Chapter 25 Summary of Suggested Mitigation and Monitoring

25.1 Introduction

1 Mainstream Renewable Power (Mainstream) is committed to being a good neighbour and creating and maintaining a harmonious relationship with other sea users. Engaging and consulting with stakeholders during the assessment process has allowed the development of mitigation measures which will be applied at key points in the construction, operation or maintenance phases in order to minimise potential impacts.

2 For each receptor, a full environmental impact assessment (EIA) has been undertaken and is presented in individual chapters in this Environmental Statement (ES). For further information on each of the impact assessments and additional detail on the suggested mitigating measures please refer to the relevant chapter.

3 Mitigation has been suggested for those impacts considered to be of moderate or major significance (refer to Chapter 6: The Approach to Environmental Impact Assessment). A summary of the mitigation is detailed in this chapter, for additional information on the impact assessment criteria and conclusions refer to the appropriate chapter within this ES.

4 Additionally certain potential impacts have been minimised through adopted of embedded mitigation measures for a number of topics. These include use of scour protection to minimise potential impacts on physical processes. Further information on embedded mitigation is provided below and in individual chapters within this ES. Where appropriate, monitoring recommendations are also described below.

25.2 Marine Licence Conditions

5 If the project is granted consent, a Marine Licence will be issued by Marine Scotland. This Marine Licence is likely to contain a number of conditions to which the developer of the offshore wind farm must adhere. Conditions are likely to include preparation of a number of plans that must be agreed with Marine Scotland, Statutory Bodies and Stakeholders prior to construction commencing (refer to Table 25.1).

Plan	Indicative Content
Site Environmental Management Plans (SEMP) and Construction Management Plans (CMP) will include: ● **Waste management;** ● **Procedures to manage European Protected Species interactions;** ● **Environmental Risk Assessment; and** ● **Corrective actions and auditing procedures.**	The developer must adhere to the measures agreed in the SEMP during construction and operation. The SEMP will be agreed in advance of any works commencing with Marine Scotland, Statutory Bodies and Stakeholders CMP will provide a description of works and construction processes, description of vessel routes and safety procedures, plant service procedures, communication and reporting structures and timeline of work. It will detail the final design selected and take into account Marine Licence Conditions and commitments within the SEMP.
Pollution Control and Spillage Response Plans	Will contain pollution risk assessment and mitigation measures and will outline procedures required to be implemented prior to construction and which are to be followed in the event of a pollution incident, including a response plan and communications procedure.
Navigational Risk Assessment and Collision Risk Management Plan	Navigational Risk Assessment on operation and maintenance (O&M) vessels and safety management procedures.
Monitoring Plan	Through the environmental impact assessment (EIA) process, conclusions have been drawn on the potential environmental impact of developing the Neart na Gaoithe offshore wind farm. Where required, a monitoring plan will be put in place to provide further evidence to support these conclusions and provide information for future offshore wind farm developments. Pre, during and post construction and operation surveys on aspects such as commercial fisheries, shipping, benthic ecology, fisheries, marine mammals and birds will be considered as part of the monitoring plan.

Table 25.1: Management plans anticipated for Neart na Gaoithe

25.2.1 Decommissioning Plans

6 Prior to commencing construction, a decommissioning plan must be in place and agreed with the Department of Energy and Climate Change (DECC) (refer to Chapter 5: Project Description).

25.2.2 Anticipated Consent Conditions

7 Mainstream anticipates the following general licence conditions to be applied (refer to Table 25.2).

Condition	Indicative Requirement
The installed structures should be marked, and/or lit.	Adhere to the requirements of the Northern Lighthouse Board at the time of construction. It is likely that the following will be undertaken: ● The turbines should be painted yellow from the level of Highest Astronomical Tide (HAT) to 15 metres higher. ● The turbines shall display identification panels with black letters or numbers 1 m high on a yellow background visible in all directions. These panels shall be easily visible in daylight as well as at night, by the use of retro-reflecting material. ● Lights will be fitted at strategic points and shall be placed not less than 6 m and not more than 30 m above Mean High Water Springs (MHWS) with a minimum effective intensity of 1400 candelas.
The United Kingdom Hydrographic Office (UKHO) should be informed of the location of the works.	UKHO will be provided with positions of all offshore structures and site boundary co-ordinates. The as laid position of the export and inter-array cables will also be provided. UKHO and Marine Scotland will also be notified of the commencement and completion of offshore works.
Local mariner's and fishermen's organisations are notified.	A notice of all construction works will be placed in Kingfisher a minimum of two weeks before the start date and Notice to Mariners (NtM) will be issued and updated as necessary. A Fisheries Liaison Officer will be offered the opportunity to be present on board one of the construction vessels during construction works.
The main operators of ships on routes passing through the survey area should be provided with advanced notice of the construction operation.	A Notice to Mariners will be issued and updated as operations continue. A safety zone will be enforced 500 m around operations and will be publicised in the NtM.
Construction vessels to comply with the Colregs particularly in respect to the display of lights shapes and signals.	All construction vessels will display lights and signage in accordance with the International Rules for the Prevention of Collisions at Sea whilst under way, and in accordance with the Standard Marking Schedule for Offshore structures if secured to the seabed.
Officers of HM Coastguard, or any other person authorised by the Scottish Ministers, should be permitted to inspect the works at any reasonable time.	Any request to inspect the works will be permitted if safe to do so.
Subsea structures shall be marked and left in safe condition during construction.	If construction of any subsea infrastructure is unfinished due to planned or unplanned events, a guard vessel will be left stationary above all subsea infrastructure to warn other mariners.

Table 25.2: Anticipated consent conditions

25.3 Physical Environment

25.3.1 Geology and Water Quality

25.3.1.1 Mitigation

8 There are no impacts of moderate or major significance predicted on geology or on the coastline, therefore no mitigation measures are necessary.

9 An impact of moderate significance is predicted on water quality and potential designated waters through accidental spillage or leaks of pollutants, although this impact is assessed as being of extremely low probability. Following best practice and observation of MARPOL Convention regulations, this impact will be managed to be as low as reasonably practicable during the installation, operation and decommissioning phases.

10 CMP, SEMP and Pollution Control and Spillage Response Plans will be developed and submitted to Marine Scotland for review prior to construction works commencing. These plans will further reduce the probability of accidental spillage and formalise a contingency plan in the event that one does occur, thereby reducing the impact by restricting a pathway to potential receptors.

25.3.1.2 Monitoring

11 No monitoring of the coastline is considered to be necessary.

12 If trenching and rock cutting are undertaken in the nearshore area, if required, the suspended solids could be monitored to ensure that concentrations remain within acceptable limits. If directional drilling is undertaken, the push through the seabed should be monitored to ensure lubricant fluid release is minimised, and is within acceptable levels.

13 Further survey work should be undertaken if the use of rock armouring on the nearshore section of the cable is needed. Surveys should determine the exact nature of the seabed throughout the whole nearshore region to enable careful design of the rock protection.

14 It is anticipated beyond the proper reporting and disposal requirements of waste and pollution, that water quality monitoring at Neart na Gaoithe will not be necessary due to the impact assessment concluding minor significance.

25.3.2 Physical Processes

25.3.2.1 Mitigation

15 There are no impacts of moderate or major significance predicted on physical processes.

16 Certain potential impacts have been minimised through adopted of embedded mitigation measures. For example, gravity base and jacket foundations have scour protection elements as part of their design (see Chapter 5: Project Description). This embedded mitigation has therefore been assessed as part of the impact assessment and as such no further mitigating measures are suggested.

17 All steps during the design and construction of the development that can reasonably be taken to minimise any impacts should be employed, for example minimising the sediment deposition in the development area by use of a licensed disposal site for dredged material. Similarly, a nearshore survey should be completed to inform the design of the intertidal and nearshore cable laying, and thus minimise impacts.

25.3.2.2 Monitoring

18 The physical processes assessment predicts the magnitude of effects due to the development of the offshore wind farm to be low or negligible. Therefore, there is no requirement for an extensive impact-monitoring campaign.

19 During the foundation preparation and cable burial operations there is the potential for local and short-term increases in suspended sediment concentrations. Limited sampling of in-water suspended sediment concentrations could be undertaken during these operations in order to confirm the predicted effect of construction activities. Further monitoring shortly after these operations are complete would demonstrate the predicted short-term nature of these impacts.

20 Regular bathymetric surveys will be undertaken around a limited number of turbines following installation in order to quantify scour pit depths and identify any possible need for further protection. Similar surveys are recommended along the cable route in order to identify any areas of cable exposure.

25.3.3 Air Quality

25.3.3.1 Mitigation

21 The impact of emissions from the construction and operation and maintenance (O&M) vessels on air quality has been assessed as not significant and as a result no mitigation measures are necessary. No mitigation options are considered necessary for localised meteorological impacts

22 As standard, all vessels employed during the project development will comply with the Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008. It will be possible to reduce emissions and overall energy use during these phases by designing the final installation, operation and maintenance, and decommissioning strategies to minimise as far as practicable the number of vessel movements and installation time required although this will have a minimal effect on the overall emissions.

23 As a measure of good practice, Mainstream will also encourage the use of low emission fuels across all construction and operation vessels.

25.3.3.2 Monitoring

24 No ongoing monitoring of atmospheric emissions or air quality is considered necessary at Neart na Gaoithe.

25.4 Biological Environment

25.4.1 Ornithology

25.4.1.1 Mitigation

25 Possible impacts on birds arising from the proposed development include collision with turbines, exclusion from the offshore site if birds avoid entering an area with turbines (displacement) and barrier effects, where birds avoid flying through the proposed development and have to fly further to go around it.

26 By avoiding placing turbines in areas of relatively higher concentrations of birds the risk of an impact occurring is reduced accordingly. However, site-specific data collected at Neart na Gaoithe have not identified any particular areas within the site where by reducing the number of turbines would reduce the potential impacts. Species densities were largely similar across the offshore site and therefore no obvious practical benefits have been identified by changing the turbine locations.

27 Evidence from some wind farms suggests that by placing turbines further apart it may reduce the level of displacement that could occur. The evidence suggests that this is speculative and it may be that other factors are causing the differences in the level of displacement across developments.

28 Increasing the minimum rotor height has the potential to reduce the risk of collision for a number of seabirds, many of which rarely fly above about 25 m but occur regularly at around 20 m. The minimum rotor height at the lowest astronomical tide (LAT) for turbines at Neart na Gaoithe is 26 m. in addition, by reducing the rotor swept area the number of collisions will automatically be reduced. In particular the blade width and the radius of the rotor may make most differences in the number of predicted collisions

29 The use of soft-start during construction will be undertaken as a routine mitigation measure. By doing so, this might reduce the impacts on prey species upon which seabirds rely.

30 By minimising vessel numbers on site or ensuring vessels using the site are travelling at reasonable speeds, displacement of birds due to vessel movements will be minimised. This will be agreed with Scottish Natural Heritage and Marine Scotland and included as part of the SEMP and CMP.

25.4.1.2 Monitoring

31 The baseline and characterisation surveys at the site (refer to Chapter 12: Ornithology) have been designed to detect significant change through a Before and After Gradient (BAG) approach. If surveys are continued during and post construction some conclusions may be drawn although it may be more useful to consider other types of monitoring. This will be agreed with Marine Scotland, Scottish Natural Heritage and stakeholders as part of the Monitoring Plan.

32 Mainstream will continue to work as part of the Forth and Tay Offshore Wind Developers Group and actively engage in bodies such as Strategic Ornithological Support Services.

25.4.2 Marine Mammals

25.4.2.1 Mitigation

33 Possible impacts arising from the proposed development include damage to hearing either permanently or temporarily from noise arising during construction activities, specifically from the installation of the turbine bases by piling. There is potential for noise arising from the construction, operation and decommissioning of the proposed development to cause either behavioural responses to, or displacement of marine mammals in the area of affect. There are also possible physical impacts to marine mammals from either collisions with vessels or impacts with vessel's thrusters.

34 The impact of piling noise on marine mammals is raised as a major concern by stakeholders and has been assessed as moderate for harbour seals.

35 The noise modelling for marine mammal species has included consideration of an embedded mitigation measure as it has included use of 'soft start' piling techniques, an industry best practice that allows animals in the vicinity to leave the area of potential impact before the maximum piling levels are reached.

36 Nevertheless further mitigation measures to minimise and mitigate noise produced during potential piling operations are being actively researched as Mainstream fully understand the importance of this issue. Mainstream is a member of The Crown Estate Underwater Noise Forum and Forth and Tay Offshore Wind Farm Developers Group (FTOWDG) where proposals for further development and testing of mitigation measures are being considered.

37 As part of the SEMP for piling operations, the developer will complete an assessment of the effectiveness for marine mammals of all available mitigation measures for piling noise. Options will include the use of barrier to noise such as large or small bubble curtains, sound-absorbing sleeves or Acoustic Deterrent Devices (ADD). The assessment will be based on technical, H&S requirements, environmental benefit and cost.

25.4.2.2 Monitoring

38 The baseline and characterisation surveys at the site (refer to Chapter 13: Marine Mammals) have been designed to detect significant change through a BAG approach. If surveys are continued during and post construction some conclusions may be drawn however, due to the limited number of marine mammals recorded, it may be more useful to consider other types of monitoring. This will be agreed with Marine Scotland, Scottish Natural Heritage and stakeholders as part of the Monitoring Plan.

39 Monitoring of actual noise produced during installation activities could be undertaken, including during construction activities such as piling or drilling, through to operation of the wind farm. Mainstream is a member of industry initiatives to better understand piling noise and will use opportunities at the site to further knowledge. Requirements for noise monitoring will be agreed with Marine Scotland, Scottish Natural Heritage and stakeholders as part of the SEMP.

25.4.3 Benthic Ecology

25.4.3.1 Mitigation

40 No impacts were assessed as being of moderate or major significance and as such no mitigation beyond restitution of the seabed following cable ploughing is suggested.

41 The embedded mitigation described in Section 25.3.2.1 (use of scour protection in subsurface structure design) minimises potential impacts on physical processes that could have an impact on the benthic environment.

42 To encourage rapid recovery of the benthic environment, it is recommended that surface sediments be reinstated following any ploughing activities.

25.4.3.2 Monitoring

43 Before construction a benthic survey will be carried out in order to inform the micrositing of the turbines and inter-array cables. In addition, annual benthic surveys are suggested for three years following completion of construction.

44 A detailed methodology, survey objectives and approach to the benthic monitoring will be discussed and agreed with Marine Scotland and Scottish Natural Heritage prior to any surveys commencing. It is likely that the approach will be to measure an agreed number of sample stations with a comparison to a known baseline.

45 It will be important to ensure that data collected from these and subsequent surveys are comparable with previously collected data both on Neart na Gaoithe and the wider area. Comparing data collected on Neart na Gaoithe with that from other wind farm areas may permit broader scale hypotheses to be explored relating to long term impacts, such as colonisation and marine growth, associated with offshore wind farms.

46 A suggested approach will be outlined in the SEMP and agreed with the regulators prior to commencement.

25.4.4 Fish and Shellfish Ecology

25.4.4.1 Mitigation

47 The noise impact on certain fish species judged to be hearing specialists (e.g., herring) is considered to be of moderate significance.

48 Mitigation measures to minimise and mitigate noise produced during potential piling operations are being actively researched as Mainstream fully understands the importance of this issue. As previously discussed, Mainstream is a member of The Crown Estate Underwater Noise Forum and FTOWDG where proposals for further development and testing of mitigation measures are being considered.

49 As part of the SEMP for piling operations, the developer will complete an assessment of the effectiveness for fish of all available mitigation measures for piling noise. Options will include the use of barrier to noise such as large or small bubble curtains or sound-absorbing sleeves. The assessment will be based on technical, H&S requirements, environmental benefit and cost.

25.4.4.2 Monitoring

50 Fish surveys could be carried out to investigate the local distribution and abundance of fish and shellfish species in relation to:

- Effects of construction and operational noise;
- Electromagnetic fields (particularly in relation to the electro sensitive species identified in the EIA); and
- Artificial reef effects (particularly in relation to species of commercial and conservation interest).

51 As with the benthic survey methodologies, the survey specification and extent would be agreed through the SEMP with Marine Scotland and Scottish Natural Heritage.

25.5 Human Environment

25.5.1 Commercial Fisheries

25.5.1.1 Mitigation

52 Restricted access to, or complete loss of, existing fishing grounds and displacement of vessels into other areas has been assessed as of moderate significance. The following mitigation measures (refer to Table 25.3) will be applied to reduce the potential significance of impact on commercial fishing activities.

Mitigation	Explanatory notes
Working Group	A Fisheries Working Group is being established through the FTOWDG. This will ensure communication between fishermen and developers when planning construction and operation activities. This group will develop procedures and mitigation options which will be incorporated in the SEMP and the Construction Management Plan.
Infrastructure lighting	Neart na Gaoithe structures to be marked and lit in line with the Northern Lighthouse Board (NLB) and (International Association of Marine Aids to Navigation and Lighthouse Authorities) IALA (O-139) guidance. As per IALA, any lighting required for aeronautical purposes is to be shielded / arranged such that it is not visible to shipping.
Burial of all cables	Secure burial of inter-array and export cables is a concern for the fishing and renewables industry and will be a key issue for the Fisheries Working Group. Post construction surveys and, if necessary, remediation works will be undertaken.
Over trawl surveys	Over trawl surveys will be carried out on inter-array cables to ensure that the cable burial and protection scheme has been successful (this has been considered as an embedded mitigation approach in assessing potential impacts on commercial fisheries).
Notice to Fishermen	Through the Fisheries Working Group a procedure for issuing a Notice to Fishermen (or similar) will be developed to ensure effective communication.

Table 25.3: Commercial fishing mitigation

53 Additionally impacts assessed on fish and shellfish species could have an indirect impact on commercial fisheries. None of the impacts predicted on species of commercial importance are assessed as being of major or moderate significance and as such no specific mitigation measures have been outlined. However, the impact of pile driving on hearing specialist fish species is considered to be of moderate significance. As described above, Mainstream is fully committed to actively researching the available mitigation options to work to minimise this impact.

25.5.1.2 Monitoring

54 No monitoring is currently suggested for commercial fishing however, as part of the FTOWDG Fisheries Working Group and an agreement of a monitoring plan with Marine Scotland, the need and type of monitoring activities will be furthered discussed.

25.5.2 Shipping and Navigation

25.5.2.1 Mitigation

1 Impacts to shipping and navigation may arise from the wind farm structures leading to a loss of navigable sea room and deviations around structures, which may lead to increased collision risk (vessel to vessel and vessel to structure).

55 The impact of Neart na Gaoithe has been minimised as industry standard risk control measures will be put in place during the development and operation of the offshore wind farm. These embedded mitigation measures will be part of the wind farm design (e.g., lighting/marking) and best practice mitigation measures will further serve to reduce the impact of the development and ensure the project conforms to regular requirements and industry good practice.

56 Also, a further Risk Assessment will be undertaken during 2012 based on confirmed operation and maintenance scenarios.

57 The following mitigation measures will be applied to reduce the operational risk of the wind farm to shipping (refer to Table 25.4).

Mitigation	Explanatory notes
Marked on Admiralty Charts	Neart na Gaoithe will be charted by the UKHO using the magenta turbine tower chart symbol found in publication 'NP 5011 - Symbols and Abbreviations used in Admiralty Charts'. Submarine cables associated with Neart na Gaoithe will also be charted on the appropriate scale charts. Export cables will be charted by the UK Hydrographic Office on the appropriate scale charts and potential to note no anchorage areas over charted cables.
Information circulation	Appropriate liaison to ensure information on the wind farm, export cable and special activities is circulated in NtMs, Navigation Information Broadcasts and other appropriate media.
Marking and lighting	Neart na Gaoithe structures to be marked and lit in line with NLB and IALA (O-139) guidance. As per IALA, any lighting required for aeronautical purposes is to be shielded / arranged such that it is not visible to shipping.
Turbine air draught	Lowest point of rotor sweep at least 22 m above MHWS as per the Maritime and Coastguard Agency (MCA) recommendation.
Cable protection (Inter-array and Export)	Cables will be protected appropriately taking into account fishing and anchoring practices. Positions of the cable routes notified to Kingfisher Information Services-Cable Awareness (KIS-CA) for inclusion in cable awareness charts and plotters for the fishing industry.
Compliance with MGN 371 including Annex 5	Annex 5 specifies 'Standards and procedures for generator shutdown and other operational requirements in the event of a SAR, counter pollution or salvage incident in or around an offshore renewable energy installation ()OREI).'
Formulation of an Emergency Response Cooperation Plan as per MCA template	Creation of an ERCoP based on the MCA template and site Safety Management Systems (SMS), in consultation with the MCA.
Marine Control Centre	A Marine Control Centre will monitor vessel activity by Closed Circuit Television (CCTV) and record the movements of ships around Neart na Gaoithe as well as infield (company) vessels working at the wind farm. Possible errant vessels identified in construction areas or safety zones will be identified and contacted.
Subsea surveys of cables and burial depths	Periodic and planned surveys of cable routes to monitor burial depths/protection and seabed mobility (cable movement).
Safety zones and guard vessels	Construction safety zones of 500 m around major activities to exclude vessels not associated with the works from the offshore site. Guard vessels can be used to monitor passing traffic and contact vessels which could infringe the safety zones.

Table 25.4: Shipping and navigation mitigation

25.5.2.2 Monitoring

58 A Marine Control Centre monitoring AIS could be used to monitor and record the movements of vessels around the wind farm (work boats and passing vessels). It was noted, during the shipping and navigation Hazard Workshop, that Forth Ports Ltd has Vessel Traffic Service (VTS) coverage in the area of Neart na Gaoithe.

59 In addition, vessel activity may be monitored by CCTV covering the whole Neart na Gaoithe wind farm from key locations either on the wind turbine structures or the substations. CCTV technology can be adjustable for day/night conditions, which will allow operators in a central control room to identify vessel names to facilitate radio communications. The distance at which vessels could be identified on CCTV will depend on the vessel size, weather conditions and the number, location and height of CCTV systems.

60 There will also be vessels regularly operating in the site, including during planned and unplanned maintenance, which can monitor any third party vessel activity both visually and on radar, although this will not be their primary function.

25.5.3 Military and Aviation

25.5.3.1 Mitigation

61 The main impacts relate to an increase in interference or clutter on radar screens and a reduction in coverage behind the turbines. The following mitigation measures are provided as an example of potential strategies which may be employed. Mainstream is working with the FTOWDG to explore alternative options which may be suitable. Any mitigation will be discussed and agreed with the Ministry of Defence (MoD) prior to adoption.

62 The following options are described as technical solutions to the reduction in cover and clutter.

Mitigation	Explanatory notes
New radar	Replacing the existing RAF Leuchars Watchman air traffic control (ATC) radar with a system that is more robust to wind farm clutter.
Infill radar	Install additional radar will supplement the radar coverage. An infill radar system could either take the form of a new onshore system, if a suitable location can be found, or a system local to the wind farm. Current local infill solutions include: ● Cambridge Solutions Aveillant, based on holographic radar methods, whereby the airspace around the wind farm is continually scanned using a three dimensional radar that can discriminate between turbines and aircraft; ● C Speed Lightwave, a solid state primary surveillance radar (PSR) that uses a high pulse repetition frequency to differentiate between wind farm clutter and real aircraft; and ● QinetiQ VERIFEYE, a novel solution using multiple navigation radars as a low cost, high redundancy solution that is readily integrated with existing radar set ups.
Change airspace designation	The proposed site is currently located in Class-G airspace, which means that most classes of airspace user can fly there with a minimum level of equipment. There is currently no requirement for aircraft to be equipped with an secondary surveillance radar (SSR) transponder, when operating at lower levels. The implementation of a transponder mandatory zone (TMZ) is a proposed mitigation for the impact of offshore wind farms in The Greater Wash, as part of the Greater Wash Regional Solution (GWRS).

Table 25.5: Radar and military mitigation

25.5.3.2 Monitoring

63 No monitoring requirements have been identified.

25.5.4 Maritime Archaeology and Cultural Heritage

25.5.4.1 Mitigation

64 The potential for physical impacts on submerged archaeological artefacts (both known wrecks and sites identified through geophysical survey as potential artefacts) has been identified as of moderate and major significance. Due to the static nature and known position of the targets it is possible to apply clear mitigation in the form of a minimum 50 m (for medium targets) and 100 m Temporary Exclusion Zone (TEZ) (for protected wrecks) around these targets.

65 The implementation and monitoring of the TEZ will be maintained through a Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) which will be developed to mitigate the potential impact on any known or unknown archaeological remains discovered during construction.

66 This protocol will also include appropriate archaeological briefings for all personnel involved in the construction, operation and decommissioning activities associated with the proposed development. The PAD will be in place for the life of the proposed development and will be updated when required should details within the document change, for example contact details for key stakeholders.

25.5.4.2 Monitoring

67 Should it not be possible to avoid sites of cultural heritage interest, a full programme of archaeological investigation, which may include diver survey or Remotely Operated Vehicle (ROV) investigation, will be undertaken to identify the nature and extent of these sites. Subject to these investigations an appropriate mitigation strategy will be agreed with Historic Scotland.

25.5.5 Seascape, Landscape and Visual Impacts

25.5.5.1 Mitigation

68 The seascape assessment concluded that direct effects will be limited an area of open sea, upwards of 15 km from shore. Significant indirect impacts, arising from presence of the turbines in offshore views, are predicted to affect areas along the Fife coast and the Isle of May closest to the proposal, with an open outlook towards the turbines. In all other areas, the development would have no significant impacts on seascape and landscape character. No significant impacts were predicted on any protected landscapes.

69 Mitigation for wind farms is generally limited to the reduction of potential direct effects through detailed siting, and the reduction in adverse aesthetic effects through wind farm design, however this is applicable only for onshore developments.

70 Consultation indicated that detailed siting of the turbines in regular arrangements was preferred, however due to the number of potential viewing positions it is not possible to ensure the turbines are always viewed as sitting in rows.

25.5.5.2 Monitoring

71 No monitoring has been identified.

25.5.6 Other Users

25.5.6.1 Mitigation

72 No impacts were assessed as being of moderate or major significance and as such no mitigation is suggested however, it is acknowledged that there will be potential for disturbance at Thorntonloch Beach during construction activities. Minimising disturbance during any intertidal and beach works through timing of activities will be considered as part of the SEMP agreed with Marine Scotland, East Lothian Council, statutory consultees and stakeholders.

25.5.6.2 Monitoring

73 No monitoring has been identified.

25.5.7 Socioeconomics

25.5.7.1 Mitigation

74 The socioeconomic assessment has concluded that gross value added (GVA) and employment impacts are positive. Therefore, no mitigation is suggested.

25.5.7.2 Monitoring

75 No monitoring has been identified.

76 In addition to the above, consultation will continue into 2012 with public meetings, presentations and stakeholder meetings.

77 Table 25.6 below summarises the mitigation and monitoring Mainstream is committing to undertake.

25.6 Summary of Mitigation

Receptor	Mitigation	Monitoring
Geology	None	• Monitor the suspended solids; • If directional drilling is undertaken, the push through the seabed should be monitored to ensure lubricant fluid release is minimised; and • Further survey work should be undertaken if the use of rock armouring on the nearshore section of the cable is needed.
Water quality	• CMP and SEMP; and • Pollution Control and Spillage Response Plan.	• If trenching and rock cutting are undertaken in the nearshore area, the suspended solids should be monitored to ensure that concentrations remain within acceptable limits (to be agreed with regulators); • If directional drilling is undertaken, the push through the seabed should be monitored to ensure lubricant fluid release is minimised, and is within acceptable levels; • Further survey work should be undertaken if the use of rock armouring on the nearshore section of the cable is needed. Surveys should determine the exact nature of the seabed throughout the whole nearshore region to enable careful design of the rock protection; and • It is anticipated that water quality monitoring at Neart na Gaoithe will not be necessary due to the impact assessment concluding minor significance.
Physical processes	• Considered within engineering design.	• Limited sampling of in-water suspended sediment concentrations undertaken during construction activities; • Further monitoring shortly after completion of construction to demonstrate the predicted short-term nature of these impacts; and • Regular bathymetric surveys (swath bathymetry and sidescan sonar monitoring) be undertaken around a limited number of turbines and export cable route following installation in order to quantify scour pit depths and identify any possible need for further protection.
Air quality	None considered necessary due to impacts being considered not significant.	None considered necessary due to impacts being considered not significant.
Ornithology	• Changes to turbine layout or height; • Reducing the rotor swept area; and • Limiting vessel numbers and speed (through the SEMP).	• BAG Survey – pre/post construction surveys; and • Impact monitoring once constructed.
Marine mammals	• Minimise noise during piling operations through design; and • Agree effective mitigation campaign through SEMP which may include the use of marine mammal observers, and passive acoustic monitoring.	• BAG Survey – pre/post construction surveys; and • Impact monitoring once constructed.
Benthic ecology	• Burial of the cable.	• Pre-construction benthic survey to inform the micrositing of the turbines and inter-array cables; • Annual benthic surveys for three years following completion of construction; and • Intertidal invertebrate sampling at lower, mid and upper shore.

Fish and shellfish ecology	• Soft start for piling operations (SEMP); and
	• Burial of the cable (SEMP).
		• Fish surveys may be undertaken to investigate the local distribution and abundance of fish and shellfish species in relation to:
		  ▪ Effects of construction and operational noise;
		  ▪ Electromagnetic fields (particularly in relation to the electro sensitive species identified in the EIA); and
		  ▪ Artificial reef effects (particularly in relation to species of commercial and conservation interest).
		• Study to analyse the stomach content of fish within and outside wind farms in order to determine any differences in feeding habits.
		• Supplement traditional survey techniques with use of dropdown still and video cameras.

Commercial fishing	• Working Group; • Infrastructure lighting; • Burial of all cables; and • Over trawl surveys.	None proposed. Will follow best practice and Fisheries Working Group/MS advice/requirements.
Shipping and navigation	• Marked on charts; • Provision of information to stakeholders; • Lighting on the wind farm; • Cable protection; • Compliance with MGN 371 including Annex 5; • Formulation of an Emergency Response Cooperation Plan as per MCA template; • Marine Control Centre; • Subsea surveys of cables and burial depths; and • Safety zones and guard vessels.	• A Marine Control Centre monitoring AIS; • CCTV monitoring of vessel activity; and • Periodic AIS and radar monitoring by operation and maintenance vessels.

Receptor	Mitigation	Monitoring
Military and aviation	• New radar; • Infill radar; and • Change of airspace designation.	None.
Maritime archaeology and cultural heritage	• Written Scheme of Investigation; and • Protocol for Archaeological Discoveries.	• Diver survey or Remotely Operated Vehicle (ROV) investigation.
Seascape, landscape and visual impacts	None.	None.
Other users	None identified however disturbance to other users during construction needs to be managed through SEMP.	None.
Socioeconomics	None.	None.

Table 25.6: Summary of mitigation and monitoring