DUMFRIES & GALLOWAY SHORELINE MANAGEMENT PLAN

Appendix F – Environmental Mitigation Measures

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APPENDIX F – ENVIRONMENTAL MITIGATION MEASURES

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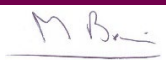
Malcolm Brian		26 April 2023

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Mitigation measures have been recommended in the Strategic Environmental Assessment Environmental Report (SEA), and Habitats Regulations Appraisal Record (HRA), where potential negative impacts are likely to result from a proposed measure for shoreline management. These mitigation measures aim to prevent, reduce and as fully as possible offset any significant adverse effects on the environment due to the implementation of the Dumfries & Galloway Shoreline Management Plan (SMP).

1.1 General Mitigation

The principal mitigation recommendation is that the predicted negative effects should be considered further during the next stage of policy development, when details of the physical shoreline management measures (e.g., visual appearance and alignment of any hard engineering works) can be optimised through detailed feasibility studies and design in order to limit identified impacts on sensitive receptors. Where feasible, natural flood management and soft / green engineering methods should be incorporated into the detailed planning to reduce the negative environmental impacts of a scheme.

Further environmental studies based on the detailed design and construction methodology should be undertaken as appropriate. These studies may involve, but are not limited to marine, aquatic and terrestrial ecology surveys, ornithological and bat surveys, fish surveys, landscape and visual assessments, WFD assessments, geotechnical investigations and heritage surveys. Further Appropriate Assessment, to meet the requirements of the Habitats Directive, of the detailed design and construction methodology for implementing the preferred policy will be required at the project level, where potential impacts have been identified in the SEA Environmental Report and accompanying HRA Record for the SMP.

Before any works are carried out, detailed method statements and management plans (construction and environmental) should be prepared, to provide information on timing of works, the specific mitigation measures to be employed for each works area, and mechanisms for ensuring compliance with environmental legislation and statutory consents.

The timing of construction and maintenance works should be planned to avoid any potential for negative cumulative effects or inter-relationships with other schemes, plans or projects, yet should look to optimise any potential positive cumulative effects or inter-relationships.

Contractors should be required to prepare Construction Environmental Management Plans (CEMPs), which would include a requirement for related plans to be prepared, as appropriate, for project implementation, such as Erosion and Sediment Control, Invasive Species Management, Emergency Response, Traffic and Safety Management, Dust and Noise Minimisation and Stakeholder Communication Plans.

Works should only be carried out once the method statements have been agreed with competent authorities such as NatureScot, Historic Environment Scotland and SEPA. At the project level it will not be sufficient to defer the production of construction method statements. These should be completed in the detailed design stage and may be subject to further Appropriate Assessment where potential impacts have been identified in the SEA Environmental Report and accompanying HRA Record for the SMP. Where there may be unavoidable impacts on protected habitats and / or species the necessary derogation licences should be applied for prior to seeking planning permission or approval for a scheme.

Marine construction and in stream works, such as sea wall refurbishment, groynes or sediment management have the greatest potential for negative impacts during spawning / breeding and early nursery periods for aquatic and marine protected species. No marine or instream works should occur during restricted periods for relevant species and consultation should be undertaken with the appropriate authorities in this regard.

Monitoring of project level mitigation measures should be undertaken during and after works, to ensure effectiveness.

All works and planning of works should be undertaken with regard to all relevant legislation, licensing and consent requirements, and recommended best practice guidelines. An ecological clerk of works should be appointed for environmental management of each scheme, and where specific sensitive species may be impacted, an appropriate expert should also be appointed.

In areas of the coastline where the policy is to take no action and allow natural uninterrupted coastal processes, including erosion and accretion, to continue (NAI), there is potential for loss or damage to cultural heritage features or their settings from these processes. Owners of designated heritage assets should continue to

monitor the risk to these assets, and follow advice provided by HES Managing Change in the Historic Environment Guidance Notes[1].

1.2 Mitigation by Environmental Effect

Table F1.1 demonstrates environmental effect specific mitigation measures that should be adopted in project level implementation of the SMP to minimise the potential for any negative effects on the wider environment of implementing the preferred policies. These mitigation measures should be implemented and further developed at the next detailed design stage and project level study stage.

Effect	Proposed Mitigation
Temporary disturbance and destruction of existing habitats and flora, and the displacement of fauna, along the shoreline and river corridors.	Good planning and appropriate timing of works to minimise adverse effects. Where applicable, prior to any vegetation clearance an appropriately qualified ecologist should be contracted to undertake a 'pre-vegetation clearance' survey for signs of nesting birds and protected and important species e.g., otters, kingfisher etc. Should important species be found during surveys the sequential approach of avoid, reduce or mitigate should be adopted to prevent significant adverse effects with advice from appropriately qualified professionals. Vegetation and tree clearance should be minimised and only occur outside the main bird nesting season from February to August. Where there are over-wintering birds, to avoid disturbance, works should be avoided between September and March. Following construction, replanting and landscaping, or natural revegetating, should be undertaken in line with appropriate guidelines that aim to improve local biodiversity. This will provide medium- and long-term benefits to the biodiversity, flora and fauna of the working areas. Where possible, original sediment / soil should be reinstated to original levels to facilitate natural restoration and recolonisation of habitat. Consider integration of design as part of blue / green infrastructure plans and habitat enhancement where possible.
Temporary displacement of otters, birds, fish and other fauna during the construction period.	Good planning, appropriate timing of works and sensitive construction methods are essential. Adherence to best practice construction guidelines.
Adverse effects on European sites, habitats and species from construction or operation of shoreline management scheme.	Good planning and appropriate timing of works, and good construction and management practices will keep adverse effects to a minimum. There should be timely consultation with NatureScot. Site- and species-specific mitigation should be followed, as provided for in the HRA for the SMP, including requirements for site specific surveys, timing of works etc. Provide local, connected, compensatory habitat if loss of area of European site is unavoidable.
Spread of invasive species during construction.	Pre-construction survey for invasive species. Effective cleaning of equipment and machinery along with strict management protocols to combat the spread of invasive species should be adopted. Preparation of invasive species management plan for construction and maintenance-related activities if invasive species are recorded during the pre-construction surveys. Any imported materials will need to be free from alien invasive species. Post-construction survey for invasive species.

[1] https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/managing-change-in-the-historic-environment-guidance-notes/

Effect	Proposed Mitigation
Sediment Management impacts on biodiversity, flora and fauna.	Minimise requirement for in-water works through good planning. Good sediment management practices should be implemented, along with consultation with environmental bodies on methodology and appropriate timing to cause the least amount of damage, habitat loss, and sedimentation. Scoping or relevant specialist ecological surveys during the planning stage and prior to any construction works.
Construction disturbance to the local population.	Disturbances can be kept to a minimum with good working practices, planning and timing. Adoption of Construction Best Practice and measures outlined in the CEMP and implementation of traffic and pedestrian management during construction.
Health and Safety risk to the local population during construction works.	Good construction management practices and planning of works. Adoption of Construction Best Practice and measures outlined in the CEMP.
Loss of access to agricultural soil resource.	Consultation and agreement with local landowners on detailed designs and residual impacts of coastal flooding. Potential for requirement for compensation.
Removal of soil and rock material via Sediment Management during construction.	Re-use material where possible on site for either embankments or landscaping.
Temporary disturbances of water quality during the construction phase	Good management and planning to keep water quality disturbance to a minimum. Any potential water quality issues from construction should be contained and treated to ensure no damage to natural water bodies. Sediment Management and construction will have to be planned appropriately, using Best Available Techniques / Technology (BAT) at all times, to ensure water quality issues are kept to a minimum, with no significant adverse effects. Adherence with guidelines such as CIRIA Document C532 - Control of Water Pollution from Construction Sites. Development and consenting of environmental management plan prior to commencement of works.
Potential for pollution incidents during the construction phase.	Minimise requirement for in-water works through good planning. Strict management and regulation of construction activities. Provision of appropriate facilities in construction areas to help prevent pollution incidents. Preparation of emergency response plans. Good work practices including; channelling of discharges to settlement ponds, construction of silt traps, construction of cut-off ditches to prevent run-off from entering waterbodies, hydrocarbon interceptors installed at sensitive areas, appropriate storage of fuel, oils and chemicals, refuelling of plant and vehicles on impermeable surfaces away from drains / waterbodies, provision of spill kits, installation of wheel wash and plant washing facilities, implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste and regular monitoring of surface water quality.
Potential requirement for Sediment Management	Design should aim to ensure WFD objectives are not compromised. All options to be subject to a WFD Assessment. Any negative effects on the status of a water body will only be permitted under the WFD if the strict conditions set out in WFD Article 4 are met. Adhering to good work practices including diversion of discharges to settlement ponds, construction of silt traps, construction of cut-off ditches to prevent run-off from entering excavations, granular materials placed over bare soils. If a channel is maintained on an as-required basis, using good planning, timing and BAT, there should be only minimal temporary disturbance to the local water quality.

Effect	Proposed Mitigation
Alterations to coastal processes.	Detailed surveys and hydrodynamic modelling to inform detailed design of coastal works to ensure no negative effects on coastal processes.
Disturbances to local infrastructure during the construction phase, e.g., traffic, water and electricity.	Good site management practices, traffic and construction management plans and consultation with the competent and statutory authorities prior to any works should enable all adverse effects to be kept to a minimum over a short timescale. Adoption of Construction Best Practice.
In the short-term construction period, there is the potential for damage to heritage features.	Where necessary a heritage impact assessment should be prepared in respect of any works to architectural or archaeological features to feed into detailed design. Consultation and agreement with Historic Environment Scotland in advance of any works taking place in respect of protected archaeological or architectural features. Construction supervision by qualified project archaeologists, combined with sensitive construction methods and restoration would mean this damage could be kept to a minimum. Heritage features damaged could be restored / preserved. Statutory consents and notices may be required prior to works taking place.
Medium- and long-term effects on the setting of heritage features.	Adverse effects could be kept to a minimum through sensitive design and planning. Planning and design advice from qualified archaeologists. Statutory consents may be required prior to works.
Potential for undiscovered heritage to be adversely affected during construction and sediment management operations.	Interpretation of side-scan sonar and bathymetry information, along with supervision of construction and sediment management operations by qualified archaeologists will minimise any adverse effects or the possibility of destruction of underwater and undiscovered heritage features in areas of heritage potential.
Extent and severity of short-term negative effects on landscape from construction.	Adverse effects could be kept to a minimum through good site practice and planning (e.g., screened laydown areas and traffic management). Adoption of Construction Best Practice.
Extent and severity of medium to long term negative effects on landscape from preferred policies.	Adverse effects could be kept to a minimum through sensitive design and planning (e.g., vegetative screening and landscape management planning). Landscape and visual assessment and advice during detailed design. Public consultation on draft designs.
Restricted access to waterbodies for recreational activities due to preferred policies.	Sensitive design of the shoreline management measures. Potential to improve recreational access, safety of access and improve local recreational and ecological linkages considered in the detailed design. Public and stakeholder consultation on draft designs.
Disturbances to local amenity, community and social infrastructure during the construction phase, e.g., shops and amenity areas.	Good site management practices, traffic and construction management plans and consultation with the competent and statutory authorities prior to any works should enable all adverse effects to be kept to a minimum over a short timescale. Adoption of Construction Best Practice.

Table F1.1 Proposed Mitigation Measures

1.3 HRA Mitigation

Where the potential for adverse effects on European site integrity cannot be excluded at this strategic plan level, the HRA Record has outlined mitigation to ensure the avoidance of adverse effects. This is shown in Table F1.2. The mitigation provided is considered appropriate at this strategic Plan level, as the details regarding required defence maintenance works, the scale or nature of potential alterations to existing defences

and / or new defences are not known at this stage. The next stage of SMP implementation will be further study, and this will inform the nature of the policy implementation.

The Plan level mitigation outlined in Table F1.2 states that any maintenance works or coastal flood and erosion protection schemes should be designed appropriately at the outset to avoid any direct losses, minimise the potential for damage to designated habitats, and avoid significant effects on European Sites. It stipulates that works areas should be minimised to avoid disturbance of habitats, and that best practice guidance should be followed during any maintenance or construction works in order to avoid the potential for pollution and the spread of invasive species.

Any projects that arise from the implementation of the policies identified in the SMP will themselves be required to conform with the regulatory provisions of Environmental Impact Assessment (EIA), Habitats Regulations Appraisal (HRA), Ecological Impact Assessment (EcIA), Consent under the Nature Conservation (Scotland) Act 2004, environmental risk assessments, and planning regulations / requirements, as appropriate. The Plan-level mitigation outlined includes the requirement for consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 (for SSSIs) and / or project-level HRA, which should prescribe appropriate project-level mitigation measures, when specific details regarding the scale and nature of any works are known.

PU	European Site	Proposed Mitigation
PU 20: Primary HTL PU 21: Localised HTL PU 22: Localised HTL PU 23: Localised HTL PU 24: Primary HTL PU 25: Primary HTL PU 26: Localised HTL	Luce Bay and Sands SAC	The details regarding any maintenance works, alterations of existing defences or new defences are not known at this strategic plan stage. A HTL policy in these areas will be subject to further study. The following plan-level mitigation is proposed: Maintenance works / coastal flood and erosion protection schemes will be designed appropriately to avoid footprint losses, reduce any damage to dune / intertidal habitats, avoid potential for intertidal narrowing, and avoid significant effects on the SAC. Mitigation for works will include: - Works area minimised and traffic routed to avoid sensitive dune habitats; - Best practice guidance followed to avoid pollution and the introduction of invasive species; - Any works should ensure that they do not interfere with natural coastal processes, including sediment transport; and - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures e.g., dune / intertidal habitat surveys and monitoring, great-crested newt surveys and monitoring (if required) when specific details of the scale and nature of the maintenance works / coastal flood and erosion protection scheme are known. At project level, the potential for in-combination effects from implementation of SMP policies in other areas of the CPU should be examined, as well as other projects that could affect the coastal / intertidal habitats. The HRA should conclude 'no adverse effects' on site integrity.
PU 15: Localised HTL	River Bladnoch SAC	The details regarding any maintenance works are not known at this strategic plan stage. A HTL policy in this area will be subject to further study. The following plan-level mitigation is proposed: Maintenance works will be designed appropriately to avoid significant effects on the SAC. Mitigation for works will include: - Best practice guidance followed to avoid pollution and the introduction of invasive species; and - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures when specific details of the

PU	European Site	Proposed Mitigation
		scale and nature of the maintenance works are known. The HRA should conclude 'no adverse effects' on site integrity.
PU 1: Localised HTL PU 2: Localised HTL PU 3: Localised HTL PU 4: Localised HTL PU 6: Primary HTL PU 7: Localised HTL PU 8: Localised HTL	Solway Firth SAC	The details regarding any maintenance works, alterations of existing defences or new defences are not known at this strategic plan stage. A HTL policy in these areas will be subject to further study. The following plan-level mitigation is proposed: Maintenance works / coastal flood and erosion protection schemes will be designed appropriately to avoid footprint losses, reduce any damage to coastal / intertidal habitats, avoid potential for intertidal narrowing, and avoid significant effects on the SAC. Mitigation for works will include: - Works area minimised and traffic routed to avoid sensitive coastal habitats; - Best practice guidance followed to avoid pollution and the introduction of invasive species; - Any works should ensure that they do not interfere with natural coastal processes, including sediment transport; and - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures including coastal / intertidal habitat survey and monitoring (if required) when specific details of the scale and nature of the maintenance works / coastal flood and erosion protection scheme are known. At project level, the potential for in-combination effects from implementation of SMP policies in other areas of the CPU should be examined, as well as other projects that could affect the coastal / intertidal habitats. The HRA should conclude 'no adverse effects' on site integrity.
PU 30: Localised HTL PU- 31: Localised HTL PU 32: Primary HTL PU 33: Primary HTL short-term, MR medium to long-term PU 34: Primary HTL	Glen App and Galloway Moors SPA	The details regarding any re-routing of the A77, maintenance works, alterations of existing defences or new defences are not known at this strategic plan stage. A HTL or MR policy in these areas will be subject to further study. The following plan-level mitigation is proposed: Any scheme to re-route the A77 road will be designed appropriately to avoid footprint losses and identify and reduce any damage to suitable / sensitive habitat used by this species and avoid significant effects on the SPA. Mitigation for works arising from implementation of MR and HTL policies will include: - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures including timing of works to avoid periods of key bird usage in the identified locations, bird surveys / monitoring (if required) when specific details of the scale and nature of the works are known. At project level, the potential for in-combination effects from implementation of SMP policies in other areas of the CPU should be examined, as well as other projects that could affect the intertidal habitats. The HRA should conclude 'no adverse effects' on site integrity.
PU 20: Primary HTL PU 21: Localised HTL PU 22: Localised HTL PU 23: Localised HTL	Loch of Inch and Torrs Warren SPA / Ramsar	The details regarding any maintenance works, alterations of existing defences or new defences are not known at this strategic plan stage. A HTL policy in these areas will be subject to further study. The following plan-level mitigation is proposed: Maintenance works / coastal flood and erosion protection schemes will be designed appropriately to avoid footprint losses, identify and avoid any damage to suitable / sensitive habitat used by these species, avoid potential for intertidal narrowing and avoid significant effects on the SPA. Mitigation for works will include:

PU	European Site	Proposed Mitigation
		- Works area minimised; - Best practice guidance followed to avoid pollution and the introduction of invasive species; - Any works should ensure that they do not interfere with natural coastal processes, including sediment transport; and - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures including timing of works to avoid periods of key bird usage in the identified locations, bird surveys / monitoring (if required) when specific details of the scale and nature of the maintenance works / coastal flood and erosion protection scheme are known. At project level, the potential for in-combination effects from implementation of SMP policies in other areas of the CPU should be examined, as well as other projects that could affect the intertidal habitats. The HRA should conclude 'no adverse effects' on site integrity.
PU 9: Localised HTL PU 13: Localised HTL	Loch Ken and River Dee Marshes SPA / Ramsar	The details regarding any maintenance works, alterations of existing defences or new defences are not known at this strategic plan stage. A HTL policy in these areas will be subject to further study. Following the precautionary principle, the following plan-level mitigation is proposed: - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures including timing of works to avoid periods of key bird usage in the identified locations, bird surveys / monitoring (if required) when specific details of the scale and nature of the maintenance works / coastal flood and erosion protection scheme are known. The HRA should conclude 'no adverse effects'.
PU 1: Localised HTL PU 2: Localised HTL PU 3: Localised HTL PU 4: Localised HTL PU 6: Primary HTL PU 7: Localised HTL PU 8: Localised HTL PU 9: Localised HTL PU 10: Localised HTL PU 12: Localised HTL PU 13: Localised HTL PU 14: Localised HTL PU 15: Localised HTL PU 16: Primary HTL	Solway Firth SPA / Upper Solway Flats and Marshes Ramsar	The details regarding any maintenance works, alterations of existing defences or new defences are not known at this strategic plan stage. A HTL policy in these areas will be subject to further study. The following plan-level mitigation is proposed: Maintenance works / coastal flood and erosion protection schemes will be designed appropriately to avoid footprint losses, identify and avoid any damage to suitable / sensitive habitats used by the species, avoid potential for intertidal narrowing and avoid significant effects on the SPA. Mitigation for works will include: - Works area minimised; - Best practice guidance followed to avoid pollution and the introduction of invasive species; - Any works should ensure that they do not interfere with natural coastal processes, including sediment transport; and - Consultation with NatureScot to confirm the need for consent under the Nature Conservation (Scotland) Act 2004 and / or HRA which will prescribe project-level mitigation measures including timing of works to avoid periods of key bird usage in the identified locations, bird surveys / monitoring (if required) when specific details of the scale and nature of the maintenance works / coastal flood and erosion protection scheme are known. At project level, the potential for in-combination effects from implementation of SMP policies in other areas of the CPU should be examined, as well as other projects that could affect the supporting habitats. The HRA should conclude 'no adverse effects' on site integrity.

PU	European Site	Proposed Mitigation
PU 17: Localised HTL PU 18: Primary HTL		

Table F1.2 Proposed Plan-Level HRA Mitigation Measures