs and wirelines in Appendix 12: Seascape, Landscape and Visual and Onshore Historic Environment Wireline/ZTVs of the Morven Site Scoping Report), meaning that there are unlikely to be any significant effects on the seascape, landscape and visual receptors. With regard to cumulative effects, as stated in Volume 1, Chapter 6: EIA Methodology, cumulative impacts are only assessed within the Cumulative Effects Assessment (CEA) where potential significant effects are likely in the alone assessment. Since this topic is scoped out of the EIA, it has not been assessed within the CEA.
		The Scoping Report considers impacts on fishing. Fish is a healthy food that is becoming increasingly expensive which affects people on lower incomes especially. The Scoping report on page 307 notes that changes are not considered likely to affect the availability or price of food to a degree that could affect population health. No further information has been given on this however so the council is	As stated in the Morven Site Scoping Report, this impact has been scoped out of the human health assessment as changes to commercial fisheries as a result of Morven South and its indirect impact on food availability is not of a scale that can affect population health and is beyond the scope of this assessment. The impact on Morven South on fishing grounds and fishing activity is assessed in detail in

Date	Consultee and type of consultation	Summary of issue(s) raised	Applicant's response to issue raised and, if applicable, where considered in this chapter
		not sure on what basis this has been scoped out.	Volume 2, Chapter 12: Commercial Fisheries.
		The health section does not consider either way whether there is any potential for contaminants from the windfarm to enter the human food chain, although the impact of accidental spillage is scoped out under 'water' and others due to the mitigation of a MCMP and others. It would be reassuring to know if this has been considered.	Morven South will adopt standard best practice, pollution and spill prevention and response procedures as detailed within Volume 4, Annex 1: Environmental Management Plan (EMP) (Version 1) and Volume 4, Annex 1, Appendix 1.1: Marine Pollution Contingency Plan (MPCP) (Version 1). Morven South construction activities are not anticipated to result in substantial contamination issues, and the operation of Morven South does not create any further sources of contamination. The nature and scale of activities related to all phases of Morven South are not anticipated to result in contamination of human food-chains that has the potential to impact human health, and therefore this is not assessed further.
November 2023	Marine Analytical Unit Response – Scoping Consultation Responses	The MAU notes that some impacts identified in the MAU general advice (see Annex below), such as socio-cultural (referred to as 'community identity, culture, resilience and influence' in the scoping report) and distributional impacts, have been scoped out, or have not been mentioned at all (page 307, Table 9.36). 'Transport modes, access, and connections' have also been scoped out. The report states that transport links and infrastructure in the proposed locations are generally good and so no impacts are anticipated. Nonetheless, the increased use of these	As reported in Chapter 9.7: Seascape and Visual Impact and Onshore Heritage Assets of the Morven Site Scoping Report, the assessment of visual impacts from Morven South has been scoped out; and this has been agreed by the Scoping Opinion. Visual impacts have been scoped out due to the large, intervening distance (beyond an "accepted" 50km SLVIA Study Area from the Scoping Boundary) and limited visibility of the Morven South (as illustrated in the ZTVs and wirelines in Appendix 12: Seascape, Landscape and Visual and Onshore Historic Environment Wireline/ZTVs of the Morven Site Scoping

Date	Consultee and type of consultation	Summary of issue(s) raised	Applicant's response to issue raised and, if applicable, where considered in this chapter
		transport modes could lead to an increase in traffic congestion, reduced road quality etc. which could be disruptive for local populations. Please scope in these impacts.	Report), meaning that there are unlikely to be any significant effects on the seascape, landscape and visual receptors. Accordingly, the health determinant 'community identity, culture, resilience and influence' which in this context is mostly affected by visual impacts, has been scoped out of the human health assessment. As detailed in the Morven Site Scoping Report, the health determinant 'Transport modes, access, and connections' has also been scoped out, due to there not being any commercial passenger ferries identified by relevant Shipping and Navigation surveys; and therefore, there being no potential for significant population health effects as a result of changes in routine or emergency health related journey travel times, access to health promoting goods and services, or community severance. Traffic changes in local roads are also not anticipated to be of a scale that would impact population health.
		The MAU welcomes scoping in of human health (page 303, paragraph 9.10.2.2.).	Noted.

20.5 Scope of the assessment

20.5.1 Impacts scoped into the assessment

20.5.1.1 The scope of this EIA Report has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Table 20.3. The Morven Site Scoping Opinion was received on 30 November 2023, and MD-LOT confirmed that they were in agreement with the scope of the assessment for the Morven Site which is now used to represent Morven South. Taking into account the scoping and consultation process, Table 20.4 summarises the potential impacts which have been scoped into this assessment. Where an impact is likely to occur within a specific development phase of the project, this is indicated within each relevant topic chapter (a '✓' is used to denote the phase the potential impact can occur, conversely a '✗' outlines there is no impact within this project phase), where relevant.

Table 20.4: Potential impacts scoped into the human health assessment

C= Construction, O= Operations and Maintenance, D= Decommissioning phases

"✓" is used to denote the phase the potential impact can occur, "✗" outlines there is no impact within this project phase

Category	Potential impact	Phase			Justification
		C	O	D	
Economic environment	Impact of changes to employment and income on human health	✓	✓	✓	Health effects from wider indirect economic impacts are scoped in. Any potential unemployment or adverse economic implications are scoped in, for example, the effects of Morven South on commercial fisheries.
Biophysical environment	Impact of changes to climate change and adaptation on human health	✗	✓	✗	Morven South would be a part of a wider energy sector transition that reduces the severity of climate change. Health effects of climate change are scoped in.
Institutional and built environment	Impact of changes to wider societal infrastructure and resources on human health	✗	✓	✗	During operation, the wider societal contribution of Morven South to supporting public health is scoped in. Morven South would provide energy infrastructure that supports many aspects of public health.

20.5.2 Impacts scoped out of the assessment

20.5.2.1 A summary of the impacts scoped out, together with justification for scoping them out, is presented in Table 20.5.

Table 20.5: Impacts scoped out of the assessment for human health

C= Construction, O= Operations and Maintenance, D= Decommissioning phases

"✓" denotes the impact has been scoped out for this phase, "X" denotes the impact has not been scoped out for this phase

Category	Potential impact	Phase			Justification
		C	O	D	
Health related behaviours	Physical activity	✓	✓	✓	All phases • Health promotion within the workforces is considered as a good practice enhancement measure but it is otherwise scoped out. Community physical activity would not be affected by offshore works or port operations.
	Risk taking behaviour	✓	✓	✓	Construction and Decommissioning phases • Issues of community health behaviours being detrimentally affected by the presence of the workforce are scoped out. The workforces comprise those based aboard vessels and those based at the ports. Those aboard vessels may be multinational professionals travelling back to their usual place of residence on a rotational basis. This may involve temporary accommodation, (e.g. in a hotel close to the port or other travel hub, the night following disembarking and the night prior to reembarking). This is usual practice. Extended periods of leave spent within port, or other UK, communities is not expected. The port workforces are assumed to be predominantly existing residents within the regional area, commuting to work and returning home between shifts. There is not considered to be the potential for a likely significant population health effect associated with risk taking behaviour by the workforces afloat or ashore; this issue is scoped out. The issue of communicable illness, including in relation to the COVID-19 pandemic is noted but scoped out. Morven South would operate appropriate measures to safeguard the project workforce and the public in line with Government guidance of the day and guidance issued by the International Maritime Organisation (IMO), including in relation to vessel crews. Risks are similar to other routine offshore construction and shipping activities. O&M phase • The same conclusions are reached for the operational workforce. The workforce is expected to be smaller in number and more locally resident. There is not considered to be the potential for a likely significant population health effect associated with risk taking behaviour by the workforces afloat or ashore, this issue is scoped out.
	Diet and nutrition	✓	✓	✓	All phases

Category	Potential impact	Phase			Justification
		C	O	D	
					• There are no effects on agricultural lands associated with offshore activities. Port activities are neither expected to require agricultural land take, nor disrupt food related production or transport. Potential effects on diet due to impacts to commercial fisheries have been considered and are not of a scale or nature that is anticipated to impact human health. The changes are not considered likely to affect availability or price of food to a degree that could affect population health. The general impact on Morven South on fishing grounds and fishing activity is assessed in detail in Volume 2, Chapter 12: Commercial Fisheries. Wider economic effects to health associated with commercial fisheries are discussed in Section 20.11.2.
Economic environment	Education and training	✓	✓	✓	All phases • While Morven South will support upskilling and career development in relation to its workforces, this is not expected to be sufficiently localised at a scale with the potential for significant population level effects. This issue is, therefore, scoped out.
Social environment	Housing	✓	✓	✓	All phases • Housing related issues are scoped out. No new housing is proposed. The workforce will have housing requirements, but it is expected that a high proportion will be resident in the regional area or would be based aboard their vessels unless travelling to their usual place of residence. Any temporary accommodation requirements would be met through usual capacity for such activities around ports. Health effects associated with housing are scoped out on the basis of sufficient anticipated capacity in the local housing market. • Demographic changes and demand for housing impacts are considered in the Socio-economics chapter (Volume 2, Chapter 17: Socio-Economics). Volume 2, Chapter 17: Socio-Economics does not identify any significant demographic changes and demand for housing and other services during construction, O&M and decommissioning. As such, housing health effects are scoped out.
	Relocation	✓	✓	✓	All phases • Neither offshore works nor port activities of Morven South would involve compulsory land purchases of homes or community facilities. This issue is scoped out.
	Open space, leisure and play	✓	✓	✓	All phases • Offshore and port activities are not expected to affect access to areas of open space that could significantly affect population health. This reflects use of existing port areas and designated shipping routes near ports. Furthermore, offshore activities would be a considerable distance from

Category	Potential impact	Phase			Justification
		C	O	D	
					land, so have limited potential to effect marine leisure on a scale that could be influential to public health. This issue is scoped out.
	Transport modes, access and connections	✓	✓	✓	All phases • Vehicle transport is expected to predominantly relate to the movement of goods, materials, people and plant to and from an operational port location associated with the offshore works. The road infrastructure to ports, in general, is good. It is considered reasonable to assume that an existing major port would be selected with appropriate existing consents that have taken transport impacts into account, including in relation to any transportation connected with cruise tourism. Morven South does not include port construction or redevelopment works. Any potential environmental effects are expected to be considered in accordance with any consents and permits that may be required by the ports themselves. This issue is, therefore, scoped out. • The potential impact of changes in shipping access to the mainland is scoped out. • As no commercial passenger ferries were identified in the Shipping and Navigation assessment (See Volume 2, Chapter 13: Shipping and Navigation and Volume 3, Annex 13.1: Shipping and Navigation Shared Navigational Risk Assessment), there is not considered to be any potential for significant population health effects due to changes in: routine or emergency health related journey travel times; access to health promoting goods and services; community severance.
	Community safety	✓	✓	✓	All phases • Morven South requires skilled technical roles. There are not anticipated to be community safety or security issues associated with worker behaviour in ports or communities. Morven South would operate appropriate safeguarding and modern slavery policies. The potential for widespread actual or perceived crime that could affect population health is unlikely. This issue is, therefore, scoped out.
	Community identity, culture, resilience and influence	✓	✓	✓	All phases • Demographic changes that could affect community identity are not anticipated, as there would not be a large in-migration or outmigration of workers to local communities. Employment opportunities are not expected to be at a scale to have a strong localised influence on community identity. These issues are, therefore, scoped out. • The visual impact of Offshore Wind Farms (OWF) has the potential for the introduction of visual change in the seascape, which may affect community identity. However, Morven South is c.60km

Category	Potential impact	Phase			Justification
		C	O	D	
					offshore. As reported in Chapter 9.7: Seascape and Visual Impact and Onshore Heritage Assets of the Morven Site Scoping Report, due to the large, intervening distance (outwith an "accepted" 50 km SLVIA Study Area from the scoping boundary) and limited visibility of the Morven Site (as illustrated in the Zone of Theoretical Visibility (ZTVs) mappings and wirelines in Appendix 12: Seascape, Landscape and Visual and Onshore Historic Environment Wireline/ZTVs of the Morven Site Scoping Report), there are unlikely to be any significant effects on the seascape, landscape and visual receptors. Following scoping it was agreed by all interested parties that the Seascape, Landscape and Visual and Onshore Historic Environment assessment was scoped out of further assessment. Therefore, this issue is scoped out.
	Social participation, interaction and support	✓	✓	✓	All phases • Morven South will not directly affect land used for community interaction (e.g. meeting places, village greens, community centres, etc) that promote community voluntary, social, cultural or spiritual participation. This issue is, therefore, scoped out.
Bio-physical environment	Climate change and adaptation	✓	✗	✓	Construction and Decommissioning phases • Embodied carbon and climate altering pollutant emissions associated with construction and decommissioning activities (associated materials and transportation emissions) are not of a scale to have the potential for population level health effects. This is confirmed in Volume 2, Chapter 18: Climate Change. This issue is, therefore, scoped out.
	Air quality	✓	✓	✓	All phases • During all phases, Morven South is not expected to generate offshore air quality emissions that could affect onshore populations to a degree that there could be potentially significant adverse effects. Operational port related air quality effects are scoped out on the basis of compliance with any consents and permits that may be required by the ports themselves. Morven South does not include port construction or redevelopment works. This issue is, therefore, scoped out.
	Water quality and availability	✓	✓	✓	All phases • Offshore pollutant spills have potential to affect coastal bathing water quality, which can result in toxin exposures through dermal contact and ingestion. However, Morven South would adopt standard best practice, spill avoidance and response measures that would be secured through management plans. Morven South does not include port construction or redevelopment works.

Category	Potential impact	Phase			Justification
		C	O	D	
					This issue is scoped out on the basis of the anticipated effectiveness of such measures and the distance of the Morven South from coastal bathing waters.
	Land quality	✓	✓	✓	All phases • Offshore works would not affect land quality. Operational port activities are unlikely to result in public exposures to contaminated soils. Morven South does not include port construction or redevelopment works. Any new or historic contamination that may be mobilised by activities will be managed by existing port consents, standard best practice contamination avoidance and response measures. This issue is scoped out.
	Noise and vibration	✓	✓	✓	All phases • The offshore airborne noise effects to human health are scoped out. Operational port activities would generate noise, but this is not expected to be of a scale, timing or character that differs from existing operational port levels. Morven South does not include port construction or redevelopment works. This issue is scoped out.
	Radiation	✓	✓	✓	All phases • Non-ionising Electromagnetic Fields (EMFs) effects are scoped out. Offshore electrical infrastructure, including offshore substations, are not located in proximity to communities. Relevant occupational safeguards would be followed. No EMF risk is, therefore, likely for offshore aspects of Morven South. No ionising radiation sources are proposed. These issues are scoped out.
Institutional and built environment	Health and social care services	✓	✓	✓	All phases • Effects on health and social care are scoped out. The workforce for Morven South is assumed to include a high proportion of people who are resident in the regional area. The UK workforce would have the National Health Service (NHS) entitlement irrespective of place of residence or place of working activity. UK workers away from their usual place of residence for a prolonged period would be able to register with local primary healthcare on a temporary basis. This would facilitate NHS funding for their care. The expectation is that the great majority of healthcare needs of the offshore workforce will be met either by occupational provision aboard their vessel or by their usual healthcare provider when they return to their usual place of residence during rotation. Any multinational workers are assumed to be covered by health insurance provisions that would allow the NHS to recoup costs to an extent that avoided any significant adverse effect on healthcare

Category	Potential impact	Phase			Justification
		C	O	D	
					services. This is routine practice across industries and sectors. The Morven South workforce assumptions set out in Volume 2, Chapter 17: Socio-Economics support routine NHS service planning. • Morven South will operate appropriate occupational health services. It is not expected that a high proportion of workers would move to the area with dependants requiring social care. Health protection measures such as screening and immunisations are expected to continue from the workers' usual place of residence. Similarly, routine dental appointments are assumed to be with the worker's dental practice close to their usual place of residence. Other health services are not expected to be affected as no large scale in-migration is expected and the workforce of skilled technical roles would return to their usual places of residence when ashore. This issue is, therefore, scoped out.
	Built environment	✓	✓	✓	Construction and Decommissioning phases • Offshore utilities disruption is unlikely, and any crossing of existing power or communications cables would be managed to avoid interruption. Appropriate waste management practices would be used, including regard to the International Convention for the Prevention of Pollution from Ships (MARPOL) Regulations on disposal of waste at sea and relevant legislation covering disposal and/or recycling of wastes from vessels when in port. Significant population health implications are not anticipated and are scoped out. Operational and maintenance phase • Morven South would introduce new elements in the built environment; however, the distance offshore means there is very limited direct impacts on human receptors. Port or offshore operational activities are not considered to have waste management, land use or infrastructure use implications on a scale that could affect population health, reflecting compliance with statutory and regulatory regimes. These issues are scoped out.
	Wider societal infrastructure and resources	✓	✗	✓	Construction and Decommissioning phases • Morven South renewable energy infrastructure would not generate public health benefits during construction and decommissioning phases, in terms of contributing to energy security and therefore indirectly impacting on population health. This issue is scoped out.

20.6 Approach to baseline characterisation

20.6.1.1 The human health baseline environment has been characterised through a literature review of key desktop datasets and reports (see Table 20.6).

20.6.2 Relevant guidance

20.6.2.1 The approach to baseline characterisation for human health follows the same methodology and guidance set out in Section 20.6.2.

20.6.3 Desktop study

20.6.3.1 Data from the inter-related technical disciplines set out in paragraph 20.1.1.4 has been used to inform the health assessment. This data informs the health assessment by identifying potential receptors and community assets for these disciplines, such as schools, residential properties, walking and cycling routes, as well as tourism and recreational amenities. No separate health specific data collection surveys have been undertaken. The health analysis is informed by scheme-wide consultation.

20.6.3.2 The following data sources have informed the health baseline assessment:

Table 20.6: Summary of key desktop reports used to characterise the human health baseline

Title	Source	Evidence	Year	Author
Local statistics	Office for National Statistics (ONS) – Explore local statistics (ONS, 2025)	Population profile and employment statistics	2021 – 2025	Office for National Statistics
Statistics and data; Scotland's Census	National Records of Scotland and Scotland's Census (Scottish Government, 2022a, 2025a)	Population estimates including life expectancy data	2022; 2025	Scottish Government
Scottish Index of Multiple Deprivation Mapping	Scottish Government – Scottish Index of Multiple Deprivation 2020 (Scottish Government, 2020a)	Relevant small area deprivation mapping, including 'Index of Multiple Deprivation' and individual sub-domains	2020	Scottish Government
ScotPHO Profiles	Scottish Public Health Observatory (Scottish Public Health Observatory, 2025)	Relevant small area and comparator levels. Indicators from 'behaviours', 'economy' and 'life expectancy and mortality'.	2016 – 2025	Scottish Public Health Observatory
Scottish Health Survey	Scottish Health Survey (Scottish Government, 2025c)	This Survey provides a detailed picture of the health of the Scottish population in private households and is designed to make a major contribution to the monitoring of health in Scotland.	2024	Scottish Government

Title	Source	Evidence	Year	Author
Google Earth Pro	Google Earth Pro	Google Earth Pro Aerial and street level site location review. Local health mapping: Scottish maps including local services; learning; leisure and culture; highways and transportation; countryside environment and waste; and crime and public safety.	2025	Google

20.6.4 Site specific surveys

20.6.4.1 As stated in the Morven Site Scoping Report, no site specific surveys have been undertaken to inform the EIA for human health. This is because sufficient desktop data is available to inform the baseline from which the potential impacts can be assessed.

20.7 Baseline environment

20.7.1 Overview of baseline environment

20.7.1.1 The following sections provide the human health assessment baseline.

20.7.1.2 Different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstances.

20.7.1.3 The aim of the following information is primarily to put into context the local health circumstance of the communities surrounding Morven South, drawing from available statistics. As the ports to be used during construction and O&M have not yet been identified, data has been collected for the regional areas of Aberdeenshire, Angus, City of Aberdeen, City of Edinburgh, Dundee City, East Lothian, Fife, Highland, Moray, Perth and Kinross, and Scottish Borders. Regional data has then been compared with the national (Scotland) average.

20.7.1.4 This is then applied as the foundation to the assessment and aids in the delivery of public health objectives/priorities.

20.7.1.5 It should be noted that the description of the whole population, and the populations within the Regional Study Area does not exclude the probability that there will be some individuals or groups of people who do not conform to the overall profile.

20.7.2 Population profile

Population structure

Sex

20.7.2.1 The sex distribution across local authorities is broadly similar to the national (Scotland) profile. Males account for between 48.3% and 49.2% of local populations, compared to 48.6% nationally. Females represent between 50.8% and 51.7%, closely aligning with the Scotland figure of 51.4%. No notable gender imbalance is present in the Regional Study Area.

Age

20.7.2.2 The proportion of residents aged 0 to 15 years ranges from 14.6% to 18.5%, which is closely aligned with the Scottish average of 16.4%. The working age population (16 to 64 years) makes up between 58.1% and 67.2%, which is overall consistent with the national figure of 63.6%. The percentage of residents aged 65 and over varies between 15.9% and 24.7% compared with 20.0% nationally.

20.7.2.3 Overall, rural authorities including Moray, Highland, and Perth and Kinross have slightly older populations, whereas more urban authorities, including the City of Aberdeen, have younger profiles.

Self-reported general health

20.7.2.4 Self-reported health provides an overarching measure of wellbeing. According to the 2022 Scottish Census, the majority of the population across all local authorities reported very good or good health. Overall, the proportion of residents describing their health as “very good” or “good” ranges from 77.8% to 83.7%, compared to 78.8% for Scotland.

20.7.2.5 The majority of local authorities perform higher (better) than the national average except for Dundee City (77.9%) and Fife (77.8%) which are slightly lower (worse) than the average for Scotland (78.8%). Aberdeenshire (83.3%) and the City of Edinburgh (83.7%) perform highest (best) compared to the national average.

20.7.2.6 Reports of “fair” health account for 11.4% to 14.7% of the local populations, compared to 14.2% for Scotland. In most local authorities, a lower (better) percentage of the population reporting fair health corresponds with a higher (better) proportion reporting very good/good health. However, Dundee City and Fife are the exception.

20.7.2.7 For “bad/very bad” health, local authority population percentages range between 4.4% and 6.9% (lower and better than the national average), except for Dundee City which reports a higher (worse) average (7.4%) than the Scottish average, and Fife, which is the same as the national average (7.0%).

20.7.2.8 Overall, these patterns identify Dundee and Fife as having the least favourable general health profile within the Regional Study Area, consistent with wider socio-economic inequalities (see section 20.7.5).

Long-term health problem or disability

20.7.2.9 Patterns in long-term health conditions and disability also reflect these trends.

20.7.2.10 The proportion of people whose day-to-day activities are limited a lot varies between 7.6% and 11.6%, compared with 10.8% nationally. Aberdeenshire (7.6%) and the City of Edinburgh (7.6%) perform lower (better) than the national average, whereas Dundee City (11.6%) and Fife (11.1%) exhibit higher (worse) levels of limitation. The percentage of those whose activities are limited a little is between 11.9% and 14.3% across all local authorities, which is broadly consistent with the Scottish proportion of 13.3%. However, the proportion is higher (worse) for Angus (14.3%), Dundee City (14.1%), Fife (14.5%), Highland (14.0%), Moray (13.7%), Perth and Kinross (13.6%) and the Scottish Boarders (14.1%) compared to the national average of 13.3%. The proportion of those whose day-to-day activities are not limited is higher (better) in all local authorities (between 76.2% and 80.5%) than the Scottish average of 75.3%, except in Angus (75.3%), Dundee City (74.3%) and Fife (74.3%).

Summary

20.7.2.11 Overall, as shown above and in Table 20.7 below, the Regional Study Area displays a generally healthy and relatively young working-age population, with pockets of health vulnerability associated with older age structures and socio-economic inequality in certain local authorities (notably Dundee City and Fife).

20.7.2.12 These patterns are relevant for understanding different levels of sensitivity to changes to health determinants assessed in this assessment.

Table 20.7: Population profile

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
Sex													
Male (%)	2022	49.2	48.3	48.8	48.4	48.6	47.9	48.4	49.0	49.2	48.7	48.6	48.6
Female (%)		50.8	51.7	51.2	51.6	51.4	52.1	51.6	51.0	50.8	51.3	51.4	51.4
Age													
Age 0 to 15 (%)	2022	18.5	16.0	15.7	14.6	15.8	18.0	16.6	15.8	16.7	15.8	15.6	16.4
Age 16 to 64 (%)		60.5	58.9	67.2	69.5	66.2	60.9	61.8	60.4	60.4	59.5	58.1	63.6
Age 65 and over (%)		21.0	25.1	17.1	15.9	18.0	21.1	21.5	23.7	22.9	24.7	26.3	20.0
Self-reported general health													
Very good/Good (%)	2022	83.3	79.4	82.1	83.7	77.9	80.9	77.8	79.8	80.4	81.4	79.6	78.8
Fair (%)		12.3	14.4	12.7	11.4	14.7	13.4	15.1	14.2	14.0	13.1	14.6	14.2
Bad/Very bad (%)		4.4	6.2	5.2	4.9	7.4	5.7	7.0	6.1	5.6	5.5	5.8	7.0%

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
Long-term health problem or disability													
Day-to-day activities limited a lot (%)	2022	7.6	10.4	8.1	7.6	11.6	9.2	11.1	9.8	9.1	9.3	9.5	10.8
Day-to-day activities limited a little (%)		12.3	14.3	12.1	11.9	14.1	13.2	14.6	14.0	13.7	13.6	14.1	13.3
Day-to-day activities not limited (%)		80.2	75.3	79.8	80.5	74.3	77.6	74.3	76.2	77.2	77.1	76.4	75.9

Legend	
	Better than the national average
	Worse than the national average
	Same as the national average
	Comparative analysis not applicable

20.7.3 Life expectancy, hospital admissions and mortality

Life expectancy and healthy life expectancy

20.7.3.1 Life expectancy across the Regional Study Area demonstrates notable variation between local authorities, reflecting underlying socio-economic and health inequalities.

20.7.3.2 For males, life expectancy at birth ranges from 74.6 years in Dundee City to 79.3 years in Aberdeenshire, compared with the Scottish average of 76.8 years. Dundee City performs significantly worse (74.6 years) than the national average, the City of Aberdeen performs similarly to the national average, while the other local authorities exhibit higher (better) life expectancy.

20.7.3.3 For females, the pattern is similar, with Dundee City reporting the lowest life expectancy at 79.2 years and Aberdeenshire the highest at 82.7 years, compared to 80.8 years nationally. Overall, the other local authorities perform similarly or higher (better) than the national average on this metric.

20.7.3.4 Healthy Life Expectancy (HLE) shows even greater disparity and provides insight into the number of years individuals can expect to live in good health.

20.7.3.5 For males, HLE ranges from 56.2 years in Dundee City to 64.6 years in the City of Edinburgh, against a Scottish average of 59.6 years. Dundee City's figure is markedly worse, indicating a prolonged period of ill health relative to other authorities. The City of Aberdeen and Fife also perform lower (worse) than Scotland for male HLE, while other local authorities perform better compared to the national average.

20.7.3.6 For females, HLE varies between 56.3 years in Dundee City and 66.6 years in Perth and Kinross, compared to the national average of 60.0 years. These patterns suggest that while overall life expectancy is relatively high in most local areas, Dundee City, Fife and the City of Aberdeen face significant health inequalities, with fewer years lived in good health.

Hospital admissions

20.7.3.7 Hospital admission data further illustrates differences in health outcomes across the Regional Study Area.

20.7.3.8 Coronary Heart Disease (CHD) hospitalisation rates range from 253.4 per 100,000 population in East Lothian to 345.7 in Dundee City, compared with 326.8 nationally. Dundee City performs worse than average, followed by Highland (338.6), the City of Aberdeen (334.2) and Moray (328.8) compared to the national average. Other local authorities perform better (lower hospitalisation rates) compared to Scotland.

20.7.3.9 Dundee City records the highest emergency patient hospitalisations (8483.4 per 100,000) amongst the local authorities, followed by Fife (7975.0 per 100,000) compared to the Scottish average (7242.5 per 100,000). Other local authorities perform lower (better) than the national average.

20.7.3.10 Emergency admissions among those aged 65 years and over highlight areas of vulnerability in older populations. Dundee City reports the highest rate at 26,768.8 per 100,000 population, well above the national average of 23,998.6, indicating high levels of acute care need among older residents. In contrast, Aberdeenshire and Moray record the lowest (better) rates at approximately 18,100 per 100,000. With the exception of Dundee City and Fife, local authorities generally perform better than the national average, suggesting comparatively better health among its older population. These findings point to concentrated health service pressures in Dundee City and Fife, consistent with patterns of poorer health and socio-economic disadvantage.

Mortality

20.7.3.11 Mortality rates provide further evidence of health inequalities within the Regional Study Area.

20.7.3.12 Deaths from all causes range from 998.1 per 100,000 population in Aberdeenshire (lowest) to 1,298.9 in Dundee City (highest), compared with 1,172.2 nationally. The figures for Dundee City and Fife are substantially worse than the national average, while Aberdeenshire and the Scottish Borders perform better. Overall, all other local authorities perform lower (better) than the national average.

20.7.3.13 Premature mortality is particularly concerning in Dundee City, where deaths among those aged 15–44 years stand at 138.2 per 100,000 population, which is above the Scottish average of 111.7. Fife also reports a higher (worse) rate at 117.9 per 100,000 compared to the national average. By contrast, Aberdeenshire (99.2), the City of Edinburgh (82.9) and East Lothian (92.5) report much lower (better) rates, indicating better health outcomes for younger adults. Overall, other local authorities perform lower (better) than the Scottish average.

20.7.3.14 Deaths under 75 years follow a similar pattern, with Dundee City recording 557.2 per 100,000 population, far exceeding the national average of 447.7. Aberdeenshire (345.1) and the Scottish Borders (350.8) report the lowest (better) rates, suggesting lower (better) levels of premature mortality. The other local authorities in the Regional Study Area also perform lower (better) than the Scottish average.

20.7.3.15 These trends reinforce the conclusion that Dundee City and Fife experience the greatest health challenges within the Regional Study Area, with elevated mortality across all age groups and particularly high rates of early death.

Summary

20.7.3.16 Overall, as shown above and in Table 20.8 below, the Regional Study Area displays a mixed health profile. Most local authorities perform better than or close to the national average for life expectancy and mortality, with Aberdeenshire, Edinburgh, and the Scottish Borders standing out as comparatively healthy areas. However, Dundee City consistently emerges as the most health-vulnerable authority, with the lowest life expectancy, poorest HLE, highest CHD hospitalisation rates, and the greatest burden of premature mortality. Fife also shows areas of concern, particularly in emergency hospitalisations and older-age admissions. These patterns are relevant for understanding differential sensitivity to changes in health determinants assessed in this chapter.

Table 20.8: Life Expectancy, hospital admissions and mortality

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
Life expectancy and HLE													
Life expectancy, males	2022	79.3	78.2	76.9	77.8	74.6	78.8	77.1	77.4	77.6	78.8	78.7	76.8
Life expectancy, females		82.7	81.2	80.9	82.0	79.2	82.0	80.7	81.9	82.0	82.6	82.6	80.8
HLE at birth for males		64.3	62.8	58.0	64.6	56.2	61.1	58.7	60.9	62.9	65.4	63.4	59.6
HLE at birth for females		64.9	63.2	58.1	65.8	56.3	61.0	58.7	62.1	64.2	66.6	64.6	60.0
Hospital admissions													
CHD patient hospitalisations (per 100,000)	2021/22 – 2023/24	280.4	296.3	334.2	234.2	345.7	253.4	325.6	338.6	328.8	276.6	297.4	326.8
Emergency patient hospitalisations (per 100,000)	2021 – 2023	5401.0	6983.6	6489.9	5771.1	8483.4	5760.2	7975.0	7037.0	5767.3	7159.2	6315.5	7242.5
Emergency admissions, aged 65+ years (per 100,000)	2021/22 – 2023/24	18178.7	20599.6	23106.4	20815.7	26768.8	19565.3	25019.2	20235.1	18177.3	22848.5	20240.0	23998.6
Mortality													
Deaths, all ages (per 100,000)		998.1	1076.6	1144.0	1075.4	1298.9	1030.5	1173.8	1068.3	1114.6	998.3	992.9	1172.2

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
Deaths, aged 15-44 years (per 100,000)	2021 – 2023	88.2	115.6	106.1	82.9	138.2	92.5	117.9	112.8	106.8	104.3	111.9	111.7
Deaths, under 75 years (per 100,000)		345.1	398.0	442.1	412.0	557.2	362.1	440.2	387.9	371.8	358.2	350.8	447.7

Legend	
	Better than the national average
	Worse than the national average
	Same as the national average

20.7.4 Mental health and lifestyle factors

Mental health

20.7.4.1 Mental health indicators across the Regional Study Area reveal important differences in wellbeing and mental health related outcomes. Adult mental wellbeing, measured using the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS), shows relatively consistent scores across local authorities, ranging between 48.6 and 49.7 which is higher (better) than the national average (48.4), suggesting comparatively better mental wellbeing. East Lothian performs the same as Scotland (48.4), whereas Dundee City (46.6) performs marginally below the national average (48.4), indicating slightly poorer wellbeing.

20.7.4.2 Deaths from suicide (aged 16 and over) present a more concerning picture. Rates vary substantially, from 13.2 per 100,000 population in the City of Edinburgh to 24.0 per 100,000 in Dundee City compared to the Scottish average (16.8 per 100,000). Angus, Dundee City, Fife, Highland, Moray, Perth and Kinross and the Scottish Borders all have a higher (worse) rate than the Scottish average, while Aberdeenshire, the City of Aberdeen, the City of Edinburgh and East Lothian perform lower (better) than Scotland overall.

20.7.4.3 Prescriptions for drugs related to anxiety, depression, or psychosis further illustrate mental health challenges. The proportion of the population receiving such prescriptions ranges from 16.9% in the City of Edinburgh to 22.3% in Angus, compared with 20.9% nationally. Angus (22.3%), Dundee City (22.9%) and Fife (22.2%) report higher (worse) levels of prescribing, suggesting greater mental health needs, while other local authorities perform better (lower) than the national average. This pattern indicates that certain highlighted areas may have higher levels of mental health need and reliance of pharmacological treatment, reflecting underlying socio-economic and health inequalities that could influence overall community resilience and wellbeing.

Lifestyle and behavioural risk factors

20.7.4.4 Child healthy weight in Primary 1 is an important indicator of early-life health and future wellbeing. Across the Regional Study Area, the proportion of children at a healthy weight ranges from 71.7% in Angus to 80.8% in the City of Edinburgh, compared to 76.5% nationally. Edinburgh performs notably better (80.8) than average, while Angus and Dundee City (74.3%) fall below the national figure, indicating lower levels of healthy child weight in Primary 1.

20.7.4.5 Smoking prevalence among adults aged 16 and over shows relative variation across local authorities, ranging from 9% in East Lothian and Moray to 19% in Angus and 17% in Dundee City, compared with 15% nationally. Angus and Dundee City report the highest smoking prevalence, while East Lothian and Perth and Kinross perform lower (better) than the national average. Other local authorities perform similarly or lower (better) than the Scottish average.

20.7.4.6 Alcohol-related hospital admissions present a stark contrast between local authorities. Rates range from 255.5 per 100,000 population in the City of Aberdeen to 764.9 in Dundee City, compared to 548.5 nationally. Dundee City's figure is significantly worse than the national average, indicating high levels of alcohol-related harm. Fife (696.7) also reports elevated rates. All other local authorities perform better (lower) than the national average.

Summary

20.7.4.7 Overall, as shown above and in Table 20.9 below, mental health and behavioural risk factors across the Regional Study Area reveal a complex and uneven health profile. While most local authorities report adult wellbeing scores close to or slightly above the national average, suggesting generally positive mental wellbeing, several areas exhibit indicators of vulnerability. Angus, Dundee City, and Fife stand out with higher levels of prescribing for mental health conditions, elevated suicide rates, and poorer behavioural health outcomes, pointing to significant mental health needs. Dundee City,

in particular, demonstrates compounded challenges, including the second highest smoking prevalence, the greatest burden of alcohol-related hospital admissions, and lower levels of healthy weight in children, which may contribute to long-term health inequalities.

Table 20.9: Mental health and lifestyle factors

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
Mental health													
Adult mental wellbeing score (higher is better) (Mean score on the Warwick-Edinburgh Wellbeing Scale, WEMWBS)	2021 – 2024	48.6	49.0	49.0	49.3	46.6	48.4	48.9	48.7	49.7	49.7	49.4	48.4
Deaths from suicide (16+ years) (per 100,00)	2020 – 2024	15.1	19.8	14.4	13.2	24.0	16.2	17.3	20.2	21.0	20.0	17.2	16.8
% Population prescribed drugs for anxiety/depression/psychosis	2023/24	18.0	22.3	17.4	16.9	22.9	19.9	22.2	19.1	20.0	19.1	21.5	20.9
Lifestyle and behavioural risk factors													
% Child healthy weight in primary 1	2023/24	78.9	71.7	77.3	80.8	74.3	78.4	74.7	74.9	77.7	75.6	78.1	76.5
% Smoking prevalence ages 16+	2019 – 2023	14	19	15	13	17	9	16	13	14	9	14	15
Alcohol-related hospital admissions	2023/24	255.5	441.6	538.5	451.1	764.9	337.0	696.7	455.9	319.9	440.3	273.0	548.5
Legend													
		Better than the national average											

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
		Worse than the national average											
		Same as the national average											

20.7.5 Employment and deprivation

Un/Employment

20.7.5.1 The percentage of those aged 16 to 64 who are economically active is generally high across the Regional Study Area and higher (better) than the average for Scotland (76.9%). The percentage for Moray is consistent with the national average. However, Angus (73.3%) and Dundee City (74.2%) perform worse than Scotland.

20.7.5.2 The City of Edinburgh (83.9%), East Lothian (87.9%) and Perth and Kinross (80.8%) report considerably higher (better) percentages of those economically active compared to the national average (76.9%).

20.7.5.3 The percentage of those who are in employment follows a similar pattern. Local authorities perform higher (better) than the national average (74.1%), with the exception of Angus (70.5%), Dundee City (69.6%) and Moray (73.6%) which perform worse.

20.7.5.4 Unemployment rates provide further insight into labour market conditions. In most local authorities the proportion of unemployed individuals remains below the national percentage for Scotland of 3.6%, with the exception of the City of Aberdeen (3.9%), Dundee City (5.3%), and Fife (3.7%).

20.7.5.5 Overall, employment indicators across the Regional Study Area are generally positive, with most local authorities reporting higher (better) levels of economic activity and employment compared to the Scottish average. However, Angus and Dundee City consistently perform worse, with lower economic activity and employment rates and higher unemployment, highlighting areas of labour market vulnerability. In contrast, the City of Edinburgh and East Lothian demonstrate strong performance, suggesting more resilient local economies.

Deprivation and other vulnerabilities

20.7.5.6 The majority of local authorities have a lower (better) percentage of children in low income families compared to the Scottish average of (16.3%), with the exception of Angus (16.8%), Dundee City (18.7%) and Fife (18.0%) which perform higher (worse) than the national average.

20.7.5.7 The proportion of people claiming pension credits (aged over 60) is below the Scottish average of 5.5% for the majority of local authorities in the Regional Study Area, with the exception of Dundee City (7.2%). The percentage of the working-age population claiming out-of-work benefits is below (better) the national average of 10.6% for the majority of local authorities in the Regional Study Area with the exception of Dundee City (14.2%) and Fife (11.2%).

20.7.5.8 Similarly, adults claiming incapacity benefit or severe disability allowance account for 7.8% in Dundee City which is notably higher (worse) than the national average of 6.1%. However, for all other local authorities in the Regional Study Area, the percentage is below (better than) the national average.

Young people and deprivation

20.7.5.9 Looking at deprivation among young people, the proportion living in the most access-deprived quintile (aged 0 to 25 years) across the majority of local authorities is higher (worse) than the national average of 20.9%. The rate is substantially higher (worse) for Aberdeenshire (51.6%) and Highland (51.5%). However, the City of Aberdeen (9.7%), the City of Edinburgh (5.5%), Dundee City (5.3%) and Fife (15.5%) perform lower (better) than the national average (20.9%) on this metric. This largely reflects the rurality of the different local authorities, with more rural areas having higher access deprivation.

20.7.5.10 Aberdeenshire and Highland (51.5%) report significantly higher (worse) levels of access deprivation, reflecting rurality and transport challenges, while Dundee City and Edinburgh (5.5%) perform better.

20.7.5.11 In terms of income deprivation among young people, rates range starkly from 2.4% in Aberdeenshire to 36.9% in Dundee City, compared with 19.6% nationally. Dundee City performs markedly worse, indicating concentrated income deprivation among younger populations, while Aberdeenshire and Moray (5.7%) report lower (better) levels.

Summary

20.7.5.12 As shown above and in Table 20.10 below, there are considerable inequalities in employment and deprivation across the local authorities. Most local authorities have economic activity similar or better to the Scotland average, however Dundee City and Fife exhibit lower employment, higher unemployment and higher economic deprivation. Based on this, Dundee City and Fife may be more sensitive to changes in economic conditions or opportunities.

Table 20.10: Un/Employment and deprivation

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
Employment and unemployment													
Economically Active (%)	2024 – 2025	77.7	73.3	78.6	83.9	74.2	87.9	78.1	78.9	76.9	80.8	77.6	76.9
In Employment (%)		74.3	70.5	76.5	83.2	69.6	85.5	75.3	74.5	73.6	77.8	75.8	74.1
Employees (%)		66.0	61.0	70.5	74.6	64.4	75.0	64.8	71.3	67.0	67.0	64.6	65.9
Self Employed (%)		7.9	9.1	3.8	8.3	5.2	10.5	10.4	N/A	6.3	10.2	11.0	7.8
Unemployed (%)		2.5	3.2	3.9	2.5	5.3	3.2	3.7	N/A	2.7	2.5	3.0	3.6
Deprivation and other vulnerabilities													
% Children in low income families	2023/24	9.3	16.8	12.3	12.1	18.7	11.6	18.0	15.2	16.0	13.3	15.9	16.3
% People claiming pension credits, aged >60	2016	2.9	4.0	4.0	3.8	7.2	4.0	4.1	4.2	3.8	3.6	3.9	5.5
% Working age population claiming out-of-work benefits		5.9	9.5	7.9	7.5	14.2	7.6	11.2	8.1	7.6	7.5	8.4	10.6
% Adults claiming incapacity benefit/severe disability allowance		3.2	4.7	4.4	4.7	7.8	4.5	5.8	4.7	4.1	4.2	4.6	6.1

Indicator	Year	Regional											National
		Aberdeenshire	Angus	City of Aberdeen	City of Edinburgh	Dundee City	East Lothian	Fife	Highland	Moray	Perth and Kinross	Scottish Borders	Scotland
% Young people living in the most access-deprived quintile, aged 0-25 years	2023	51.6	31.7	9.7	5.5	5.3	30.4	15.5	51.5	36.2	38.7	32.5	20.9
% Young people living in the most income deprived quintile, aged 0-25 years		2.4	8.3	7.8	11.1	36.9	5.9	20.0	8.5	1.7	5.7	7.1	19.6
Legend													
		Better than the national average											
		Worse than the national average											
		Same as the national average											

20.7.6 Future baseline scenario

20.7.6.1 The EIA Regulations require the following to be included within the EIA Report: "a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort, on the basis of the availability of environmental information and scientific knowledge."

20.7.6.2 In the event that Morven South does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

20.7.6.3 Population health data presents a snapshot at a particular time. It is well recognised that population health is subject to continuing influences, both at the individual and community level. Influences may be environmental, such as seasonal variation in wellbeing and communicable diseases, they may also respond to socio-economic factors, such as migration and the availability of jobs.

20.7.6.4 Longer term trends and interventions in population health may influence the future baseline. Health and social care, public health initiatives and government policies aim to reduce inequalities and improve quality of life. The historic success of such interventions is increasingly challenged by national trends such as an aging population, rising levels of obesity and the COVID-19 pandemic. The implications of COVID-19 for public health will take years to be reflected within statistical data releases, but it is expected that the pandemic will have exacerbated public health challenges. The pandemic disproportionately affected vulnerable groups, including due to age and ill health.

20.7.6.5 Climate change may also exacerbate physical and mental health risk factors, particularly around flooding and extremes of temperature. The impacts of climate change including extreme temperatures, flooding, increase in atmospheric pollutants and drought are well documented. These noted impacts on the future human health baseline are summarised below and taken into account by the assessment. Without adaptation:

- Heat and cold-related deaths are forecasted to rise in the UK due to climate change and sociodemographic factors. Mortality risk from extreme temperatures rises with age, and despite fewer cold days expected mortality due to moderate cold is projected to increase with the ageing population with heat-related mortality increasing over time (UKHSA, 2023a).
- Flood-affected individuals are prone to adverse health effects including death, injury, increased risk of infectious disease, and mental health effects including depression, anxiety and post-traumatic stress disorder. Increase in flood risk in the UK is largely driven by coastal flooding (UKHSA, 2023b).
- Weather pattern shifts, notably in temperature, rainfall, and wind speed, are anticipated to influence the dispersion and concentration of air pollutants like Particulate Matter (PM) and Ozone (O_3). Implementing climate change mitigation strategies to cut greenhouse gas emissions will aid in lowering air pollution levels, thus enhancing health outcomes. While long-term exposure to $PM_{2.5}$ and NO_2 is forecasted to decrease by around 25% to 37% compared to 2018 levels, localised urban increases in O_3 could heighten health risks (UKHSA, 2023c).
- Climate has a significant impact on infectious diseases, influencing pathogen behaviour, human susceptibility, and transmission periods. Warmer temperatures can expand disease distribution and transmission windows. Weather and climate also play a significant role in influencing the presence and activity of disease-carrying ticks and mosquitoes. Rising temperatures are extending their range and activity periods, affecting the spread of pathogens and their habitats including potential expansion of tick species like the castor bean tick (*Ixodes ricinus)*, which spread Lyme disease and tick-borne encephalitis, and invasive mosquitoes like the Asian tiger mosquito (*Aedes albopictus*), capable of transmitting diseases such as dengue and Zika. Climate change also increases the risk of diseases like West Nile virus in the UK, highlighting the need for collaborative efforts across sectors to address these climate-related public health challenges (UKHSA, 2023d).

- Climate change poses a threat to food supplies, increasing the risk of public health issues as the UK becomes more reliant on climate-vulnerable food-producing countries. This dependence on imports, especially plant-based foods, may lead to shortages of nutritious options and unhealthy dietary changes unless local production is strengthened. While initial benefits like crop diversification and extended growing seasons may occur due to warmer, drier conditions, inadequate adaptation measures could decrease overall yields in the long run. As climate impacts intensify, fluctuations in food imports and prices may make it challenging to access healthy foods and follow dietary guidelines (UKHSA, 2023e).

20.7.6.6 For assessment purposes, the current health baseline is considered a suitable proxy of the future baseline. The current baseline used in this assessment includes appropriate health indicators to reflect the types of health outcomes that would also be relevant for the future population (e.g. in relation to age and long-term conditions). The assessment methodology includes a categorisation of vulnerable population groups, which, for example, allows for the effects of 'older people' and 'people with existing poor health' to be distinguished from the general population. The assessment sensitivity score for each vulnerable group is independent of the population size within that group, which would be the main change between the current and future baseline. The sensitivity scores within the assessment therefore account for both current and future population characteristics.

20.7.6.7 It would not be proportionate (or consistent with the qualitative assessment approach taken) to quantitatively model the population's future health. This reflects the complexities of interactions between the wider determinants of health, as well as the potential for macro-economic changes in the next decade that are hard to predict. Any predication would have such wide error margins that it would greatly limit the value of the exercise. Annual national population health trend forecasting is undertaken as a government public health activity (Department of Health and Social Care, 2023; Office for National Statistics, 2021) and has been taken into account by the health assessment.

20.7.7 Data limitations and assumptions

20.7.7.1 This assessment is based on publicly available statistics and evidence sources. No new primary research or bespoke analysis of non-public data was undertaken for the assessment.

20.7.7.2 The health assessment partially draws from and builds upon, the technical outputs from inter-related technical disciplines set out in paragraph 20.1.1.4.

20.7.7.3 As a consequence, the assumptions and limitations of those assessments also apply to any information used in this chapter. It is, however, considered that the information available provides a suitable basis for assessment.

20.7.7.4 Reducing uncertainty is a key element of impact assessment. While not all uncertainty can be removed, the following steps have been taken to allow confidence in the health assessment conclusions:

- Methods are used that triangulate evidence sources and professional perspectives.
- The scientific literature reviews undertaken give priority to high quality study design, such as systematic reviews and meta-analysis, and strength of evidence.
- Quantitative inputs for other assessments have been used, which included model validation, as described in inter-related technical disciplines set out in paragraph 20.1.1.4.
- The health assessment has been cautious, with conservative assessments, for example in taking account of non-threshold effects (i.e. when there is no known exposure threshold level below which adverse health effects may not occur) and vulnerable group findings.
- The need for monitoring and adaptive management has been considered.
- The health assessment has been transparent in its analysis and follows good practice as set out in guidance referenced in paragraph 20.8.1.1.

20.7.7.5 It is also noted that a number of assumptions were made on the required workforce of Morven South. These are detailed in Volume 2, Chapter 17: Socio-Economics.

20.7.7.6 It is considered that these limitations and assumptions do not affect the robustness of the assessment and that the evidence available is sufficient to reach conclusions as to the LSE[1] of the project on population health.

20.8 Methodology for assessment of effects

20.8.1 Overview

20.8.1.1 The human health assessment of effects has followed the methodology set out in Volume 1, Chapter 6: EIA Methodology. Specific to the human health assessment of effects, the following guidance documents have also been considered:

- Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA)) 2022 guidance on health in EIA series: effective scoping (Pyper, Lamming, *et al.*, 2022) and determining significance (Pyper, Waples, *et al.*, 2022).
- Institute of Public Health (IPH) Guidance, Standalone Health Impact Assessment and health in environmental assessment, 2021 (Institute of Public Health, 2021).
- International Association for Impact Assessment (IAIA) and European Public Health Association. A reference paper on addressing Human Health in EIA (Cave *et al.*, 2020) and academic discussion of the same (Cave *et al.*, 2021).
- Public Health England, Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning (NSIP) Regime (Public Health England, 2021).
- Public Health England, Health Impact Assessment in spatial planning (Public Health England, 2020).
- WHO guidelines on air quality and noise (Berglund *et al.*, 1999; Guski *et al.*, 2017; WHO, 2009; 2021).

20.8.1.2 In addition, the human health assessment of effects has considered the legislative framework as defined by:

- Climate Change (Scotland) Act 2009;
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019;
- Health and Safety at Work etc. Act 1974;

20.8.2 Assessment criteria

20.8.2.1 This section sets out the methods for assessment of any likely significant population health effects of Morven South.

20.8.2.2 The generic approach to the assessment methodology is set out in Volume 1, Chapter 6: EIA Methodology. This section sets how the generic approach is refined to address the specific needs of the EIA health assessment. Namely criteria for sensitivity, magnitude and significance that inform a professional judgement and reasoned conclusion as to the public health implications of Morven South.

20.8.2.3 Regard has been had to the Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be Contained in EIA Reports. The guidelines provide generic definitions for significance but also note that when more specific definitions exist within a specialised factor or topic, these should be used in preference to the generalised definitions. In the case of Human Health, specific definitions are set out by IPH (2021) and IEMA 2022 guidance (Pyper, Lamming, *et al*., 2022; Pyper, Waples, *et al*., 2022).

20.8.2.4 The methodology outlines in this section follows the IEMA (2022) and IPH (2021) guidance, which sets out best practice for the consideration of health in EIA. The IPH guidance was informed by the international consensus publication between impact assessment and public health practitioners, the IAIA/EUPHA Reference Paper (Cave *et al*., 2020).

20.8.2.5 Where significant adverse effects are identified, then mitigation has been proposed to avoid or reduce the effects. Mitigation is secured as part of the Morven South design or development consent. In line with good practice Morven South takes a proportionate approach to identifying opportunities to enhance beneficial population health effects, including for vulnerable groups.

20.8.2.6 Where proportionate, the need for monitoring has been considered, including relevant governance.

Determining effect significance

20.8.2.7 The approach for determining the significance of effects is a two-stage process that involves defining the magnitude of the potential impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 6: EIA Methodology.

20.8.2.8 The assessment of EIA health significance is an informed expert judgement about what is important, desirable or acceptable for public health with regards to changes triggered by Morven South. These judgements are: value-dependant (underpinned by scientific data, but also informed by professional perspectives); and are context-dependent (judgements reflect relevant social, economic and political factors for the population) (European Commission *et al*., 2017).

20.8.2.9 The determination of significance two stages are:

- Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change to consider;
- Secondly, a professional judgement is made as to whether the expected change in a population's health outcomes would be significant in public health terms. This judgement is explained using an evidence-based narrative setting out reasoned conclusions.

20.8.2.10 Table 20.11, Table 20.12, Table 20.13, and Table 20.14 together summarise the assessment methodology that has been adopted. This approach shows how the general EIA methods of using sensitivity and magnitude to inform a judgement of significance, are applied for human health. The approach uses professional judgement, drawing on consistent and transparent criteria for sensitivity and magnitude. It also references relevant contextual evidence to explain what significance means for human health in public health terms.

20.8.2.11 The EIA human health assessment uses qualitative analysis following the IEMA 2022 guidance approach. This draws on qualitative and quantitative inputs from other EIA topic chapters. This reflects the consensus position amongst public health and impact assessment practitioners that qualitative analysis is the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

20.8.2.12 The EIA human health chapter conclusions are both EIA scores, such as major, moderate, minor or negligible; and a narrative explaining this score with reference to evidence, local context and any inequalities.

20.8.2.13 Terms in bold in Table 20.11, Table 20.12 and Table 20.14 indicate terms that qualitatively describe levels within criteria that are discussed across the scoring options. For example, high, moderate, low or very low levels of deprivation. These are the terms from the guidance that are used within the assessment narrative. While a judgement is made based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories.

20.8.2.14 The criteria for defining magnitude in this chapter are outlined in Table 20.11 below.

Table 20.11: Health magnitude methodology criteria

Magnitude of impact	Definition
High	**High** exposure or scale; **long-term** duration; **continuous** frequency; severity predominantly related to **mortality** or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; **majority** of population affected; **permanent** change; **substantial** service quality implications.
Medium	**Low** exposure or **medium** scale; **medium-term** duration; **frequent** events; severity predominantly related to moderate changes in **morbidity** or major change in quality of life; **large minority** of population affected; **gradual** reversal; **small** service quality implications.
Low	**Very low** exposure or **small** scale; **short-term** duration; **occasional** events; severity predominantly related to minor change in **morbidity** or moderate change in quality of life; **small minority** of population affected; **rapid** reversal; **slight** service quality implications.
Negligible	**Negligible** exposure or scale; **very short-term** duration; **one-off** frequency; severity predominantly relates to a minor change in **quality of life**; very few people affected; immediate reversal once activity complete; no service quality implication.

20.8.2.15 The criteria for defining sensitivity in this chapter are outlined in Table 20.12 below.

Table 20.12: Health sensitivity methodology criteria

Value (sensitivity of the receptor)	Description
High	**High** levels of deprivation (including pockets of deprivation); **reliance** on resources shared (between the population and Morven South); existing **wide** inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or **concern**; people who are **prevented** from undertaking daily activities; **dependants**; people with **very poor** health status; and/or people with a **very low** capacity to adapt.
Medium	**Moderate** levels of deprivation; **few alternatives** to shared resources; existing **widening** inequalities between the most and least healthy; a community whose outlook is predominantly **uncertainty** with some concern; people who are **highly limited** from undertaking daily activities; people providing or requiring **a lot of care**; people with **poor** health status; and/or people with a **limited** capacity to adapt.
Low	**Low** levels of deprivation; **many alternatives** to shared resources; existing **narrowing** inequalities between the most and least healthy; a community whose outlook is predominantly **ambivalence** with some concern; people who are **slightly limited** from undertaking daily activities; people providing or requiring **some care**; people with **fair** health status; and/or people with a **high** capacity to adapt.

Value (sensitivity of the receptor)	Description
Very low	**Very low** levels of deprivation; **no** shared resources; existing **narrow** inequalities between the most and least healthy; a community whose outlook is predominantly **support** with some concern; people who are **not limited** from undertaking daily activities; people who are independent (not a carer or dependant); people with **good** health status; and/or people with a **very high** capacity to adapt.

20.8.2.16 The significance of the effect upon human health is determined by correlating the magnitude of the impact and the sensitivity of the receptor. Following IEMA 2022 guidance, a single conclusion on significance is reached that takes into account the sensitivity of both the general population and the vulnerable group population. In this regard the significance conclusion takes into account the potential for health inequalities between these groups. The particular method employed for this assessment is presented in Table 20.13 and Table 20.14.

20.8.2.17 In cases where a range is suggested for the significance of effect, there remains the possibility that this may span the significance threshold (i.e. the range is given as minor to moderate). In such cases the final significance is based upon the expert's professional judgement as to which outcome delineates the most likely effect, with an explanation as to why this is the case.

20.8.2.18 For the purposes of this assessment:

- a level of effect of moderate or more will be considered a 'significant' effect in terms of the EIA Regulations;
- a level of effect of minor or less will be considered 'not significant' in terms of the EIA Regulations.

20.8.2.19 Effects of moderate significance or above are therefore considered important in the decision-making process, while effects of minor significance or less warrant little, if any, weight in the decision-making process.

Table 20.13: Matrix used for the assessment of the significance of the effect

Sensitivity of Receptor	Magnitude of Change			
	Negligible	Low	Medium	High
Very Low	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible or Minor	Minor or Moderate	Moderate or Major	Major

20.8.2.20 The definitions for significance of effect levels are provided in Table 20.14 below:

Table 20.14: Health significance methodology criteria

Category/ Score	Indicative criteria
Major (significant)	The narrative explains that this is significant for public health because (select as appropriate): • Changes, due to Morven South, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity scores), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect. • Change, due to Morven South, could result in a regulatory threshold or statutory standard being crossed (if applicable). • There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from Morven South and changes to health outcomes. • In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by Morven South.
Moderate (significant)	The narrative explains that this is significant for public health because (select as appropriate): • Changes, due to Morven South, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views. • Change, due to Morven South, could result in a regulatory threshold or statutory standard being approached (if applicable). • There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from Morven South and changes to health outcomes. • In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by Morven South.
Minor (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): • Changes, due to Morven South, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders. • Change, due to Morven South, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). • There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a

Category/ Score	Indicative criteria
	suggestive relationship between changes that would result from Morven South and changes to health outcomes. • In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by Morven South.
Negligible (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): • Changes, due to Morven South are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by Morven South having no responses on this issue among stakeholders. • Change, due to Morven South, would not affect a regulatory threshold, statutory standard or guideline (if applicable). • There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from Morven South and changes to health outcomes. • In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by Morven South.

20.8.2.21 Population health effects that are scored major or moderate are considered significant.

20.8.2.22 Ultimately a likely significant health effect is one that should be brought to the attention of the determining authority, as the effect of Morven South is judged to provide, or be contrary to providing, a high level of protection to population health. This may include reasoned conclusions in relation to health protection, health improvement and/or improving services.

20.8.2.23 Where significant adverse effects are identified, mitigation is considered to reduce the significance of such effects. Similarly, enhancements are considered where significant and proportionate opportunities to benefit population health are identified.

Determinants of health, risk factors and health outcomes

20.8.2.24 The chapter uses the WHO definition of health, which states that health is a "state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".

20.8.2.25 The chapter also uses the WHO definition for mental health, which is a "state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 2022).

20.8.2.26 Health and wellbeing are influenced by a range of factors, termed the 'wider determinants of health'. Determinants of health span environmental, social, behavioural, economic and institutional factors. Determinants therefore reflect a mix of influences from society and environment on population and individual health.

20.8.2.27 Impacts of Morven South that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility and exposure.

20.8.2.28 A change in a determinant of health does not equate directly to a change in population health. Rather the change in a determinant alters risk factors for certain health outcomes. The assessment considers the degree and distribution of change in these pathways. The analysis of health pathways focuses on the risk factors and health outcomes that are most relevant to the determinants of health affected by Morven South. As there are both complex and wide-ranging links between determinants

of health, risk factors and health outcomes, it would not be proportionate or informative for an assessment to consider every interaction.

20.8.2.29 Typically, the change in a risk factor may need to be large, sustained and widespread within a population for there to be a significant influence on public health outcomes.

Population health approach and vulnerable groups

20.8.2.30 In line with IEMA (2022) guidance, a population health approach has been taken, informed by discussion of receptors within the other technical chapters of the EIA.

20.8.2.31 For each determinant of health, the human health chapter identifies relevant inequalities through consideration of the differential effect to the 'general population' of the relevant study area and effects to the 'vulnerable population group' of that study area. The vulnerable population group being comprised of relevant sensitivities for that determinant of health. The following population groups have been considered:

- The 'general population' including residents, visitors, workers, service providers, and service users;
- The 'vulnerable group population'.

20.8.2.32 The methods draw on the list of vulnerable population groups set out in the IEMA guide to effective scoping, Table 9.2 in the guide (Pyper, Lamming, *et al*., 2022). The following six broad population groups are used to inform a consistent narrative on potential health inequalities across the assessment.

- **Young age:** Children and young people (including pregnant women and unborn children).
- **Old age:** Older people (particularly frail elderly).
- **Low income:** People on low income, who are economically inactive or unemployed.
- **Poor health:** People with existing poor health; those with existing long-term physical or mental health conditions or disability that substantially affects their ability to carry out normal day-to-day activities.
- **Social disadvantage:** People who suffer discrimination or other social disadvantage, including relevant protected characteristics under the Equality Act 2010 or groups who may experience low social status or social isolation for other reasons.
- **Access and geographical factors:** People experiencing barriers in access to services, amenities and facilities and people living in areas known to exhibit high deprivation or poor economic and/or health indicators.

20.8.2.33 For example, young children are particularly susceptible to air pollution because of their developing lungs, high breathing rates per bodyweight, and amount of time spent exercising outdoors. Other vulnerable groups include people with existing medical conditions (e.g. asthma, type 2 diabetes), the elderly, and pregnant women.

20.8.2.34 People falling into more than one group may be especially sensitive, for example, children with a health condition; children with complex needs and a health condition; and adults with complex needs and/or health condition.

20.8.2.35 The assessment covers these populations within two groups: The general population for the geographic area, notably residents of local authorities in the Regional Study Area (see Section 20.2), and the vulnerable sub-population for this area. The latter is comprised of the vulnerabilities listed above. The differentiation of these two groups allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

20.8.2.36 The following general characterisations of how the 'general population' may differ from 'vulnerable group populations' were considered when scoring sensitivity. These statements are not duplicated

in each assessment and apply (as relevant) to the issues discussed for both construction and operation.

- In terms of life stage, the general population can be characterised as including a high proportion of people who are independent, as well as those who are providing some care. By contrast, the vulnerable group population can be characterised as including a high proportion of people who are providing a lot of care, as well as those who are dependant.
- The general population can be characterised as experiencing low deprivation. However, the professional judgement is that the vulnerable group population experiences high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas).
- The general population can be characterised as broadly comprised of people with good health status. Vulnerable groups, however, tend to include those parts of the population reporting bad or very bad health status.
- The general population tends to include a large majority of people who characterise their day-to-day activities as not limited. The vulnerable group population tends to represent those who rate their day-to-day activities as limited a little or limited a lot.
- Based on a professional judgement the general population's resilience (capacity to adapt to change) can be characterised as high while the vulnerable group population can be characterised as having limited resilience.
- Regarding the usage of affected infrastructure or facilities, the professional judgement is that the general population are more likely to have many alternatives to resources shared with the Morven South (e.g. shared routes or community assets). For the vulnerable group population, the professional judgement is that they are more likely to have a reliance on shared resources.
- The general population includes the proportion of the community whose outlook on Morven South includes support and ambivalence. The vulnerable group population includes the proportion of the community who are uncertain or concerned about Morven South.

Temporal scope

20.8.2.37 The temporal scope of the assessment is consistent with the period over which Morven South will be carried out and therefore covers the construction, operational and decommissioning periods. The temporal duration is expected to be different for each of the phases, with construction and decommissioning, taking around 5 years each, considered temporary, and the O&M phase, which is expected to last for 35 years, considered permanent.

20.8.2.38 With respect to the duration of impacts, the IEMA (Pyper, Waples, *et al*., 2022) terminology has been used as a guide within this assessment. The terms have been defined by this assessment as follows:

- 'Very short-term' relates to effects measured in hours, days or weeks;
- 'Short-term' relates to effects up to 24 months;
- 'Medium-term' relates to effects measured in years from two up to nine years;
- 'Long-term' relates to effects measured in decades (e.g. the long-term effects on health from long-term employment).

20.9 Parameters for assessment

20.9.1 Maximum Design Scenario

20.9.1.1 The human health assessment does not duplicate the Maximum Design Scenarios (MDS) described in the technical chapters that form the basis of the assessment, as laid out in paragraph 20.1.1.4.

20.9.1.2 The MDS described in the other technical chapters are inherent to the assessment for human health. The MDS identified in Table 20.15 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in Volume 1, Chapter 3: Project Description. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details

within the Project Design Envelope (PDE) (e.g. different infrastructure layout), to that assessed here, be taken forward in the final design scheme.

Table 20.15: Maximum Design Scenario considered for the assessment of potential impacts on human health

C= construction, O= O&M, D= decommissioning phases

"✓" is used to denote the phase the potential impact can occur, "X" outlines there is no impact within this project phase

Potential impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
Impact of changes to employment and income on human health	✓	✓	✓	MDS is in relation to: 1) loss or restricted access to commercial fishing grounds. The relevant MDS is as stated in Volume 2, Chapter 12: Commercial Fisheries. 2) construction and decommissioning employment opportunities. The relevant MDS is as stated in Volume 2, Chapter 17: Socio-Economics.	1) The greatest unemployment or adverse economic implications. 2) The smallest worker number and the smallest proportion assumed to be from the regional level.
Impact of changes to climate change and adaptation on human health	×	✓	×	MDS is in relation to renewable energy generation and subsequent reduced greenhouse gas emissions. The relevant MDS is as stated in Volume 2, Chapter 18: Climate Change.	The smallest output contribution to renewable energy generation would be the most conservative basis of assessment for this beneficial effect.
Impact of changes to wider societal infrastructure and resources on human health	×	✓	×	MDS in relation to the electrical power generating capacity associated with Morven South. The relevant MDS is as stated in Volume 2, Chapter 18: Climate Change.	The smallest output contribution to renewable energy generation would be the most conservative basis of assessment for this beneficial effect.

20.10 Designed-in measures and mitigation

20.10.1.1 For the purposes of the EIA process, the term 'designed-in measure' is used to include the following measures (adapted from IEMA, 2016 and IEMA, 2024):

- Measures included as part of the design of Morven South. These include modifications to the location or design of Morven South, which are integrated into the application for consent. These measures are considered standard industry practice for this type of development and are referred to as primary mitigation in IEMA, 2016 and IEMA, 2024.
- Measures required to meet legislative requirements, or actions that are generally standard practice used to manage commonly occurring environmental effects. These measures are secured through the conditions of the marine licences and referred to as tertiary mitigation in IEMA, 2016 and IEMA, 2024.

20.10.1.2 As there is a commitment to implementing these measures, they are considered inherently part of the design of Morven South and have therefore been considered in the assessment presented in Section 20.11 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures).

20.10.1.3 This human health chapter takes as its input, the residual effect conclusions of the inter-related technical disciplines set out in paragraph 20.1.1.4. In this regard the human health assessment relies on the measures adopted as part of Morven South set out in those chapters and does not repeat them. This avoids duplication and keeps the assessment proportionate.

20.10.1.4 Where significant effects have been identified, further mitigation measures (referred to as secondary mitigation in IEMA, 2016 and IEMA 2024) have been identified to reduce the significance of effect to acceptable levels following the initial assessment. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment These measures are set out, where relevant, in Section 20.11 below.

20.11 Assessment of significant effects

20.11.1.1 The potential impacts arising from the construction, O&M and decommissioning phases of Morven South are listed in Table 20.15, along with the MDS against which each impact has been assessed.

20.11.1.2 An assessment of the likely significance of the effects of Morven South on human health receptors caused by each identified impact is given below.

20.11.2 Impact of changes to employment and income on human health

20.11.2.1 The presence and spacing of wind turbines and associated infrastructure within Morven South may lead to health effects associated with changes in economic conditions affecting employment and income, including temporary changes in access to commercial fishing grounds and direct employment associated with Morven South. The MDS is represented by the scenario resulting in the least potential for employment or adverse economic implications and is summarised in Table 20.15.

20.11.2.2 As stated in Section 20.7 changes in direct and indirect employment opportunities are socio-economic determinants that can influence physical and mental wellbeing.

20.11.2.3 The scientific literature identifies the following general points relevant to potential effects and health outcomes. Employment is an important determinant of health and wellbeing both directly and indirectly by making health-promoting resources available to an employee and any dependants. The socio-economic benefits associated with employment are improved living conditions and the potential to make healthier choices, (e.g. eating a healthier diet and undertaking more physical activity). If members of the community are employed, this can also generate indirect economic activity.

20.11.2.4 There is strong evidence for a protective effect of employment on depression and general mental health. Employment has been shown to have favourable effects on depression and psychological distress (van der Noordt *et al*., 2014). Unemployment is associated with poor health outcomes, with more negative health effects linked to lower socio-economic status and unemployment due to health reasons, while a strong social network is beneficial in reducing the health effects of unemployment (Norström *et al*., 2014).

20.11.2.5 This section has been informed by Volume 2, Chapter 17: Socio-Economics and Volume 2, Chapter 12: Commercial Fisheries and measures adopted as part of Morven South.

20.11.2.6 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is changes in direct and indirect jobs and economic activity.
- The pathway is good quality employment and income providing more health supporting resources.
- Receptors are people of working age (and their dependants).

20.11.2.7 Furthermore, the theoretical effect described is considered applicable in the context of Morven South.

20.11.2.8 The population groups relevant to this assessment are:

- The 'regional' population consisting of the local authorities of: Aberdeenshire; Angus; City of Aberdeen; City of Edinburgh; Dundee City; East Lothian; Fife; Highland; Moray; Perth and Kinross; and the Scottish Borders.
- The national populations of Scotland and the UK.
- The sub-population vulnerable due to:
  - young age vulnerability (children and young people who are dependants, as well as young adults early in their careers);
  - old age vulnerability (older people who are dependants);
  - poor health vulnerability (people with existing poor physical and/or mental health, including as dependants);
  - low-income vulnerability (people living in deprivation, including those on low incomes for whom good quality employment may be particularly beneficial);
  - access and geographical vulnerability (people for whom other job opportunities may be limited due to access and geographical limitations).

Construction and decommissioning phases

Magnitude of impact

20.11.2.9 As stated in Volume 2, Chapter 17: Socio-Economics, during construction, the effect of Morven South on employment and Gross Value Added (GVA) is assessed to be minor beneficial for the Scottish economy and negligible beneficial for the UK economy. During decommissioning, the effect of Morven South on employment and GVA for the Scottish and UK economy is assessed as negligible beneficial. No significant secondary socio-economic effects on commercial fisheries, shipping and marine recreation, or visitor behaviour will occur due to Morven South.

20.11.2.10 During construction and decommissioning, Volume 2, Chapter 12: Commercial Fisheries concludes that temporary loss or temporary restricted access to fishing grounds due to construction activities is considered to be a minor adverse effect. The loss of access or exclusion from fishing grounds due to Morven South may lead to increases in fishing effort in other areas that may already be exploited thereby leading to increased pressure and gear conflict; this effect is judged to be minor adverse. The effect of noise and seabed disturbances that may displace commercially important fish is assessed to be minor adverse.

20.11.2.11 In terms of population health, the impact is considered to be of regional spatial extent, medium-term duration, continuous and rapid reversibility. The impact is direct for construction employment opportunities and indirect and small scale for commercial fishing as there will be access to alternative fishing grounds for most commercial fishing. This is likely to relate to minor changes in physical and mental health morbidity associated with employment for a small minority of the population. At most there may be slight healthcare service implications. The magnitude is therefore, considered to be low.

Sensitivity of the receptor

20.11.2.12 Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in Section 20.8.2. This reflects that most people would already be within stable employment that would be unaffected by Morven South (or being a dependant of such a person). The sensitivity of the general population is therefore considered to be low.

20.11.2.13 Vulnerability in this case relates to people and their dependants who are in affected commercial fisheries employment, on low incomes, have poor job security, poor working conditions or who are unemployed. Future young or older people may also come to rely on those employed. The sensitivity of the vulnerable group population is therefore considered to be high.

Significance of the effect

20.11.2.14 Overall, for employment and income health effects, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable population group is considered to be high (the vulnerable population has been considered for sensitivity throughout this assessment, as a conservative worst case).

20.11.2.15 The changes to employment and income associated with some commercial fishing activities within Morven South would have adverse physical and mental health effects (including to dependants). This conclusion is supported by a clear association between employment and health in the scientific literature. Consequently, there may be a small adverse change in localised health baselines where coastal community employment is strongly linked to commercial fishing in the Morven South Boundary. This could be associated with a marginal increase in health inequalities. More generally, the regional and national health baseline change would, at most, be slight; with limited potential to affect the delivery of health policy. Additionally, the changes to direct employment and income associated with construction job opportunities for Morven South would have a beneficial effect. This conclusion reflects that the scientific literature establishes a clear relationship between good quality employment and factors that promote health or are protective against poor health, particularly mental health. The scale and nature of employment could be associated with a slight change to regional health baselines and is not expected to widen or narrow existing health inequalities. As defined in Section 20.8.2, the above impacts relate to a minor rather than moderate effect.

20.11.2.16 The effect will, therefore, be of **minor adverse** and **minor beneficial** significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

20.11.2.17 No mitigation measures for employment and income health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.

Operations and maintenance phase

Magnitude of Impact

20.11.2.18 During the O&M phase, Volume 2, Chapter 17: Socio-Economics concludes the effect of Morven South on employment and GVA is assessed to be negligible beneficial for the Scottish and UK

economy. No significant secondary socio-economic effects on commercial fisheries, shipping and marine recreation, and visitor behaviour will occur due to Morven South.

20.11.2.19 As stated in Volume 2, Chapter 12: Commercial Fisheries, during the O&M phase, reduction in access to, or exclusion from established fishing grounds within Morven South is assessed to be minor adverse. Displacement leading to gear conflict and increased fishing pressure on adjacent grounds is assessed to be minor adverse. Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity is assessed to be minor adverse. Increased vessel traffic associated with Morven South within fishing grounds leading to interference with fishing activity is assessed to be minor adverse.

20.11.2.20 In terms of population health, the impact is considered to be of regional spatial extent, long-term duration, continuous and rapid reversibility. The impact is direct for O&M employment opportunities and indirect and small scale for commercial fishing as there will be access to alternative fishing grounds for most commercial fishing. This is likely to relate to minor changes in physical and mental health morbidity associated with employment for a small minority of the population. At most there may be slight healthcare service implications. The magnitude is therefore, considered to be low.

Sensitivity of the receptor

20.11.2.21 Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in Section 20.8.2. This reflects that most people would already be within stable employment that would be unaffected by Morven South (or being a dependant of such a person). The sensitivity of the general population is therefore considered to be low.

20.11.2.22 Vulnerability in this case relates to people and their dependants who are in affected commercial fisheries related employment, on low incomes, have poor job security, poor working conditions or who are unemployed. Future young or older people may also come to rely on those employed. The sensitivity of the vulnerable group population is therefore considered to be high.

Significance of the effect

20.11.2.23 Overall, for employment and income health effects, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable population group is considered to be high.

20.11.2.24 The changes to employment and income associated with changes to commercial fishing activities within the Morven South Boundary would have adverse physical and mental health effects (including to dependants). This conclusion is supported by a clear association between employment and health in the scientific literature. Consequently, there may be a small adverse change in localised health baselines where coastal community employment is strongly linked to commercial fishing in the Morven South Boundary. This could be associated with a marginal increase in health inequalities. Changes to direct employment and income associated with O&M job opportunities for Morven South would have a beneficial effect, though this would be small within the regional context. More generally the regional and national health baseline change would, at most, be slight; with limited potential to affect the delivery of health policy.

20.11.2.25 The effect will, therefore, be of **minor adverse** and **minor beneficial** significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

20.11.2.26 No mitigation measures for employment and income health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.

20.11.3 Impact of changes to climate change and adaptation on human health

20.11.3.1 Morven South contributes towards wider energy sector transition to renewable energy which reduces the severity of climate change. The MDS is represented by the smallest output contribution to renewable energy generation and is summarised in Table 20.15.

20.11.3.2 Renewable energy generation and subsequent reduced greenhouse gas emissions supports avoiding adverse health effects associated with climate change. These include extreme temperature and climatic effects related to infectious diseases occurrence, food insecurity, injury and death (Costello *et al*., 2009). These effects are relevant to the UK population, but also the global population, particularly deprived populations in LMIC.

20.11.3.3 There are global inequalities in the effects of climate change which are important to recognise, with the greatest adverse effects on health expected in the some of the poorest and least economically developed populations. In contrast, populations that benefit from rapid social and economic development are expected to experience reduced (but not eliminated) adverse effects to health from climate change. Changes in health outcomes related to climate change are therefore expected to be relatively small in the UK. When considering health and wellbeing, there is a global responsibility to reduce the effect of climate-altering pollutants that are expected to reduce health outcomes in LMIC. The Intergovernmental Panel on Climate Change (IPCC) states that there are opportunities to achieve co-benefits from actions that reduce emissions of climate altering pollutants and at the same time improve health (IPCC, 2014).

20.11.3.4 Key health outcomes (globally) relate to heat-related disorders (e.g. heat stress and lower work capacity), respiratory disorders (e.g. worsened asthma), infectious disease, population displacement, water and food insecurity (e.g. lower crop yields) and injury, death and mental stress associated with natural disasters.

20.11.3.5 This section has been informed by Volume 2, Chapter 18: Climate Change, which sets out the relevant assessment.

20.11.3.6 The potential health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- Source: renewable energy generation;
- Pathway: reduction in climate-altering pollutants that contribute to climate change, which is associated with global changes in temperature, crop yields, productivity and disease prevalence;
- Receptor: national and global population, particularly deprived populations in LMIC.

20.11.3.7 Furthermore, the theoretical effect described is considered applicable in the context of Morven South.

20.11.3.8 The population groups relevant to this assessment are:

- The ‘national’ population of Scotland and the wider UK;
- The ‘international’ population for global effects;
- The sub-population vulnerable due to less capacity to adapt to climate change including young and old people, people with low incomes, people with poor health (physical and mental), people experiencing social disadvantage including gender disparities and people with access and geographical vulnerability (such that they may be unable to adopt climate change mitigation strategies).

Operations and maintenance phase

Magnitude of impact

20.11.3.9 Volume 2, Chapter 18: Climate Change concludes (within the "Net whole lifetime greenhouse gas impacts of Morven South" impact):

- Within the context of national policy, the purpose of Morven South is to provide a source of renewable energy, thereby contributing towards UK and Scottish climate change policy goals and associated renewable energy targets (in particular the respective net zero targets). The effect will, therefore, be of beneficial effect.

20.11.3.10 In terms of population health, while the scale of change would be very small within the national energy sector emissions context, the impact is predicted to be of long-term duration and continuous. The health effect likely represents a minor change in the risk of mortality and morbidity linked to a range of health determinants influenced by a changing climate for a large minority of the global population and a small minority of the national population. Relevant effects include population displacement, food insecurity, infectious disease occurrence and exposure to extreme climatic events.

20.11.3.11 The impact is predicted to be of national and international spatial extent affecting the receptor directly and indirectly. The magnitude is therefore, considered to be low.

Sensitivity of the receptor

20.11.3.12 Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in Section 20.8.2. This reflects that UK is a developed economy and has comparatively high resilience and capacity to adapt, so in general the national population can be considered to be of low sensitivity.

20.11.3.13 The sensitivity of the general population is therefore, considered to be low.

20.11.3.14 Adverse effects would be disproportionately experienced by the most vulnerable members and regions of society (globally). Such effects are likely to widen health inequalities. Although the general population in UK are likely able to get support to cope with the effects of climate change, some vulnerable population groups are at greater risk (e.g. people with socio-economic disadvantage or old age making it harder to cope with heatwaves or flooding).

20.11.3.15 The sensitivity of the vulnerable group population is therefore, considered to be high.

Significance of the effect

20.11.3.16 Overall, for climate change and adaptation health effects, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable population group is considered to be high.

20.11.3.17 The scientific literature (Al-Delaimy *et al.*, 2020) supports a causal relationship between climate altering pollutants, climate change and population health outcomes. Although the change due to Morven South would have a very limited change on the global or national health baseline even accounting for long-term inter-generational effects; Morven South makes an influential contribution to delivering national climate change policy, including public health related climate policies. As defined in Section 20.8.2, the above impacts relate to a minor rather than moderate effect.

20.11.3.18 The effect will, therefore, be of **minor beneficial** significance, which is not significant in EIA terms.

Secondary mitigation and residual effect

20.11.3.19 No mitigation measures for climate change and adaptation health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10) is not significant in EIA terms.

20.11.4 Impact of changes to wider societal infrastructure and resources on human health

20.11.4.1 The electricity produced by Morven South would enable many aspects of everyday life that either protect or promote good health. The MDS is represented by the smallest output contribution to renewable energy generation and is summarised in Table 20.15.

20.11.4.2 UK energy security is important for maintaining continuous and affordable electricity which supports many aspects of public health. This includes power to safely cook and refrigerate food, regulate the temperature and lighting of homes and schools, operate health and social care services, maintain economic productivity and employment, and operate technologies that improve quality of life and social support. Sustained interruption of supply or rapid increases in costs would both be expected to result in reductions in health and wellbeing outcomes. Increases in the cost of electricity, particularly in the context of rising costs of living, can cause some people to prioritise essential costs (e.g. food, shelter) over electricity demands (e.g. heating a home).

20.11.4.3 Energy insecurity is a public health concern particularly for vulnerable populations (low-income, children, elderly). It is associated with hazardous exposures, heat stress, cold stress, asthma, chronic disease, poor mental health, parental fear and stigma, family disruption and residential instability (Hernández, 2016). In children, energy insecurity has been shown to affect development, hospitalisation and overall child health (Cook *et al.*, 2008).

20.11.4.4 This section has been informed by Volume 2, Chapter 18: Climate Change, which sets out the relevant assessment.

20.11.4.5 The potential health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- Source: renewable energy generation;
- Pathway: energy security while avoiding climate altering emissions;
- Receptor: population connected to the national power grid.

20.11.4.6 Furthermore, the theoretical effect described is considered applicable in the context of Morven South.

20.11.4.7 The population groups relevant to this assessment are:

- The 'national' population of Scotland, and the wider UK;
- The vulnerable subpopulations including young and old people, people with low income and their dependants, people with poor health or disabilities, people experiencing social disadvantage and people with access and geographical vulnerability.

Operations and maintenance phase

Magnitude of impact

20.11.4.8 Volume 2, Chapter 18: Climate Change concludes (within the "GHG emissions arising from […] the estimated abatement of UK grid emissions" impact):

- Within the context of national policy, the purpose of Morven South is to provide a source of renewable energy, thereby contributing towards UK and Scottish climate change policy goals

and associated renewable energy targets (in particular the respective net zero targets). The effect will, therefore, be of beneficial effect.

20.11.4.9 Morven South generation of renewable electricity would have continuous public health benefits to energy security (subject to weather conditions and maintenance), despite the scale of contribution being relatively small within the national energy generation context. The effects are likely to provide a minor reduction in risks for population mortality (e.g. reducing excess winter deaths) and morbidity of physical and mental health outcomes related to standard of living and access to health supporting infrastructure. Such an effect may extend via the national grid to a small minority of the national population. Such effects may bring slight benefits to healthcare service quality by reducing capacity burdens above.

20.11.4.10 The population health impact is predicted to be of national spatial extent, with direct and indirect effects to population health. The magnitude is therefore, considered to be low.

Sensitivity of the receptor

20.11.4.11 Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in Section 20.8.2. The general population comprise those members of the community in good physical and mental health and with greater resources to respond to the costs of energy or to interruptions in supply.

20.11.4.12 The sensitivity of the general population is therefore, considered to be low.

20.11.4.13 The sub-population on low incomes are more sensitive to energy security and interruption of energy supplies. This is particularly the case for dependants and people in poor health who are at risk during temperature extremes (e.g. heatwaves and cold weather) as well as those accessing healthcare.

20.11.4.14 The sensitivity of the vulnerable group population is therefore considered to be high.

Significance of the effect

20.11.4.15 Overall, for wider societal infrastructure and resources health effects, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable population group is considered to be high.

20.11.4.16 Morven South provides a protective effect on the health baseline and that would be important for public health. This conclusion reflects the scientific literature which establishes a clear association between energy security and health outcomes. Morven South is likely to be marginal to delivering health policy, including in narrowing inequalities that are at risk of widening due to reduced national energy security and rising costs of living. As defined in Section 20.8.2, the above impacts relate to a minor rather than moderate effect.

20.11.4.17 The effect will, therefore, be of **minor beneficial** significance, which is significant in EIA terms.

Secondary mitigation and residual effect

20.11.4.18 No mitigation measures for wider societal infrastructure and resources are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10) is not significant in EIA terms.

20.11.5 Proposed monitoring

20.11.5.1 No further monitoring is proposed for human health. Relevant to the health issues discussed in this chapter, Volume 2, Chapter 17: Socio-Economics sets out monitoring commitments relevant to employment and income.

20.12 Whole project assessment and Cumulative Effects Assessment Methodology

20.12.1 Methodology

20.12.1.1 The Morven Programme comprises four distinct projects: Morven South, Morven North, Morven Hawthorn Pit Grid Connection Project (MHPGC Project), and Morven Branxton Area Grid Connection Project (MBAGC Project).

20.12.1.2 The following assessment scenarios have been considered to identify the LSE[1] of Morven South in combination with other projects on the same receptor, as follows (and summarised in Table 20.16):

- Whole project assessment: to identify the potential impacts associated with Morven South together with each grid connection option in turn, (Scenario 1: MHPGC and Scenario 2: MBAGC Project), each of which would comprise a "Whole Project";
- Morven Programme assessment: to identify potential impacts associated with all four components of the Morven Programme together with relevant third-party projects, plans and activities (Scenario 3);
- Cumulative Effects Assessment (CEA): to identify the potential impacts associated with Morven South together with other relevant projects, plans and activities including other components of the Morven Programme, using a tiered approach (Scenario 4).

20.12.1.3 The whole project assessment and CEA have been undertaken in accordance with the methodology described in Volume 1, Chapter 6: EIA methodology.

Table 20.16: Scenarios to be considered in the Morven South whole project assessment, Morven Programme assessment and Cumulative Effects Assessment for human health

Whole project assessment		Morven Programme assessment (OO and S&N ONLY)	Cumulative Effects Assessment
Scenario 1	**Scenario 2**	**Scenario 3**	**Scenario 4**
Morven South + MHPGC Project	Morven South + MBAGC Project	Morven South + Morven North + MHPGC Project + MBAGC Project	Morven South + Tier 1, Tier 2 and Tier 3 Plans/Projects screened in

20.12.1.4 For the purposes of this human health chapter, Scenarios 1, 2, and 4 have been taken forward for assessment; Scenario 3 has not been included as it is not applicable to this chapter. As discussed in Volume 1, Chapter 6: EIA Methodology, the Morven Programme assessment (Scenario 3) is only required for specific chapters to provide further context to, and to support, the conclusions of the CEA scenario (Scenario 4), in agreement with the relevant stakeholders for these topics. As Scenario 3 does not form the basis of the CEA conclusions, it is considered a supplementary assessment to the CEA scenario (Scenario 4) for these specific topics. The approach to CEA presented in this human health chapter complies with the requirements under the EIA Regulations to assess the LSE[1] on the environment arising from a project cumulatively with other relevant plans, projects and activities, and no supplementary assessment of the Morven Programme (Scenario 3) is required or has been requested by relevant stakeholders with regard to human health.

20.12.1.5 The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 3, Annex 6.1: Cumulative Effects Screening). Each project or plan has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

20.12.1.6 In undertaking the CEA for Morven South, it should be noted that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside Morven South. Therefore, a tiered approach has been adopted, whereby all third-party projects and plans considered have been allocated into 'tiers' reflecting their current stage within the planning and development process. This provides a framework for placing relative weight upon the potential for each project/plan included in the CEA to ultimately be realised, based upon the project/plan's current stage of maturity and certainty in the project/plan's parameters. The tiered approach utilised within the Morven South CEA employs the following tiers:

- Tier 1 assessment – Existing developments either built (operational) or under construction; approved developments awaiting implementation; and permitted/submitted application(s), but not yet determined, plus Morven North.
- Tier 2 assessment – All plans/projects assessed under Tier 1, plus MHPGCP, and plans/projects where a scoping report has been submitted and is in the public domain.
- Tier 3 assessment – All plans/projects assessed under Tier 1 and 2, plus MBAGCP, and plans/projects that are reasonably foreseeable (e.g. projects identified in development plans, projects in other plans and programmes, offshore renewable energy projects that have a Crown Estate Scotland Lease Option Agreement).

20.12.1.7 The specific projects and plans screened into the CEA for human health are outlined in Table 20.17.

20.12.1.8 All impacts considered for the Morven South alone assessment have been taken forward to the whole project and CEA assessment.

Table 20.17: List of other projects and plans considered within the Cumulative Effects Assessment for human health

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
Tier 1						
INTOG: Aspen	Application submitted/Awaiting decision	111	A fast-track FLOW development located in the UK's Central North Sea. Proposed for up to 1,008MW.	-	2032 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Ayre Offshore Wind Farm	Application submitted/Awaiting decision	346	Ayre Offshore Wind Farm is proposed for up to 60 wind turbines at a capacity of 1000MW.	2029 - 2033	2034-2064	Project construction and O&M phases overlap with Morven South construction and O&M phase
Berwick Bank	Consented	34	Berwick Bank Offshore Wind Farm is proposed for up to 307 wind turbines with a capacity of up to 4,100MW.	-	2032 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Berwick Bank Export Cable - Branxton Connection	Consented	52	The Branxton Connection is an offshore export cable connecting Berwick Bank to the coast.	2025 - 2032	2032 - 2065	Project O&M phase overlaps with Morven South construction and O&M phase
Bowdun Offshore Wind Farm - Onshore	Application submitted/Awaiting decision	81	National onshore infrastructure associated with the	2031 - 2034	2035 onwards	Project construction and O&M phases

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
Transmission Infrastructure			proposed Bowdun Offshore Wind Farm including export cable landfall and cable circuits, erection of substation and associated works.			overlap with Morven South construction and O&M phase
Buchan	Application submitted/Awaiting decision	178	Buchan Offshore Wind Farm has a total capacity of 960MW and 60 wind turbines.	-	2033 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Caledonia North Offshore Wind Farm	Application submitted/Pre-construction	195	Caledonia Offshore Wind Farm is proposed for up to 150 wind turbines at a capacity of 2,000MW.	-	2031 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Caledonia South Offshore Wind Farm	Application submitted/Pre-construction	181	Caledonia Offshore Wind Farm is proposed for up to 150 wind turbines at a capacity of 2,000MW.	-	2031 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
INTOG: Cenos	Application submitted/Pre-construction	124	Floating Offshore Windfarm and associated infrastructure. Proposed capacity up to 3MW.	-	2032 onwards	Project O&M phase overlaps with Morven South construction and O&M phase

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
INTOG: Culzean Demo	Under Construction	163	Floating Offshore Windfarm and associated infrastructure. Proposed capacity up to 15MW	-	2026 - 2037	Project O&M phase overlaps with Morven South construction phase
Dogger Bank South (East and West)	Application submitted/Awaiting decision	224	Dogger Bank South Offshore Wind Farm is proposed for up to 200 wind turbines at a capacity of 3GW.	-	2033 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Five Estuaries	Consented	528	Five Estuaries Offshore Wind Farm is proposed for up to 79 wind turbines at a capacity of 353MW.	-	2030 - 2054	Project O&M phase overlaps with Morven South construction and O&M phase
Flex Marine Power Ltd	Under Construction	332	Scottish Tidal Energy Site	-	2025 - 2049	Project O&M phase overlaps with Morven South construction and O&M phase
Forthwind Demonstration Project	Consented	136	Forthwind Offshore Wind Demonstration Project is consented for up to seven wind turbines at a capacity of 54MW.	-	2027-2049	Project O&M phase overlaps with Morven South construction and O&M phase

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
Mona Offshore Wind Project	Consented	350	Mona Offshore Wind Farm is proposed for up to 107 wind turbines at a capacity of 945MW.	-	2030-2026	Project O&M phase overlaps with Morven South construction and O&M phase
Morecambe Offshore Wind Farm	Consented	340	Morecambe Offshore Wind Farm is proposed for up to 40 wind turbines at a capacity of 480MW.	-	2028 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Morven South Offshore Wind Array Project	Consenting/Pre-Construction	n/a	Morven South offshore Wind Array Project is proposed for up to 95 wind turbines at a capacity of 1500MW	2033-2042	2038 onwards	Predicted project construction and O&M phases overlaps with Morven South construction and O&M phases
Muir Mhor Offshore Wind Farm	Application submitted/Awaiting decision	77	Muir Mhor Offshore Wind Farm is proposed for a capacity of 798MW.	2030-2033	2034 onwards	Project construction phase briefly overlaps with Morven South construction phase, and Project O&M phase overlaps with Morven South construction and O&M phases

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
North Falls	Application submitted/Awaiting decision	522	North Falls Offshore Wind Farm is proposed for up to 71 wind turbines at a capacity of 504MW.	-	2030-2054	Project O&M phase overlaps with Morven South construction and O&M phase
Ossian	Application submitted/Awaiting decision	5	The Ossian Floating Wind project is proposed for up to 3,610MW capacity.	2029-2038	2039 onwards	Project construction and O&M phases overlap with Morven South construction and O&M phases
Outer Dowsing	Consented	335	Outer Dowsing Wind Farm is proposed for up to 1500MW capacity with 100 turbines.	-	2030 - 2058	Project O&M phase overlaps with Morven South construction and O&M phase
INTOG: Salamander	Consented	106	Salamander Offshore Wind Farm proposed for capacity up to 100MW	-	2029-2063	Project O&M phase overlaps with Morven South O&M phase
Seagreen 1A	Consented	52	Seagreen 1A Offshore Wind Farm is consented for up to 36 turbines with no maximum generating capacity.	-	2032 - 2046	Project O&M phase overlaps with Morven South O&M phase

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
West of Orkney Wind Farm	Consented	311	West of Orkney Wind Farm is proposed for up to 125 wind turbines at a capacity of 2,000MW.	-	2030-2055	Project O&M phase overlaps with Morven South O&M phase
Tier 2						
Eastern Green Link 5	Consenting/Pre-Construction	4	Scotland to England Green Link 5. Up to 555km in length	2030-2034	-	Project construction phase overlaps with Morven South
Arven	Consenting/Pre-Construction	390	Arven Offshore Wind Farm is proposed for a capacity of 1,800MW.	-	2035-2060	Project O&M phase overlaps with Morven South construction and O&M phase
Bellrock Offshore Wind Farm	Consenting/Pre-Construction	35	Bellrock Floating Offshore Wind Farm is proposed for a capacity of 1,800MW. Up to 132 wind turbines.	-	2031 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Broadshore	Consenting/Pre-Construction	174	The BroadShore Offshore Wind Farm is proposed for a capacity of 900MW.	-	2030 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Bowdun	Consenting/Pre-Construction	44	Bowdun Offshore Wind Farm is proposed for up to	2029-2033	2034-2064	Project construction phase briefly overlaps with

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
			67 wind turbines at a capacity of 1,008MW.			Morven South construction phase, and Project O&M phase overlaps with Morven South O&M phase
Dogger Bank D	Consenting/Pre-Construction	214	Dogger D is proposed for a capacity of 2,000MW.	-	2036 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
MarramWind	Consenting/Pre-Construction	150	Marram Offshore Wind Farm is proposed for up to 150 wind turbines at a capacity of 3,000MW.	-	2030-2054	Project O&M phase overlaps with Morven South construction and O&M phase
Machairwind	Consenting/Pre-Construction	346	MachairWind Offshore Wind Farm is proposed for up to 100 wind turbines at a capacity of 2000MW.	-	2033 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
INTOG: Scaraben	Consenting/Pre-Construction	177	INTOG site 2 is proposed for up to 99.45MW	-	2032-2055	Project O&M phase overlaps with Morven South construction and O&M phase

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
ScotWind 1, Site 18: Arven	Consenting/Pre-Construction	388	Floating Project is proposed for up to 500MW capacity.	-	2037-2062	Project O&M phase overlaps with Morven South construction and O&M phase
ScotWind 1, Site 15: Talisk Offshore Wind:	Consenting/Pre-Construction	403	Floating Project is proposed for up to 495MW capacity.	-	2032 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Stromar	Consenting/Pre-Construction	208	Stromer Floating Offshore Wind Project is proposed for up to 1,000MW capacity.	-	2034 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Morven Hawthorn Pit Grid Connection Project	Consenting/Pre-Construction	0	Potential cable route of Morven North or Morven South.	Unknown	Unknown	Unknown. Project construction phase, O&M and decommissioning phases may overlap with Morven South construction, O&M and decommissioning phases.
Tier 3						
Havbredey	Consenting/Pre-Construction	361	Havbredey Offshore Wind Farm is proposed for up to 108 wind turbines at	-	2036 onwards	Project O&M phase overlaps with Morven South

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
			a capacity of 1,500MW.			construction and O&M phase
INTOG: Sinclair	Consenting/Pre-Construction	181	INTOG site 1 is proposed for up to 99.45MW	-	-	-
INTOG: Flora	Consenting/Pre-Construction	94	INTOG site 4 is proposed for up to 50MW	-	-	-
INTOG: Malin Sea Wind	Consenting/Pre-Construction	376	INTOG site 5 is proposed for up to 100MW	-	-	-
INTOG: Beech	Consenting/Pre-Construction	189	INTOG site 9 is proposed for up to 1,008MW	-	2028 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
INTOG: Cedar	Consenting/Pre-Construction	85	INTOG site 10 is proposed for up to 1,008MW	-	2028 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
INTOG: HE South (Judy)	Consenting/Pre-Construction	163	INTOG site 13 is proposed for up to 15MW	-	-	-
Northland Mhairi Offshore Wind Farm	Consenting/Pre-Construction	361	Mhairi Offshore Wind Farm is proposed for a capacity of 1,500MW.	-	-	-

Project/plan	Status	Distance from Morven South (km)	Description of project/plan	Estimated dates of construction (If applicable)	Estimated dates of operation (If applicable)	Overlap with Morven South
ScotWind 1, Site 13: Offshore Wind Power Fixed (west of Orkney)	Consenting/Pre-Construction	311	Project is proposed for up to 2,000MW capacity.	-	2031-2061	Project O&M phase overlaps with Morven South construction and O&M phase
ScotWind 1, Site 20: ESB Asset Development: Stoura	Consenting/Pre-Construction	420	Floating Project is proposed for up to 500MW capacity.	-	-	-
Northland Sheena Offshore Wind Farm (Spiorad na mara)	Consenting/Pre-Construction	398	Sheena Offshore Wind Project is proposed for up to 840MW capacity.	-	2031 onwards	Project O&M phase overlaps with Morven South construction and O&M phase
Morven Branxton Area Grid Connection Project	In Planning	0	Potential cable route of Morven North and Morven South.	-	-	N/A

20.12.2 Maximum Design Scenario

20.12.2.1 The cumulative MDSs identified in Table 20.18 have been selected as those having the potential to result in the greatest potential cumulative effect on an identified receptor or receptor group. The cumulative MDSs have been based on the Morven South alone assessment MDS (Table 20.15), as well as publicly available information on other third-party projects and plans that have been screened into the CEA (Table 20.17). Where applicable, the Morven North alone assessment MDS, the Project Description contained within the MHPGC Project Scoping Report and project information available for MBAGC Project have also informed the cumulative MDSs outlined in Table 20.18.

Table 20.18: Maximum Design Scenario considered for the assessment of potential whole project and cumulative effects on human health

C= Construction, O= Operations and maintenance, D= Decommissioning phases

"✓" is used to denote the phase the potential effect can occur, "X" outlines there is no effect within this project phase

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
Impact of changes to employment and income on human health	✓	✓	✓	Scenario 1 MDS as described for Morven South (Table 20.15), assessed cumulatively with MHPGC Project. Scenario 2 MDS as described for Morven South (Table 20.15), assessed cumulatively with MBAGC Project. Scenario 4 MDS as described for Morven South (Table 20.15), assessed cumulatively with the following other projects and plans: Tier 1 • INTOG: Aspen • Ayre Offshore Wind Farm • Berwick Bank • Berwick Bank Export Cable - Branxton Connection • Bowdun Offshore Wind Farm - Onshore Transmission Infrastructure • Buchan • Caledonia North Offshore Wind Farm • Caledonia South Offshore Wind Farm • INTOG: Cenos • INTOG: Culzean Demo • Dogger Bank South (East and West) • Five Estuaries • Flex Marine Power Ltd	Outcome of the CEA will be greatest when the activities of other projects and plans occur within the same commercial fishing grounds creating the greatest restriction on commercial fishing activities; and also when the workforce of other projects and plans is the least possible number and the lowest proportion assumed to be from the regional level, creating the lowest potential employment opportunities.

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• Forthwind Demonstration Project • Mona Offshore Wind Project • Morecambe Offshore Wind Farm • Morven North Offshore Wind Array Project • Muir Mhor Offshore Wind Farm • North Falls • Ossian • Outer Dowsing • INTOG: Salamander • Seagreen 1A • West of Orkney Wind Farm Tier 2 • Eastern Green Link 5 • Arven • Bellrock Offshore Wind Farm • Broadshore • Bowdun • Dogger Bank D • MarramWind • Machairwind • INTOG: Scaraben • ScotWind 1, Site 18: Arven • ScotWind 1, Site 15: Talisk Offshore Wind: • Stromar • Morven Hawthorn Pit Grid Connection Project Tier 3	

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• Havbredey • INTOG: Sinclair • INTOG: Flora • INTOG: Malin Sea Wind • INTOG: Beech • INTOG: Cedar • INTOG: HE South (Judy) • Northland Mhairi Offshore Wind Farm • ScotWind 1, Site 13: Offshore Wind Power Fixed (west of Orkney) • ScotWind 1, Site 20: ESB Asset Development: Stoura • Northland Sheena Offshore Wind Farm (Spiorad na mara) • Morven Branxton Area Grid Connection Project	
Impact of climate change and adaptation on human health	×	✓	×	Scenario 1 MDS as described for Morven South (Table 20.15), assessed cumulatively with MHPGC Project. Scenario 2 MDS as described for Morven South (Table 20.15), assessed cumulatively with MBAGC Project. Scenario 4 MDS as described for Morven South (Table 20.15), assessed cumulatively with all OWF developments and transmission infrastructure in Tiers 1, 2 and 3.	Outcome of the CEA will be greatest when the lowest number of other renewable energy projects and plans will get consented to operation stage, and operate at minimum capacity; creating the lowest opportunity for renewable energy generation and reduction of greenhouse gas emissions.

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
Impact of changes to wider societal infrastructure and resources on human health	×	✓	×	Scenario 1 MDS as described for Morven South (Table 20.15), assessed cumulatively with MHPGC Project. Scenario 2 MDS as described for Morven South (Table 20.15), assessed cumulatively with MBAGC Project. Scenario 4 MDS as described for Morven South (Table 20.15), assessed cumulatively with the following other projects and plans: Tier 1 • INTOG: Aspen • Ayre Offshore Wind Farm • Berwick Bank • Berwick Bank Export Cable - Branxton Connection • Bowdun Offshore Wind Farm - Onshore Transmission Infrastructure • Buchan • Caledonia North Offshore Wind Farm • Caledonia South Offshore Wind Farm • INTOG: Cenos • INTOG: Culzean Demo • Dogger Bank South (East and West) • Five Estuaries • Flex Marine Power Ltd • Forthwind Demonstration Project • Mona Offshore Wind Project • Morecambe Offshore Wind Farm • Morven North Offshore Wind Array Project	Outcome of the CEA will be greatest when the lowest number of other renewable energy projects and plans will get consented to operation stage and operate at minimum capacity; creating the lowest opportunity for renewable energy generation and subsequent improvement of local and national energy security.

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• Muir Mhor Offshore Wind Farm • North Falls • Ossian • Outer Dowsing • INTOG: Salamander • Seagreen 1A • West of Orkney Wind Farm Tier 2 • Eastern Green Link 5 • Arven • Bellrock Offshore Wind Farm • Broadshore • Bowdun • Dogger Bank D • MarramWind • Machairwind • INTOG: Scaraben • ScotWind 1, Site 18: Arven • ScotWind 1, Site 15: Talisk Offshore Wind: • Stromar • Morven Hawthorn Pit Grid Connection Project Tier 3 • Havbredey • INTOG: Sinclair • INTOG: Flora • INTOG: Malin Sea Wind	

Potential cumulative effect	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• INTOG: Beech • INTOG: Cedar • INTOG: HE South (Judy) • Northland Mhairi Offshore Wind Farm • ScotWind 1, Site 13: Offshore Wind Power Fixed (west of Orkney) • ScotWind 1, Site 20: ESB Asset Development: Stoura • Northland Sheena Offshore Wind Farm (Spiorad na mara) • Morven Branxton Area Grid Connection Project.	

20.13 Whole project assessment and Cumulative Effects Assessment

20.13.1 Overview

20.13.1.1 A description of the significance of whole project and cumulative effects upon human health receptors arising from each identified impact is given below. The whole project assessment and CEA for Morven South is presented in Table 20.19 to Table 20.22.

20.13.1.2 The human health whole project study area for Morven South differs from the Morven South alone assessment study area described in section 20.2 as it includes the Morven South Human Health Study Area as well as the receptors relevant to the MHPGC Project (in Scenario 1) and the MBAGC Project (in Scenario 2). The human health cumulative study area for Morven South includes these components, as well as the study areas defined by the EIA chapters that inform the human health assessment in relation to the relevant projects/plans identified for Scenario 4 (see Table 20.18).

Impact of changes to employment and income on human health

20.13.1.3 The summary of the whole project assessment for impact of changes to employment and income on human health is presented in Table 20.19 and CEA for impact of changes to employment and income on human health is presented in Table 20.20.

Table 20.19: Morven South whole project assessment for effect of changes to employment and income on human health

	Whole project assessment	
	Scenario 1: Morven South + MHPGC Project	**Scenario 2: Morven South + MBAGC Project**
Construction phase		
Magnitude of impact	The whole project assessment for Scenario 1 considers Morven South together with MHPGC Project. As stated in Volume 2, Chapter 17: Socio-Economics, the impact on construction employment opportunities from Morven South and the MHPGC Project will remain the same as the impact magnitude assessed for the Morven South alone assessment: which is medium for Scotland and negligible for the UK. As stated in Volume 2, Chapter 12: Commercial Fisheries, the temporary loss or restricted access to fishing grounds due to construction activities from Morven South and the MHPGC Project, will remain the same as the impact magnitude assessed for Morven South alone. The whole project impact on population health is predicted to be of regional spatial extent, medium term duration, continuous and rapid reversibility. It is predicted that the impact will affect the receptor directly for construction employment opportunities and indirectly on a small scale for disruption in access to fishing grounds. The magnitude is therefore, considered to be low.	The whole project assessment for Scenario 2 considers Morven South together with MBAGC Project. Given the lack of publicly available parameters for the MBAGC Project, but its similarity in nature to the MHPGC Project, the magnitude of impact for Scenario 2 is as provided in the column for Scenario 1.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.	
Significance of effect	Overall, the magnitude of the Whole Project impact is deemed to be low and the sensitivity of the receptor is considered to be high. The Whole Project effect will, therefore, be of **minor beneficial** (construction employment) and **minor adverse** (disruption in access to fishing grounds) significance, which is not significant in EIA terms.	Overall, the magnitude of the Whole Project impact is deemed to be low and the sensitivity of the receptor is considered to be high. The Whole Project effect will, therefore, be of **minor beneficial** (construction employment) and **minor adverse** (disruption in access to fishing grounds) significance, which is not significant in EIA terms.
Further mitigation and	No mitigation measures for employment and income health effects are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.	

	Whole project assessment	
	Scenario 1: Morven South + MHPGC Project	**Scenario 2: Morven South + MBAGC Project**
residual significance		
Operations and maintenance phase		
Magnitude of impact	As stated in Volume 2, Chapter 17: Socio-Economics, the magnitude of impact from operational employment opportunities from Morven South and the MHPGC Project will remain the same as the impact magnitude assessed for the Morven South alone assessment, which is negligible for both Scotland and the UK. As stated in Volume 2, Chapter 12: Commercial Fisheries, the operation of Morven South and the MHPGC Project is not anticipated to cumulatively raise the impact magnitude assessed for Morven South alone, in terms of effect on access to fishing grounds. This is based on the assumption that fishing will be possible within Morven South and the MHPGC Project during operation, due to wind turbine spacing and layout. The whole project impact on population health is predicted to be of regional spatial extent, long-term duration, continuous and rapid reversibility. It is predicted that the impact will affect the receptor directly for operational employment opportunities and indirectly on a small scale for access to fishing grounds. The magnitude is therefore, considered to be low.	Given the lack of publicly available parameters for the MBAGC Project, but its similarity in nature to the MHPGC Project, the magnitude of impact for Scenario 2 is as provided in the column for Scenario 1.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.	
Significance of effect	Overall, the magnitude of the Whole Project impact is deemed to be low and the sensitivity of the receptor is considered to be high. The Whole Project effect will, therefore, be of **minor beneficial** (operational employment) and **minor adverse** (access to fishing grounds) significance, which is not significant in EIA terms.	Overall, the magnitude of the Whole Project impact is deemed to be low and the sensitivity of the receptor is considered to be high. The Whole Project effect will, therefore, be of **minor beneficial** (operational employment) and **minor adverse** (access to fishing grounds) significance, which is not significant in EIA terms.
Further mitigation and	No mitigation measures for employment and income health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.	

	Whole project assessment	
	Scenario 1: Morven South + MHPGC Project	**Scenario 2: Morven South + MBAGC Project**
residual significance		
Decommissioning phase		
Magnitude of impact	The magnitude of impact during decommissioning is the same or similar to that assessed during construction. The whole project impact on population health is predicted to be of regional spatial extent, medium term duration, continuous and rapid reversibility. It is predicted that the impact will affect the receptor directly for decommissioning employment opportunities and indirectly on a small scale for disruption in access to fishing grounds. The magnitude is therefore, considered to be low.	Given the lack of publicly available parameters for the MBAGC Project, but its similarity in nature to the MHPGC Project, the magnitude of impact for Scenario 2 is as provided in the column for Scenario 1.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.	
Significance of effect	The significance of effect during decommissioning is the same or similar to that assessed during construction. Overall, the magnitude of the Whole Project impact is deemed to be low and the sensitivity of the receptor is considered to be high. The Whole Project effect will, therefore, be of **minor beneficial** (decommissioning employment) and **minor adverse** (disruption in access to fishing grounds) significance, which is not significant in EIA terms.	The significance of effect during decommissioning is the same or similar to that assessed during construction. Overall, the magnitude of the Whole Project impact is deemed to be low and the sensitivity of the receptor is considered to be high. The Whole Project effect will, therefore, be of **minor beneficial** (decommissioning employment) and **minor adverse** (disruption in access to fishing grounds) significance, which is not significant in EIA terms.
Further mitigation and residual significance	No mitigation measures for employment and income health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.	

Table 20.20: Morven South Cumulative Effects Assessment for impact of changes to employment and income on human health

	Cumulative Effects Assessment
	Scenario 4: Morven South and Tier 1, Tier 2 and Tier 3 Projects
Construction phase	
Magnitude of Impact	The CEA for Scenario 4 considers Morven South together with the Tier 1, Tier 2 and Tier 3 projects below. Tier 1 includes: • INTOG: Aspen; • Berwick Bank; • Buchan; • Caledonia North Offshore Wind Farm; • Caledonia South Offshore Wind Farm; • INTOG: Cenos; • INTOG: Culzean Demo; • Dogger Bank South (East and West); • Five Estuaries; • Forthwind Demonstration Project; • Mona Offshore Wind Project; • Morecambe Offshore Wind Farm; • Morgan Offshore Wind Project; • Morven North Offshore Wind Array Project; • Muir Mhor Offshore Wind Farm; • Ossian; • INTOG: Salamander; • West of Orkney Wind Farm. Tier 2 includes: • Eastern Green Link 5; • Arven;

	Cumulative Effects Assessment
	• Ayre Offshore Wind Farm; • Bellrock Offshore Wind Farm; • Broadshore; • Bowdun; • CampionWind; • Dogger Bank D; • MarramWind; • Machairwind; • North Falls; • INTOG: Scaraben; • ScotWind 1, Site 18: Arven; • ScotWind 1, Site 15: Talisk Offshore Wind; • Stromar; • Morven Hawthorn Pit Grid Connection Project. Tier 3 includes: • Havbredey; • INTOG: Sinclair; • INTOG: Flora; • INTOG: Malin Sea Wind; • INTOG: Beech; • INTOG: Cedar; • INTOG: HE South (Judy); • Northland Mhairi Offshore Wind Farm; • ScotWind 1, Site 13: Offshore Wind Power Fixed (west of Orkney); • ScotWind 1, Site 20: ESB Asset Development: Stoura; • Northland Sheena Offshore Wind Farm (Spiorad na mara); • Morven Branxton Area Grid Connection Project.

	Cumulative Effects Assessment
	As stated in Volume 2, Chapter 17: Socio-Economics, the magnitude of impact related to increased offshore wind supply chain is considered to be medium in Scotland and negligible in the UK. Due to there being a number of OWF developments proposed off the east coast of Scotland, it is anticipated that cumulatively these will result in an increased number of construction employment opportunities. However, given the scale and spatial extent of the Tier 1, Tier 2 and Tier 3 projects identified above, the impact on construction employment opportunities from Morven South together with the Tier 1, Tier 2 and Tier 3 will remain the same as the impact magnitude assessed for the Morven South alone assessment, both for Scotland and the UK. As stated in Volume 2, Chapter 12: Commercial Fisheries, the temporary loss or restricted access to fishing grounds due to construction activities from Morven South together with the Tier 1 projects listed above, will remain of a similar magnitude as that assessed for Morven South alone. However, this is anticipated to increase to a medium magnitude when including Tier 2 and Tier 3 projects. In terms of population health, the spatial extent of impacts remain regional (rather than international), and a smaller number of OWF projects are included in Tier 1, Tier 2 and Tier 3 projects listed above. Additionally, although income will be directly impacted, as stated in Volume 2, Chapter 12: Commercial Fisheries, the commercial fisheries sector has adapted to the presence and construction of OWF in the area, and are able to change fishing practices temporarily to avoid construction areas and find alternative fishing grounds. It is also assumed that Tier 2 and Tier 3 projects will implement appropriate mitigation measures to minimise adverse impacts. Therefore, it is anticipated that the impact magnitude from the temporary loss or restricted access to fishing grounds due to construction activities from Morven South and the Tier 1, Tier 2 and Tier 3 projects listed above, will remain of a similar magnitude as that assessed for Morven South alone. The cumulative effect is predicted to be of regional spatial extent, medium term duration, continuous and rapid reversibility. It is predicted that the impact will affect the receptor directly for construction employment opportunities and indirectly on a small scale for disruption in access to fishing grounds. The magnitude is therefore, considered to be low.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.
Significance of effect	Tier 1, Tier 2 and Tier 3: Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be high. The cumulative effect will, therefore, be of **minor beneficial** (construction employment) and **minor adverse** (disruption in access to fishing grounds) significance, which is not significant in EIA terms.
Further mitigation and residual significance	No mitigation measures for employment and income health effects are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.
Operations and maintenance phase	

	Cumulative Effects Assessment
Magnitude of impact	In terms of employment opportunities during the operations and maintenance phase, while there will be an increase in employment opportunities when considering Morven South together with the Tier 1, Tier 2 and Tier 3 projects listed in the construction section, due to the scale and spatial extent of these projects, the cumulative impact is not anticipated to be of a greater magnitude than that assessed within the human health assessment for Morven South alone (low). In terms of access to commercial fishing grounds and the indirect impact on employment and income, as stated in Volume 2, Chapter 12: Commercial Fisheries, the commercial fisheries sector will continue to adapt to the presence of OWF in fishing grounds, and are able to carry out active fishing within operational OWFs. The cumulative impact is therefore not anticipated to be of a greater magnitude than that assessed for Morven South alone. The cumulative effect is predicted to be of regional spatial extent, long-term duration, continuous and rapid reversibility. It is predicted that the impact will affect the receptor directly for operational employment opportunities and indirectly on a small scale for access to fishing grounds. The magnitude is therefore, considered to be low.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.
Significance of effect	Tier 1, Tier 2 and Tier 3: Overall, the magnitude of the cumulative effect is deemed to be low and the sensitivity of the receptor is considered to be high. The cumulative effect will, therefore, be of **minor beneficial** (operational employment) and **minor adverse** (access to fishing grounds) significance, which is not significant in EIA terms.
Further mitigation and residual significance	No mitigation measures for employment and income health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.
Decommissioning phase	
Magnitude of impact	The magnitude of impact during decommissioning is the same or similar to that assessed during construction. The cumulative effect is predicted to be of regional spatial extent, medium term duration, continuous and rapid reversibility. It is predicted that the impact will affect the receptor directly for decommissioning employment opportunities and indirectly on a small scale for disruption in access to fishing grounds. The magnitude is therefore, considered to be low.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.

	Cumulative Effects Assessment
Significance of effect	The significance of effect during decommissioning is the same or similar to that assessed during construction. Tier 1, Tier 2 and Tier 3: Overall, the magnitude of the cumulative impact is deemed to be low and the sensitivity of the receptor is considered to be high. The cumulative effect will, therefore, be of **minor beneficial** (decommissioning employment) and **minor adverse** (disruption in access to fishing grounds) significance, which is not significant in EIA terms.
Further mitigation and residual significance	No mitigation measures for employment and income health impacts are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.

Impact of climate change and adaptation on human health

20.13.1.4 The whole project assessment for Scenario 1 considers Morven South together with MHPGC Project, and Scenario 2 considers Morven South together with MBAGC Project. However, the operational impact of Morven South and the MHPGC Project as a source of renewable energy that will contribute towards Scottish and UK climate change policy goals, and associated public health effects of mitigating climate change, are anticipated to be the same as the impact magnitude assessed for the Morven South alone assessment. This is due to the fact that the MHPGC Project will not generate any energy itself. This is also the case for the operational impact of Morven South and MBAGC Project. Therefore, Scenario 1 and 2 have been screened out of the climate change and adaptation health impact.

20.13.1.5 The CEA for climate change and adaptation health impact is presented in Table 20.21.

Table 20.21: Morven South cumulative Effects Assessment for the impact of changes to climate change and adaptation on human health

	Cumulative Effects Assessment
	Scenario 4: Morven South and Tier 1, Tier 2 and Tier 3 Projects
Operations and maintenance phase	
Magnitude of impact	In alignment with the methodology stated in Chapter 18: Climate Change, it is noted that all developments that avoid or sequester greenhouse gases (GHGs) have the potential to affect atmospheric mass of GHGs, and therefore have a combined contribution to reducing the severity of climate change. Best practice for assessing cumulative climate change effects therefore considers atmospheric mass of GHGs as a high sensitivity receptor rather than considering the cumulative effects of individual projects. Morven South in combination with other OWF developments, including those identified in the Tier 1, Tier 2 and Tier 3 projects listed in Table 20.17, will contribute towards wider energy sector transition to renewable energy which is expected to reduce the severity of climate change. In this sense, the cumulative contribution across these projects is greater than that of Morven South alone. However, because atmospheric GHG mass is a global rather than a localised receptor, the true cumulative effect is effectively inclusive of *all* renewable energy developments currently being consented or constructed, and indeed extends beyond this sector. A cumulative assessment on this global scale is beyond the scope of a project-level EIA. Therefore, while the cumulative contribution across relevant developments is inherently greater, the magnitude of impact is conservatively assessed as unchanged from that of Morven South alone, reflecting the methodological approach in which atmospheric GHG mass is treated as a single global receptor rather than through project-specific aggregation. Accordingly, the cumulative effect is predicted to be of national and international spatial extent, long-term duration, continuous and gradual reversibility. It is predicted that the impact will affect the receptor indirectly. Given the contribution of Morven South, even in combination with other projects assessed as part of Scenario 4, is not of a scale large enough to produce a higher magnitude of change than that of Morven South alone (due to its global reach), the magnitude is therefore considered to be low.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South Morven South alone assessment: low for the general population and high for the vulnerable population.
Significance of effect	Overall, the magnitude of the cumulative impact is deemed to be low and the sensitivity of the receptor is considered to be high. The cumulative effect will, therefore, be of **minor beneficial** significance, which is not significant in EIA terms.
Further mitigation and residual significance	No mitigation measures for climate change and adaptation health effects are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is not significant in EIA terms.

Impact of changes to wider societal infrastructure and resources on human health

20.13.1.6 The whole project assessment for Scenario 1 considers Morven South together with MHPGC Project, and Scenario 2 considers Morven South together with MBAGC Project. However, the operational impact of Morven South and the MHPGC Project as a source of renewable energy that will contribute towards Scottish and UK energy security and result in associated public health impacts described in section 20.11.4, are anticipated to be the same as the impact magnitude assessed for the Morven South alone assessment. This is due to the fact that the MHPGC Project will not generate any energy itself. This is also the case for the operational impact of Morven South and MBAGC Project. Therefore, Scenario 1 and 2 have been screened out of the wider societal infrastructure and resources health impact.

20.13.1.7 The CEA for the impact of changes to wider societal infrastructure and resources on human health is presented in Table 20.22.

Table 20.22: Morven South cumulative Effects Assessment for the impact of changes to wider societal infrastructure and resources on human health

	Cumulative Effects Assessment
	Scenario 4: Morven South and Tier 1, Tier 2 and Tier 3 Projects
Operations and maintenance phase	
Magnitude of impact	The CEA for Scenario 4 considers Morven South together with the Tier 1, Tier 2 and Tier 3 projects below. Tier 1 includes: • INTOG: Aspen; • Berwick Bank; • Buchan; • Caledonia North Offshore Wind Farm; • Caledonia South Offshore Wind Farm; • INTOG: Cenos; • INTOG: Culzean Demo; • Dogger Bank South (East and West); • Five Estuaries; • Forthwind Demonstration Project; • Mona Offshore Wind Project; • Morecambe Offshore Wind Farm; • Morgan Offshore Wind Project; • Morven North Offshore Wind Array Project; • Muir Mhor Offshore Wind Farm; • Ossian; • INTOG: Salamander; • West of Orkney Wind Farm. Tier 2 includes: • Eastern Green Link 5;

	Cumulative Effects Assessment
	• Arven; • Ayre Offshore Wind Farm; • Bellrock Offshore Wind Farm; • Broadshore; • Bowdun; • CampionWind; • Dogger Bank D; • MarramWind; • Machairwind; • North Falls; • INTOG: Scaraben; • ScotWind 1, Site 18: Arven; • ScotWind 1, Site 15: Talisk Offshore Wind; • Stromar; • Morven Hawthorn Pit Grid Connection Project. Tier 3 includes: • Havbredey; • INTOG: Sinclair; • INTOG: Flora; • INTOG: Malin Sea Wind; • INTOG: Beech; • INTOG: Cedar; • INTOG: HE South (Judy); • Northland Mhairi Offshore Wind Farm; • ScotWind 1, Site 13: Offshore Wind Power Fixed (west of Orkney); • ScotWind 1, Site 20: ESB Asset Development: Stoura; • Northland Sheena Offshore Wind Farm (Spiorad na mara);

	Cumulative Effects Assessment
	• Morven Branxton Area Grid Connection Project. Morven South in combination with the OWF developments identified in the Tier 1, Tier 2 and Tier 3 projects listed above, will provide enhanced energy security through reduced reliance on fossil fuels. The national context of such energy security has been considered and the individual effects are expected to be collectively greater than that provided by Morven South alone. The cumulative effect is predicted to be of national spatial extent, long-term duration, continuous and gradual reversibility. It is predicted that the effect will affect the receptor directly and indirectly. The magnitude is therefore, considered to be medium.
Sensitivity of receptor	The sensitivity of the human health receptor populations is the same or similar to that assessed for the Morven South alone assessment: low for the general population and high for the vulnerable population.
Significance of effect	Tier 1, Tier 2 and Tier 3: Overall, the magnitude of the cumulative impact is deemed to be medium and the sensitivity of the receptor is considered to be high. The cumulative effect will, therefore, be of **moderate beneficial** significance, which is significant in EIA terms.
Further mitigation and residual significance	No mitigation measures for wider societal infrastructure and resources health effects are considered necessary because the likely effect in the absence of further mitigation (beyond the designed-in measures outlined in Section 20.10), is beneficial.

20.13.2 Proposed monitoring

20.13.2.1 Site-specific monitoring is not proposed because the assessment concluded that Morven South would not give rise to significant effects for human health, either alone or when considered cumulatively with other plans, projects, or activities. The Applicant will, however, continue to liaise with MD-LOT, and other key stakeholders to help identify opportunities for proportionate, evidence-led regional or strategic monitoring that can improve the understanding of the environmental implications of offshore wind, particularly where recognized evidence gaps exist. This may include contributing to, or participating in, relevant ongoing initiatives under the ScotMER programme (Scottish Government, 2026).

20.14 Transboundary effects

20.14.1.1 A screening of transboundary impacts has been carried out (see Volume 3, Annex 6.2: Transboundary Effects Screening). This has identified that no likely significant transboundary effects with regard to human health would result from Morven South upon the interests of other European Economic Area States.

20.15 Inter-related effects

20.15.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of Morven South on the same receptor. Inter-related effects are considered to be either:

- Lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of Morven South (construction, O&M and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three project stages (e.g. underwater sound effects from piling, wind turbines, vessels and decommissioning); or
- Receptor-led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on human health, such as changes in employment and benefits from renewable energy security, may interact to produce a different, or greater effect on a given population than when the effects are considered in isolation. Receptor-led effects may be short-term, temporary or transient effects or incorporate longer term effects.

20.15.1.2 A description of the likely inter-related effects arising from Morven South on human health is provided in Volume 2, Chapter 21: Inter-related and Ecosystem Effects.

20.15.1.3 The population health effects identified and assessed in this chapter have the potential to interact with each other.

20.15.1.4 For human health, the following potential impacts have been considered within the inter-related assessment:

- Impact of changes to employment and income on human health;
- Impact of climate change and adaptation on human health;
- Impact of changes to wider societal infrastructure and resources on human health.

20.15.1.5 The areas of potential interaction between effects for a given geographic population are presented in Table 20.23. Vulnerable group effects are expected across all geographic populations, so are not listed separately.

20.15.1.6 Table 20.24 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, O&M and decommissioning of Morven South and the inter-related effects (receptor-led effects) that are predicted to arise for human health receptors.

Table 20.23: Interaction between health determinants and geographic populations

	Regional	National	International
	Aberdeenshire; Angus; City of Aberdeen; City of Edinburgh; Dundee City; East Lothian; Fife; Highland; Moray; Perth and Kinross; and the Scottish Borders;	UK	Global
Impact of changes to employment and income on human health	✓		
Impact of changes to climate change and adaptation on human health		✓	✓
Impact of changes to wider societal infrastructure and resources on human health		✓	

Key		
Beneficial (green)	Adverse (orange)	Beneficial and adverse (blue)

Table 20.24: Summary of likely significant inter-related effects on the environment from individual effects occurring across the construction, operation and maintenance and decommissioning phases of Morven South and from multiple effects interacting across all phases (receptor-led effect)

C= Construction, O= O&M, D= Decommissioning phases

"✓" is used to denote the phase the potential impact can occur, "✗" outlines there is no impact within this project phase

Description of impact	Phase			Likely significant inter-related effect	Significance
	C	O	D		
Morven South lifetime effects					
Combined economic effects to employment across project phases	✓	✓	✓	Effects relating to ongoing changes in fishing access and direct employment opportunities for Morven South across construction, operations and maintenance and decommissioning are already taken into account by the health assessment, including where effects are characterised as 'long-term'. The combined effect across all project phases is not expected to be greater than the individual effects.	No change
Receptor-led effects					
Combined national population benefits relating to climate change and wider societal resources	✗	✓	✗	Nationally the population would benefit both from a reduction in the severity of health effects associated with climate change and from the benefits to public health of energy security. Effects would be greatest for vulnerable groups, particularly those on low incomes less able to adapt or afford alternatives. As the effects associated with climate change are expected to be driven by the benefit to deprived populations globally, the combined effect in the UK of these health determinants is not expected to be greater than the individual effects.	No change

20.16 Summary of impacts, mitigation, Likely Significant Effects and monitoring

20.16.1.1 Information on human health within the Morven South Human Health Study Area was informed by a review of relevant public health evidence sources, including scientific literature, baseline data, health policy, local health priorities and health protection standards with reference to corresponding chapters as set out in paragraph 20.1.1.4.

20.16.1.2 Table 20.25 presents a summary of the potential impacts, mitigation measures and the conclusion of LSE[1] on human health in EIA terms. The impacts assessed include: Impact of changes to employment and income on human health, impact of changes to climate change and adaptation on human health, and impact of changes to wider societal infrastructure and resources on human health. Overall, it is concluded that there will be no LSE[1] arising from Morven South during the construction, O&M or decommissioning phases.

20.16.1.3 Table 20.26 presents a summary of the potential cumulative impacts, mitigation measures and the conclusion of LSE[1] on human health in EIA terms. The cumulative effects assessed include: impact of changes to employment and income on human health, impact of changes to climate change and adaptation on human health, and impact of changes to wider societal infrastructure and resources on human health. Overall, it is concluded that there will be the following likely significant cumulative effects from Morven South alongside other projects/plans: moderate beneficial impacts of changes

to wider societal infrastructure and resources on human health, as a result of operation of Moven South and the Tier 1, Tier 2 and Tier 3 projects identified in Table 20.17.

20.16.1.4 No likely significant transboundary effects have been identified in regard to effects of Morven South.

Table 20.25: Summary of Likely Significant Effects, mitigation and monitoring

C= Construction, O= Operations and Maintenance, D= Decommissioning phases

"✓" is used to denote the phase the potential impact can occur, "✗" outlines there is no impact within this project phase

Description of impact	Phase			Designed-in measures	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Significance of residual effect	Proposed monitoring
	C	O	D							
Impact of changes to employment and income on human health	✓	✓	✓	Measures as set out in Volume 2, Chapter 17: Socio-Economics and Volume 2, Chapter 12: Commercial Fisheries	C: low O: low D: low	C: high O: high D: high	Employment opportunities from Morven South C: Minor beneficial O: Minor beneficial D: Minor beneficial Reduced access to commercial fishing grounds C: Minor adverse O: Minor adverse D: Minor adverse	No further mitigation required.	No change	None.
Impact of changes to climate change and adaptation on human health	✗	✓	✗	Measures as set out in Volume 2, Chapter 18: Climate Change	O: low	O: high	Minor beneficial	No further mitigation required.	No change	None.
Impact of changes to wider societal infrastructure and resources on human health	✗	✓	✗	Measures as set out in Volume 2, Chapter 18: Climate Change	O: low	O: high	Minor beneficial	No further mitigation required.	No change	None.

Table 20.26: Summary of likely significant cumulative environment effects, mitigation and monitoring

C= Construction, O= Operations and Maintenance, D= Decommissioning phases

"✓" is used to denote the phase the potential impact can occur, "✗" outlines there is no impact within this project phase

Description of impact	Phase			Designed-in measures	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Significance of residual effect	Proposed monitoring
	C	O	D							
Scenarios 1, 2 and 4										
Impact of changes to employment and income on human health	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor beneficial and Minor adverse	No further mitigation required.	Minor beneficial and Minor adverse	None.
Scenario 4										
Impact of changes to climate change and adaptation on human health	✗	✓	✗	Tertiary measures	O: low	O: high	Minor beneficial	No further mitigation required.	Minor beneficial	None.
Impact of changes to wider societal infrastructure and resources on human health	✗	✓	✗	Tertiary measures	O: medium	O: high	Moderate beneficial	No further mitigation required.	Moderate beneficial	None.

20.17 References

Al-Delaimy, W., Ramanathan, V., & Sánchez Sorondo, M. (2020). *Health of people, health of planet and our responsibility: Climate change, air pollution and health*. Springer Nature. https://link.springer.com/book/10.1007/978-3-030-31125-4 (Accessed: November 2025).

Berglund, B., Lindval, T., Schwela, D. H., & Organization, W. H. (1999). *Guidelines for community noise*. WHO Occupational and Environmental Health Team.

Cave, B., Claßen, T., Fischer-Bonde, B., Humboldt-Dachroeden, S., Martin-Olmedo, P., Mekel, O., Pyper, R., Silva, F., Viliani, F., & Xiao, Y. (2020). *Human health: Ensuring a high level of protection A reference paper on addressing Human Health in Environmental Impact Assessment As per EU Directive 2011/92/EU amended by 2014/52/EU*.

Cave, B., Pyper, R., Fischer-Bonde, B., Humboldt-Dachroeden, S., & Martin-Olmedo, P. (2021). Lessons from an International Initiative to Set and Share Good Practice on Human Health in Environmental Impact Assessment. *Int. J. Environ. Res. Public Health*, *18*(4). https://doi.org/10.3390/ijerph18041392 (Accessed: November 2025).

Cook, J. T., Frank, D. A., Casey, P. H., Rose-Jacobs, R., Black, M. M., Chilton, M., Ettinger de Cuba, S., Appugliese, D., Coleman, S., Heeren, T., Berkowitz, C., & Cutts, D. B. (2008). A brief indicator of household energy security: Associations with food security, child health, and child development in US infants and toddlers. *Pediatrics*, *122*(4), e867-75. https://doi.org/10.1542/peds.2008-0286 (Accessed: November 2025).

Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., Friel, S., Groce, N., Johnson, A., Kett, M., Lee, M., Levy, C., Maslin, M., McCoy, D., McGuire, B., Montgomery, H., Napier, D., Pagel, C., Patel, J., … Patterson, C. (2009). Managing the health effects of climate change: Lancet and University College London Institute for Global Health Commission. *Lancet*, *373*(9676), 1693–1733. https://doi.org/10.1016/S0140-6736(09)60935-1. (Accessed: November 2025).

Department for Environment, Food & Rural Affairs. (2011). *UK Marine Policy Statement*. https://www.gov.uk/government/publications/uk-marine-policy-statement (Accessed: November 2025).

Department of Health and Social Care. (2023). *Chief Medical Officer's annual report 2023: Health in an ageing society*. https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2023-health-in-an-ageing-society (Accessed: November 2025).

European Commission, Directorate-General for Environment, McGuinn, J., McNeill, A., Banfi, P., & Lantieri, A. (2017). *Environmental impact assessment of projects: Guidance on scoping (Directive 2011/92/EU as amended by 2014/52/EU)*. Publications Office. https://doi.org/10.2779/286012 (Accessed: November 2025).

Guski, R., Schreckenberg, D., & Schuemer, R. (2017). WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Annoyance. *Int. J. Environ. Res. Public Health*, *14*(12). https://doi.org/10.3390/ijerph14121539 (Accessed: November 2025).

Hernández, D. (2016). Understanding 'energy insecurity' and why it matters to health. *Social Science & Medicine*, *167*, 1–10. https://doi.org/10.1016/j.socscimed.2016.08.029 (Accessed: November 2025).

HM Government. (1974). *Health and Safety at Work Act 1974*. https://www.legislation.gov.uk/ukpga/1974/37/contents (Accessed: November 2025).

Institute of Public Health. (2021). *Health Impact Assessment Guidance: A Manual and Technical Guidance. Standalone Health Impact Assessment and health in environmental assessment.* https://publichealth.ie/hia/guidance.pdf (Accessed: November 2025).

IPCC. (2014). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change.*

IEMA. (2016, July). *Environmental Impact Assessment Guide to: Delivering Quality Development*.

IEMA (2024). *Implementing the Mitigation Hierarchy from Concept to Construction*. Institute of Sustainability and Environmental Professionals. https://www.iema.net/media/oone2qce/iema-mitigation-in-eia-guidance-final.pdf (Accessed: November 2025).

Office for National Statistics. (2021). *Population projections*. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections (Accessed: November 2025).

Office for National Statistics. (2025). *Explore local statistics*. https://www.ons.gov.uk/explore-local-statistics (Accessed: November 2025).

Public Health England. (2020). *Health Impact Assessment in spatial planning*.

Public Health England. (2021). *Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime*.

Pyper, R., Lamming, M., Beard, C., Buroni, A., Douglas, M., Turton, P., Hardy, K., Netherton, A., McClenaghan, R., Barratt, T., Bhatt, A., Cave, B., & Gibson, G. (2022). *IEMA Guide: Effective Scoping of Human Health in Environmental Impact Assessment. England:* Institute of Sustainability and Environmental Professionals.

Pyper, R., Waples, H., Barratt, T., Hardy, K., Turton, P., Netherton, A., McDonald, J., Buroni, A., & Bhatt, A. (2022). *IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment*. Institute of Sustainability and Environmental Professionals.

Scottish Government. (2015). *Scotland's National Marine Plan*. https://www.gov.scot/publications/scotlands-national-marine-plan (Accessed: November 2025).

Scottish Government. (2017). *Scottish Energy Strategy: The future of energy in Scotland*. https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/ (Accessed: November 2025).

Scottish Government. (2018). *Public Health Priorities for Scotland*. https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2018/06/scotlands-public-health-priorities/documents/00536757-pdf/00536757-pdf/govscot%3Adocument/00536757.pdf (Accessed: November 2025).

Scottish Government. (2020a). *Scottish Index of Multiple Deprivation (SIMD)*. https://simd.scot/#/simd2020/BTTTFTT/9/-4.0000/55.9000/ (Accessed: November 2025)..

Scottish Government. (2020b). *Securing a green recovery on a path to net zero: Climate change plan 2018–2032—Update*. https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/ (Accessed: November 2025)..

Scottish Government. (2022a). *Scotland's Census*. https://www.scotlandscensus.gov.uk/ (Accessed: November 2025)..

Scottish Government. (2022b). *Scotland's National Strategy for Economic Transformation—Delivery Plans October 2022*. https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation-delivery-plans-october-2022/ (Accessed: November 2025)..

Scottish Government. (2023a). *Draft Energy Strategy and Just Transition Plan*. https://www.gov.scot/publications/draft-energy-strategy-transition-plan/ (Accessed: November 2025)..

Scottish Government. (2023b). *National Planning Framework 4*. https://www.gov.scot/publications/national-planning-framework-4/ (Accessed: November 2025)..

Scottish Government. (2025a). *National Records of Scotland*. https://www.nrscotland.gov.uk/statistics-and-data/ (Accessed: November 2025)..

Scottish Government. (2025b). *Offshore wind energy—Draft updated Sectoral Marine Plan 2025: Consultation*. https://www.gov.scot/publications/draft-updated-sectoral-marine-plan-offshore-wind-energy-2025/pages/2/ (Accessed: November 2025).

Scottish Government. (2025c). *Scottish Health Survey*. https://scotland.shinyapps.io/sg-scottish-health-survey/ (Accessed: November 2025).

Scottish Government (no date) Marine renewable energy: ScotMER programme overview and evidence maps. Available at: https://www.gov.scot/policies/marine-renewable-energy/ (Accessed: February 2026).

Scottish Public Health Observatory. (2025). *Welcome to the ScotPHO Profiles—Explore over 250 indicators of public health.* https://scotland.shinyapps.io/ScotPHO_profiles_tool/ (Accessed: November 2025).

UK Government. (2009). *Climate Change (Scotland) Act 2009*. https://www.legislation.gov.uk/asp/2009/12/contents (Accessed: November 2025).

UK Government. (2019). *Climate Change (Emissions Reduction Targets) (Scotland) Act 2019*. https://www.legislation.gov.uk/asp/2019/15 (Accessed: November 2025).

UKHSA. (2023a). *Health Effects of Climate Change (HECC) in the UK: 2023 report Chapter 2. Temperature effects on mortality in a changing climate*. https://assets.publishing.service.gov.uk/media/659ff712e96df5000df844bf/HECC-report-2023-chapter-2-temperature.pdf (Accessed: November 2025).

UKHSA. (2023b). *Health Effects of Climate Change (HECC) in the UK: 2023 report Chapter 3. Climate change, flooding, coastal change and public health*. https://assets.publishing.service.gov.uk/media/657086ad746930000d488919/HECC-report-2023-chapter-3-flooding.pdf (Accessed: November 2025).

UKHSA. (2023c). *Health Effects of Climate Change (HECC) in the UK: 2023 report Chapter 4. Impacts of climate change and policy on air pollution and human health*. https://assets.publishing.service.gov.uk/media/6570a68b7469300012488948/HECC-report-2023-chapter-4-outdoor-air-quality.pdf (Accessed: November 2025).

UKHSA. (2023d). *Health Effects of Climate Change (HECC) in the UK: 2023 report Chapter 7. Effect of climate change on infectious diseases in the UK*.

UKHSA. (2023e). *Health Effects of Climate Change (HECC) in the UK: 2023 report Chapter 9. Climate change and food supply*.

WHO. (2009). *Night Noise Guidelines for Europe*. https://apps.who.int/iris/bitstream/handle/10665/326486/9789289041737-eng.pdf?sequence=1&isAllowed=y (Accessed: November 2025).

WHO. (2022). Mental health: Strengthening our response. *Retrieved September*, *2022*. https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response (Accessed: November 2025).

World Health Organization. (1948). *The Preamble of the Constitution of the World Health Organization*. Bulletin of the World Health Organization.

World Health Organization. (2021). *WHO global air quality guidelines: Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide*. World Health Organization. https://apps.who.int/iris/handle/10665/345329 (Accessed: November 2025).

World Health Organization. (2022). *World mental health report: Transforming mental health for all*. World Health Organization.