



Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 4, Annex 4.2: Climate Change Risk
Assessment



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Glossary

Term	Meaning
Alternating Current (AC) connection cables	AC cables that will connect the proposed onshore land substation to the National Grid Hawthorn Pit Substation.
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Climate resilience	The capacity of social, economic and ecosystems to cope with and adapt to climate-related hazards, trends and disturbances.
Embedded mitigation	Measures included as part of the project design. Includes both primary and tertiary mitigation.
Magnitude	A combination of the spatial extent, duration, frequency and reversibility of an impact.
MHPGC Project PEIR Red Line Boundary	The area within which all components of the MHPGC Project will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds).
MHPGC Project Preliminary Environmental Information Report (PEIR)	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
Morven Hawthorn Pit Grid Connection Project	The MHPGC Project is comprised of the offshore export cables in Scottish and English waters from the Morven North or the Morven South offshore substation platform(s) (OSP), landfall, onshore export cables, the onshore land substation (LSS) and AC connection cables. Also referred to in this report as the MHPGC Project, for ease of reading.
Offshore substation platform (OSP(s))	OSP(s) comprise the support structure, topside and electrical components used for collecting the electricity generated by the wind turbine generators, in Scottish waters, for the passage or transmission to landfall. These OSP(s) can be divided into two types: • High Voltage Alternating Current (HVAC) collector substations; • High Voltage Direct Current (HVDC) converter substations.
Onshore Land Substation (LSS)	A purpose-built site comprising a compound containing the electrical components for converting the HVDC to HVAC power. The LSS site associated with the MHPGC Project adjusts the power quality and power factor to meet the requirements of power supply being fed to the National Grid Hawthorn Pit Substation.
Operations and maintenance phase (O&M)	The operational and maintenance phase of the MHPGC Project.
Outline Cable Specification and Installation Plan (CSIP)	An outline plan describing cable installation, burial, protection and monitoring, including a Cable Burial Risk Assessment. The CSIP is intended to manage interactions with the seabed and other marine receptors, including navigation, the environment, and other legitimate sea users such as commercial fisheries.
Primary mitigation	Measures included as part of the location or design of the MHPGC Project made during the pre-application phase that are an inherent part of the MHPGC Project and do not require additional action to be taken.

Term	Meaning
	This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the MHPGC Project, the parameters and associated commitments secured by the DCO and marine licence, or both.
Secondary mitigation	Actions that will require further activity to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES. These include measures required to reduce the significance of environmental effects and may be secured through an environmental management plan. For secondary mitigation measures, both pre-mitigation and residual effects are presented.
Significance	Effect factor that is determined by the magnitude of impact along with the sensitivity of the receptor.
Tertiary mitigation	Actions that would occur with or without input from the EIA process feeding into the design. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.

Acronyms

Acronym	Meaning
AC	Alternating Current
CBRA	Cable Burial Risk Assessment
CCRA	Climate Change Risk Assessment
CoCP	Code of Construction Practice
CSIP	Cable Specification and Installation Plan
IEMA	Institute of Environmental Management and Assessment
ISEP	Institute of Sustainability and Environmental Professionals
GLA	General Lighthouse Authority
LSS	Land substation
MCA	Maritime and Coastguard Agency
MHPGC	Morven Hawthorn Pit Grid Connection
NLB	Northern Lighthouse Board
O&M	Operation and Maintenance
ODMP	Operational Drainage Management Plan
OEMP	Offshore Environmental Management Plan
PEIR	Preliminary Environmental Information Report
SuDS	Sustainable Drainage System
SWGMP	Surface Water and Groundwater Management Plan

Units

Unit	Meaning
m	Metre
%	Percentage

1 Introduction

1.1 Overview

- 1.1.1.1 This report presents the detailed Climate Change Risk Assessment (CCRA) for the Morven Hawthorn Pit Grid Connection Project (hereafter 'the MHPGC Project'). It forms **Volume 4, Annex 4.2: Climate Change Risk Assessment, of the Preliminary Environmental Information Report (PEIR)** prepared for the MHPGC Project and supports **Volume 4, Chapter 4: Climate Change, of the PEIR**.
- 1.1.1.2 The Climate Change Risk Assessment supports the assessment of potential impacts and likely significant effects carried out in **Volume 4, Chapter 4: Climate Change, of the PEIR**. The assessment is based on the methodology provided in **Volume 4, Chapter 4: Climate Change, of the PEIR** which also sets out the baseline and future baseline for the study area and a summary of the results of this assessment to present the overall likely significant risks.
- 1.1.1.3 The assessment considers the vulnerability to climate change for the onshore and offshore receptors. This considers future changes in climate and includes the Operations and Maintenance (O&M) and decommissioning phases of the MHPGC Project. The construction phase of the MHPGC Project in relation to the assessment of climate change risk has been scoped out, since long term climate change won't have a significant impact within the timescales of the proposed programme of works associated with the MHPGC Project.

2 Climate Change Receptor Sensitivity

2.1 Introduction

2.1.1.1 Using the methodology outlined in **Volume 4, Chapter 4: Climate Change of the PEIR**, sensitivity has been determined for each of the receptors identified as requiring assessment. Table 2.1 provides detail of the sensitivity of each receptor based on its vulnerability and susceptibility to the specific impacts that could arise from the MHPGC Project. Professional judgement has been used to identify the sensitivity of the key receptors.

2.1.1.2 Receptors that may experience a change as a result of the MHPGC Project have been identified taking into account the spatial and temporal scope of the assessment. The main receptors identified that may experience likely significant effects for Climate Resilience are:

- Buildings and Infrastructure;
- Humans.

2.1.2 Buildings and Infrastructure

2.1.2.1 Receptors included within this group have been split into two categories:

- Onshore Infrastructure: this includes the onshore export cables, onshore LSS, AC connection cables, access roads, ancillary infrastructure and onshore components of the landfall for the MHPGC Project.
- Offshore Infrastructure: this comprises the offshore export cables, cable protection and offshore landfall components associated with the MHPGC Project.

2.1.3 Humans

2.1.3.1 The receptor included in this group is human welfare which refers to the welfare of maintenance personnel associated with the operation of the MHPGC Project.

Table 2.1: Receptor Sensitivity

Climate Risk	Sensitivity	Receptor			Justification
		Onshore infra-structure	Human welfare	Offshore infra-structure	
Increased frequency and intensity of extreme weather events: Intense rainfall events	Susceptibility	medium	medium	low	Onshore infrastructure: Limited extent of above ground infrastructure means susceptibility is limited to LSS. Components are designed with some tolerance for intense rainfall. Human welfare: Weather forecasts can be used to reduce susceptibility, but variable conditions can mean exposure during ongoing works. Offshore Infrastructure: Majority of components are unaffected by intense rainfall events.

Climate Risk	Sensitivity	Receptor			Justification
		Onshore infrastructure	Human welfare	Offshore infrastructure	
	Vulnerability	Medium	Medium	Medium	Onshore infrastructure: Asset vulnerability to intense rainfall events is limited. Human welfare: Refuge areas onshore and offshore provide means of reducing vulnerability to higher risk of injury. Offshore Infrastructure: There is potential for accelerated deterioration in asset condition leading to greater vulnerability.
	Sensitivity	Medium	Medium	Low	Overall sensitivity is assessed as medium for onshore infrastructure and human welfare but low for offshore infrastructure.
Increased frequency and intensity of extreme weather events: Intense rainfall events leading to increased frequency of flooding	Susceptibility	Medium	Medium	Medium	Onshore infrastructure: Limited extent of above ground infrastructure means susceptibility is limited to LSS. Failure of surface water management systems can lead to damage to asset components. Human welfare: Flood events may mean workers stranded at the LSS site or unable to traverse access roads. Offshore Infrastructure: There is no surface piercing offshore infrastructure that could be at risk of flooding.
	Vulnerability	Medium	Medium	Medium	Onshore infrastructure: Surface water management systems would minimise vulnerability to flood events. Human welfare: Use of forward weather forecast and welfare alerts for personnel should minimise vulnerability. Offshore Infrastructure: Design parameters used to minimise vulnerability to storm surge.
	Sensitivity	Medium	Medium	Medium	Overall sensitivity is assessed as medium in each case.
Increased frequency and intensity of high temperatures: Heatwaves	Susceptibility	Medium	Medium	Low	Onshore infrastructure: Limited extent of above ground infrastructure means susceptibility is limited to LSS. Human welfare: Personnel susceptible in extreme heat and work schedules disrupted. Offshore Infrastructure: Design parameters used to minimise susceptibility to extreme heat.

Climate Risk	Sensitivity	Receptor			Justification
		Onshore infrastructure	Human welfare	Offshore infrastructure	
	Vulnerability	Medium	Medium	Medium	Onshore infrastructure: Vulnerability to some disruption in terms of function of electrical components and access road deterioration. Human welfare: Refuge areas onshore and offshore provide means of reducing vulnerability to higher risk of injury. Offshore Infrastructure: Extreme heat may increase risk of malfunction of offshore infrastructure.
	Sensitivity	Medium	Medium	Low	Overall sensitivity is assessed as medium for onshore infrastructure and human welfare but low for offshore infrastructure.
Drier summers and wetter winters. Cycling between hot and cool temperatures	Susceptibility	Medium	Medium	Medium	Onshore infrastructure: Cycling between high and cool temperatures can leave asset components and access roads susceptible to deterioration. Human welfare: Personnel susceptible to being exposed to more extreme weather conditions more frequently. Offshore Infrastructure: Cycling between high and cool temperatures can leave asset components susceptible to greater deterioration than design expectation.
	Vulnerability	Medium	Medium	Medium	Onshore infrastructure: Vulnerability to some disruption in terms of function of electrical components and access road deterioration. Human welfare: Refuge areas onshore and offshore provide means of reducing vulnerability to higher risk of exposure / injury. Offshore Infrastructure: Extreme weather patterns increase risk of malfunction of offshore infrastructure.
	Sensitivity	Medium	Medium	Medium	Overall sensitivity is assessed as medium in each case.

Climate Risk	Sensitivity	Receptor			Justification
		Onshore infrastructure	Human welfare	Offshore infrastructure	
Extreme weather events: Windstorms and wind gusts	Susceptibility	Medium	Medium	Medium	Onshore infrastructure: LSS does not have extremely tall structures susceptible to damage. However, there is limited means of minimising impacts of high winds in terms of debris blown into the asset or blocking access roads. Human welfare: Personnel susceptible to being exposed to high winds in event of access or egress being blocked to the LSS site. Offshore Infrastructure: Windstorms could disrupt capacity to carry out routine offshore activities.
	Vulnerability	Medium	Medium	Medium	Onshore infrastructure: Vulnerability to some disruption in terms of damage to electrical components and access roads being blocked for prolonged periods. Human welfare: Refuge areas onshore and offshore provide means of reducing vulnerability to higher risk of exposure / injury. Offshore Infrastructure: Extreme weather patterns increase risk of disruption to O&M activities.
	Sensitivity	Medium	Medium	Medium	Overall sensitivity is assessed as medium in each case.
Sea level rise and increased wave height	Susceptibility	Low	Medium	Medium	Onshore infrastructure: Limited susceptibility. Human welfare: Working conditions susceptible to greater disruption due to increased wave heights. Offshore Infrastructure: There is no surface piercing offshore infrastructure that could be susceptible to increased wave heights.

Climate Risk	Sensitivity	Receptor			Justification
		Onshore infrastructure	Human welfare	Offshore infrastructure	
	Vulnerability	Low	Medium	Medium	Onshore infrastructure: Vulnerability low given location selection of landfall and cable entry/exist points in concrete chambers. Human welfare: Weather forecasts in planning O&M works, and refuge areas onshore and offshore provide means of reducing vulnerability to higher risk of exposure / injury. Offshore Infrastructure: Some vulnerability to landfall, though design parameters provide some resilience to future change.
	Sensitivity	Low	Medium	Medium	Overall sensitivity is assessed as medium for offshore infrastructure and human welfare, but low for onshore infrastructure.
Rising sea surface temperatures and ocean acidification	Susceptibility	Low	Medium	Medium	Onshore infrastructure: No significant susceptibility. Human welfare: Low susceptibility. Offshore Infrastructure: Offshore vessels susceptible to potential deterioration in general condition due to changing conditions.
	Vulnerability	Low	Medium	Medium	Onshore infrastructure: Vulnerability low given location selection of landfall and cable entry/exit points in concrete chambers. Human welfare: Moderate vulnerability to unsafe conditions given increased risk of structural stability due to deterioration of OSP. Offshore Infrastructure: There is no surface piercing offshore infrastructure that could be at risk of increased structural integrity risks.
	Sensitivity	Low	Medium	Medium	Overall sensitivity is assessed as medium for offshore infrastructure and human welfare, but low for onshore infrastructure.

3 Climate Change Risk Assessment

3.1 Introduction

3.1.1.1 Table 3.1 and Table 3.2 contains the CCRA for the O&M and decommissioning phases, respectively.

Table 3.1: CCRA for offshore and onshore receptors for the O&M phase

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
Project Phase: Operations and Maintenance						
Receptor: Onshore Infrastructure						
Extreme rainfall events could result in damage to the onshore cables, land substation (LSS) and associated equipment leading to operational interruptions.	An Outline Operational Drainage Management Plan (ODMP) for the onshore Land Substation (LSS) will be prepared and submitted with the application for development consent. The Outline ODMP will detail measures to ensure that existing land drainage is reinstated and/or maintained, and ensure surface water runoff generated at the chosen onshore LSS option by new impermeable areas is attenuated with an allowance for climate change and discharged from the site to an appropriate location at a restricted discharge rate, thus protecting the LSS assets. A Detailed ODMP will be developed substantially in accordance with the Outline ODMP and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority. (CoT22). The onshore cabling would be buried at a minimum typical depth of 1.8m, reducing risk of exposure and damage as a result of extreme weather events. Volume 1, Chapter 2: Project Description, of the PEIR additionally outlines the routine inspections and monitoring that would take place on shore. As part of this, the condition of the onshore export cables and the Alternating Current (AC) connection cables would be subject to planned periodic inspections. Joint bays would also be inspected and cleaned on a scheduled basis. The O&M team would also visit the LSS site twice a year as a minimum to perform scheduled preventative and corrective tasks.	Medium	Likely	Low	Low	Not Significant
Increased coastal and fluvial flooding could damage onshore infrastructure through inundation and scour. Any buried infrastructure near watercourses could also be vulnerable to this.	Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR states that the MHPGC Project PEIR Red Line Boundary is within Flood Zone 1 (Low Probability), a small area of Flood Zone 2 (Medium Probability), less than 1% of the Red Line Boundary, and Flood Zone 3. According to EA online mapping, it is not located in an area with a potential flood risk associated with reservoir failure and no other artificial sources of flood risk have been identified at or near the MHPGC Project PEIR Red Line Boundary: Onshore.	Low	Likely	Low	Low	Not Significant

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
	Where practicable, the siting of the temporary and permanent footprint of the MHPGC Project will avoid areas of Flood Risk Zone 2 and 3, sensitive historic, cultural, ecological and other environmental receptors, both statutory and non-statutory, during the site selection process for the MHPGC Project. [CoT17] The onshore cabling would be buried at a minimum depth of 1.8m, reducing risk of exposure and damage as a result of extreme weather events. An Outline Operational Drainage Management Plan (ODMP) for the onshore Land Substation (LSS) will be prepared and submitted with the application for development consent. The Outline ODMP will detail measures to ensure that existing land drainage is reinstated and/or maintained, and ensure surface water runoff generated at the chosen onshore LSS option by new impermeable areas is attenuated with an allowance for climate change and discharged from the site to an appropriate location at a restricted discharge rate. A Detailed ODMP will be developed substantially in accordance with the Outline ODMP and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority. (CoT22). Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR, further states that the drainage design will follow the Sustainable Drainage Systems (SuDS) hierarchy with preference being given to local infiltration of surface water run-off from new areas of hardstanding, where possible. Volume 1, Chapter 2: Project Description, of the PEIR additionally outlines the routine inspections and monitoring that would take place onshore. As part of this, the condition of the onshore export cables and the Alternating Current (AC) connection cables would be subject to planned periodic inspections. Joint bays would also be inspected and cleaned on a scheduled basis. The O&M team would also visit the LSS site twice a year as a minimum to perform scheduled preventative and corrective tasks.					

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
Increased frequency and severity of extreme heat events (i.e. heat waves) could result in overheating of mechanical and electrical equipment within the LSS.	Energy-efficient auxiliary equipment and cooling systems for the onshore LSS will be used and account for variable temperature conditions and future climate extremes. Any replacements of equipment would be with more efficient versions which would further mitigate overheating in the event of temperature increase. Volume 1, Chapter 2: Project Description, of the PEIR outlines the routine inspections and monitoring that would take place onshore. As part of this, the condition of the onshore export cables and the Alternating Current (AC) connection cables would be subject to planned periodic inspections. Joint bays would also be inspected and cleaned on a scheduled basis to assess structural integrity and drainage sufficiency (i.e. no water ingress), check for animal or vegetation intrusion and visually examine the cable joints, accompanied as needed by thermography, insulation-resistance measurements and sheath testing. The O&M team would also regularly visit the LSS to perform scheduled preventative and corrective tasks. Given all cables will be below ground the impact of higher air temperatures is limited.	Medium	Likely	Low	Low	Not Significant
Drier summers could cause drier soils and soil instability, while wetter winters could also cause this through heave leading to upward movement of the ground when soil expands with moisture. Cycling between extreme temperatures can cause shrinkage and expansion of structures could lead to cracking of concrete structures. These factors could lead to the instability of onshore	A Design Principles document will be produced and submitted as part of the application for development consent. It will focus on design elements associated with the onshore Local Substation (LSS) fulfilling the requirement for 'good design', as prescribed in the National Policy Statements EN-1, EN-3 and EN-5. [CoT62] Access roads to the LSS will be designed in line with relevant guidance (Design Manual for Roads and Bridges (DMRB)). This includes geo-technical design parameters to account for potential soil instability and heave. Volume 1, Chapter 2: Project Description, of the PEIR outlines the routine inspections and monitoring that would take place on shore. Joint bays would also be inspected and cleaned on a scheduled basis which would include an assessment of structural integrity. The O&M team would also periodically visit the LSS to perform scheduled preventative and corrective tasks.	Medium	Likely	Low	Low	Not Significant

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
structures such as the LSS and joint bays.						
Storm events and extreme wind forces could cause damage to the MHPGC Project. This damage could include structural damage to the LSS and associated equipment leading to operational interruptions.	The onshore export cables and the AC connection cables will be completely buried underground for the entire length. No overhead pylons will be installed as part of the MHPGC Project. [CoT27]. The onshore export cables and AC connection cables will not therefore be exposed to high winds. A Design Principles document will be produced and submitted as part of the application for development consent. It will focus on design elements associated with the onshore Local Substation (LSS) fulfilling the requirement for 'good design', as prescribed in the National Policy Statements EN-1, EN-3 and EN-5. [CoT62]. This includes durability standards and guidance.	Medium	Possible	Low	Low	Not Significant
Sea level rise could lead to greater occurrences of coastal flooding with potential damage to structures, electrical equipment, causing interference with operations.	Flood risk is mitigated through appropriate siting of infrastructure, a high TJB (30 m AOD), the distance from the coast and avoidance of areas of Flood Zone 3 through the use of HDD.	Low	Likely	Low	Low	Not Significant
Receptor: Human Welfare (maintenance personnel)						
Intense rainfall events could affect the ability of onshore maintenance personnel to undertake certain maintenance operations which may	An Outline Operational Drainage Management Plan (ODMP) for the onshore Land Substation (LSS) will be prepared and submitted with the application for development consent. The Outline ODMP will detail measures to ensure that existing land drainage is reinstated and/or maintained, and ensure surface water runoff generated at the chosen onshore LSS option by new impermeable areas is	Medium	Likely	Low	Medium	Not Significant

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
cause operational issues. The welfare of maintenance personnel could be affected.	attenuated with an allowance for climate change and discharged from the site to an appropriate location at a restricted discharge rate. A Detailed ODMP will be developed substantially in accordance with the Outline ODMP and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority. (CoT22). This supports attenuation of intense rainfall from storm events. Safe systems of work will include weather monitoring and provision for stand down during storm events. Welfare facilities on site provide place of refuge during storm event.					
Heatwaves and higher temperatures could impact the welfare of maintenance personnel, for example, heat stress and unsafe working conditions.	All operational activities will be subject to relevant Health & Safety legislation. Working protocols will be in place to avoid unsafe working conditions for personnel during periods of elevated temperatures. Welfare facilities at the LSS will provide means of shade for personnel and access to potable water.	Medium	Likely	Medium	Medium	Not Significant
Windstorms or wind gusts could impact on the safety and activities of maintenance site personnel.	The onshore export cables and the AC connection cables will be completely buried underground for the entire length. No overhead pylons will be installed as part of the MHPGC Project [CoT27]. This reduces personnel exposure to height and therefore higher speed wind gusts. Weather monitoring will support planned maintenance activities to avoid periods of high winds where at all practicable. All operational activities will be subject to relevant Health & Safety legislation. Working protocols will be in place to avoid unsafe working conditions for personnel during periods of high winds.	Medium	Likely	Low	Medium	Not Significant
Intense rainfall events could disrupt offshore maintenance activities and lead to operational issues. The welfare of maintenance personnel could be affected.	Weather monitoring will be used to plan O&M works and avoid adverse weather conditions where at all practicable. An Outline Offshore Operations and Maintenance Plan will be prepared and submitted as part of the application for development consent and as part of the marine licence application(s) to the Scottish Ministers. A Detailed Offshore Operations and Maintenance Plan will be produced substantially in accordance with the outline plan, prior to entering the operation and maintenance phase. [CoT07]	Medium	Likely	Medium	Medium	Not Significant

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
	As stated in Volume 1, Chapter 2: Project Description, of the PIER, guard vessels would be deployed as needed during O&M					
Receptor: Offshore Infrastructure						
Overheating may inhibit the functioning of export cables.	As stated in Volume 1, Chapter 2: Project Description, of the PEIR regular inspections of the offshore export cables would be undertaken. An element of these inspections would include an assessment of the condition of the offshore export cables and their protection systems. Given all cabling infrastructure will be submarine in nature there is limited risk of overheating and cable malfunction.	Low	Unlikely	Low	Low	Not Significant
Heatwaves and higher temperatures could impact the welfare of offshore maintenance personnel, for example, heat stress and unsafe working conditions.	Weather monitoring will be used to plan O&M works and avoid adverse weather conditions where at all practicable. An Outline Offshore Operations and Maintenance Plan will be prepared and submitted as part of the application for development consent and as part of the marine licence application(s) to the Scottish Ministers. A Detailed Offshore Operations and Maintenance Plan will be produced substantially in accordance with the outline plan, prior to entering the operation and maintenance phase. [CoT07]. As stated in Volume 1, Chapter 2: Project Description, of the PIER , guard vessels would be deployed as needed during O&M.	Medium	Possible	Medium	Medium	Not Significant
Increased temperatures and ocean acidification could accelerate the deterioration of structures below sea-level, such as offshore export cables and cable protection.	As stated in Volume 1, Chapter 2: Project Description, of the PEIR regular inspections of the offshore export cables would be undertaken. An element of these inspections would include an assessment of the condition of the offshore export cables and their protection systems. An Offshore In-Principal Monitoring Plan (OIPMP) will be prepared and submitted as part of the application for development consent and as part of the marine licence application(s) to the Scottish Ministers. The OIPMP will include for monitoring as part of the operational asset integrity surveys. A Detailed Offshore Monitoring Plan will be produced prior to operation and maintenance phases substantially in accordance with the OIPMP, and will be approved in consultation with statutory advisors and regulators. [CoT56]	Medium	Possible	Low	Low	Not Significant

Impact	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
Damage to cabling as a consequence of scour from sediment transfer.	As stated in Volume 1, Chapter 2: Project Description of the PIER, regular inspections of the offshore export cables would be undertaken. An element of these inspections would include an assessment of the condition of the offshore export cables and their protection systems An Offshore In-Principal Monitoring Plan (OIPMP) will be prepared and submitted as part of the application for development consent and as part of the marine licence application(s) to the Scottish Ministers. The OIPMP will include for monitoring as part of the operational asset integrity surveys. A Detailed Offshore Monitoring Plan will be produced prior to operation and maintenance phases substantially in accordance with the OIPMP, and will be approved in consultation with statutory advisors and regulators. [CoT56]	Medium	Possible	Low	Low	Not Significant

Table 3.2: CCRA for offshore and onshore receptors for the decommissioning phase

Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
Decommissioning						
Human Welfare (Maintenance Personnel)						
Intense rainfall events could affect the ability of onshore decommissioning personnel to undertake dismantling and lead to risk of injury.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable. [CoT16]. Standard health and safety measures / standards at the time of decommissioning would be adhered to. Volume 1, Chapter 2: Project Description, of the PIER states that at the Decommissioning Phase the MHPGC Project would be risk assessed in line with current government guidance and the Applicant's own best-practice standards. Outcomes would inform the methods, controls and safety precautions applied throughout the MHPGC Project's life cycle. A strong safety culture and continual monitoring would be adopted to ensure all safeguards remain.	Medium	Likely	Medium	Low	Not Significant
Heatwaves and higher temperatures could impact the welfare of onshore decommissioning personnel, for example, heat stress and unsafe working conditions.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable. [CoT16].	Medium	Likely	Medium	Low	Not Significant

Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
	The Decommissioning Plan will apply the standard health and safety measures / standards at the time, including the provision of shelter, welfare and potable water.. Volume 1, Chapter 2: Project Description, of the PIER states that at the Decommissioning Phase the MHPGC Project would be risk assessed in line with current government guidance and the Applicant's own best-practice standards. Outcomes would inform the methods, controls and safety precautions applied throughout the MHPGC Project's life cycle. A strong safety culture and continual monitoring would be adopted to ensure all safeguards remain.					
Windstorms or wind gusts could impact on the safety and activities of onshore decommissioning personnel.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable. [CoT16]. Standard health and safety measures / standards at the time of decommissioning would be adhered to. Volume 1, Chapter 2: Project Description of the PIER states that at the Decommissioning Phase the MHPGC Project would be risk assessed in line with current government guidance and the Applicant's own best-practice standards. Outcomes would inform the methods, controls and safety precautions applied throughout the MHPGC Project's life cycle. A strong safety culture and continual monitoring would be adopted to ensure all safeguards remain.	Medium	Possible	Low	Low	: Not Significant
Intense rainfall events could affect the ability of decommissioning personnel to undertake dismantling and lead to risk of injury.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Offshore Decommissioning Programme will be developed prior to decommissioning and will be adhered to. It will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable (CoT44). Standard health and safety measures / standards at the time of decommissioning would be adhered to.	Medium	Likely	Medium	Low	Not Significant

Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
	As stated in Volume 1, Chapter 2: Project Description, of the PIER, throughout construction, O&M and decommissioning, suitable aids to navigation, lights and marks would be deployed to protect all sea users. Lighting would ensure clear visibility for search and rescue and emergency response. These combined measures will reduce risk of exposure to unsafe conditions for personnel carrying out decommissioning works.					
Heatwaves and higher temperatures could impact the welfare of offshore decommissioning personnel, for example, heat stress and unsafe working conditions.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Offshore Decommissioning Programme will be developed prior to decommissioning and will be adhered to. It will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable (CoT44). Standard health and safety measures/ standards at the time of decommissioning would be adhered to. These combined measures will reduce risk of exposure to unsafe conditions for personnel carrying out decommissioning works.	Medium	Likely	Low	Medium	Not Significant
Windstorms or wind gusts could impact on the safety and activities of offshore decommissioning personnel.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Offshore Decommissioning Programme will be developed prior to decommissioning and will be adhered to. It will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable (CoT44). Standard health and safety measures/ standards at the time of decommissioning would be adhered to. These combined measures will reduce risk of exposure to unsafe conditions for personnel carrying out decommissioning works.	Medium	Likely	Medium	Low	Not Significant
Increased wave heights leading to unsafe conditions on vessels and flooding of decommissioning platforms could pose a risk to offshore personnel dismantling the infrastructure.	Weather monitoring will be used to plan decommissioning works and avoid adverse weather conditions where at all practicable. An Offshore Decommissioning Programme will be developed prior to decommissioning and will be adhered to. It will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable (CoT44). Standard health and safety measures / standards at the time of decommissioning would be adhered to.	Medium	Likely	Low	Low	Not Significant

Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Sensitivity	Likelihood	Consequence	Magnitude	Significance of Effect
	These combined measures will reduce risk of exposure to unsafe conditions for personnel carrying out decommissioning works.					

4 Summary

4.1.1.1 Table 3.1 and Table 3.2 contain the assessments of climate hazards for the onshore and offshore elements for the O&M and decommissioning phases, respectively. When considering the existing design and embedded mitigations, the significance of effect is considered Not Significant in EIA terms.

5 References

ISEP. (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation. Available at: <https://www.isepglobal.org/media/mabhqino/iema-eia-climate-change-resilience-june-2020.pdf> (Accessed: November 2025).