

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Environmental Statement

Volume 2, Chapter 14: Human health assessment

Planning Inspectorate Reference Number: EN010136

Document Number: MRCNS-J3303-RPS-10057

Document reference: F2.14

APFP Regulations: 5(2)(a)

April 2024

F01



MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Application	RPS	Morgan Offshore Wind Ltd	Morgan Offshore Wind Ltd	April 2024

Prepared by:

RPS

Prepared for:

Morgan Offshore Wind Ltd.

Contents

14	HUMAN HEALTH ASSESSMENT	1
14.1	Introduction	1
14.1.1	Overview	1
14.1.2	Purpose of chapter	2
14.2	Legislative and policy context.....	3
14.2.1	Legislation	3
14.2.1	Planning policy context.....	3
14.2.2	National Policy Statements	3
14.2.3	National Planning Policy Framework	6
14.2.4	North West Inshore and North West Offshore Marine Plans	7
14.3	Consultation.....	8
14.4	Baseline Methodology	16
14.4.1	Relevant Guidance.....	16
14.4.2	Scope of the assessment.....	16
14.4.3	Methodology to inform baseline	20
14.4.4	Study area	20
14.4.5	Desktop study.....	23
14.4.6	Site specific surveys.....	23
14.5	Baseline environment.....	23
14.5.2	Future baseline scenario	27
14.5.3	Data limitations.....	28
14.6	Impact assessment methodology	29
14.6.1	Overview	29
14.6.2	Impact assessment criteria	29
14.6.3	Vulnerable groups	33
14.7	Key parameters for assessment.....	34
14.7.1	Maximum design scenario	34
14.8	Measures adopted as part of the Morgan Generation Assets.....	36
14.9	Assessment of significant effects	37
14.9.1	Overview	37
14.9.2	Transport modes, access and connections.....	37
14.9.3	Community identity, culture, resilience and influence	40
14.9.4	Employment and income.....	43
14.9.5	Climate change and adaptation	45
14.9.6	Wider societal infrastructure and resources.....	47
14.10	Cumulative effect assessment methodology.....	49
14.10.1	Methodology.....	49
14.10.2	Maximum design scenario	50
14.11	Cumulative effects assessment.....	52
14.11.2	Transport modes, access and connections.....	54
14.11.3	Community identity, culture, resilience and influence	59
14.11.4	Employment and income.....	61
14.11.5	Climate change and adaptation	63
14.11.6	Wider societal infrastructure and resources.....	65
14.11.7	Future monitoring	67
14.12	Transboundary effects.....	67
14.13	Inter-related effects.....	67
14.14	Summary of impacts, measures adopted as part of Morgan Generation Assets and monitoring.....	71
14.15	References	77

Tables

Table 14.1:	Summary of the NPS EN-1 provisions relevant to human health.	4
-------------	---	---

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.2: Summary of NPS EN-1 policy on decision making relevant to human health.	6
Table 14.3: English National Planning Policy Framework.....	7
Table 14.4: North West Inshore and North West Offshore Marine Plan policies of relevance to human health.	7
Table 14.5: Summary of key consultation topics raised during consultation activities undertaken for the Morgan Generation Assets relevant to human health.....	9
Table 14.6: Impacts scoped into the assessment for human health.	16
Table 14.7: Impacts scoped out of the assessment for human health.....	17
Table 14.8: Summary of key desktop reports.....	23
Table 14.9: Selection of Public Health Outcomes – Isle of Man (Isle of Man Cabinet Office, 2021).	24
Table 14.10: Selection of Public Health Outcomes – North West Region England (OHID, 2023a).....	24
Table 14.11: Definition of terms relating to the magnitude of an impact.	30
Table 14.12: Definition of terms relating to the sensitivity of the receptor.....	30
Table 14.13: Matrix used for the assessment of the significance of the effect.....	31
Table 14.14: Explanation of Population Health Significance.....	31
Table 14.15: Maximum design scenario considered for the assessment of potential impacts on human health.	35
Table 14.16: MDS considered for the assessment of potential cumulative effects on Human Health.....	51
Table 14.17: Transport modes, access and connections cumulative impacts summary.....	54
Table 14.18: Community identity, culture, resilience and influence cumulative impacts summary.	59
Table 14.19: Employment and income cumulative impacts summary.....	61
Table 14.20: Climate change and adaptation cumulative impacts summary.....	63
Table 14.21: Wider societal infrastructure and resources cumulative impacts summary.....	65
Table 14.22: Interaction between health determinants by geographic populations.....	68
Table 14.23: Summary of likely significant inter-related effects on the environment for individual effects occurring across the construction, operations and maintenance and decommissioning phases of the Morgan Generation Assets and from multiple effects interacting across all phases (receptor-led effects).....	69
Table 14.24: Summary of potential environmental effects, mitigation and monitoring.....	73
Table 14.25: Summary of potential cumulative environmental effects, mitigation and monitoring.	74

Figures

Figure 14.1: Human Health study area.....	22
---	----

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Glossary

Term	Meaning
Applicant	Morgan Offshore Wind Limited.
Non-Statutory Consultee	Consultees (organisations or individuals) who - whilst not designated in law - are likely to have an interest in a proposed development.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Statutory consultee	Organisations that are required to be consulted by an applicant pursuant to the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
The Secretary of State for the Department for Energy Security and Net Zero	The decision maker with regards to the application for development consent for the Morgan Offshore Wind Project.
Maximum Design Scenario	The scenario within the design envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.
National Policy Statement	The current national policy statements published by the Department for Energy Security and Net Zero in 2023.

Acronyms

Acronym	Description
DCO	Development Consent Order
IEMA	Institute of Environmental Management and Assessment
LMIC	Low and middle income countries
MDS	Maximum Design Scenario
NPS	National Policy Statement
NSIPs	Nationally Significant Infrastructure Projects
UKHSA	United Kingdom Health Security Agency
OHID	Department of Health and Social Care's Office for Health Improvement and Disparities
PEIR	Preliminary Environmental Information Report
PHE	Public Health England
IAIA	International Association for Impact Assessment
WHO	World Health Organisation
TSC	Territorial Sea Committee
NEET	Not in Education, Employment or Training
DESNZ	Department of Energy Security and Net Zero

14 Human health assessment

14.1 Introduction

14.1.1 Overview

- 14.1.1.1 This chapter of the Environmental Statement presents the assessment of the potential impact of the Morgan Offshore Wind Project: Generation Assets (hereafter referred to as the Morgan Generation Assets) on Human Health. Specifically, this chapter considers the potential impact of Morgan Generation Assets during the construction, operations/maintenance and decommissioning phases.
- 14.1.1.2 Human health is a broad topic. The assessment considers how the Morgan Generation Assets affect 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 the Morgan Generation Assets is a resource that supports society.
- 14.1.1.3 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, 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*’ (World Health Organization, 2022). In this chapter the terms health and wellbeing are used interchangeably, and equal consideration is given to considering both physical and mental health outcomes.
- 14.1.1.4 This chapter also assesses the cumulative effects of the Morgan Generation Assets together with other projects on human health.
- 14.1.1.5 The health assessment focuses on the source of the impact, with offshore sources assessed in this chapter, including where these may affect onshore receptors. For example, if physical infrastructure and civil works are located offshore, any resulting impacts are categorised as offshore. The chapter’s cumulative assessment (section 14.11) does however consider the combined effects of the Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms Transmission Assets.
- 14.1.1.6 This assessment has been undertaken with specific reference to the relevant legislation and guidance, of which the primary sources are the National Policy Statements (NPS). Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) are presented in Volume 1, Chapter 5: EIA Methodology of the Environmental Statement and section 14.10 of this chapter.
- 14.1.1.7 The assessment presented is informed by the following technical chapters of the Environmental Statement:
- Volume 2, Chapter 1: Physical processes of the Environmental Statement
 - Volume 2, Chapter 2: Benthic subtidal ecology of the Environmental Statement
 - Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement
 - Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement
 - Volume 2, Chapter 9: Other sea users of the Environmental Statement
 - Volume 2, Chapter 10: Seascape, landscape and visual resources of the Environmental Statement

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- Volume 2, Chapter 12: Climate change of the Environmental Statement
- Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

14.1.1.8 The health assessment also considers wider determinants of health not covered by other Environmental Statement chapters. The scope of the health chapter is summarised below:

- Table 14.6 describes in more detail these determinants of health that are scoped into the human health assessment for offshore effects.
- Table 14.7 describes the determinants scoped out of the human health assessment for offshore effects because they are not considered to have the potential for likely significant effects to population health.

14.1.2 Purpose of chapter

14.1.2.1 The primary purpose of the Environmental Statement is outlined in Volume 1, Chapter 1: Introduction of the Environmental Statement. In summary, the primary purpose of the Environmental Statement is to support the Development Consent Order (DCO) application for Morgan Generation Assets under the Planning Act 2008 (the 2008 Act).

14.1.2.2 In particular, this Environmental Statement chapter:

- Presents the existing population health baseline established from desk studies
- Identifies any assumptions and limitations encountered in compiling the environmental information
- Presents the potential environmental and social effects on human health arising from the Morgan Generation Assets, based on the information gathered and the analysis and assessments undertaken
- Presents the mitigation and monitoring that the Morgan Generation Assets has committed to in order to prevent, minimise, reduce or offset the possible environmental effects of the Morgan Generation Assets on human health.

14.1.2.3 This chapter considers appropriate actions to avoid or mitigate health risks and promote health opportunities including targeting measures to respond to health inequalities for vulnerable groups. The following issues related to population health are discussed in this assessment:

- The public health implications of changes to offshore shipping affecting transport modes, access and connections during construction, operations and maintenance and decommissioning phases, section 14.9.2
- The public health implications of offshore visual changes that may affect community identity, culture, resilience and influence during the operations and maintenance phase, section 14.9.3
- The public health implications of changes in offshore employment and income during the construction, operations and maintenance and decommissioning phases, section 14.9.4
- The public health implications of offshore renewable energy generation for climate change and adaptation during the operations and maintenance phase, section 14.9.5
- The public health implications of offshore energy generation infrastructure having wider societal benefits to energy security during the operations and maintenance phase, section 14.9.6.

14.2 Legislative and policy context

14.2.1 Legislation

14.2.1.1 The legislative context for the Morgan Generation Assets is set out in Volume 1, Chapter 2: Policy and legislative context of the Environmental Statement. In addition, the following legislation has also been considered:

- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 set out the topics to be assessed within the EIA process, including: *‘The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors –population and human health...’*
- The Environment Act 1995 sets provisions for protecting certain environmental conditions of relevance to health in the UK. Part II covers contaminated land and Part IV covers air quality
- The Environmental Protection Act 1990, Part IIA covers contaminated land and Part III manages the control of emissions (including dust, noise and light) that may be prejudicial to health or a nuisance
- The Health and Safety at Work etc Act 1974 places duties on employers to ensure, ‘so far as is reasonably practicable’: the health, safety and welfare at work of all their employees; and that persons not in their employment are not exposed to risks to their health or safety as a result of the activities undertaken
- Control of Pollution Act 1974 makes provisions in relation to waste disposal, water pollution, noise, atmospheric pollution and public health. It describes licencing of certain activities to avoid danger to public health or serious detriment to the amenity of the locality affected. It also covers control of, and consent for, noise on construction sites (sections 60 and 61), including defining ‘best practicable means’ (section 72)
- International Convention for the Prevention of Pollution from Ships (MARPOL) 1973 Regulations aimed at preventing and minimising accidental and operational pollution from ships.

14.2.1 Planning policy context

14.2.1.1 The Morgan Generation Assets will be located in English offshore waters (beyond 12 nautical miles (nm) from the English coast). As set out in Volume 1, Chapter 1: Introduction of the Environmental Statement, as the Morgan Generation Assets is an offshore generating station with a capacity greater than 100 MW located in English waters, it is a Nationally Significant Infrastructure Project (NSIP) as defined by section 15(3) of the Planning Act 2008 (the 2008 Act). As such, there is a requirement to submit an application for a Development Consent Order (DCO) to the Planning Inspectorate to be decided by the Secretary of State for the Department for Energy Security and Net Zero (DESNZ).

14.2.2 National Policy Statements

14.2.2.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to human health, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- Energy Security and Net Zero, 2024a) and the NPS for Renewable Energy Infrastructure EN-3 (Department for Energy Security and Net Zero, 2024b)
- 14.2.2.2 NPS EN-3 (Department for Energy Security and Net Zero, 2024b) has been reviewed and it is not considered that there are relevant policy positions in relation to human health that need to be taken into account.
- 14.2.2.3 NPS EN-1 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 14.1 below. NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 14.2 below.

Table 14.1: Summary of the NPS EN-1 provisions relevant to human health.

Summary of NPS EN-1 provision	How and where considered in the Environmental Statement
<p>EN-1 paragraph 4.3.4: To consider the potential effects, including benefits, of a proposal for a project, the applicant must set out information on the likely significant environmental, social and economic effects of the development, and show how any likely significant negative effects would be avoided, reduced, mitigated or compensated for, following the mitigation hierarchy. This information could include matters such as employment, equality, community cohesion, health and wellbeing.</p>	<p>The potential for employment and upskilling is covered in sections 14.9.4 and 0.</p> <p>The potential for effects relating to healthy lifestyles and safe and cohesive communities are covered in section 14.9.3.</p> <p>Effects on wellbeing and equality are inherent to all the assessments in section 14.9.</p>
<p>EN-1 paragraph 4.4.1: Energy infrastructure has the potential to impact on the health and wellbeing (“health”) of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the construction of energy infrastructure and the production, distribution and use of energy may have negative impacts on some people’s health.</p>	<p>The effects to population health are considered in section 14.9. For example, benefits of access to energy are covered in section 14.9.6.</p> <p>The potential for adverse effects is covered in sections 14.9.2, 14.9.3 and 14.9.4.</p> <p>Cumulative effects to population health are considered in section 14.11.</p> <p>Impacts from air and water pollution including dust and odour have been scoped out of the human health assessment as discussed in Table 14.7</p> <p>Public perception and EMF risks are scoped out as explained in Table 14.7.</p>
<p>EN-1 paragraph 4.4.2: The direct impacts on health may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation....</p>	<p>Given the Morgan Generation Assets are remote to human health receptors the main pathway is water pollution, which is considered within this chapter (section 14.4.2) and informed by Volume 2, Chapter 7: Benthic subtidal ecology of the Environmental Statement.</p> <p>The assumption is that ports would operate within their consented levels of activity or would apply for planning permission or additional permits, (e.g. discharges to water), if they required additional approvals. Such consents would be separate from this application, so are not included within the scope of this assessment.</p> <p>Port expansion is not part of the scheme being proposed. Any potential environmental effects are expected to be considered in accordance with any consents and permits that may be required by the ports themselves.</p> <p>Impacts from onshore traffic, air, dust and hazardous waste and substances have been scoped out of the human health assessment as discussed in Table 14.7.</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Summary of NPS EN-1 provision	How and where considered in the Environmental Statement
	<p>Public perception and EMF risks are scoped out as explained in Table 14.7.</p> <p>An assessment of impacts due to Airborne construction sound is presented in Volume 4, Annex 14.1: Airborne construction sound of the Environmental Statement (Document Reference F4.14.1).</p>
<p>EN-1 paragraph 4.4.3: New energy infrastructure may also affect the composition and size of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport, or the use of open space for recreation and physical activity.</p>	<p>Given the Morgan Generation Assets are remote to human health receptors the main pathway is potential effects to health and other services on the Isle of Man should offshore transport be disrupted. This is considered within this Chapter (section 14.9.2), informed by Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement and Volume 2, Chapter 13: Socio economics of the Environmental Statement.</p> <p>Open space, leisure and play for recreation and physical activity has been scoped out of the human health assessment as explained in Table 14.7.</p>
<p>EN-1 paragraph 4.4.4: As described in the relevant sections of this NPS and in the technology specific NPSs, where the proposed project has an effect on humans, the ES should assess these effects for each element of the project, identifying any potential adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate.</p> <p>EN-1 paragraph 4.4.5: The impacts of more than one development may affect people simultaneously, so the applicant should consider the cumulative impact on health in the ES where appropriate.</p> <p>EN-1 paragraph 4.4.6: Opportunities should be taken to mitigate indirect impacts, by promoting local improvements to encourage health and wellbeing, this includes potential impacts on vulnerable groups within society and impacts on those with protected characteristics under the Equality Act 2010, i.e. those groups which may be differentially impacted by a development compared to wider society as whole</p>	<p>The potential human health effects, including inter-related and cumulative effects of the Morgan Generation Assets are presented in section 14.9 and section 14.11.</p> <p>This chapter considers the potential for differential effects to vulnerable groups. See section 14.6.3.</p> <p>Measures adopted as part of the Morgan Generation Assets are stated in section 14.8, and further mitigation and enhancement measures are discussed within each health determinant in section 14.9.</p>
<p>EN-1 paragraph 5.12.1: Excessive noise can have wide-ranging impacts on the quality of human life and health such as annoyance, sleep disturbance, cardiovascular disease and mental ill-health.</p>	<p>The effects to population health due to noise are scoped out as explained in Table 14.7. Construction noise impacts have been assessed in Volume 4, Annex 14.1 Airborne construction sound of the Environmental Statement.</p> <p>The human health chapter in all its assessments in section 4.11 considers differential effects to vulnerable groups.</p>
<p>EN-1 paragraph 5.12.17 The Secretary of State should not grant development consent unless it is satisfied that the proposals will meet the following aims through the effective management and control of noise:</p> <ul style="list-style-type: none"> • Avoid significant adverse impacts on health and quality of life from noise • Mitigate and minimise other adverse impacts on health and quality of life from noise 	<p>Construction noise impacts have been assessed in in Volume 4, Annex 14.1: Airborne construction sound of the Environmental Statement in line with:</p> <ul style="list-style-type: none"> • BS 5228-1:2009+A1:2014 – ‘Code of practice for noise and vibration control on construction and open sites – Part 1: Noise’ (British Standards Institution, 2014a) • ISO 9613-2:1996 – Acoustics – ‘Attenuation of sound during propagation outdoors – Part 2: General method of calculation’(International Organisation for Standards, 1996).

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Summary of NPS EN-1 provision	How and where considered in the Environmental Statement
<ul style="list-style-type: none"> Where possible, contribute to improvements to health and quality of life through the effective management and control of noise. 	
<p>EN-1 paragraph 5.16.2: During the construction, operations and maintenance and decommissioning phases, developments can lead to ... increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse impacts on health.</p>	<p>Potential health effects relating to water have been considered and are scoped out as explained in Table 14.7 and informed by Volume 2, Chapter 2: Benthic subtidal ecology of the Environmental Statement.</p> <p>Mitigation measures to minimise the risk of marine pollution events are outlined in the Marine Pollution Contingency Plan (MPCP) developed as part of an Offshore Environment Management Plan secured within the deemed marine licences within the draft DCO (Document Reference C1).</p>

Table 14.2: Summary of NPS EN-1 policy on decision making relevant to human health.

Summary of NPS EN-1 provision	How and where considered in the Environmental Statement
<p>EN-1 paragraphs 4.4.7: Generally, those aspects of energy infrastructure which are most likely to have a significantly detrimental impact on health are subject to separate regulation (for example for air pollution) which will constitute effective mitigation of them, so that it is unlikely that health concerns will either by themselves constitute a reason to refuse consent or require specific mitigation under the Planning Act 2008.</p> <p>EN-1 paragraphs 4.4.8: However, not all potential sources of health impacts will be mitigated in this way and the Secretary of State may want to take account of health concerns when setting requirements relating to a range of impacts such as noise</p>	<p>Impacts that are governed by separate regulation (for example air pollution) have been considered. Where appropriate issues have been scoped out, see section 14.4.2.</p>

14.2.3 National Planning Policy Framework

14.2.3.1 The Human Health study area as defined in section 14.4.4 includes areas of the English Mainland. The National Planning Policy Framework (December 2023) (NPPF) provides overarching advice regarding development. The aim of achieving sustainable development is the main theme of the NPPF. Those sections of particular relevance to human health are set out in Table 14.3, below.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.3: English National Planning Policy Framework.

Summary of NPPF provision	How and where considered in the Environmental Statement
<p>96. Planning policies and decisions should aim to achieve healthy, inclusive and safe places and beautiful buildings promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other</p>	<p>The potential effects to population health relating to community identity, culture, resilience and influence for the regional population of North West England are considered in section 14.9.3.</p>

14.2.4 North West Inshore and North West Offshore Marine Plans

14.2.4.1 The human health impact assessment has also been made with consideration to the specific policies set out in the North West Inshore and North West Offshore Marine Plans (Marine Management Organisation, 2021). Key provisions are set out in Table 14.4 along with details as to how these have been addressed within the assessment.

Table 14.4: North West Inshore and North West Offshore Marine Plan policies of relevance to human health.

Policy	Key provisions	How and where considered in the Environmental Statement
Objectives of the North West Marine Plan	Objectives include: infrastructure to support and promote safe, profitable and efficient marine businesses; marine businesses respect environmental limits and are socially responsible; the use of the marine environment is benefiting society as a whole... contributing to physical and mental wellbeing; the coast, seas, oceans and their resources are safe to use; there is equitable access for those who want to use and enjoy the coast, seas and their wide range of resources and assets and recognition that for some island and peripheral communities the sea plays a significant role in their community.	The effects on seascape and visual resources are considered in section 14.9.3. Access by other sea users is considered in section 14.9.3 Equitable access to health determinants is considered throughout the assessment in section 14.9, with reference made to relevant vulnerable population groups.
NW-WQ-1	Proposals that protect, enhance and restore water quality will be supported.	The water quality effects of the Morgan Generation Assets to population health are discussed in section 14.4.2.
NW-FISH-2	Proposals that may have significant adverse impacts on access for fishing activities must demonstrate that they will, in order of preference: a) avoid; b) minimise; c) mitigate adverse impacts so they are no longer significant.	Economic effects that could influence population health are discussed in section 14.9.4.
NW-SCP-1	Proposals should ensure they are compatible with their surroundings and should not have a significant adverse impact on the character and visual	Visual effects that could influence population health are discussed in section 14.9.3.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Policy	Key provisions	How and where considered in the Environmental Statement
	resource of the seascape and landscape of the area.	
NW-CO-1	Proposals that may have significant adverse impacts on, or displace, existing activities must demonstrate that they will, in order of preference: a) avoid; b) minimise; c) mitigate adverse impacts so they are no longer significant.	Sea transport access between the Isle of Man and the mainland that could affect population health is discussed in section 14.9.2.
NW-EMP-1	Proposals that result in a net increase in marine-related employment will be supported.	Economic effects that could influence population health area discussed in section 14.9.4.
NW-REN-1 NW-AIR-1	Proposals that enable the provision of renewable energy technologies and associated supply chains will be supported. Clean air is essential for life, health, the environment and the economy. Air pollution and greenhouse gas emissions must be reduced to protect health, habitats and species and reduce the impacts of climate change.	The renewable energy benefits of the Morgan Generation Assets to population health are discussed in section 14.9.6. The population health benefits of renewable energy for reduction of greenhouse gas emissions are discussed in section 14.9.5.
NW-SOC-1	Those bringing forward proposals should consider and demonstrate how their development shall enhance public knowledge, understanding, appreciation and enjoyment of the marine environment as part of (the design of) the proposal.	Public information sharing is discussed in section 14.9.2 and section 14.9.3.

14.3 Consultation

- 14.3.1.1 A summary of the key topics raised during consultation activities undertaken to date specific to human health is presented in Table 14.5 below, together with how these topics have been considered in the production of this Environmental Statement chapter.
- 14.3.1.2 The S42 responses of 02 June 2023 also included comments from members of the public. These are set out in the Consultation Report (document reference E3). There was consistent support and agreement that there is a need for clean sustainable electricity generated by wind farms. This was coupled with concern about effects to essential shipping routes, particularly between Heysham and the Isle of Man, including the implications for essential food and medicine supplies, as well as healthcare related journeys.
- 14.3.1.3 The primary assessment of shipping effects is set out in Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement. Section 14.9.2 of the health assessment considers the public health implications of potential for the Morgan Generation Assets to disrupt commercial operators including strategic routes and lifeline ferries to the Isle of Man. This includes the specific matters of medical deliveries, healthcare related journeys and healthy food availability. Regard has also been given to these matters as part of the cumulative assessment in section 14.11.2.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.5: Summary of key consultation topics raised during consultation activities undertaken for the Morgan Generation Assets relevant to human health.

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
22 July 2022	The Planning Inspectorate Scoping Opinion	<p>The Applicant proposes to scope out a standalone aspect chapter on Human health on the basis that potential impacts on human health will be assessed within other aspect chapters of the Environmental Statement (ES) and an overall conclusion of the significance of effects on human health will be included within a technical appendix. The Inspectorate is content that Human health does not need to be considered as a standalone aspect chapter.</p> <p>The Scoping Report states that potential impacts on health arising from the generation assets would be considered in the following ES topics:</p> <ul style="list-style-type: none"> • Physical processes • Commercial fisheries • Shipping and navigation • Socio-economics and community • Other sea users. <p>However, these chapters do not reference human health and there is no explanation of how human health will be assessed in these chapters. The Environmental Statement should set out what impacts on human health are assessed and effort should be made to agree the approach with the relevant consultees.</p>	November 2022 guidance on human health in EIA by the Institute of Environmental Management and Assessment (IEMA) states that good practice is to include a chapter on human health within the Environmental Statement to facilitate discussions with public health stakeholders and to ensure there is a consistent methodology applied in explaining the public health implications of various effects described in other chapters. On this basis a Human Health chapter has been included in the Environmental Statement.
22 July 2022	Marine Management Organisation (MMO) Scoping Opinion	As a prescribed consultee under the 2008 Act, the MMO advises developers during preapplication on those aspects of a project that may have an impact on the marine area or those who use it. In addition to considering the impacts of any construction, deposit or removal within the marine area, this also includes assessing any risks to human health, other legitimate uses of the sea and any potential impacts on the marine environment from terrestrial works.	This Human Health chapter brings together the conclusions relevant to public health and provides relevant context in terms of compliance with standards, guidance and NPSs.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
		<p><i>'The MMO defers to the Local Authority and Public Health England on the suitability of the scope of the assessment with regards to population and human health impacts.'</i></p>	
<p>22 July 2022</p>	<p>United Kingdom Health Security Agency (UKHSA) and the Department of Health and Social Care's Office for Health Improvement and Disparities (OHID). Collectively UKHSA and OHID were previously known as Public Health England (PHE).</p> <p>Scoping Opinion.</p>	<p>We understand that the promoter will wish to avoid unnecessary duplication and that many issues including air quality, emissions to water, waste, contaminated land etc. will be covered elsewhere in the Environmental Statement. We believe the summation of relevant issues into a specific section of the report provides a focus which ensures that public health is given adequate consideration. The section should summarise key information, risk assessments, proposed mitigation measures, conclusions and residual impacts relating to human health. Compliance with the requirements of National Policy Statements (NPS) and relevant guidance and standards should also be highlighted.</p> <p>UKHSA and OHID's predecessor organisation Public Health England produced an advice document 'Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning (NSIP) Regime', setting out aspects to be addressed within the Environmental Statement (PHE, 2021). This advice document and its recommendations are still valid and should be considered when preparing an ES.</p> <p>Please note that where impacts relating to health and/or further assessments are scoped out, promoters should fully explain and justify this within the submitted documentation.</p> <p>It is noted that population and human health will be considered using existing chapters to generate a technical annex and not form a separate chapter within the Environmental Statement. Given the current knowledge of the scheme and potential impacts this appears to be a proportionate approach. This should</p>	<p>This Human Health chapter brings together the conclusions relevant to public health and provides relevant context in terms of compliance with standards, guidance and NPSs.</p> <p>The PHE NSIP advice note (PHE, 2021) has been taken into account, see section 14.6.1.</p> <p>The topic has been kept under review and a human health chapter has been included to ensure appropriate coverage of likely and potentially significant population health effects, beneficial and adverse.</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
		<p>be kept under review as more information becomes available and a separate population and human health chapter may be justified as the assessments develop.</p> <p>The impacts on health and wellbeing and health inequalities of the Morgan Generation Assets may have particular effect on vulnerable or disadvantaged populations, including those that fall within the list of protected characteristics. The identification of vulnerable populations and sensitive populations should be considered.</p> <p>The identification of vulnerable populations should be based on the list provided by the Welsh Health Impact Assessment Support Unit and the International Association of Impact Assessment (IAIA).</p> <p>Baseline health data should be provided, which is adequate to identify any local sensitivity or specific vulnerable populations.</p>	<p>This Human Health chapter considers relevant vulnerable groups in line with IEMA 2022 guidance. Consideration has also been given into vulnerable population groups provided in the Welsh Health Impact Assessment Support Unit and the International Association for Impact Assessment (IAIA) HIA guidance.</p> <p>A baseline is set out for the purpose of identifying local sensitivity and relevant vulnerable population groups. See section 14.4.</p>
11 August 2022	Isle of Man Government Scoping Response	<p>As an island nation, any significant risk of interference with marine navigation is of concern to the Territorial Sea Committee (TSC) with regard to transport to and from the island, and the shipping lanes in our Territorial waters which are used to connect the UK and Ireland. These are strategic, lifeline routes that the Island depends on and it is essential that these are not impacted upon as part of these proposals, particularly Morgan.</p> <p>The economy of the Island is highly reliant on the regular, safe shipping for its goods, and any deviations from well established timetables and routes would not support the Island's business community relying on daily deliveries via the Isle of Man Steam Packet Company.</p>	Section 14.9.2 considers the potential for the Morgan Generation Assets to disrupt commercial operators including strategic routes and lifeline ferries to the Isle of Man. This includes the public health implications associated with any change of access to the Isle of Man. Regard has also been given to this issue as part of the cumulative assessment in section 14.11.
02 June 2023	Isle of Man Chamber of Commerce S42 Response	Noting that when the ferry service is cancelled due to bad weather our materials and products become stalled and priority on the next sailings is given to	The point about prioritisation of essential public health supplies is noted. Section 14.9.2 considers the potential for the Morgan Generation Assets to disrupt commercial operators including strategic

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
		perishables, food and medical supplies over our supplies.	routes and lifeline ferries to the Isle of Man. Regard has also been given to this issue as part of the cumulative assessment in section 14.11.2. Regard has been given to the public health implications associated with medical deliveries.
02 June 2023	Isle of Man Steam Packet Company S42 Response	The Company carries around 600,000 passengers, 150,000 private vehicles and 40,000 freight trailers/vans per annum and is the only Ro-Ro ferry service to the Isle of Man carrying all urgent 'just-in time' food, retail, medicine and time sensitive lifeline and business supplies. Isle of Man Steam Packet Company services provide essential travel means for the public to and from the Isle of Man, and the Isle of Man community rely on timely services for receiving UK medical treatment, travel overseas, business, tourism and day to day travel needs.	The primary assessment of effects to shipping is set out in Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement. Section 14.9.2 of the health assessment considers the public health implications of potential for the Morgan Generation Assets to disrupt commercial operators including strategic routes and lifeline ferries to the Isle of Man. Regard has also been given to this issue as part of the cumulative assessment in section 14.11.214.11.2, including the public health implications associated with medical deliveries and healthcare related journeys. The economic effects of potential disruption to commercial operators is assessed in Volume 2, Chapter 13: Socio-economics of the Environmental Statement.
02 June 2023	Stena Line S42 Response	<p>Stena Line notes that there is <i>“insufficient information in respect of the cumulative impact of the Mona, Morecambe and Morgan Offshore Wind Farms on Human Health deriving from navigational risks or otherwise, to be able to make a cumulative effects assessment (“CEA”) (see Mona Preliminary Environmental Information Report (PEIR) Chapter 30 at section 30.11.1.10, Morecambe PEIR Chapter 19 at section 19.190). Although, it is queried why Morgan Offshore Wind Project Generation Assets has not included a similar reservation (see Morgan PEIR Chapter 19 at section 19.10)”</i>.</p> <p>(a) <i>“It is understood that the CEA for the Wind Farms will be contained within the Environmental Statement health chapter submitted in support of the application for Development Consent (see</i></p>	<p>The Environmental Statement Human Health chapter has had regard for cumulative effects, including of the Morgan, Mona, and Morecambe Offshore Wind Farms. A cumulative assessment of the public health implications is presented in section 14.11, which takes into consideration the cumulative effects discussed in the other technical chapters of the Environmental Statement, including detailed information on cumulative effects presented within Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement.</p> <p>The Environmental Statement Human Health chapter has had regard for cumulative effects, including of the Morgan, Morecambe and Mona Offshore Wind Farms. A cumulative assessment of the public health implications is presented in section 14.11, which takes into consideration the cumulative</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
		<p><i>Mona PEIR Chapter 30, section 30.11.1.10, Morecambe PEIR Chapter 19 section 19.193)</i>”.</p>	<p>effects discussed in the other technical chapters of the Environmental Statement.</p>
		<p><i>“There is the potential for adverse effects associated with shipping's access to human health, when Mona, Morecambe and Morgan are considered together. The Morecambe PEIR Chapter 19, section 19.193 states: ‘Discussions between the projects developers is ongoing to develop measures to avoid navigational impacts that could constitute a likely significant effect for public health’ (emphasis added)”.</i></p>	<p>The Environmental Statement Human Health chapter has had regard for cumulative effects, including of the Mona, Morecambe and Morgan Offshore Wind Farms. A cumulative assessment of the public health implications is presented in section 14.11, which takes into consideration the cumulative effects discussed in the other technical chapters of the Environmental Statement.</p>
		<p><i>“As stated above, Stena Line's concerns are that the shipping risks are not going to be properly mitigated effectively. To emphasise, Stena Line provides a lifeline ferry service to several communities. In particular, Stena Line's concerns in respect of overcrowded shipping lanes and the associated increased collision and allision risks, which will in turn affect human health, are restated”.</i></p>	<p>The Environmental Statement Human Health chapter has had regard for cumulative effects, including of the Morgan, Morecambe and Mona Offshore Wind Farms. A cumulative assessment of the public health implications is presented in section 14.11, which takes into consideration the cumulative effects discussed in the other technical chapters of the Environmental Statement.</p>
		<p><i>“Stena Line requires further details to be provided as to the mitigation steps being taken to reduce the impact of human health, particularly where there is an increased risk of fatalities and injuries during navigation, to make an informed opinion and position.</i></p>	<p>The Environmental Statement Human Health chapter has had regard for cumulative effects, including of the Morgan, Morecambe and Mona Offshore Wind Farms. A cumulative assessment of the public health implications is presented in section 14.11, which takes into consideration the cumulative effects discussed in the other technical chapters of the Environmental Statement.</p>
<p>12 and 18 December 2023</p>	<p>Director of Corporate Services and Healthcare Services on the Isle of Man, email correspondence</p>	<p>Correspondence has confirmed the following points in relation to access and the provisions of medicines and other health related deliveries.</p>	<p>Section 14.9.2 considers the potential for the Morgan Generation Assets to disrupt commercial operators including strategic routes and lifeline ferries to the Isle of Man. This includes the specific</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
	<p>Consultation response</p>	<p>In general, any medical drugs required on the Isle of Man have to be delivered to the Island, these are forwarded to a single courier (Movianto) who deliver once a week to the Island. The usual sailing is the Wednesday morning boat (02:15) from Heysham. The system is managed by the UKHSA.</p> <p>Most medicines are in temperature-controlled boxes and some require refrigeration. Some medicines can therefore be short dated. If it is known that the weather is going to be bad, then there is a process where the Isle of Man Steam Packet Company will be in contact with Movianto and Manx Care so refrigerated medicines are not ordered for that delivery, which the Director of Corporate Services notes mitigates the issue.</p> <p>The real issue is with the potential of an unexpected delay. If this results in delays of multiple weeks in receiving stock, this can impact on patient care. Particularly if a medicine is needed at short notice.</p> <p>Short delays will not normally be an issue. It is where there is either significant delays or cancellations that are out of the norm that the potential impact arises.</p> <p>Non-drug deliveries include x-ray contrast media and liquid gas deliveries. Oxygen is ordered every six months, with smaller amounts as needed. Helium is ordered every 18 months or so. For these products the time between 'normal' requirements is quite long it should be a reasonably small issue in terms of any shipping delays.</p> <p>With regard to food availability, some retailers on the Isle of Man with limited or no storage facilities report a full day of non-sails creates food availability issues that take three days to get back to normal. Two full days of non-sails creates availability issues that take a full week to get back to normal. The most affected food products include fruit, vegetables and bread.</p> <p>The recovery time reflects that the Steam Packet have limited capacity to catch-up with the backlog and that</p>	<p>issue of medical deliveries as well as affordable healthy food availability. Regard has also been given to this issue as part of the cumulative assessment in section 14.11.2. The economic effects of potential disruption to commercial operators is assessed in Volume 2, Chapter 13: Socio-economics of the Environmental Statement.</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Date	Consultee and type of response	Topic raised	Response to topic raised and where considered in this chapter
		the retailers' ordering and replenishment system struggles to handle the sales patterns created by the non-delivery days and double delivery days.	

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.4 Baseline Methodology

14.4.1 Relevant Guidance

14.4.1.1 The human health assessment follows the IEMA 2022 guidance on health in EIA series: effective scoping (Pyper, Lamming, *et al.*, 2022) and determining significance (Pyper, Waples, *et al.*, 2022). Hereafter referred to collectively as the ‘IEMA 2022’ guidance. Other guidance considered are set out in section 14.6.1. The IEMA 2022 and other guidance documents are relevant to both the baseline and the assessment methodology.

14.4.2 Scope of the assessment

14.4.2.1 The scope of this Environmental Statement has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Table 14.6.

14.4.2.2 Taking into account the scoping and consultation process, Table 14.6 summarises the issues considered as part of this assessment. Table 14.6 follows the list of issues set out in guidance (IEMA, 2022).

Table 14.6: Impacts scoped into the assessment for human health.

Health determinant	Summary
Social environment	
Transport modes, access and connections	Construction, Operations/maintenance and Decommissioning phases: The potential impact of changes to commercial operators including strategic routes and lifeline ferries to the Isle of Man is scoped in. Disruption of routine and or emergency access has the potential to affect the availability of goods and services that support health promotion, health protection and healthcare services.
Community identity, culture, resilience and influence	Operations and maintenance phase: The visual impact of the Morgan Generation Assets is scoped in to consider the potential for the introduction of visual change in the seascape, which may affect community wellbeing. This takes into account a context that includes other windfarm projects.
Economic environment	
Employment and income	Construction, Operations and maintenance and Decommissioning phases: Health effects from wider indirect economic impacts are considered. Any potential unemployment or adverse economic implications are scoped in, for example, the Morgan Generation Asset’s effects on commercial fisheries.
Bio-physical environment	
Climate change and adaptation	Operations and maintenance phase: Health effects of climate change are scoped in. The Morgan Generation Assets would be a part of a wider energy sector transition that reduces the severity of climate change. The benefits to population health are assessed.
Institutional and built environment	
Wider societal infrastructure and resources	Operations and maintenance phase: During operations and maintenance, the project’s wider societal contribution to supporting public health is scoped in. The project would provide energy infrastructure that supports many aspects of public health.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.4.2.1 Table 14.7 describes the determinants scoped out of the human health assessment because they are not considered to have the potential for likely significant effects to population health. Table 14.7 follows the list of issues set out in guidance (IEMA, 2022).

Table 14.7: Impacts scoped out of the assessment for human health.

Potential impact	Justification
Health related behaviours	
Physical activity	<p>Construction and Decommissioning phases</p> <ul style="list-style-type: none"> Health promotion within the Morgan Generation Assets workforces will be considered as a good practice enhancement measure but is otherwise scoped out. Community physical activity is not affected by offshore works and associated port operations. <p>Operations and maintenance phase</p> <ul style="list-style-type: none"> Health promotion within the Morgan Generation Assets workforces will be considered as a good practice enhancement measure but is otherwise scoped out. Community physical activity is not affected by offshore works or port operations.
Risk taking behaviour	<p>Construction and Decommissioning phases</p> <ul style="list-style-type: none"> 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 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 reembarkeing). 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 no 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 COVID-19 is noted but scoped out. The Morgan Generation Assets will operate appropriate measures to safeguard the Morgan Generation Assets workforce and the public in line with Government guidance of the day, including in relation to vessel crews. Risks are similar to other routine construction and shipping activities. <p>Operations and maintenance phase</p> <ul style="list-style-type: none"> The same conclusions are reached for the operations 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	<p>All phases</p> <ul style="list-style-type: none"> Offshore there are no effects on agricultural lands. 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 (notably shellfish harvesting) have been considered, see section 14.9.4. The changes are not considered likely to affect availability or price of food to a degree that could affect population health. Wider economic effects to health associated with commercial fisheries are discussed in section 14.9.4. The potential for shipping and navigation changes to affect access to affordable healthy food for the population of the Isle of Man is discussed in section 14.9.2.
Social environment	
Housing	<p>All phases</p> <ul style="list-style-type: none"> 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 traveling to their usual place of residence. Any temporary accommodation requirements would be met through usual capacity for such activities around ports. As stated in Volume 2, Chapter 13: Socio-economics of the

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Potential impact	Justification
	Environmental Statement, there is not considered to be a significant effect associated with changes in the availability of housing.
Relocation	<p>All phases</p> <ul style="list-style-type: none"> Neither offshore works nor port activities would involve compulsory land purchases of homes or community facilities. This issue is scoped out.
Open space, leisure and play	<p>All phases</p> <ul style="list-style-type: none"> 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 land, so have limited potential to effect marine leisure on a scale that could be influential to public health. As stated in Volume 2, Chapter 9: Other Sea Users of the Environmental Statement, there is not considered to be a significant effect associated with displacement of recreational activities. This issue is scoped out.
Transport modes, access and connections	<p>All phases</p> <ul style="list-style-type: none"> Vehicle transport is expected to predominantly relate to the movement of goods, materials, people and plant to and from a port location associated with the offshore works. Although a project port has not been determined, generally road infrastructure to ports 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. Port expansion is not part of the scheme being proposed. Any potential environmental effects are expected to be considered in accordance with any consents and permits that may be required, by the ports themselves.
Community safety	<p>All phases</p> <ul style="list-style-type: none"> The Morgan Generation Assets workforce requires skilled technical roles. It is anticipated that there will be no community safety or security issues associated with worker behaviour in ports or communities. The Morgan Generation Assets would operate appropriate safeguarding and modern slavery policies, with safety as a top priority. 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	<p>Construction and Decommissioning phases</p> <ul style="list-style-type: none"> Demographic changes that could affect community identity are not anticipated, as there would not be a large in-migration or out-migration of workers to local communities. Visual impacts of offshore activities are limited due to their distance offshore and are not of a scale to have the potential for a significant public health effect. Temporary employment opportunities are not expected to have a strong influence on community identity. These issues are therefore scoped out.
Social participation, interaction and support	<p>All phases</p> <ul style="list-style-type: none"> The Morgan Generation Assets 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) as it is located wholly offshore. This issue is therefore scoped out.
Economic environment	
Education and training	<p>All phases</p> <ul style="list-style-type: none"> Whilst the project could support upskilling and career development in relation to its workforces, this is not on a scale with the potential for significant population level effects. Consideration has been given to how benefits, including for local and vulnerable groups, could be enhanced. An Outline Skills and Employment Plan (Document Reference J.9) has been produced. The potential for tailoring opportunities to local and vulnerable groups will be considered as that plan is developed. A large influx for workers, including those bringing families, is not expected, so changes to educational capacity or quality are unlikely and are scoped out.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Potential impact	Justification
Employment and income	<p>All phases</p> <ul style="list-style-type: none"> Whilst the project provides opportunities for good quality employment, which are noted as beneficial for health, these are not on a scale with the potential for significant population level effects. Consideration has been given to how benefits, including for local and vulnerable groups, could be enhanced. An Outline Skills and Employment Plan (Document Reference J.9) has been produced. The potential for tailoring opportunities to local and vulnerable groups will be considered as that plan is developed. Any international supply chain would be expected to operate appropriate policies that safeguard against significant population challenges to equality, health and safety, for both workers and, as appropriate, the public. These issues are therefore scoped out. The project would operate appropriate employment equality policies but is not expected to influence how employment affects family structures and relationships in local populations. Occupational working conditions include particular risks, which are appropriately managed through health and safety policies and practices. Project activities are not expected to differ from industry norms. These issues are therefore scoped out.
Bio-physical environment	
Climate change and adaptation	<p>Construction and Decommissioning phases</p> <ul style="list-style-type: none"> As assessed in Volume 2, Chapter 12: Climate change of the Environmental Statement, embodied carbon and climate altering pollutant emissions are not of a scale to have the potential for population level effects associated with climate change. This issue is therefore scoped out.
Air quality	<p>All phases</p> <ul style="list-style-type: none"> The Morgan Generation Assets are not expected to generate offshore air quality effects during any phase that could have significant effects for public health. This issue is therefore scoped out.
Water quality or availability	<p>All phases</p> <ul style="list-style-type: none"> Offshore pollutant spills have potential to affect coastal bathing water quality, which can result in toxin exposures through dermal contact and ingestion. However, as stated in Volume 2, Chapter 2: benthic subtidal ecology of the Environmental Statement, the risk of such events is managed by the implementation of measures set out in standard post-consent plans (e.g. Offshore Environmental Management Plan, including a Marine Pollution Contingency Plan (MPCP)). These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR (Oslo-Paris), International Maritime Organisation (IMO) and MARPOL (International Convention for the Prevention of Pollution from Ships) guidelines for preventing pollution at sea. This issue is scoped out on the basis of the anticipated effectiveness of such measures.
Land quality	<p>All phases</p> <ul style="list-style-type: none"> Offshore works would not affect land quality. Port expansion is not part of the scheme being proposed. 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. As such, the Morgan Generation Assets would not result in public exposures to contaminated soils. This issue is scoped out.
Noise and vibration	<p>All phases</p> <ul style="list-style-type: none"> Consistent with the section 3.15 of the Scoping Opinion (Planning Inspectorate Case Reference: EN010136), the offshore airborne noise effects to human health are scoped out. 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. This issue is scoped out. A detailed assessment of impacts due to Airborne construction sound is presented in Volume 4, Annex 14.1 Airborne construction sound of the Environmental Statement
Radiation	<p>All phases</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Potential impact	Justification
	<ul style="list-style-type: none"> Non-ionising electro-magnetic field (EMF) 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 the Morgan Generation Assets. No ionising radiation sources are proposed. These issues are scoped out.
Institutional and built environment	
Health and social care services	<p>All phases</p> <ul style="list-style-type: none"> Effects on health and social care are scoped out. The Morgan Generation Assets workforce is assumed to include a high proportion of people who are resident in the regional area. The UK workforce would have National Health Service (NHS) entitlement irrespective of place of residence. 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. The multinational workforce is 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 services. This is routine practice across industries and sectors. The Morgan Generation Assets workforce assumptions set out in Volume 2, Chapter 13: Socio-economics chapter of the Environmental Statement support routine NHS service planning. The Morgan Generation Assets 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 largescale 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	<p>Construction and Decommissioning phases</p> <ul style="list-style-type: none"> 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 MARPOL regulations on waste at sea. Significant population health implications are not anticipated and are scoped out. <p>Operations and maintenance phase</p> <ul style="list-style-type: none"> The Morgan Generation Assets would introduce new elements in the built environment. This is assessed in section 14.9.3. The distance offshore means there are very limited direct impacts on human receptors. Port or offshore operations activities are not considered to have waste management, land use or infrastructure use implications on a scale that could affect population health. These issues are scoped out. Procedures for handling waste materials will be set out in the offshore Environmental Management Plan (EMP) submitted post-consent and secured through the Draft DCO (Document Reference C1). Further information on the offshore EMP is provided in Volume 1, Chapter 5 EIA methodology of the Environmental Statement.
Wider societal infrastructure and resources	<p>Construction and Decommissioning phases</p> <ul style="list-style-type: none"> The Morgan Generation Assets' energy infrastructure would not generate public health benefits at this stage. This issue is scoped out.

14.4.3 Methodology to inform baseline

14.4.4 Study area

14.4.4.1 The Morgan Array Area is located approximately 22.22 km from the Isle of Man and 37.13 km from the North West coast of England. The Morgan Generation Assets is

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

situated far from the nearest mainland receptor population. For most determinants of health there is not a localised population impact around which a study area can be defined. The closest population to the project is on the Isle of Man. As discussed later in this chapter in section 14.9.2 the offshore transport connections between England and the Isle of Man are of interest, as are coastal communities associated with commercial fisheries (section 14.9). Wider impacts of the Morgan Generation Assets are relevant to national public health and climate change related effects extend to the global population. To be proportionate the Human Health study area for the Environmental Statement is therefore comprised of:

- The local populations of Isle of Man (offshore access and visual impacts, see sections 14.9.2 and 14.9.3)
- The regional populations of North West England (visual impacts and commercial fishing impacts, see sections 14.9.3 and 14.9.4)
- The national populations of England and the United Kingdom (offshore asset electricity generation impacts and climate change, see sections 14.9.5 and 14.9.6)
- The global population, particularly low and middle income countries (LMIC) (offshore asset climate change impacts, see section 14.9.5).

14.4.4.2 The 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 broader areas are designed to encompass all effects, including fishing communities outside of North West England.

14.4.4.3 The health assessment has regard to the topic specific study areas defined by other Environmental Statement chapters listed in paragraph 14.1.1.7. Those chapters inform the Human Health chapter's consideration of magnitude of impact, including the extent of effects.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

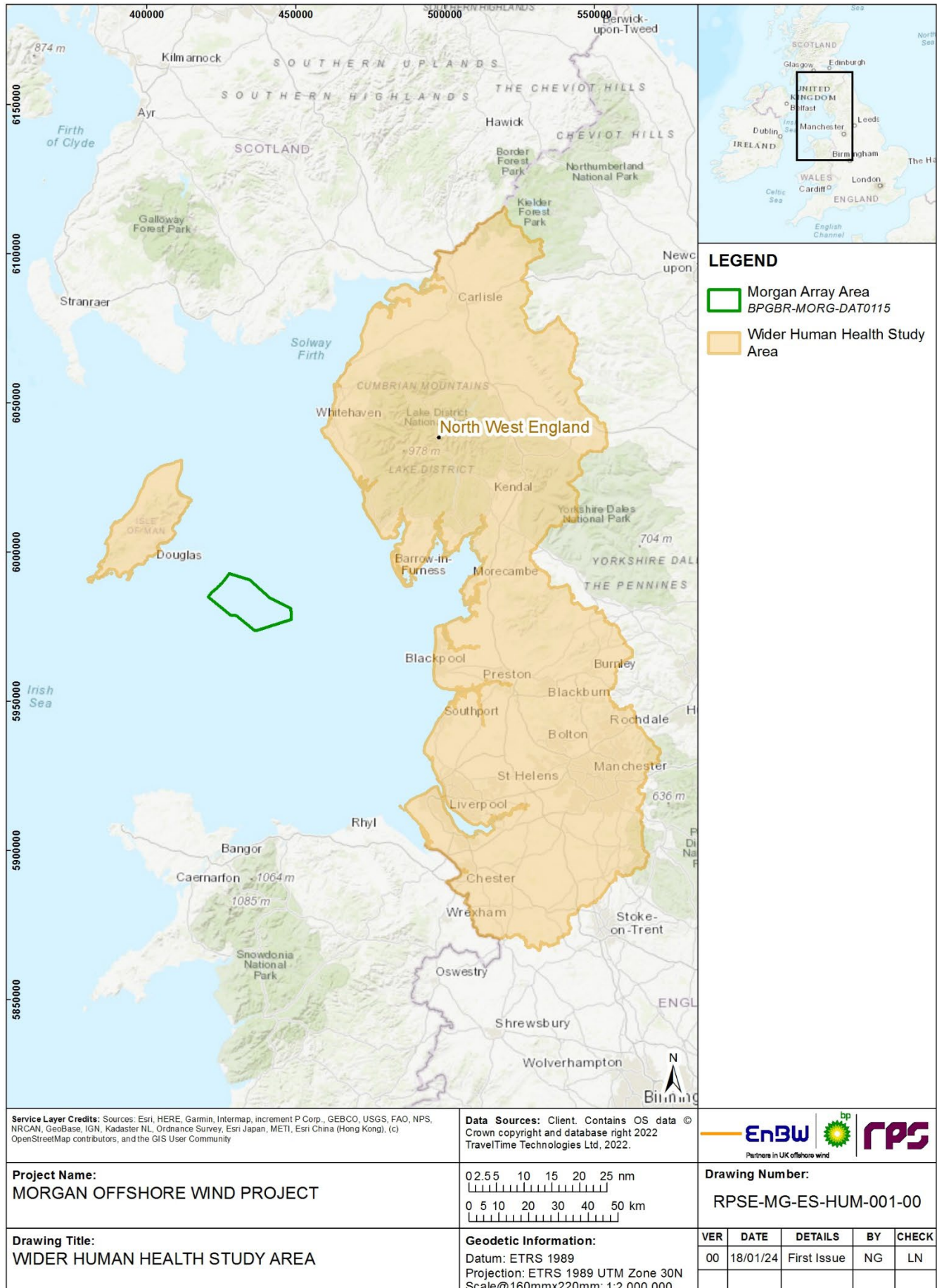


Figure 14.1: Human Health study area

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.4.5 Desktop study

14.4.5.1 Information on human health within the Human Health study area was collected through a detailed desktop review of existing studies and datasets. These are summarised in Table 14.8 below.

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

- Office for Health Improvement and Disparities. Fingertips Public Health Data (OHID, 2023b).
- Isle of Man Cabinet Office. Public Health Outcomes Framework (Isle of Man Cabinet Office, 2021).
- Google Earth Pro 2021 aerial review of the general site context in relation to population receptors.

Table 14.8: Summary of key desktop reports.

Title	Source	Year	Author
Public Health Outcomes Framework, England	Fingertip's resource	2011 to 2023	Office of Health Improvement and Disparities (OHID)
Public Health Outcomes Framework, Isle of Man	Health Intelligence	2016 to 2021	Isle of Man Cabinet Office

14.4.6 Site specific surveys

14.4.6.1 No site-specific surveys have been undertaken to inform the EIA for human health. This is because relevant population health data is publicly available and further data collection would not be proportionate.

14.5 Baseline environment

Isle of Man data

14.5.1.1 Public health data as recent as 2021 demonstrate slightly poorer health outcomes on the Isle of Man compared to England averages. These are summarised in Table 14.9. Healthy life expectancy at birth is lower for both males and females compared to the average of England (60.9 years vs 63.4 years for males and 56.1 years vs 63.8 years for females). Excess weight in children (4 to 5 years old) is slightly higher than the England average (25.2% vs 22.4%). Mortality rate from all causes considered preventable is lower than in England (155.3 per 100,000 v. 183.2 per 100,000). Infant mortality and excess winter mortality (all ages) rates are very low on the Isle of Man. Emergency hospital admissions for intentional self-harm (a mental health indicator), shows higher rates for the Isle of Man compared to England (206.5 per 100,000 v. 185.5 per 100,000) (Isle of Man Cabinet Office, 2021).

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS
Table 14.9: Selection of Public Health Outcomes – Isle of Man (Isle of Man Cabinet Office, 2021).

Description	Sex	Period	Unit	Isle of Man	England
Healthy Life Expectancy at birth	Male	2018 to 2020	Years	60.9	63.4
Healthy Life Expectancy at birth	Female	2018 to 2020	Years	56.1	63.8
Child Excess weight - 4–5-year-olds	All	2017 to 2018	%	25.2	22.4
Infant mortality	All	2018 to 2020	per 1000	1.9	3.9
Under 75 mortality rate from causes considered preventable	All	2021	per 100,000	155.3	183.2
Under 75 mortality rate from all cardiovascular diseases considered preventable	All	2021	per 100,000	31.4	30.2
Under 75 mortality rate from cancer considered preventable	All	2021	per 100,000	55.1	50.1
Under 75 mortality rate from liver disease considered preventable	All	2021	per 100,000	13.5	18.9
Under 75 mortality rate from respiratory disease considered preventable	All	2021	per 100,000	16.3	15.6
Excess Winter Mortality Index (single year, all ages)	All	2021	%	14.4	21.6
Emergency Hospital Admissions for Intentional Self-Harm	All	2017 to 2018	per 100,000	206.5	185.5

North West England data

14.5.1.2 The baseline health conditions for relevant determinants of health are reported below in Table 14.10. In many instances only indicators for England (including regional data) were available. Recent public health data indicate poorer health outcomes in the North West region than the rest of England.

Table 14.10: Selection of Public Health Outcomes – North West Region England (OHID, 2023a).

Indicator	Sex	Period	Unit	North West	England
Socio-economic Indicators					
A01a - Healthy life expectancy at birth	Male	2018 to 2020	Years	61.53	63.14
A01a - Healthy life expectancy at birth	Female	2018 to 2020	Years	62.43	63.87
B01b - Children in absolute low-income families (under 16s)	Persons	2021/22	%	16.58	15.28
B05 - 16- to 17-year-olds not in education, employment or training (NEET) or whose activity is not known	Persons	2022/23	%	5.3	5.2

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Indicator	Sex	Period	Unit	North West	England
1.01i - Children in low-income families (all dependent children under 20)	Persons	2016	%	18.1	17.0
Percentage of people in employment (16-64 years)	Persons	2022/23	%	73.6	75.7
Noise Indicators					
B14a - The rate of complaints about noise	Persons	2020/21	Per 1000	6.04	12.00
B14b - The percentage of the population exposed to road, rail and air transport noise of 65dB(A) or more, during the daytime	Persons	2016	%	5.51	5.50
B14c - The percentage of the population exposed to road, rail and air transport noise of 55 dB(A) or more during the night-time	Persons	2016	%	9.37	8.48
Wider Infrastructure and resources					
B17 - Fuel poverty (low income, low energy efficiency methodology)	N/A	2021	%	14.6	13.1
B15a - Homelessness: households owed a duty under the Homelessness Reduction Act	N/A	2022/23	%	14.0	12.4
B15c - Homelessness: households in temporary accommodation	N/A	202/23	%	2.0	4.20
Healthy lifestyle behaviours Indicators					
B16 - Utilisation of outdoor space for exercise/health reasons (over 16s)	Persons	Mar 2015 to Feb 2016	%	17.55	17.92
C09a - Reception: Prevalence of overweight (including obesity)	Persons	2022/23	%	23.1	21.3
C09b - Year 6: Prevalence of overweight (including obesity)	Persons	2022/23	%	3830	3668
C10 - Percentage of physically active children and young people	Persons	2022/23	%	45.1	47.0
C15 - Proportion of the population meeting the recommended '5-a-day' on a 'usual day' (adults)	Persons	2019/20	%	51.2	55.4
C16 - Percentage of adults (aged 18+) classified as overweight or obese	Persons	2021/22	%	66.7	63.8
C17a - Percentage of physically active adults	Persons	2021/22	%	65.2	67.3
C17b - Percentage of physically inactive adults	Persons	2021/22	%	24.2	22.3
C22 - Estimated diabetes diagnosis rate	Persons	2018	%	81.1	78.0
C27 - Percentage reporting a long-term Musculoskeletal (MSK) problem	Persons	2022	%	19.7	17.6
Mental Health Indicators					
C28d - Self reported wellbeing: people with a high anxiety score	Persons	2021/22	%	24.0	22.6
Depression: QOF prevalence (18+ years)	Persons	2022/23	%	16.50	13.2

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Indicator	Sex	Period	Unit	North West	England
Self-reported wellbeing: people with a high anxiety score (16+ years)	Persons	2022/23	%	24.6	23.3
Hypertension: QOF prevalence (all ages)	Persons	2022/23	%	15.0	14.4
Emergency hospital admissions for intentional self-harm (SAR)	Persons	2021/22	SAR	190.2	163.7
Environment and Health Indicators					
D01 - Fraction of mortality attributable to particulate air pollution (new method)	Persons	2021	%	5.3	5.5
E01 - Infant mortality rate	Persons	2019 to 2021	Per 1000	4.43	3.92
E03 - Under 75 mortality rate from causes considered preventable (2019 definition)	Persons	2021	Per 100 000	222.19	183.15
E04b - Under 75 mortality rate from cardiovascular diseases considered preventable (2019 definition)	Persons	2021	Per 100 000	36.99	30.19
E05b - Under 75 mortality rate from cancer considered preventable (2019 definition)	Persons	2021	Per 100 000	58.78	50.14
E06b - Under 75 mortality rate from liver disease considered preventable (2019 definition)	Persons	2021	Per 100 000	25.92	18.92
E07b - Under 75 mortality rate from respiratory disease considered preventable (2019 definition)	Persons	2021	Per 100 000	20.38	15.61
Climate change and adaptation					
E14-Winter Mortality Index	Persons	Aug 2020 to Jul 2021	%	24.30	36.2

Discussion

Community Identity

- 14.5.1.3 The way people feel about and experience their community is a significant determinant of population mental health. As shown in Table 14.10 in relation to the sensitivity of the regional population to mental health influences, the North West region performs worse than England overall noting that community identity is only one contributing factor to these mental health metrics. The proportion of the North West population with a clinical diagnosis of depression is higher (16.5%) than the national average (13.2%). Similarly, the proportion of people with a high self-reported anxiety score is higher (24.6%) in the North West as compared to England (23.3%). Regarding the physiological outcomes of mental health, the percentage of the North West population diagnosed with hypertension (high blood pressure) and emergency hospital admissions for intentional self-harm are both higher than the national averages. Similarly, 2018 data from Isle of Man shows higher emergency hospital admissions for intentional self-harm compared to England (206.5 vs 185.5 per 100,000 respectively) and higher under 75 mortality rate from cardiovascular disease (54.3% vs 45.9% respectively). Data suggest high sensitivity in the regional population of North West and Isle of Man to mental health influences.

Socio-economics

14.5.1.4 Socio-economic status has correlations with health, both for those directly employed and their dependants. Most recent statistics for England (2022) show that the North West regional population performs worse than the national comparator in its socio-economic health outcomes. The percentage of people in employment in the North West (73.6%) is relatively lower (worse) compared to the average for England (75.7%). Statistics also show the proportion of 16 to 17-year-olds not in education, employment or training (NEET) in the region (53.9%) is slightly higher than the average for England (5.2%). Similarly, the proportion of children in absolute low-income families is higher in the North West region (16.58%) than the national comparator (15.28%). Healthy life expectancy for males and females is lower compared to the rest of England. Based on this, data suggest high sensitivity in the regional population to employment and socio-economic opportunities. There is not equivalent data in the Isle of Man Public Health Outcomes Framework, so conservatively high sensitivity is assumed.

Climate Change

14.5.1.5 Table 14.10 shows that in relation to climate change and adaptation, most recent statistics show better performance in the North West region compared to England. Winter mortality (the difference between the actual number of winter deaths and those expected during the 4-month winter period of December to March) is an indicator relevant to climate change related extreme weather. Renewable energy sources contribute to avoiding climate change adverse health outcomes and provide energy infrastructure resilience. The latter supports homes to be adequately heated, even where climate related extreme weather occurs. The winter mortality index is significantly lower in the North West (24.30%) compared to the average for England (36.2%). Similarly for Isle of Man, the proportion of excess winter mortality is significantly lower than the average of England.

Infrastructure (green energy)

14.5.1.6 In relation to the sensitivity of the regional population to infrastructural changes that support access to green energy, most recent statistics show the proportion of households in fuel poverty is higher in North West (14.6%) than the national average (13.1%) suggesting higher sensitivity in the region to infrastructure changes which support increased affordable energy capacity. Fuel poverty on the Isle of Man is notably lower (9.8% of households) than the average of England (13.1% of households) (Isle of Man Government, 2020).

14.5.2 Future baseline scenario

14.5.2.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires that '*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*' is included within the Environmental Statement. In the event that the Morgan Generation Assets does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

14.5.2.2 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.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- 14.5.2.3 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.
- 14.5.2.4 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.
- 14.5.2.5 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 (Public Health England, 2021b) and has been taken into account by the assessment.

14.5.3 Data limitations

- 14.5.3.1 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.
- 14.5.3.2 The health assessment partially draws from and builds upon, the technical outputs from inter-related technical disciplines set out in paragraph 14.1.1.7.
- 14.5.3.3 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.
- 14.5.3.4 Reducing uncertainty is a key element of impact assessment. Whilst 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 14.1.1.7

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- The health assessment has been cautious, with conservative assessments, for example in taking account of non-threshold effects 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 section 14.6.1.

14.5.3.5 It is also noted that a number of assumptions were made on the required workforce of the Morgan Generation Assets. These are detailed in Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

14.5.3.6 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 likely significant effects of the project on population health.

14.6 Impact assessment methodology

14.6.1 Overview

14.6.1.1 The human health impact assessment has followed the methodology set out in Volume 1, Chapter 5: EIA methodology of the Environmental Statement. Specific to the human health impact assessment, the following guidance documents have also been considered:

- 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 (Pyper *et al.*, 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, 2021a)
- Public Health England, Health Impact Assessment in spatial planning 2020 (Public Health England, 2020)
- World Health Organisation (WHO) guidelines on air quality and noise (Berglund *et al.*, 1999; WHO, 2009, p. 1, 2018, 2021).

14.6.2 Impact assessment criteria

14.6.2.1 Determining the significance of effects is a two-stage process that involves defining the magnitude of the 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 5: EIA Methodology of the Environmental Statement.

14.6.2.2 Judgements are based on the most relevant criteria in Table 14.11, Table 14.12 and Table 14.14. It is likely in any given analysis that some criteria will span score categories. These are as set out by guidance (IEMA, 2022).

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.6.2.3 The criteria for defining magnitude in this chapter are outlined in Table 14.11 below.

Table 14.11: Definition of terms relating to the magnitude of an impact.

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.

14.6.2.4 The criteria for defining sensitivity in this chapter are outlined in Table 14.12 below.

Table 14.12: Definition of terms relating to the sensitivity of the receptor.

Sensitivity	Definition
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); 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.
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.

14.6.2.5 The significance of the effect upon human health is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 14.13. Where a range of significance of effect is presented in Table 14.13, the final assessment for each effect is based upon expert judgement. Table 14.14 provides indicative criteria to support this judgement.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.6.2.6 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Table 14.13: Matrix used for the assessment of the significance of the effect.

Sensitivity of receptor	Magnitude of impact			
	Negligible	Low	Medium	High
Very Low	Negligible	Negligible	Negligible or Minor	Minor
Low	Negligible	Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Minor or Negligible	Minor or Moderate	Moderate or Major	Major

14.6.2.7 The IEMA 2022 guidance requires that the conclusions, reached using sensitivity and magnitude, are then explained for the public health audience with a suitable concise narrative. The narrative summarises key considerations and supporting evidence. The guidance sets out the criteria for doing so, see Table 14.14.

Table 14.14: Explanation of Population Health Significance.

Category/Score	Indicative criteria
Major (significant)	<p>The narrative explains that this is significant for public health because:</p> <ul style="list-style-type: none"> • Changes, due to the project, 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 the project, 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 the project 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 the project.
Moderate (significant)	<p>The narrative explains that this is significant for public health because:</p> <ul style="list-style-type: none"> • Changes, due to the project, 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 the project, 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 the project 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 the project.
Minor (not significant)	<p>The narrative explains that this is not significant for public health because:</p> <ul style="list-style-type: none"> • Changes, due to the project, 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

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Category/Score	Indicative criteria
	<ul style="list-style-type: none"> • Change, due to the project, 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 suggestive relationship between changes that would result from the project 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 the project.
Negligible (not significant)	<p>The narrative explains that this is not significant for public health because:</p> <ul style="list-style-type: none"> • Changes, due to the project, 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 the project having no responses on this issue among stakeholders • Change, due to the project, 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 the project 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 the project.

- 14.6.2.8 The temporal scope of this chapter used the following summary terms:
- ‘Very short term’ relates to effects measured in hours, days or weeks;
 - ‘Short term’ relates to effects measured in months, (up to 24 months duration)
 - ‘Medium term’ relates to effects measured in years and
 - ‘Long term’ relates to effects measured in decades.
- 14.6.2.9 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.
- 14.6.2.10 Impacts of the Morgan Generation Assets 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.
- 14.6.2.11 A change in a determinant of health effects 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 the Morgan Generation Assets. 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.
- 14.6.2.12 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.
- 14.6.2.13 The human health assessment is a qualitative analysis, following the IEMA 2022 guidance approach, which draws on qualitative and quantitative inputs from other

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Environmental Statement chapters listed in 14.1, paragraph 14.1.1.7. This is considered the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

14.6.2.14 As set out in guidance the assessment methods allow a consideration of the effect on population health outcomes and what this means for public health, drawing on, as relevant, the: scientific literature; health baseline change; local health priorities; health policy context; compliance with regulatory or statutory standards; and consultation.

14.6.2.15 The approach taken ensures that Health Impact Assessment (HIA) is embedded within the EIA in line with good practice (Public Health England, 2020).

14.6.3 Vulnerable groups

14.6.3.1 The impact assessment methodology draws on the list of vulnerable population groups set out in guidance. The following six broad population groups are used to inform a consistent narrative on potential health inequalities across the assessment. These groups are broadly defined to facilitate a consistent discussion across health issues. People falling into more than one group may be especially sensitive:

- 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/workless
- 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.

14.6.3.2 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 construction, operations/maintenance and decommissioning.

- 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; experiencing low deprivation; comprising people with good health status; rating their day-to-day activities as not limited; having a high capacity to adapt to change (high resilience); less likely to rely on resources shared with the Morgan Generation Assets
- 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; experiencing high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas); reporting bad or very bad health status; rating their day-to-day activities as limited; having a low capacity to adapt

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

to change (limited resilience); more likely to rely on resources shared with the Morgan Generation Assets (e.g. commercial fishing areas and shipping routes).

- 14.6.3.3 Heightened vulnerability is rarely due to a single cause and people may experience multiple forms of vulnerability due to intersecting social processes that result in inequalities (e.g. socioeconomic status and income).
- 14.6.3.4 As all development has the potential for adverse effects to some particularly vulnerable individuals, the role of EIA significance conclusions is not to set a threshold of ‘no harm’ from development, but to show where, at a population level, the harm should weigh strongly in the balance alongside the development’s benefits for health and other outcomes.
- 14.6.3.5 In some situations, an effect may only be relevant to a few individuals, indicating that a population health effect would not occur. As stated by guidance: *‘Where the effect is best characterised as only affecting a few individuals, this may indicate that a population health effect would not occur. Such individuals should still be the subject of mitigation and discussion, but in EIA and public health terms the effect may not be a significant population health change.’* (Pyper, Waples, et al., 2022) paragraph 8.18.

14.7 Key parameters for assessment

14.7.1 Maximum design scenario

- 14.7.1.1 The health assessment does not duplicate the maximum design scenarios (MDS) described in the inter-related technical disciplines set out in paragraph 14.1.1.7.
- 14.7.1.2 The MDS identified in Table 14.15 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 project design envelope provided in Volume 1, Chapter 3: Project description of the Environmental Statement. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project design envelope (e.g. different infrastructure layout), to that assessed here be taken forward in the final design scheme.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.15: Maximum design scenario considered for the assessment of potential impacts on human health.

^a C=construction, O=operations and maintenance, D=decommissioning

Potential impact	Phase ^a			Maximum Design Scenario	Justification
	C	O	D		
Transport modes, access and connections	✓	✓	✓	MDS is in relation to commercial operators including strategic routes and lifeline ferries. The relevant MDS is stated in Volume 2, Chapter 7: Shipping and Navigation of the Environmental Statement.	The greatest level of disruption to access of routes while vessels navigate around the Morgan Array Area.
Community identity, culture, resilience and influence	x	✓	x	MDS is in relation to visual impact of the wind turbines. The relevant MDS is as stated in Volume 2, Chapter 10: Seascape, Landscape and Visual Resources.	The greatest visual impact of the Morgan Generation Assets.
Employment and income, adverse	✓	✓	✓	MDS is in relation to loss or restricted access to commercial fishing grounds. The relevant MDS is as stated in Volume 2, Chapter 6: Commercial Fisheries.	The greatest unemployment or adverse economic implications.
Climate change and adaptation	x	✓	x	MDS is in relation to renewable energy generation and subsequent reduced greenhouse gas emissions. The relevant MDS is as stated in Volume 2, Chapter 12: Climate Change.	The smallest output contribution to renewable energy generation would be the most conservative basis of assessment for this beneficial effect.
Wider societal infrastructure and resources	x	✓	x	MDS is in relation to the electrical power generating capacity associated with Morgan Generation Assets. The relevant MDS is as stated in Volume 2, Chapter 12: Climate Change.	The smallest output contribution to renewable energy generation would be the most conservative basis of assessment for this beneficial effect.

14.8 Measures adopted as part of the Morgan Generation Assets

- 14.8.1.1 For the purposes of the EIA process, the term 'measures adopted as part of the project' is used to include the following measures (adapted from IEMA, 2016):
- Measures included as part of the project design. These include modifications to the location or design of the Morgan Generation Assets which are integrated into the application for consent. These measures are secured through the consent itself, in particular the description of authorised development and the parameters secured in the DCO and/or deemed marine licences (referred to as primary mitigation in IEMA, 2016)
 - Measures required to meet legislative requirements, or actions that are generally standard practice used to manage commonly occurring environmental effects and are secured through the DCO requirements and/or the conditions of the deemed marine licences (referred to as tertiary mitigation in IEMA, 2016).
- 14.8.1.2 This human health chapter takes as its input, the residual effect conclusions of the inter-related technical disciplines set out at paragraph 14.1.1.7. In this regard the health assessment relies on the measures adopted as part of the Morgan Generation Assets set out in those chapters and does not repeat them. This avoids duplication and keeps the assessment proportionate.
- 14.8.1.3 Where significant effects have been identified, further mitigation measures (referred to as secondary mitigation in IEMA 2016) 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 14.9 below.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.9 Assessment of significant effects

14.9.1 Overview

14.9.1.1 The impacts of the construction, operations and maintenance and decommissioning phases of the Morgan Generation Assets have been assessed for human health. The potential impacts arising from the construction, operations and maintenance and decommissioning phases of the Morgan Generation Assets are listed in Table 14.15 along with the MDS against which each impact has been assessed.

14.9.1.2 A description of the potential effect on human health receptors caused by each identified impact is given below.

14.9.2 Transport modes, access and connections

14.9.2.1 During the construction, operations/maintenance and decommissioning phases, shipping and offshore restricted areas may lead to disruption of routine and or emergency commercial operators including strategic routes and lifeline ferries to the Isle of Man. This has the potential to affect the availability of goods and services that support health promotion, health protection and healthcare services. The MDS is represented by the greatest level of disruption in access and is summarised in Table 14.15.

14.9.2.2 The scientific literature identifies the following general points relevant to potential exposures and health outcomes. For accessibility, health effects are associated with emergency response times or non-emergency treatment outcomes. Transportation barriers are important to healthcare access, particularly for those with lower incomes. Transportation barriers may lead to rescheduled or missed appointments, delayed care, and missed/delayed medication use. These consequences may lead to poorer management of chronic illness and thus poorer health outcomes (Parsons *et al.*, 2021; Syed *et al.*, 2013).

14.9.2.3 This section has been informed by Volume 2, Chapter 7: Shipping and Navigation, which sets out relevant assessment findings and measures adopted as part of Morgan Generation Assets that have been taken into account. This includes the issues of vessel collision and allision, which are discussed in section 14.11, being most relevant to cumulative effects. Volume 2, Chapter 7: Shipping and Navigation concludes for the issues most relevant to this assessment:

- A potential impact on recognised sea lanes essential to international navigation is negligible (not significant in EIA terms) for construction, operations/maintenance and decommissioning
- The potential impact to commercial operators including strategic routes and lifeline ferries is a minor adverse (not significant in EIA terms) for construction, operations/maintenance and decommissioning
- Potential impacts on adverse weather routing for all project phases is a moderate adverse effect for Isle of Man Steam Packet Company and Stena Line which is significant in EIA terms and a minor adverse effect on Seatruck ferries and Commercial cargo which is not significant in EIA terms. During adverse weather, some sailings are delayed or inevitably cancelled irrespective of the presence of the Morgan Array Area. However, with the presence of the Morgan Array Area, where sailings are safe to take place, they may be required to take routes of a greater distance and duration. Over the course of a day, the accumulation of these delays would result in the potential for additional sailings to be cancelled.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Such effects are already experienced by operators, but consultation has demonstrated that the presence of the Morgan Generation Assets may potentially exacerbate this

- Potential impact on access to ports and harbours is negligible (not significant in EIA terms) for all project phases.

14.9.2.4 Volume 1, Chapter 4: Site Selection and Consideration of Alternatives of the Environmental Statement sets out how the final design of the Morgan Generation Assets has benefited from stakeholder feedback and an iterative design process, including to refine and reduce the total footprint of the Morgan Array Area. These changes minimise potential impacts on shipping and navigation stakeholders both from the Morgan Generation Assets alone and cumulatively with other proposed offshore wind farms in the east Irish Sea.

14.9.2.5 For these transport access issues, a potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:

- The source is disruption by vessels and restricted areas
- The pathway is a change in access to goods and services that support health directly and indirectly
- Receptors are residents and visitors to the Isle of Man.

14.9.2.6 Furthermore, the theoretical effect is considered applicable in the context of this project.

14.9.2.7 The population groups relevant to this assessment are:

- The 'local' population of the Isle of Man
- The sub-population vulnerable due to young age, old age, low income, poor health, social disadvantage or access and geographical factors.

Construction, Operations/Maintenance and Decommissioning

Magnitude of impact

14.9.2.8 The Applicant has consulted with the Director of Corporate Services who provided information from the Healthcare Services on the Isle of Man (Table 14.5). The response to consultation confirms that the potential for impacts arising from delayed medical and other supplies is limited to whether there would be 'significant delays or cancellations that are out of the norm', in the context that existing sailings are routinely cancelled in adverse weather every year. Short delays are unlikely to be an issue for public health. As noted in Volume 2, Chapter 7: Shipping and Navigation, the potential for significant delays or cancellations may arise due to accumulated delays due to deviations around the Morgan Array Area in adverse weather, whereby the final sailings on that day are most affected by earlier delays. As medical supplies are routinely scheduled on the Wednesday early morning sailing (02:15) from Heysham to Douglas, accumulated delays from earlier sailings are unlikely. Similarly full days of no sailings would be unlikely to arise, only fewer sailings on a given day if cancellations are required. The potential for effects to medical and other health related deliveries that are on the first sailing of the day would therefore be limited. Furthermore, it is likely that medical supplies would be given priority when freight is transferred to the next available sailing. It is not expected that the Morgan Generation Assets would result in additional non-sailing days of a scale to affect public health. It is noted that there are a range of other existing transport options that contribute to resilience in access to Isle

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

of Man. These include the Motor Vessel MV Arrow freight relief vessel and transport via Isle of Man Airport.

- 14.9.2.9 Effects on medical deliveries from Heysham to Douglas are very limited. The scale of change in all other health-related access issues is considered small, with potential for occasional disruption. For commercial operators including strategic routes and lifeline ferries changes in access would result in possible minor delays. During adverse weather conditions, longer delays could occur potentially resulting in cancellations in some later sailings on a given day. This could for example affect people travelling to non-urgent medical appointments in England who used a later sailing time that was more prone to disruption. However, additional days of no sailings are not expected due to the Project, so medical and healthcare access would be maintained. Use of the first sailing of the day for medical and health related deliveries and trips, continues to be appropriate to mitigate against adverse weather delays, with or without the Morgan Generation Assets. The duration of any disruption would be short-term. Outcome reversal may be rapid once services are reinstated, with slight service quality implications. There is the potential for minor adverse changes in morbidity for a small minority of the population.
- 14.9.2.10 It is predicted that the impact will affect the receptor directly and indirectly. The magnitude is therefore considered to be **low**.

Sensitivity of receptor

- 14.9.2.11 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 14.6.3.
- 14.9.2.12 The general population of residents and visitors to the Isle of Man is likely to be in good general health and make limited use of healthcare services affected by any disruption to shipping. Most people are also likely to have access to alternative goods, amenities and services that have a health promotion or health protection function, (i.e. that facilitate active lifestyles or reduce the risk of social isolation). The general population comprise those members of the community with a high capacity to adapt to changes in access, including changes in healthcare access, for example due to them having greater resources and good physical and mental health.
- 14.9.2.13 The sensitivity of the general population is therefore considered to be **low**.
- 14.9.2.14 The vulnerable group sub-population includes a high representation of dependants, both children, elderly and those receiving care due to poor health. This sub-population may have fewer resources and less capacity to adapt to changes. The population may therefore be more reliant on the affected goods and services with greater likelihood that any disruption could affect health outcomes.
- 14.9.2.15 Deprived populations may already face more access barriers compared to the general population and therefore be more sensitive to access changes. Issues of access are particularly relevant in island contexts, such as the Isle of Man, where alternative access to goods and services is limited. Low incomes may compound access barriers by limiting adaptive response.
- 14.9.2.16 Vulnerability also includes those accessing emergency or non-emergency health services at locations in the UK. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient). The Isle of Man Air Ambulance Service is not expected to be affected by the Morgan Generation Assets. There may be some disruption during adverse weather to the Isle of Man Steam Packet Company vessels, and other vessels, that provide lifeline and essential deliveries, including of people to NHS care in the UK. People in

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

poor or very poor health may be more frequent users of healthcare services and therefore be more sensitive to access changes.

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

Significance of effect

14.9.2.18 Overall, the magnitude of the impact is deemed to be **low** and the sensitivity of the vulnerable group population is considered to be **high**.

14.9.2.19 Access to health supporting goods and services is a specific public health priority for the Isle of Man community and the scientific literature is well established on the causal association between physical and mental health outcomes and access to resources that support health and healthcare services. However, the overall potential access disruption is on a scale that could have only slight implications for the population health baseline of the Isle of Man. This conclusion takes into account that a scarcity of resources or access opportunities may result in differential or disproportionate effects experienced by those who are most vulnerable, including due to low incomes and existing poor health. Even accounting for this, there is considered only a marginal impact on the ability to deliver health policies, including related to the supply of essential goods and services, as well as in relation to narrowing health inequalities.

14.9.2.20 The effect would, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Further mitigation and residual effects

14.9.2.21 No further mitigation is considered necessary in relation to population health outcomes.

14.9.3 Community identity, culture, resilience and influence

14.9.3.1 The operations and maintenance of the Morgan Generation Assets' offshore activities (22.2 km offshore from the Isle of Man and 37.13 km from the North West coast of England) may lead to effects on visual impact and community identity. The MDS is represented by the greatest visual impact of the Morgan Generation Assets and is summarised in Table 14.15.

14.9.3.2 Impact will result from visibility of both moving and static project components occupying the Morgan Array Area (22.2km offshore from the Isle of Man) such as rotating wind turbines and service vessels/aircraft, which have the potential to affect peoples' appreciation of the surrounding seascape and or landscape.

14.9.3.3 Community identity as a determinant of health has a strong subjective dimension that varies between individuals. Visibility of a windfarm can be interpreted differently and includes beneficial effects such as reminding people that the local economy supports employment opportunities and renewable electricity generation, as well as potential adverse effects where people feel the coastal setting is adversely affected. Health effects may be associated with mental health conditions (e.g. stress, anxiety or depression) due to underlying social determinants influencing community identity and wellbeing.

14.9.3.4 This section has been informed by Volume 2, Chapter 10: Seascape, landscape and visual resources of the Environmental Statement which sets out relevant assessment findings and measures adopted as part of Morgan Generation Assets that have been taken into account.

14.9.3.5 Volume 2, Chapter 10: Seascape, landscape and visual resources of the Environmental Statement concludes:

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- Views from and visual amenity of national trails and long-distance paths in the Seascape, Landscape and Visual Impact Assessment (SLVIA) study area falling within the Zone of Theoretical Visibility (ZTV) of Morgan Array Area will be affected. During construction and decommissioning phases, the effect will be minor adverse at most for Raad ny Foillan Coastal Path (Isle of Man). During operations and maintenance, the effect on the Raad ny Foillan Coastal Path will be moderate adverse. The exception to this will be the sections in the vicinity of Douglas and Laxey (due to the nature of views and the proximity of the receptor to Morgan Array Area) where the effects will be moderate to major adverse
- The visual impacts on people using land with public access will affect the summits of Snaefell, Slieau Ruy and South Barrule (Isle of Man). During construction and decommissioning the temporary effect is deemed to be minor to moderate adverse. During operations/maintenance the effect is deemed to be minor to moderate adverse
- The impact to people using the Isle of Man National Cycleway is judged to be negligible to minor adverse during construction and decommissioning, and minor adverse at most during operations/maintenance
- Impacts to key coastal settlement seafronts/shorelines are considered in relation to the Douglas and Laxey (Isle of Man). The effect is judged to be minor to moderate adverse during construction and decommissioning. For operations /maintenance the effects will be moderate to major adverse in the case of the views across the adjacent seascape from Douglas and Laxey seafronts
- The visual impact of people travelling along coastal roads near the coast on the Isle of Man is deemed to be negligible adverse during construction and decommissioning, and negligible to minor adverse during operations/ maintenance
- The visual impact on people travelling along coastal railways near the coast on the Isle of Man is judged to be minor adverse during construction and decommissioning, and minor to moderate adverse during operations/maintenance
- The visual impact on people using main ferry routes is judged to be moderate to major adverse during all construction and decommissioning and moderate adverse during operations and maintenance.

14.9.3.6 A potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:

- The source is visual change associated with the operational Morgan Generation Assets and perceived benefits of the Morgan Generation Assets, which influence community identity
- The pathway by which health outcomes are affected relates to factors that contribute to behaviour and a sense of identity, including: changes in visual environmental cues; and economic and prosperity cues that influence social status
- Receptors are residents in the local coastal communities.

14.9.3.7 Furthermore, the theoretical effect described is considered applicable in the context of this project.

14.9.3.8 The population groups relevant to this assessment are:

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- The 'local' population of the Isle of Man
- The 'regional' population of coastal communities in North West England and
- The vulnerable sub-populations including young and old people, people with low incomes, people with poor health, and people experiencing social disadvantage.

Operations and maintenance

Magnitude of impact

- 14.9.3.9 The impact is predicted to be of local and regional spatial extent, long-term duration, and continuous during the operations/maintenance phase. However, the scale of visual change from the Morgan Generation Assets 22.2 km offshore would be small with frequent views during clear weather conditions. The change is likely to have a very minor influence on quality of life and morbidity risk factors linked to wellbeing for a small minority of the population. No healthcare services implications are anticipated.
- 14.9.3.10 It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **low**.

Sensitivity of receptor

- 14.9.3.11 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 14.6.3. This reflects that for most people in the local area the Morgan Generation Assets would not be a strong driver of community identity given many other influences on the local social, economic and environmental landscape. For most people there would be no regular views of the Morgan Generation Assets.
- 14.9.3.12 The sensitivity of the general population is therefore, considered to be **low**.
- 14.9.3.13 Vulnerability in this case is linked to the proportion of people who have expectations that their community or way of life would be changed to a large degree, positively or negatively, by visual change caused by the Morgan Generation Assets. This includes those with frequent views of the Morgan Array Area, for whom uninterrupted natural seascape views are highly valued as a component of community identity, for example coastal communities of Douglas and Laxey.
- 14.9.3.14 The sensitivity of the vulnerable group population is therefore, considered to be **high**.

Significance of effect

- 14.9.3.15 Overall, the magnitude of the impact is deemed to be **low** and the sensitivity of the vulnerable population group is considered to be **high**.
- 14.9.3.16 The effect is characterised as being both beneficial and adverse in direction, reflecting the subjective nature of community identity. The level of change in sense of place and community cohesion is unlikely to influence health policy delivery or inequalities. Any change to the local population health baseline would be slight and comprised of both beneficial and adverse influences.
- 14.9.3.17 Across both the general population and vulnerable group population there are expected to be both **minor adverse** and **minor beneficial** effects, which is **not significant** in EIA terms. The inclusion of both positive and negative outcomes from the same impact reflects the likelihood of a range of subjective responses to the visual change.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.9.4 Employment and income

- 14.9.4.1 The spacing of wind turbines within the Morgan Array Area may lead to changes in access to commercial shellfish harvesting grounds. The MDS is represented by the greatest unemployment or adverse economic implications and is summarised in Table 14.15.
- 14.9.4.2 As stated in section 14.4.2, changes in direct and indirect employment opportunities have socio-economic effects that impact upon health and mental well-being.
- 14.9.4.3 This section has been informed by Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement, which sets out relevant assessment findings and measures adopted as part of Morgan Generation Assets. Volume 2, Chapter 6: Commercial fisheries assesses the potential impacts on commercial fisheries including offshore static gear, beam trawl, Scottish west coast scallop, Isle of man scallop and other scallop vessels.
- 14.9.4.4 Volume 2, Chapter 6: Commercial fisheries concludes:
- Loss or restricted access to fishing grounds during construction, operations/ maintenance and decommissioning of the Morgan Generation Assets is judged to be negligible for most receptors and minor adverse for Scottish west coast and Isle of Man scallop vessels
 - The construction, operations/maintenance and decommissioning phases may lead to displacement of fishing activity into other areas, as a result of loss or restricted access to fishing grounds. The impact is judged to be negligible for all receptor groups
 - The construction, operations/maintenance and decommissioning phases may lead to interference with fishing activity, as a result of increased vessel traffic caused by vessels associated with the Morgan Generation Assets or changes to shipping routes. The impact is judged to be negligible for most receptor groups and minor adverse for offshore static gear vessels
 - The construction and decommissioning phases of the Morgan Generation Assets may lead to increased steaming times and distances for commercial fishing vessels, which could increase operational costs. This impact is judged to be negligible for all receptor groups
 - The impact of loss or damage to fishing gear due to snagging during construction, operations/maintenance and decommissioning is judged to be negligible for most receptors and minor adverse for Scottish west coast and Isle of Man scallop vessels. It is noted that the impact on scallop fishing has been reduced through the inclusion of a scallop mitigation zone over an area of core scallop grounds.
 - There are no significant impacts predicted for any commercial fisheries receptor groups during the operations and maintenance phase, as a result of impacts on commercially important fish and shellfish resources.
 - The construction, operations/maintenance and decommissioning of the Morgan Generation Assets may lead to supply chain opportunities for local fishing vessels. The impact is judged to be minor beneficial for offshore static gear vessels, Scottish west coast and Isle of Man scallop vessels, other scallop vessels and herring vessels and negligible for beam trawl vessels.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- 14.9.4.5 A potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:
- The source is changes in direct/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).
- 14.9.4.6 Furthermore, the theoretical effect as described above is considered applicable in the context of this project.
- 14.9.4.7 The population groups relevant to this assessment are:
- The 'regional' populations of North West England and Scotland (for communities strongly associated with Scottish west coast scallop vessels). Consideration has also been given to potential effects on the Isle of Man
 - The vulnerable sub-populations including young and old people, people with low incomes, people with poor health or disabilities and people experiencing social disadvantage/access and geographical factors.

Construction, Operations and Maintenance and Decommissioning

Magnitude of impact

- 14.9.4.8 Changes in fishing access would be continuous and of long-term duration, though reversible following decommissioning. The effects are judged to relate to a small scale of change given access to alternative fishing grounds for most employers. This is likely to relate to minor changes in physical and mental health morbidity associated with job insecurity 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 receptor

- 14.9.4.9 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 14.6.3. This reflects that most people would already be within stable employment that would be unaffected by the Morgan Generation Assets (or being a dependant of such a person).
- 14.9.4.10 The sensitivity of the general population is therefore, considered to be **low**.
- 14.9.4.11 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.
- 14.9.4.12 The sensitivity of the vulnerable group population is therefore, considered to be **high**.

Significance of effect

- 14.9.4.13 Overall, the magnitude of the impact is deemed to be **low** and the sensitivity of the vulnerable population group is considered to be **high**.
- 14.9.4.14 The changes to employment and income associated with some commercial fishing activities being unable to operate within the Morgan Array Area 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

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

baselines where coastal community employment is strongly linked to commercial fishing in the Morgan Array Area. This could be associated with a marginal increase in health inequalities. More generally the regional and national health baseline effects would, at most, be slight; with limited potential to affect the delivery of health policy.

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

Further mitigation and residual effects

14.9.4.16 No further mitigation is considered necessary in relation to population health outcomes.

14.9.5 Climate change and adaptation

14.9.5.1 The Morgan Generation Assets contribute 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 14.15.

14.9.5.2 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 low- and middle-income countries.

14.9.5.3 There are important global inequalities in the effects of climate change, 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 well-being, there is a global responsibility to reduce the effect of climate-altering pollutants that are expected to reduce health outcomes in low- and middle-income countries. The Intergovernmental Panel on Climate Change 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).

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

14.9.5.5 This section has been informed by Volume 2, Chapter 12: Climate change of the Environmental Statement which sets out relevant assessment findings and measures adopted as part of Morgan Generation Assets that have been taken into account. Volume 2, Chapter 12: Climate change concludes:

- The impact of greenhouse gas emissions arising from the consumption of materials and activities required to facilitate the operations and maintenance of the Morgan Generation Assets and impact of estimated abatement of UK Grid emissions would result in a beneficial effect
- When considering the magnitude of avoided emissions across the whole life time of the project, the Morgan Generation Assets would have a beneficial effect.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- 14.9.5.6 Despite high greenhouse gas emissions resulting from the construction stage of development, the operations and maintenance phases would offset these emissions through the use of renewable electricity and the displacement of fossil fuels. This would result in a significant beneficial effect.
- 14.9.5.7 A potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:
- Source: renewable energy created during the operation of the Morgan Generation Assets
 - 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: international global population, particularly vulnerable populations in low- and middle-income countries.
- 14.9.5.8 Furthermore, the theoretical effect is considered applicable in the context of this project.
- 14.9.5.9 The population groups relevant to this assessment are:
- The 'national' population of England, and the wider UK
 - The 'international' population globally
 - 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

Magnitude of impact

- 14.9.5.10 Whilst the scale of change would be very small within the national energy sector emissions context, it would be continuous and long-term. 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 potential effects include population displacement, food insecurity, infectious disease occurrence and exposure to extreme climatic events.
- 14.9.5.11 The impact is predicted to be of national and international spatial extent with the impact affecting the receptor directly and indirectly. The magnitude is therefore, considered to be **low**.

Sensitivity of receptor

- 14.9.5.12 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 14.6.3. This reflects that the 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.
- 14.9.5.13 The sensitivity of the general population is therefore, considered to be **low**.
- 14.9.5.14 Adverse effects would be disproportionately experienced by the most vulnerable members and regions of society (globally). Such effects are likely to widen health

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

inequalities. Although the general population in the UK is 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).

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

Significance of effect

14.9.5.16 Overall, the magnitude of the impact is deemed to be **low** and the sensitivity of the vulnerable population group is considered to be **high**.

14.9.5.17 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 the Morgan Generation Assets would have a very limited effect on the global or national health baseline even accounting for long-term inter-generational effects; the Morgan Generation Assets makes an influential contribution to delivering national climate change policy, including public health related climate policies.

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

Further mitigation and residual effects

14.9.5.19 No further mitigation is considered necessary in relation to population health outcomes. No additional enhancements of the expected positive outcomes of the Morgan Generation Assets are considered necessary.

14.9.6 Wider societal infrastructure and resources

14.9.6.1 The electricity produced by the Morgan Generation Assets 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 (1.5 GW) and is summarised in Table 14.15.

14.9.6.2 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 well-being 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).

14.9.6.3 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).

14.9.6.4 This section has been informed by Volume 2, Chapter 12: Climate change of the Environmental Statement which sets out relevant assessment findings and measures adopted as part of Morgan Generation Assets that have been taken into account.

14.9.6.5 Volume 2, Chapter 12: Climate change of the Environmental Statement concludes that the Morgan Generation Assets are in line with the NPPF's principle of supporting new

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

renewable and low carbon energy developments, in addition to their associated infrastructure, in order to contribute to reductions in greenhouse gas emissions.

14.9.6.6 A potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:

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

14.9.6.7 Furthermore, the theoretical effect is considered applicable in the context of this project.

14.9.6.8 The population groups relevant to this assessment are:

- The 'national' population of England, and the wider UK
- The vulnerable sub-populations 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

Magnitude of impact

14.9.6.9 Project 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 large minority of the national population. Such effects may bring small benefits to healthcare service quality by reducing capacity burdens.

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

Sensitivity of receptor

14.9.6.11 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 14.6.3. The general population comprise those members of the community in good physical/mental health and with greater resources to respond to the costs of energy or to interruptions in supply.

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

14.9.6.13 The sub-population on low incomes, for whom energy security and interruption of energy supplies are more sensitive, pose a greater risk. This is particularly the case for dependants at risk during temperature extremes, including heatwaves and cold weather, as well as people in poor health, including when accessing healthcare.

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

Significance of effect

14.9.6.15 Overall, the magnitude of the impact is deemed to be **medium** and the sensitivity of the vulnerable population group is considered to be **high**.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.9.6.16 The Morgan Generation Assets provide a protective effect on the health baseline and that this would be important for public health. This conclusion reflects the scientific literature which establishes a clear association between energy security and health outcomes. The Morgan Generation Assets are likely to be influential 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.

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

Further mitigation and residual effects

14.9.6.18 No further mitigation is considered necessary in relation to population health outcomes. No additional enhancements of the expected positive outcomes of the Morgan Generation Assets are considered necessary.

14.10 Cumulative effect assessment methodology

14.10.1 Methodology

14.10.1.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms Transmission Assets, the Morecambe Offshore Windfarm Generation Assets and other projects and plans. 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 5.1: CEA screening matrix). Each project 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.

14.10.1.2 The human health CEA methodology has followed the methodology set out in Volume 1, Chapter 5: EIA Methodology of the Environmental Statement. The cumulative assessment considers three scenarios:

- Scenario 1: Morgan Generation Assets plus Morgan and Morecambe Offshore Wind Farms: Transmission Assets
- Scenario 2: Morgan Generation Assets plus Morgan and Morecambe Offshore Wind Farms: Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets
- Scenario 3: Morgan Generation Assets plus Morgan and Morecambe Offshore Wind Farms: Transmission Assets alongside all other projects, plans and activities. This assessment has been allocated into 'tiers' reflecting the current stage of the other projects, plans and activities within the planning and development process. This tiered approach is adopted to provide a clear assessment of the Morgan Generation Assets and Morgan and Morecambe Offshore Wind Farms: Transmission Assets alongside other projects, plans and activities:
 - Tier 1: includes projects, plans and activities at the following stages:
 - Under construction
 - Permitted application
 - Submitted application

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact.
 - Tier 2: includes projects, plans and activities at the following stages:
 - Scoping report has been submitted and is in the public domain.
 - Tier 3 includes projects, plans and activities at the following stages:
 - Scoping report has not been submitted and is not in the public domain
 - Identified in the relevant Development Plan
 - Identified in other plans and programmes.
- 14.10.1.3 This approach to CEA has been developed to provide an assessment of the Morgan Generation Assets together with the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (Scenario 1) and the Morecambe Offshore Windfarm: Generation Assets (Scenario 2) in order to identify, as far as possible, the combined effects of these three applications separately from the assessment that includes all other projects, plans and activities (Scenario 3).
- 14.10.1.4 The projects, plans and activities scoped into the CEA are informed by those considered within the CEA of:
- Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement
 - Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement
 - Volume 2, Chapter 9: Other sea users of the Environmental Statement
 - Volume 2, Chapter 10: Seascape, landscape and visual resources of the Environmental Statement
 - Volume 2, Chapter 12: Climate change of the Environmental Statement and
 - Volume 2, Chapter 13: Socio-economics of the Environmental Statement.
- 14.10.1.5 The Human Health chapter does not exhaustively consider all projects discussed in other chapters where those chapter's CEA identifies no potential for cumulative effects. For example, Volume 2, Chapter 10: Seascape, landscape and visual resources of the Environmental Statement identifies no cumulative effects on the Isle of Man within the SLVIA study area when considering Morgan Array and the Robin Rigg cluster and the Morgan Array and the North Wales cluster. Consequently, Robin Rigg cluster and North Wales cluster are not included in the Human Health CEA.

14.10.2 Maximum design scenario

- 14.10.2.1 The MDS is informed by the cumulative MDS provided in:
- Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement
 - Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement
 - Volume 2, Chapter 9: Other sea users of the Environmental Statement
 - Volume 2, Chapter 10: Seascape and visual resources of the Environmental Statement
 - Volume 2, Chapter 12: Climate change of the Environmental Statement and
 - Volume 2, Chapter 13: Socio-economics of the Environmental Statement

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- 14.10.2.2 The MDSs identified in Table 14.16 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the project design envelope provided in Volume 1, Chapter 3: Project description of the Environmental Statement as well as the information available on other projects and plans, in order to inform an MDS. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project design envelope (e.g. different wind turbine layout), to that assessed here, be taken forward in the final design scheme.
- 14.10.2.3 In summary the MDSs for the cumulative assessment relate to: the highest level of disruption in shipping access; the greatest visual change; the highest unemployment or adverse economic implications; and the smallest renewable energy generation capacity.

Table 14.16: MDS considered for the assessment of potential cumulative effects on Human Health

^a C=construction, O=operations and maintenance, D=decommissioning

Potential cumulative effect	Phase ^a			Maximum Design Scenario	Justification
	C	O	D		
Transport modes, access and connections	✓	✓	✓	Maximum design scenario as described for the Morgan Generation Assets (Table 14.15) assessed cumulatively with the following other projects/plans: Tier 1 <ul style="list-style-type: none"> • Mona Offshore Wind Project • Awel y Môr Tier 2 <ul style="list-style-type: none"> • Mooir Vannin offshore wind farm • Morecambe Offshore Windfarm: Generation Assets 	Outcome of the CEA will be greatest when the greatest number of other projects resulting in the highest level of disruption to access of routes are considered.
Community identity, culture, resilience and influence	✓	✓	✓	Maximum design scenario as described for the Morgan Generation Assets (Table 14.15) assessed cumulatively with the following other projects/plans: Tier 1-existing offshore wind farms <ul style="list-style-type: none"> • Northwest England Cluster Tier 1- offshore wind farms under construction, permitted and submitted for planning approval <ul style="list-style-type: none"> • Mona Offshore Wind Project • Awel y Môr Tier 2 <ul style="list-style-type: none"> • Mooir Vannin offshore wind farm • Morecambe Offshore Windfarm: Generation Assets 	Outcome of the CEA will be greatest when the greatest number of other projects, which could impact on visual receptors within a study area are considered

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Potential cumulative effect	Phase ^a			Maximum Design Scenario	Justification
	C	O	D		
Employment and income, adverse	✓	✓	✓	<p>Maximum design scenario as described for the Morgan Generation Assets (Table 14.15) assessed cumulatively with the following other projects/plans:</p> <p>Tier 1</p> <ul style="list-style-type: none"> • Mona Offshore Wind Project • Awel y Môr <p>Tier 2</p> <ul style="list-style-type: none"> • Mooir Vannin offshore wind farm • Morecambe Offshore Windfarm: Generation Assets 	Outcome of the CEA will be greatest when the greatest number of projects resulting in unemployment or adverse economic implications are considered
Climate change and adaptation	✓	✓	✓	<p>Maximum design scenario as described for the Morgan Generation Assets (Table 14.15) assessed cumulatively with the following other projects/plans:</p> <p>Tier 1</p> <ul style="list-style-type: none"> • Mona Offshore Wind Project • Awel y Môr <p>Tier 2</p> <ul style="list-style-type: none"> • Mooir Vannin offshore wind farm • Morecambe Offshore Windfarm: Generation Assets 	The smallest output contribution to renewable energy generation would be the most conservative basis of assessment for this beneficial effect.
Wider societal infrastructure and resources	✓	✓	✓	<p>Maximum design scenario as described for the Morgan Generation Assets (Table 14.15) assessed cumulatively with the following other projects/plans:</p> <p>Tier 1</p> <ul style="list-style-type: none"> • Mona Offshore Wind Project • Awel y Môr <p>Tier 2</p> <ul style="list-style-type: none"> • Mooir Vannin offshore wind farm • Morecambe Offshore Windfarm: Generation Assets 	The smallest output contribution to renewable energy generation would be the most conservative basis of assessment for this beneficial effect

14.11 Cumulative effects assessment

- 14.11.1.1 A description of the significance of cumulative effects upon population health arising from each identified impact is given below.
- 14.11.1.2 The CEA for the Morgan Generation Assets is presented in a series of tables (Table 14.17 to Table 14.21, one for each potential cumulative impact).
- 14.11.1.3 Cumulative health assessment extends the analysis of each determinant of health. This means for each determinant of health the relevant reasonably foreseeable cumulative projects are listed and a professional judgement is made as to the

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

combined level of effect and its implications for public health. Following IEMA 2022 guidance, sensitivity of the relevant populations is unchanged from the main assessment in section 14.9. Magnitude is however appraised in light of the combined effect of multiple projects.

- 14.11.1.4 As set out in IEMA 2022 guidance for human health, a combined public health effect is most likely where a population is affected by multiple determinants of health and a large proportion of the same individuals within that population experience the combination of effects.
- 14.11.1.5 A high degree of spatial proximity is required for there to be the potential for cumulative effects for localised changes in determinants of health, e.g., dust from a construction site. In contrast, where there are more far-reaching effects in a determinant of health, e.g., job creation or noise along shared transport corridors, there is greater opportunity for cumulative interactions between projects.
- 14.11.1.6 For each of the determinants in the main assessment the cumulative assessment considers the potential for pathways to the same population from other large-scale developments that are similar in location and timing. The assessment is qualitative, following the approach set out in section 14.6, and considers the potential for combined magnitudes of effect to the same populations.
- 14.11.1.7 This chapter is informed by cumulative assessment conclusions set out in other chapters (as listed in section 14.1). The health assessment does not duplicate detail set out in those chapters. Distinctions between Tier 1 and Tier 2 projects follow other assessment chapters. Tier 1 being those projects where levels of uncertainty are lower, due to being more advanced in the planning process. Where the conclusions of the assessments for tier 1 and tier 2 projects are the same, they have been grouped in the assessment summary tables to reduce duplication.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.11.2 Transport modes, access and connections

Table 14.17: Transport modes, access and connections cumulative impacts summary.

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
Construction, Operations and Maintenance and Decommissioning			
Magnitude of impact	<p>The cumulative effects assessment for scenario 1 include the following:</p> <ul style="list-style-type: none"> • Morgan Generation Assets offshore implications for the population of Isle of Man. • Transmission Assets offshore and onshore effects to the population of Fylde and Preston. <p>No cumulative effect is predicted as different population groups are affected. The magnitude therefore remains the same, which is considered to be low. This reflects the scope, study areas and findings of the assessment in 'Morgan and Morecambe Offshore Wind Farms Transmission Assets PEIR Volume 1, Annex 5.1 Human health', which does not identify any significant population health effects, compared with the scope, study areas and findings discussed in this chapter. Any overlap in people experiencing the effects of both projects is considered to be limited and not on a scale to have the potential for a cumulative population health effect. It is noted that 'Morgan and Morecambe Offshore Wind Farms Transmission Assets PEIR Volume 1, Annex 5.1 Human health' scopes-out offshore effects, with the exception of coastal recreation, as not having</p>	<p>The magnitude of impact for Scenario 2 relates to the offshore element of Scenario 1 with the addition that:</p> <ul style="list-style-type: none"> • Morecambe Offshore Windfarm Generation Assets contribute to offshore shipping and navigation routeing, with implications for the population of Isle of Man <p>Morecambe Offshore Windfarm Generation Assets and the Morgan Generation Assets are both located within a marine area off the North West coast of England where there is the potential for both array areas to influence shipping routeing, including for vessels travelling to the Isle of Man.</p> <p>The cumulative effect is predicted to be of local spatial extent (Isle of Man), long term duration and continuous. It is predicted that the impact will affect the receptor population directly and indirectly. The contribution of Morecambe Offshore Windfarm Generation Assets to any offshore transport related public health effect is considered very limited. The magnitude therefore remains the same, which is considered to be low.</p>	<p>The magnitude of impact for Scenario 3 relates to the offshore element of Scenario 2 with the addition that:</p> <ul style="list-style-type: none"> • Awel y Môr, Mona Offshore Wind Project and Mooir Vannin offshore windfarms (in the context of other existing offshore wind farms, including but not limited to Walney) contribute to offshore shipping and navigation routeing, with implications for the population of Isle of Man. <p>The cumulative effect is predicted to be of local spatial extent, long term duration and continuous.</p> <p>These effects arise from modest but appreciable delays on routes to the Isle of Man. However, significant delays or cancellations only arise if there has been an earlier sailing on that day. It remains the case that the first sailing of the day would allow medical and other health related deliveries and trips to occur. The Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement conclusion of a moderate adverse effect is driven by commercial impacts such as additional fuel, manning and lost revenue. For the Human</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

<p>Scenario 1 Morgan Generation Assets + Transmission Assets</p>	<p>Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets</p>	<p>Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects</p>
<p>the potential for significant population health effects. For coastal recreation the effects are relevant to marine activities close to the coast and are found to be not significant. No cumulative effect with the Morgan Generation Assets is therefore likely.</p>		<p>Health chapter, the continuity of health-related access means any effect is more limited. As medical supplies are routinely scheduled on the Wednesday early morning sailing (02:15) from Heysham to Douglas, even in the cumulative assessment, these supplies arrive on the Isle of Man, even if slightly delayed. The margins of delay, even if a few hours, are not considered to compromise the refrigeration or shelf-life of medical drugs or other products. It is noted that there are a range of other existing transport options that contribute to resilience in access to Isle of Man. These include the MV Arrow freight relief vessel and transport via Isle of Man Airport. Use of the first sailing of the day for medical and health related deliveries and trips, continues to be appropriate to mitigate against adverse weather delays, with or without the Project. For food transport there is not considered to be a risk of food shortages, although there may remain times (likely limited to a few days duration on an occasional basis) when fresh foods are low in stock due to adverse weather. The scheduling of fresh-foods, including fruit and vegetables, to early sailings on a given day is likely to continue to minimise any temporary reduction in healthy food choices. Any minor delays on a crossing are not considered to present a risk to public health.</p> <p>Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement also considers as a maximum design scenario of the route between the Morgan Generation Assets and the</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

<p>Scenario 1 Morgan Generation Assets + Transmission Assets</p>	<p>Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets</p>	<p>Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects</p>
		<p>existing Walney and West of Duddon Sands wind farms, with the additional inclusion of Mooir Vannin Offshore Wind Farm. For all project phases, the cumulative impacts of vessel-to-vessel collision risk and vessel-to-wind-turbine allision risk are both moderate adverse (significant in EIA terms). The effect is driven by the separation between the Morgan Generation Assets and Mooir Vannin wind farm of 2.5 NM. From a public health perspective this is noted as of concern. It is relevant context that the Mona Offshore Wind Project, Morgan Generation Assets and Morecambe Generation Assets projects have already worked collaboratively to refine their designs to mitigate against significant cumulative collision and allision risks. The cumulative effect arises with the more recent inclusion of the Mooir Vannin Offshore Wind Farm Scoping Boundary included, which is currently at the scoping stage with additional consultation yet to be completed.</p> <p>For medical and health related deliveries, the cumulative effect is predicted to be similar in the majority of its characteristics to the individual level magnitude (i.e. low). The combined scale of change due to the projects remains small, even with more frequent disruption than the individual level effects. This reflects that early sailings each day are still expected to occur and these are the most relevant in terms of medical and health related deliveries and trips. For collision and allision risk the cumulative effect is considered to be medium. Such events would</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
			be very rare (one-off), but with potential for high severity injury or mortality outcomes to the crew and passengers of an affected vessel. It is predicted that the impact will affect receptors directly and indirectly. The magnitude is considered to be low for medical and other health related access, but medium for collision and allision risk.
Sensitivity of receptor	The sensitivity of the general and of the vulnerable group populations are unchanged in the cumulative assessment. As set out in section 14.9.2, the sensitivity of the general population is low and the sensitivity of the vulnerable group population is high.	The sensitivity of receptor for Scenario 2 is considered similar to Scenario 1.	The sensitivity of receptor for Scenario 3 is considered similar to Scenario 1.
Significance of effect	Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of minor adverse significance, which is not significant in EIA terms.	Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of minor adverse significance, which is not significant in EIA terms.	Overall, the magnitude is considered to be low for medical and other health related access, but medium for collision and allision risk, and the sensitivity of the vulnerable group population is considered to be high. The medical and other health related access effect will, therefore, be of minor adverse significance, which is not significant in EIA terms. The collision and allision risk effect will, however be, moderate adverse significance, which is significant in EIA terms.
Further mitigation and residual significance. No further measures	As per section 14.9.2 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.8.2 above. No further measures proposed and no change in residual effect conclusion.	As noted in Volume 2, Chapter 7: Shipping and navigation of the Environment Statement assessment for the Morgan Generation Assets, it has been determined that the commitments made by the Applicant following feedback on the PEIR has reduced the safety impacts of the

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
<p>proposed and no change in residual effect conclusion.</p>			<p>Morgan Generation Assets to non-significant effects. However, with the inclusion of Mooir Vannin Offshore Wind Farm, significant effects were determined in the cumulative assessment, which arise when the Mooir Vannin Offshore Wind Farm Scoping Boundary is included. The Mooir Vanin Offshore Wind Farm is currently at the scoping stage with detailed consultation yet to be completed.</p> <p>The information provided by the Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement supports routine healthcare service planning on the resilience and protocols surrounding medical and other health related deliveries to the Isle of Man.</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.11.3 Community identity, culture, resilience and influence

Table 14.18: Community identity, culture, resilience and influence cumulative impacts summary.

Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
---	--	---

Construction, Operations and Maintenance and Decommissioning

<p>Magnitude of impact</p>	<p>Morgan Generation Assets offshore visual impacts may affect parts of the populations of Isle of Man and the North West England. However, the Transmission Assets, as reflected in its assessment of human health effects, does not give rise to visual impacts that have the potential for significant public health effects. No cumulative effect is therefore expected.</p> <p>No cumulative effect is predicted. The magnitude therefore remains the same, which is considered to be low.</p> <p>As with the main assessment, the potential for both beneficial and adverse effects is noted as community identity and visual cues have a high degree of subjectivity.</p>	<p>The magnitude of impact for Scenario 2 relates to the offshore element of Scenario 1 with the addition that:</p> <ul style="list-style-type: none"> • Morecambe Offshore Windfarm Generation Assets contributes to offshore visual impacts for North West England. It is considered sufficiently distant from Isle of Man to not have the potential to affect community identity. <p>The cumulative effect is predicted to be of local and regional spatial extent, albeit localised to some coastal areas, long term duration and continuous. It is predicted that the impact will affect the receptor directly. The effect to North West England is likely to be driven of Morecambe Offshore Windfarm Generation Assets, being closer, with a very limited contribution from the Morgan Generation Assets. Consequently, the magnitude remains the same, which is considered to be low.</p>	<p>The magnitude of impact for Scenario 3 relates to the offshore element of Scenario 2 with the addition that:</p> <ul style="list-style-type: none"> • Awel y Môr, Mona Offshore Wind Project, Mooir Vannin offshore and the Northwest England cluster windfarms contribute to visual change, with implications for populations of Isle of Man and the North West England. <p>The cumulative effect is predicted to be of local spatial extent, long term duration and continuous.</p> <p>The cumulative effect arises in the context of existing offshore wind farms and the scale of change would be small with frequent views during clear weather conditions. The change is likely to have a very minor influence on quality of life and morbidity risk factors linked to wellbeing for a small minority of the population.</p> <p>The cumulative effect is predicted to be of local and regional spatial extent, albeit localised to some coastal areas, long term duration and continuous. It is predicted that the impact will affect the receptor directly. The greatest visual changes are considered the combination of the Morgan Generation Assets (approximately 22.3km from the Isle of Man) and the Mooir</p>
----------------------------	--	--	---

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
			Vannin Offshore Windfarm (approximately 11km from the Isle of Man). The effect is likely to be driven by the closer windfarm, which is Mooir Vannin. Even combined, the visual changes of all the projects are not considered to have more than a low magnitude of impact for community identity.
Sensitivity of receptor	The sensitivity of the general and of the vulnerable group populations are unchanged in the cumulative assessment. As set out in section 14.9.3 the sensitivity of the general population is low and the sensitivity of the vulnerable group population is high.	The sensitivity of receptor for Scenario 2 is considered similar to Scenario 1.	The sensitivity of receptor for Scenario 3 is considered similar to Scenario 1.
Significance of effect	Overall, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be up to a minor adverse and minor beneficial significance, which is not significant in EIA terms.	Overall, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be up to a minor adverse and minor beneficial significance, which is not significant in EIA terms.	Overall, the magnitude of the impact is deemed to be low and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be up to a minor adverse and minor beneficial significance, which is not significant in EIA terms.
Further mitigation and residual significance	As per section 14.9.3 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.3 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.3 above. No further measures proposed and no change in residual effect conclusion.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.11.4 Employment and income

Table 14.19: Employment and income cumulative impacts summary.

Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
--	---	---

Construction, Operations and Maintenance and Decommissioning

Magnitude of impact	<p>The cumulative effects assessment for scenario 1 include the following:</p> <ul style="list-style-type: none"> • Morgan Generation Assets offshore implications for the populations of North West England, Scotland and Isle of Man, with a focus on adverse effects linked to commercial fisheries • Transmission Assets onshore implications for the population of North West England, with a focus on beneficial effects linked to employment. Offshore socio-economic impacts of the Transmission Assets are scoped out as not having the potential for significant population health effects in 'Morgan and Morecambe Offshore Wind Farms Transmission Assets PEIR Volume 1, Annex 5.1 Human health'. <p>Any cumulative effect is limited to the overlap in population in North West England. No cumulative effect is expected as beneficial and adverse population health effects do not necessarily cancel each other out and there is considered limited potential that the same individuals within the North West region would be affected by both types of affect. The magnitude of the effects (beneficial and</p>	<p>The magnitude of impact for Scenario 2 relates to the elements of Scenario 1 with the addition that:</p> <ul style="list-style-type: none"> • Morecambe Offshore Windfarm Generation Assets contributes to beneficial employment effects and potentially adverse commercial fisheries effects, both for North West England. <p>The cumulative effects are predicted to be of regional spatial extent, short to long term duration and continuous.</p> <p>The beneficial and adverse population health effects do not necessarily cancel each other out and there is limited potential that the same individuals to be affected by both types of affects. Furthermore, the types of commercial fishing affected by the Morgan Generation Assets and the Morecambe Offshore Windfarm Generation Assets differ (potting rather than scallops), limiting potential for greater combined effects. The beneficial employment effects between projects are noted but are unlikely to alter the magnitude of the effect in the context of regional employment markets. Consequently, the magnitudes (beneficial and adverse) remain the same, which are considered to be low.</p>	<p>The magnitude of impact for Scenario 3 relates to the elements of Scenario 2 with the addition that:</p> <ul style="list-style-type: none"> • Awel y Môr, Mona Offshore Wind Project and Mooir Vannin offshore windfarms contribute to beneficial employment effects and potentially adverse commercial fisheries effects, with implications for populations of North West England, Scotland and Isle of Man. <p>The cumulative effects are predicted to be of regional spatial extent, short to long term duration and continuous.</p> <p>The combined beneficial employment effects between projects are noted but are unlikely to alter the magnitude of the effect in the context of regional employment markets.</p> <p>The combined effect of the projects on commercial fisheries means a larger area of fishing grounds would have reduced access, notably for Scottish west coast scallop vessels, however the scale of change for affected fishing communities would remain low. The combined effect is driven by the interaction of the Morgan and Mona projects, with Awel y Môr Offshore Wind Farm also contributing to a lesser degree</p>
----------------------------	--	---	--

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
	adverse) remains the same, which is considered to be low.		due to spatial overlap in the south limits of the scallop fishery for Scottish west coast scallop vessels. Whilst there is the potential for a combined effect from the projects, it is also likely that the effect would be distributed across a large regional area, rather than the projects having overlapping localised effects to the same communities. On this basis the impact is not considered to be greater than the individual level effect. Consequently, the magnitudes (beneficial and adverse) remain the same, which are considered to be low.
Sensitivity of receptor	The sensitivity of the general and of the vulnerable group populations are unchanged in the cumulative assessment. As set out in section 14.9.4 the sensitivity of the general population is low and the sensitivity of the vulnerable group population is high.	The sensitivity of receptor for Scenario 2 is considered similar to Scenario 1.	The sensitivity of receptor for Scenario 3 is considered similar to Scenario 1.
Significance of effect	Overall, the magnitudes of the impact are deemed to be low and the sensitivity of the vulnerable group population is considered to be high. The effects will, therefore, be of minor beneficial and minor adverse significance, which are not significant in EIA terms.	Overall, the magnitudes of the impact are deemed to be low and the sensitivity of the vulnerable group population is considered to be high. The effects will, therefore, be of minor beneficial and minor adverse significance, which are not significant in EIA terms.	Overall, the magnitudes of the impact are deemed to be low and the sensitivity of the vulnerable group population is considered to be high. The effects will, therefore, be of minor beneficial and minor adverse significance, which are not significant in EIA terms.
Further mitigation and residual significance	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.11.5 Climate change and adaptation

Table 14.20: Climate change and adaptation cumulative impacts summary

Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
--	---	---

Construction, Operations and Maintenance and Decommissioning

<p>Magnitude of impact</p>	<p>The cumulative effects assessment for scenario 1 include the following:</p> <ul style="list-style-type: none"> • Morgan Generation Assets offshore renewable electricity generation benefits to public health for the populations of England and the wider UK, as well as the global population • Transmission Assets onshore transmission of renewable electricity. <p>No cumulative effect arises as the generation and transmission of the renewable electricity is part of a single benefit to public health. This approach avoids double counting. The magnitude of the effect remains the same, which is considered to be low.</p>	<p>The magnitude of impact for Scenario 2 relates to the elements of Scenario 1 with the addition that:</p> <ul style="list-style-type: none"> • Morecambe Offshore Windfarm Generation Assets contribute further renewable electricity generation to the beneficial public health effects for the populations of England and the wider UK, as well as the global population. <p>The cumulative effects are predicted to be of national and global spatial extent, long term duration and continuous. As with Scenario 1 the Transmission Assets are not double counted in relation to the beneficial effect.</p> <p>The combination of Morgan Generation Assets and Morecambe Offshore Windfarm Generation Assets contributes towards wider energy sector transition to renewable energy, which reduces the severity of climate change.</p> <p>Whilst cumulatively these projects have a greater magnitude of effect, in the context of effects on global atmospheric conditions, rather than localised effects, the cumulative effect is arguably inclusive of all energy projects currently being consented, and likely much broader than just this one sector. Such a broad</p>	<p>The magnitude of impact for Scenario 3 relates to the elements of Scenario 2 with the addition that:</p> <ul style="list-style-type: none"> • Awel y Môr, Mona Offshore Wind Project and Mooir Vannin offshore windfarms further contribute to beneficial effects for the populations of England and the wider UK, as well as the global population. <p>The cumulative effects are predicted to be of national and global spatial extent, long term duration and continuous. As with Scenario 2, whilst cumulatively these projects have a greater magnitude of effect, the magnitude conclusion remains unchanged in the EIA assessment, i.e. remains low.</p>
----------------------------	---	--	---

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
		cumulative assessment is not within the scope of project level EIA. On this basis the cumulative effect is noted as greater, but remains unchanged in the assessment, i.e. remains low.	
Sensitivity of receptor	The sensitivity of the general and of the vulnerable group populations are unchanged in the cumulative assessment. As set out in section 14.9.4 the sensitivity of the general population is low and the sensitivity of the vulnerable group population is high.	The sensitivity of receptor for Scenario 2 is considered similar to Scenario 1.	The sensitivity of receptor for Scenario 3 is considered similar to Scenario 1.
Significance of effect	Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of minor beneficial significance, which is not significant in EIA terms.	Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of minor beneficial significance, which is not significant in EIA terms.	Overall, the magnitude of the impact is deemed to be low, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of minor beneficial significance, which is not significant in EIA terms.
Further mitigation and residual significance	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

14.11.6 Wider societal infrastructure and resources

Table 14.21: Wider societal infrastructure and resources cumulative impacts summary

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
Construction, Operations and Maintenance and Decommissioning			
Magnitude of impact	<p>The cumulative effects assessment for scenario 1 include the following:</p> <ul style="list-style-type: none"> • Morgan Generation Assets offshore energy security benefits to public health for the populations of England and the wider UK • Transmission Assets onshore transmission of electricity supporting energy security. <p>No cumulative effect arises as the generation and transmission of the electricity is part of a single energy security benefit to public health. This approach avoids double counting. The magnitude of the effect remains the same, which is considered to be medium.</p>	<p>The magnitude of impact for Scenario 2 relates to the elements of Scenario 1 with the addition that:</p> <ul style="list-style-type: none"> • Morecambe Offshore Windfarm Generation Assets contribute further to the beneficial public health effects of energy security for the populations of England and the wider UK. <p>The cumulative effects are predicted to be of national spatial extent, long term duration and continuous. As with Scenario 1 the Transmission Assets are not double counted in relation to the beneficial effect.</p> <p>The combination of Morgan Generation Assets and Morecambe Offshore Windfarm Generation Assets contributes towards wider energy security. The national context of such energy security has been considered and the individual effects are not expected to be collectively greater. The magnitude therefore remains the same, which is considered to be medium.</p>	<p>The magnitude of impact for Scenario 3 relates to the elements of Scenario 2 with the addition that:</p> <ul style="list-style-type: none"> • Awel y Môr, Mona Offshore Wind Project and Mooir Vannin offshore windfarms further contribute to beneficial effects for the populations of England and the wider UK, as well as Isle of Man (which is connected to the National Grid via the Isle of Man Interconnector Cable). <p>The cumulative effects are predicted to be of national spatial extent, long term duration and continuous. As with Scenario 2, whilst cumulatively these projects have a greater magnitude of effect, the magnitude conclusion remains unchanged, i.e. remains medium.</p>
Sensitivity of receptor	<p>The sensitivity of the general and of the vulnerable group populations are unchanged in the cumulative assessment. As set out in section 14.9.4 the sensitivity of the general</p>	<p>The sensitivity of receptor for Scenario 2 is considered similar to Scenario 1.</p>	<p>The sensitivity of receptor for Scenario 3 is considered similar to Scenario 1.</p>

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

	Scenario 1 Morgan Generation Assets + Transmission Assets	Scenario 2: Morgan Generation Assets + Morecambe Offshore Windfarm Generation Assets + Transmission Assets	Scenario 3: Morgan Generation Assets + Transmission Assets + Tier 1, Tier 2, Tier 3 projects
	population is low and the sensitivity of the vulnerable group population is high.		
Significance of effect	Overall, the magnitude of the impact is deemed to be medium, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of moderate beneficial significance, which is significant in EIA terms.	Overall, the magnitude of the impact is deemed to be medium, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of moderate beneficial significance, which is significant in EIA terms.	Overall, the magnitude of the impact is deemed to be medium, and the sensitivity of the vulnerable group population is considered to be high. The effect will, therefore, be of moderate beneficial significance, which is significant in EIA terms.
Further mitigation and residual significance	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.	As per section 14.9.4 above. No further measures proposed and no change in residual effect conclusion.

14.11.7 Future monitoring

14.11.7.1 No further monitoring is proposed for human health. Relevant to the health issues discussed in this chapter, Volume 2, Chapter 7: Shipping and Navigation of the Environmental Statement, sets out monitoring commitments relevant to vessel routing and safety that are secured within the deemed marine licenses of the draft DCO.

14.12 Transboundary effects

14.12.1.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to human health from the Morgan Generation Assets upon the health of populations in other states.

14.13 Inter-related effects

14.13.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the Morgan Generation Assets on the same receptor. These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Morgan Generation Assets (construction, operations and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g. underwater sound effects from piling, operational wind turbines, vessels and decommissioning)
- 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 access, changes in community identity, 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.

14.13.1.2 A description of the likely interactive effects arising from the Morgan Generation Assets on human health is provided in Volume 2, Chapter 15: Inter-related effects of the Environmental Statement.

14.13.1.3 The population health effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects for a given geographic population are presented in Table 14.22. Vulnerable group effects are expected across all geographic populations, so are not listed separately.

14.13.1.4 Table 14.23 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, operations/maintenance and decommissioning phases of the Morgan Generation Assets, and also the inter-related effects (receptor-led effects that are predicted to arise for human health receptors).

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.22: Interaction between health determinants by geographic populations.

	Local	Regional	National	International
	Isle of Man	North West England	UK	Global
Transport (access – offshore)	✓			
Community identity	✓	✓		
Employment (adverse)		✓		
Climate change	✓	✓	✓	✓
Wider societal resources	✓	✓	✓	

Key:

Positive (green)	Positive as a component within wider area assessment (light green)	Negative (blue)	Positive and negative (orange)
------------------	--	-----------------	--------------------------------

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.23: Summary of likely significant inter-related effects on the environment for individual effects occurring across the construction, operations and maintenance and decommissioning phases of the Morgan Generation Assets and from multiple effects interacting across all phases (receptor-led effects).

Description of impact	Phase ^a			Likely significant inter-related effects	Significance
	C	O	D		
Combined transport access effects across project phases.	✓	✓	✓	Effects relating to ongoing disruption to access across construction, operations and maintenance and decommissioning are already taken into account by the health assessment, including where effects are characterised as 'long-term'.	No change from main assessment.
Combined economic effects to employment across project phases	✓	✓	✓	Effects relating to ongoing changes in fishing access across construction, operations and maintenance and decommissioning are already taken into account by the health assessment, including where effects are characterised as 'long-term'.	No change from main assessment.
Receptor-led effects					
Combination of reduced transport access and effects on community identity locally on the population of the Isle of Man.		✓		A small minority of the population of the Isle of Man may experience views of the wind farm (adversely affecting community identity health outcomes) and adverse impacts affecting health due to shipping route disruption. Combined effects are considered likely during the operational phase, once the windfarm is a feature of the seascape. The combined effects may particularly affect vulnerable groups with existing poor mental health. At a population level it is not expected that the combination of effects would interact in a way that would significantly reinforce health outcomes. No greater effect is therefore likely.	No change from main assessment.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Description of impact	Phase ^a			Likely significant inter-related effects	Significance
	C	O	D		
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 from main assessment.

14.14 Summary of impacts, measures adopted as part of Morgan Generation Assets and monitoring

- 14.14.1.1 Information on human health within the 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 14.1.1.7.
- 14.14.1.2 This chapter finds that the Morgan Generation Assets will potentially have beneficial and adverse health effects. These are summarised in Table 14.24. The chapter concludes that:
- As set out in section 14.9.2, impacts on transport modes, access and connections in relation to commercial operators including strategic routes and lifeline ferries to the Isle of Man will have a **minor adverse** effect for population health, which is not significant in EIA terms. Disruption of medical and other health related deliveries and trips is not expected on a scale to affect public health.
 - As set out in section 14.9.3, community identity, culture, resilience and influence in relation to visual impacts of the wind turbines will have a **minor adverse** and **minor beneficial** effect which is not significant in EIA terms.
 - As set out in section 14.9.4, employment and income in relation to loss or restricted access to commercial fishing grounds will have a **minor adverse** effect for population health, which is not significant in EIA terms.
 - As set out in section 14.9.5, climate change and adaptation in relation to renewable energy generation and subsequent reduced greenhouse gas emissions will have a **minor beneficial** effect for population health, which is not significant in EIA terms.
 - As set out in section 14.9.6, wider societal infrastructure and resources in relation to improved energy security will have a **moderate beneficial** effect for population health, which is significant in EIA terms.
- 14.14.1.3 Table 14.24 presents a summary of potential effects, monitoring and measures adopted as part of Morgan Generation Assets. Overall, it is concluded that there will be no significant adverse effects arising from the Morgan Generation Assets during the construction, operations and maintenance or decommissioning phases. Public health benefits in relation to climate change (not significant) and energy security (significant) are expected for population health.
- 14.14.1.4 Table 14.25 presents a summary of the potential cumulative impacts, measures adopted as part of Morgan Generation Assets and residual effects. Overall, it is concluded that there is the potential for the following cumulative effects from the Morgan Generation Assets alongside other projects/plans:
- A **moderate adverse** cumulative effect for transport modes, access and connections in relation to collision and allision risk when including the effects of the Moir Vannin Offshore Wind Farm within the assessment which is significant in EIA terms
 - **Minor adverse** (not significant in EIA terms) and **minor beneficial** (not significant in EIA terms) cumulative effects relating to community identity influences on population health

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- **Minor adverse** (not significant in EIA terms) and **minor beneficial** (not significant in EIA terms) cumulative effect relating to employment and income influences on population health
- A **minor beneficial** cumulative effect related to climate change and public health which is not significant in EIA terms
- A **moderate beneficial** cumulative effect for wider societal infrastructure and resources which is significant in EIA terms
- No potential transboundary impacts for population health have been identified in regard to effects of the Morgan Generation Assets.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.24: Summary of potential environmental effects, mitigation and monitoring.

^a C=construction, O=operations and maintenance, D=decommissioning

Description of impact	Phase ^a			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Transport modes, access and connectivity	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse (not significant)	No further mitigation required.	Minor adverse (not significant)	None.
Community identity, culture, resilience and influence		✓		Tertiary measures	O: low	O: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Minor adverse and minor beneficial (not significant)	None.
Employment and income	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse (not significant)	No further mitigation required.	Minor adverse (not significant)	None.
Climate change and adaptation		✓		Tertiary measures	O: low	O: high	Minor beneficial (not significant)	No further mitigation required.	Minor beneficial (not significant)	None.
Wider societal infrastructure and resources		✓		Tertiary measures	O: medium	O: high	Moderate beneficial (significant)	No further mitigation required.	Moderate beneficial (significant)	None.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Table 14.25: Summary of potential cumulative environmental effects, mitigation and monitoring.

^a C=construction, O=operations and maintenance, D=decommissioning

Description of effect	Phase ^a			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Scenario 1										
Transport modes, access and connectivity	✓	✓	✓	Tertiary measures	C: medium O: medium D: medium	C: high O: high D: high	Minor adverse (not significant)	No further mitigation required.	Unchanged	None
Community identity, culture, resilience and influence	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Employment and income	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Climate change and adaptation		✓		Tertiary measures	O: low	O: high	Minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Wider societal infrastructure and resources		✓		Tertiary measures	O: medium	O: high	Moderate beneficial (significant)	No further mitigation required.	Unchanged	None.
Scenario 2										
Transport modes, access and connectivity	✓	✓	✓	Tertiary measures	C: medium O: medium D: medium	C: high O: high D: high	Minor adverse (not significant)	No further mitigation required.	Unchanged	None
Community identity, culture, resilience and influence	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Unchanged	None.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Description of effect	Phase ^a			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Employment and income	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Climate change and adaptation		✓		Tertiary measures	O: low	O: high	Minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Wider societal infrastructure and resources		✓		Tertiary measures	O: medium	O: high	Moderate beneficial (significant)	No further mitigation required.	Unchanged	None.

Tier 1 & 2 & 3

Transport modes, access and connectivity	✓	✓	✓	Tertiary measures	C: medium O: medium D: medium	C: high O: high D: high	Minor adverse (not significant) for medical and other health related deliveries Moderate adverse (significant) for collision and allision risk	No further mitigation proposed, cumulative effect arises when Moir Vannin Offshore Wind Farm Scoping Boundary is included.	Unchanged	None.
Community identity, culture, resilience and influence	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Employment and income	✓	✓	✓	Tertiary measures	C: low O: low D: low	C: high O: high D: high	Minor adverse and minor beneficial (not significant)	No further mitigation required.	Unchanged	None.
Climate change and adaptation		✓		Tertiary measures	O: low	O: high	Minor beneficial (not significant)	No further mitigation required.	Unchanged	None.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Description of effect	Phase ^a			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Wider societal infrastructure and resources		✓		Tertiary measures	O: medium	O: high	Moderate beneficial (significant)	No further mitigation required.	Unchanged	None.

14.15 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 Open.
- Berglund, B., Lindval, T., Schwela, D. H., & Organization, W. H. (1999). Guidelines for community noise. Geneva: WHO Occupational and Environmental Health Team. .
- 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. 18(4).
- Cook, J. T., Frank, D. A., Casey, P. H., Rose-Jacobs, R., Black, M. M., Chilton, M., . . . 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. . 122(4).
- Costello, A., Abbas, M., Allen, A., Ball, S., Bellamy, R., & al, e. (2009). Managing the health effects of climate change: Lancet and University College London Institute for Global Health Commission. 373(9676).
- DECC. (2011a). Overarching National Policy Statement for Energy (EN-1). Retrieved February 2023, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf
- DECC. (2011b). National Policy Statement for Renewable Energy Infrastructure (EN-3). Retrieved February 2023, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf
- Hernández, D. (2016). Understanding ‘energy insecurity’ and why it matters to health. 167(1982).
- HM Government. (2012a). Civil Aviation Act.
- HM Government. (1974a). Health and Safety at Work etc. Act. 1974.
- HM Government. (1974b). Control of Pollution Act 1974 (as amended). .
- HM Government. (1979). Public Health (Aircraft) Regulations 1979 (as amended).
- HM Government. (1984). Public Health (Control of Disease) Act 1984 (as amended).
- HM Government. (1990). Environmental Protection Act 1990.
- HM Government. (1995). Environment Act 1995.
- HM Government. (2010). The Air Quality Standards Regulations.
- HM Government. (2012b). Guidance. Port health authorities: monitoring of food imports.
- HM Government. (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations.
- HM Government. (2021). The Environment Act.
- IAIA. (2020). Human health: Ensuring a high level of protection. A reference paper on addressing Human Health in Environmental Impact Assessment. International Association for Impact Assessment and European Public.
- IEMA. (2016). Environmental Impact Assessment. Guide to Delivering Quality Development. Retrieved February 2023, from <https://www.iema.net/download-document/7014>.

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

- Institute of Public Health. (2021). Health Impact Assessment Guidance: A Manual and Technical Guidance. Standalone Health Impact Assessment and health in environmental assessment. Retrieved March 2022, from <https://publichealth.ie/hia/guidance.pdf>
- International Maritime Organisation. (1973). International Convention for the Prevention of Pollution from Ships (MARPOL). Retrieved February 2023, from [https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx#:~:text=The%20International%20Convention%20for%20the,2%20November%201973%20at%20IMO.](https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx#:~:text=The%20International%20Convention%20for%20the,2%20November%201973%20at%20IMO.)
- 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. Cambridge University Press.
- Isle of Man Cabinet Office. (2018). Public Health Outcomes Framework (PHOF). Retrieved 02 06, 2023, from <https://www.gov.im/about-the-government/departments/cabinet-office/public-health/health-intelligence/public-health-outcomes-framework-phof/>
- Marine Management Organisation. (2021). North West Inshore and North West Offshore Marine Plan. London: Department for Environment, Food and Rural Affairs.
- Mona Offshore Wind Ltd (2024) Mona Offshore Wind Project.
- OEP. (2022). Our Strategy and Enforcement Policy.
- OHID. (2022). Public Health Outcomes Framework. Retrieved 02 06, 2023, from <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>
- PHE. (2021). Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime. London: Public Health England.
- Public Health England. (2020). Health Impact Assessment in spatial planning. A guide for local authority public health and planning teams. London: PHE publications.
- Public Health England. (2021). Health Profile for England: 2021. Retrieved from <https://www.gov.uk/government/publications/health-profile-for-england-2021>
- Pyper, R., Lamming, M., Beard, C., Waples, H., Birley, M., Buroni, A., . . . Cave, B. (2022a). IEMA Guide: Effective Scoping of Human Health in Environmental Impact Assessment. England: Institute of Environmental Management and Assessment.
- Pyper, R., Waples, H., Beard, C., Barratt, T., Hardy, K., Turton, P., . . . Cave, B. (2022b). IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment. England: Institute of Environmental Management and Assessment.
- WHO. (2009). Night Noise Guidelines for Europe.
- WHO. (2018). Environmental Noise Guidelines for the European Region. Copenhagen: World Health Organization Regional Office for Europe. Retrieved from www.euro.who.int/en/publications/abstracts/environmental-noise-guidelines-for-the-european-region-2018
- WHO. (2021). WHO global air quality guidelines. Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide,. Retrieved July 2022, from <https://apps.who.int/iris/handle/10665/345329>
- World Health Organization. (1948). The Preamble of the Constitution of the World Health Organization. New York: Bulletin of the World Health Organization.
- World Health Organization. (2022). Mental health: strengthening our response. Retrieved September 2022, from <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>