# South Ford and Gualan Environmental Impact Assessment Screening and Scoping Report

## Draft Report

**July 2023**

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## Revision history

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| P02 July 2023 | Revision to paragraph 1.5.7 and 1.5.8 following client review of draft report. | Colin Maciver (Comhairle Nan Eilean Siar) |

## Contract

This report describes work commissioned by Colin Maciver on behalf of Comhairle Nan Eilean Siar, by letter dated 27 June 2022. Eloise Eggleston, Scott Johnson, Alice Gent, Chris Toop, Linley Hastewell, Gabriel Pearson, Kristian Evans, and Helen Smith, JBA Consulting carried out this work.

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## Purpose

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## Acronyms

| | |
|---|---|
| BGS | British Geological Survey |
| CIRIA | Construction Industry Research and Information Association |
| EC | European Council |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| EU | European Union |
| GCR | Geological Conservation Review |
| GHG | Greenhouse Gas |
| GWDTE | Groundwater Dependant Terrestrial Ecosystems |
| IEMA | Institute of Environmental Management and Assessment |
| LCT | Landscape Character Types |
| LDP | Local Development Plan |
| NMP | National Marine Plan |
| NPF3 | Scotland's Third National Planning Framework |
| NTS | Non-Technical Summary |
| SAC | Special Area of Conservation |
| SEPA | Scottish Environment Protection Agency |
| SPA | Special Protection Area |
| SPP | Scottish Planning Policy |
| SSSI | Site of Special Scientific Interest |
| WFD | Water Framework Directive |

# 1 Introduction

## 1.1 Background

*1.1.1* JBA Consulting has been commissioned by Comhairle nan Eilean Siar (the Western Isles Council) to conduct the Environmental Impact Assessment (EIA) Screening and Scoping assessment for the proposed South Ford Flood Risk Management Scheme. The proposal would involve:

- Recharge of the Gualan Island shingle ridge, using sediment from areas of accretion at the north end of Gualan Island and within the South Ford basin.
- Construction of a flood protection bund at Liniclate
- Implementation of dune management measures on the Liniclate dune system

*1.1.2* South Ford is a tidal inlet in the Outer Hebrides, situated between the islands of South Uist and Benbecula. It is sheltered from the Atlantic Ocean on its western edge by Gualan Island which is a 2.6 kilometre long barrier ridge across the western entrance of the South Ford, enclosing the large shallow inner estuary. The ridge originates from South Uist adjacent to the settlements of Baile and Clachan and extends north in the direction of the settlement of Liniclate. Protection from the Lower Minch sea channel to the east, is afforded by an artificial raised causeway (A865), that also provides vehicular access between the two islands. The sheltered area between Gualan 'Island' and the causeway is known as The Bay. The South Ford area between South Uist and Benbecula, encompassing Gualan Island, the Bay, Creagorrey island and Liniclate, is hereafter referred to as 'the site' (Figure 1-1 and Figure 1-2).

## 1.2 Environmental Impact Assessment

1.2.1 EIA is defined as a systematic process to identify, predict and evaluate the environmental effects of proposed actions and projects[1], undertaken by the developer where the characteristics and/or location of a proposed development project would result in likely significant effects on the environment[2].

1.2.2 EIA screening determines whether or not statutory EIA is required, and EIA scoping is undertaken to define the 'scope' or potential extent of environmental effects associated with the emerging proposals, and to recommend the extent of more detailed environmental assessment required to inform development consent applications. This includes the types of potential effect and who or what may be affected (e.g. on ecology, on the landscape, on a local community, etc.), and the spatial extent of potential effects.

1.2.3 When EIA Screening is likely to conclude that a statutory EIA is required, EIA Scoping is undertaken at the same time and this approach has been undertaken for this report.

1.2.4 The requirement for EIA of certain public and private projects is set out in a series of statutory instruments. Due to the nature and terrestrial and marine location of the South Ford Flood Risk Management Scheme, the development proposals require consent under The Town and Country Planning (Scotland) Act 1997 and The Marine (Scotland) Act 2010 and therefore fall within the requirements of both:

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (SI 2017/567), and

[1] Sadler, B. and Fuller, K., 2002. *Environmental Impact Assessment Training Resource Manual 2nd Edition*. UNEP.

[2] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government., 2014 (updated 2020). *Guidance: Environmental Impact Assessment*. [Online] Available at: https://www.gov.uk/guidance/environmental-impact-assessment [Accessed August 2022]

- The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (SI 2007/1518) (as amended 2011, 2015, 2017).

1.2.5 Cognisance is also taken of Section 5 of The Marine Environment (EU Exit) (Scotland) (Amendment) Regulations 2019.

1.2.6 This report is a combined EIA Screening and Scoping Opinion and considers the proposed South Ford Flood Risk Management Scheme in relation to both The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations and The Marine Works (Environmental Impact Assessment) (Scotland) Regulations. It will be submitted to both the Comhairle nan Eilean Siar and Marine Scotland (in their roles as the respective authorities for considering EIA in relation to the aforementioned Regulations) to seek agreement on the scope and requirement for EIA.

1.2.7 The EIA screening is set out in Section 2.2 and the EIA scoping for each of the relevant topics is discussed in Sections 3 to 12.

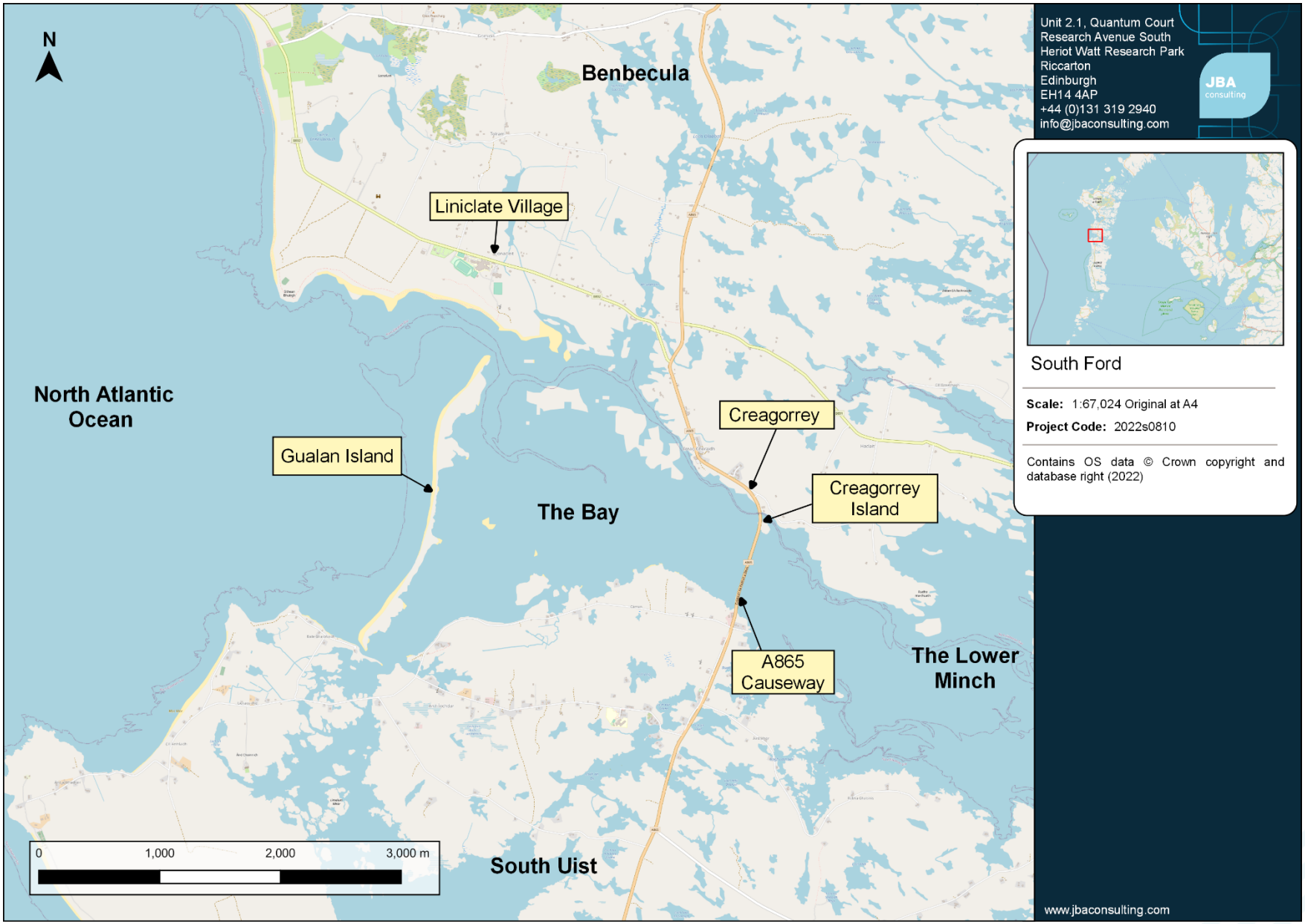


**Figure 1-1: Site Location**

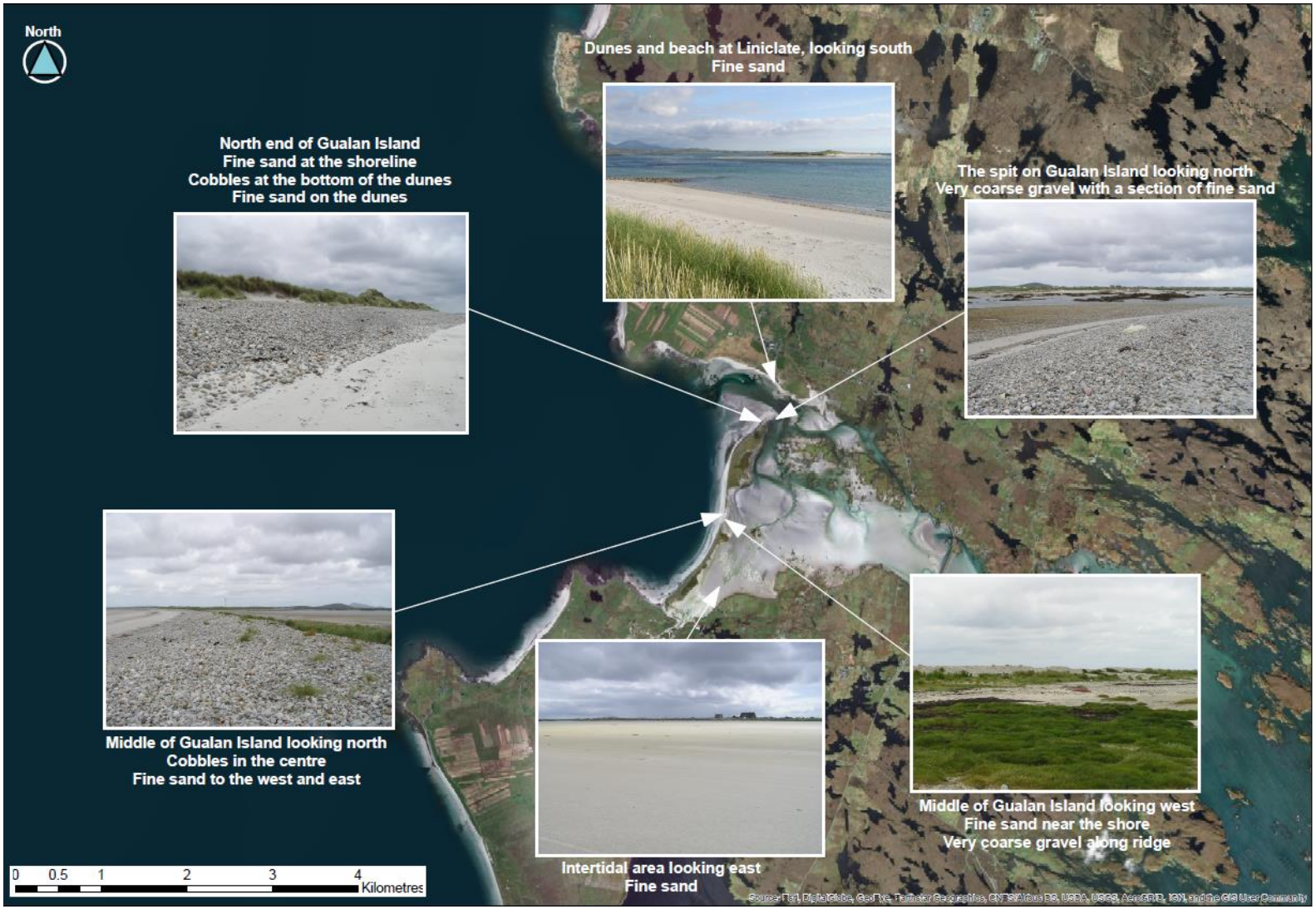


**Figure 1-2: Site Location viewpoints**

Viewpoints taken 2018, site may have changed since photographs were taken[3]

[3]Coyle, J., Pender, D., and Dobson, R., (2019). *South Ford Sediment Study Report*. JBA Consulting

## 1.3 Reason for proposed development

1.3.1 Gualan Island is exposed to the northern Atlantic Ocean and is often impacted by large swells and storm surges associated with Atlantic depressions. Behind the barrier island, the South Ford tidal basin is predominantly intertidal sandflats buffered by saltmarsh. During extreme events, the geometry of the bay results in elevated water levels, attributed to storm surge propagation through the causeway and wave setup. This has been associated with extensive and severe coastal flooding in recent history. The barrier island of Gualan provides critical protection to the causeway but is vulnerable to breaching under extreme conditions. Erosion of sand on the western side of South Uist has resulted in the extension of the sand and shingle spit on the northern extent of Gualan Island.

1.3.2 In January 2005 there was a major storm that affected the west coast of the Outer Hebrides, In the South Ford area, the storm caused extensive flooding and damage to residential properties, land and infrastructure as well as resulting in five fatalities when their car was washed from a causeway. There was also significant coastal erosion, which prompted concern from local residents that a continuation of erosion of Gualan would result in increased risk to people in local communities and infrastructure during future storms[4].

1.3.3 In March 2010 a hydrodynamic modelling study[5] was conducted to determine the features which positively and negatively influence the local flood risk within South Ford to coastal storm surges. It was identified that Gualan Island, changes to South Ford coastal geomorphology and the A865 causeway all influenced flooding, and that the limited conveyance capacity made the largest contribution to the observed flooding during the January 2005 storm.

1.3.4 In 2016, the areas and local communities on both sides of South Ford were identified in the Outer Hebrides Flood Risk Management Strategy[6] as Potentially Vulnerable Areas (PVAs)– areas where there is significant flood risk. The Strategy is one of the 14 strategies produced by each of the Local Plan Districts (LPD) in Scotland to address flooding in Scotland, as required by the 2009 Flood Risk Management Act.

1.3.5 The two PVAs for South Ford are 02/06 (Benbecula) and 02/07 (Lochs Bee and Druidibeag). It is estimated that over 70 people within the vicinity of South Ford are at risk from flooding from a 0.5% Annual Probability (AP)(1 in 100 year) event, and the main road through the islands, the A865, is also at risk.

1.3.6 The coastal flood extents for the South Ford area were mapped in 2014 as part of a study by Royal Haskoning[7], using horizontal projections of coastal water levels against the topography. The flood extents for a variety of return periods are provided in Figure 1-3[7] and show the inundation of properties, land and infrastructure.

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[4] Western Isles, Transportation and Infrastructure Committee Report, April 2015. [Online] Available at: J Item 10 - South Ford Causeway - Flood Risk Management Options and Strategy.pdf (cne-siar.gov.uk) [Accessed November 2022]

[5] Batstone, C. and Lawless, M., 2010. Hydrodynamic and Sediment Transport Modelling Study of the South Ford. JBA Consulting.

[6] SEPA., 2016. *Flood Risk Management Strategy: Outer Hebrides*. [Online] Available at: http://apps.sepa.org.uk/FRMStrategies/pdf/lpd/LPD_02_Full.pdf [Accessed August 2022]

[7] Hick, E., McMillan, A. and Kuijk P., 2015. *South Fords Benefits Assessment Technical Report*. Royal HaskoningDHV

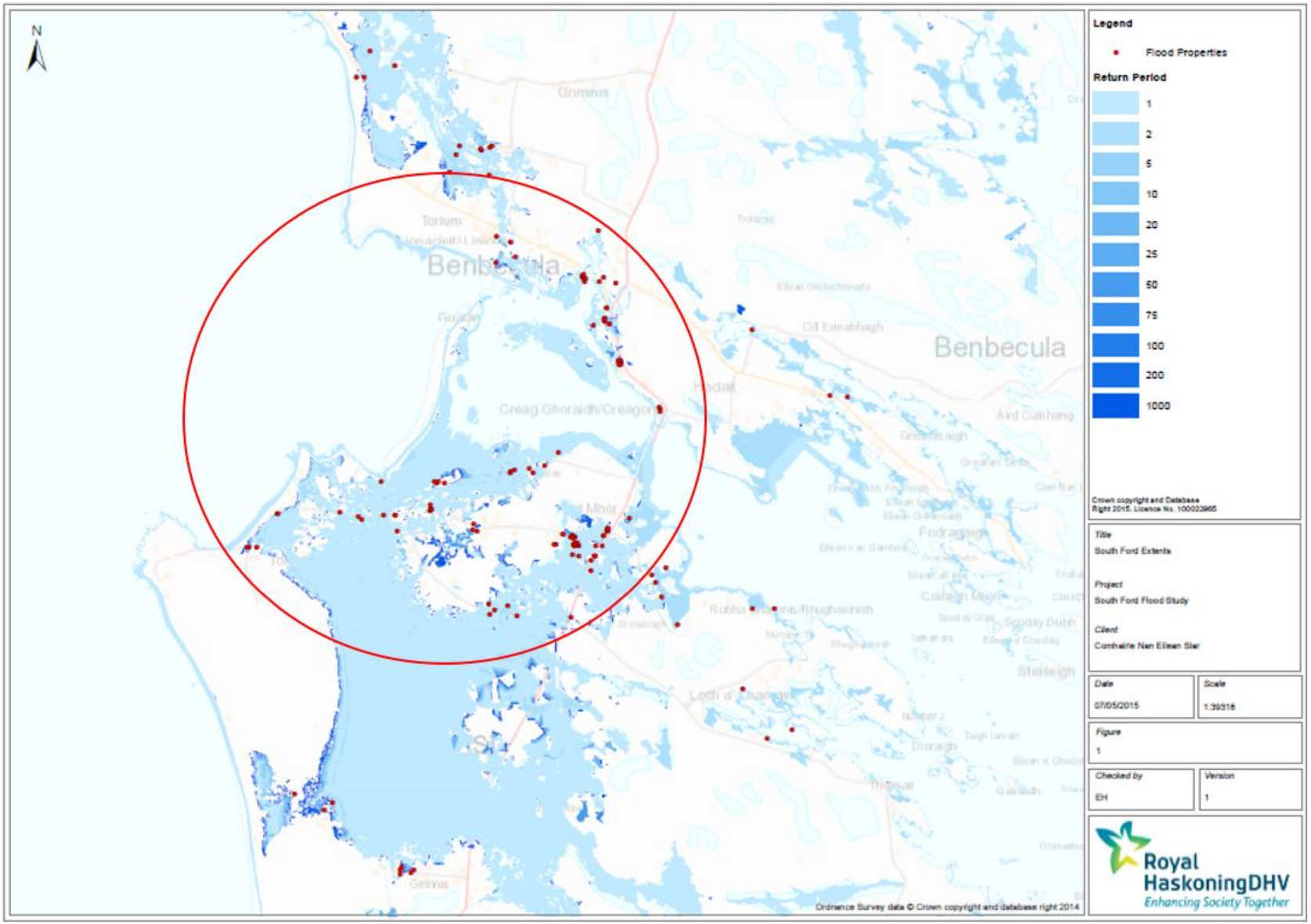


Figure 1-3: South Ford flood extents showing properties affected. Study area circled in red

## 1.4 The Scheme objectives

**1.4.1** The Outer Hebrides Flood Risk Management Strategy details objectives that have been set by SEPA in collaboration with flood risk management authorities, to manage flooding in Potentially Vulnerable Areas (PVAs). The South Ford Flood Risk Management Scheme is the action proposed to achieve the following objectives from the Outer Hebrides Strategy:

- Reduce risk to south-west Benbecula from river and coastal flooding (Objective 200602 for PVA 02/06: Benbecula)
- Reduce risk to the area surrounding Loch Bee from river and coastal flooding (Objective 200701 for PVA 02/07: Loch Bee and Loch Druidibeag).

## 1.5 Alternatives and scheme evolution

### Identification of options

1.5.1 An option and strategy report was prepared by the Western Isles Council[8] and submitted to the Council's Transportation and Infrastructure Committee in November 2014, which presented and appraised a range of options or actions that have the potential to reduce the risk from flooding to communities situated around the South Ford.

1.5.2 The options are shown in Figure 1-4 below along with an assessment of implementation cost. Options which are marked with a tick denote those considered to be beneficial in addressing flood risk but likely incur a higher cost to implement and so require further investigation to determine the Benefit Cost Ratio (BCR). Options left unticked were considered likely to have a lower cost to implement and so could progress, but were either unlikely to attract external funding, or were long-term options that are not considered justifiable at present. The ticked options were therefore identified as the shortlist options.

[8] Western Isles, Transportation and Infrastructure Committee Report, April 2015. [Online] Available at: J Item 10 - South Ford Causeway - Flood Risk Management Options and Strategy.pdf (cne-siar.gov.uk) [Accessed November 2022]

| | | |
|---|---|---|
| Option 1. | Adaptive management measures through recommendations set by CoastAdapt | |
| Option 2. | Dune management scheme for south coast of Benbecula | ✓ |
| Option 3. | Proactive and participatory approach by community towards new Flood Risk Management legislation | |
| Option 4. | Use of planning policy to determine suitability or otherwise of sites for development through Flood Risk Assessment | |
| Option 5. | Assess level of roads in areas vulnerable to flooding such as at Kilaulay. | |
| Option 6. | Register for coastal flood alert system. | |
| Option 7. | Strengthen community representation on the Coast Hebrides ICZM Forum | |
| Option 8. | Participate in development of long-term disaster recovery planning (CoastAdapt) | |
| Option 9. | Beach recharge scheme for Gualan Island (using sand sourced from the southern basin) | ✓ |
| Option 10. | Create opening(s) at least 250 metres long in the causeway with bridged sections of carriageway | ✓ |
| Option 11. | Beach recharge scheme for Gualan Island (using shingle sourced from the spit at the northern end of Gualan Island) | ✓ |
| Option 12. | Raise level of main B892 road southeast of hotel | |
| Option 13. | Construct embankments at the south and east of the hotel | ✓ |
| Option 14. | Property level protection | ✓ |
| Option 15. | Improve monitoring and measurement of change | |
| Option 16. | Long-term planning in relation to flood risk | |
| Option 17. | Do nothing in relation to Gualan Island. | ✓ |
| Option 18. | Do nothing (base case) | ✓ |

**Figure 1-4 List of options identified to reduce risk of flooding to South Ford area.**

### Development of a preferred scheme in principle

1.5.3 The Outer Hebrides Flood Risk Management Strategy and Local Plan identify the South Ford Flood Risk Management Scheme as a key objective to manage flood risk[9] and so the Do Nothing option was discounted.

1.5.4 The options selected for the shortlist were assessed to identify combinations of options which together would reduce the risk from flooding to the South Ford area, that would form a preferred scheme in principle.

1.5.5 Two combinations of options were considered, these were:

- **First scheme in principle**:
  - Dune Management- improve the dune system to the north of Gualan Island (Liniclate dunes) to provide a 1% AP (1 in 100 year) (plus climate change) level of protection.
  - Beach recharge – to reinforce the central section of Gualan Island to prevent breach. Material would be sourced from split at the northern end of Gualan Island and southern basin to provide a 1% AP (1 in 100 year) (plus climate change) level of protection.
  - Flood protection bund at Liniclate – construct a flood bund at the south and east of the hotel to provide a 0.5% AP (1 in 100 year) (plus climate change) level of protection.
- **Second scheme in principle**:
  - Dune Management – improve the dune system to the north of Gualan Island (Liniclate dunes) to provide a 1% AP (1 in 100 year) (plus climate change) level of protection.
  - Flood protection bund at Liniclate – construct a flood bund at the south and east of the hotel to provide a 0.5% AP (1 in 100 year) (plus climate change) level of protection.
  - 250m bridge in causeway – create opening at least 205m long in the causeway with bridges section of carriageway, to provide a 1% AP (1 in 100 year) (plus climate change) level of protection.

1.5.6 A cost benefit analysis[10] was undertaken to score the shortlisted combined options against various objectives, to identify which options best met the benefit-cost ratio. The first scheme in principle was identified to have a benefit-cost ratio of 3.9 whereas, the second scheme in principle had a benefit cost ratio of 0.38 and was considered to be less economically viable

1.5.7 The second option which included widening of the causeway bridge was noted in the study to be 'the only high-cost and high-impact intervention', as the current causeway is one of the key factors currently influencing flood risk in the area and thus this option would be a more effective solution to mitigate flood risk. However, as it was noted in the analysis that it would incur a high cost (preventing the scheme from passing the cost/benefit test necessary to satisfy Government funding requirements), the 'first scheme in principle' was chosen by the Western Isles Council as the preferred scheme and it is the scheme in principle which JBA has been commissioned to assess in this EIA screening and scoping report.

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[9] SEPA, 2021. *Flood Risk Management Plan Outer Hebrides Local Plan District*. [Online]. Available at: https://www2.sepa.org.uk/frmplans/documents/lpd2-outer-hebrides-frmp-2021.pdf [Accessed August 2022]

[10] Hick, E., McMillan., A. and Van Kuijk, P., 2015. *South Fords Benefits Assessment: Technical Report*. Comhairle nan Eilean Siar.

1.5.8 This is an unusual situation as a recently constructed structure (the 1982 causeway bridge) has contributed to increased risk of flooding. Under current planning guidance any structure that causes an increase in flooding to others or a deleterious impact would require mitigation or not be permitted. Whilst previous reports have identified that the introduction of further capacity on the causeway is not cost effective in flood protection terms, it could easily be reasoned that introducing additional capacity is a reasonable step to mitigate the impacts of flooding associated with the causeway construction. It is suggested that this should be considered in the long term as part of an adaptive plan for the wider island coastline, particularly as the current preferred option will require frequent maintenance intervention in a sensitive area. The scale, nature and recurrence of the environmental surveys is also likely to have impact of the presumed cost benefit of the dune management.

## 1.6 Preferred option

1.6.1 Figure 1-5 provides an indicative overview of the proposed South Ford Flood Risk Management Scheme, with each of the three components of the scheme described in further detail below[11].

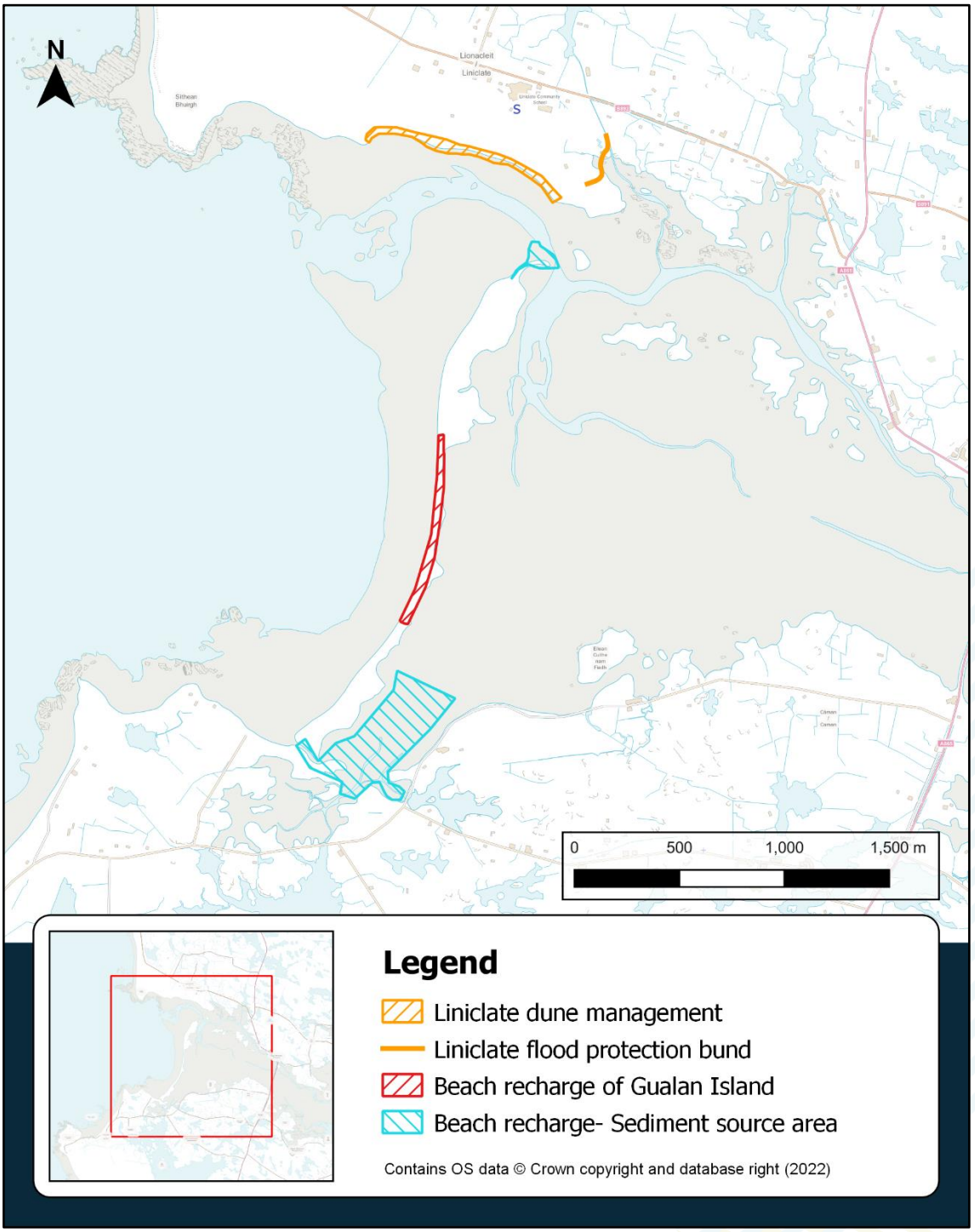


**Figure 1-5: Proposed footprint of works for the South Ford scheme**

[11] Coyle, J., Pender, D., and Dobson, R., 2019., South Ford Sediment Study Report. JBA Consulting.

### Beach recharge of Gualan Island

1.6.2 The construction of the beach recharge scheme at Gualan Island will increase the storage of the beach and dune system, allowing the beach face to better respond to extreme forcing and reduce the likelihood of breaching, while the structure is maintained.

1.6.3 The concept design proposed by the Council proposed the final crest of the structure be at 6 mAOD with a width of 10 m, stretching for approximately 950 m along Gualan Island (Figure 1-6).

### Gualan Island sediment sources

1.6.4 At the north of Gualan is a proposed a source of sediment for the Gualan beach recharge Scheme. This area sits at the tip of Gualan Island, Figure 1-4. From 2018 LiDAR survey, indications are that approximately 13,600 $m^3$ of sediment is proposed to be extracted from this location, mostly sourced from a depositional spit at the end.

1.6.5 The remainder of sediment required for the capital recharge of the scheme is proposed to be sourced from an area within South Ford basin close to Iochdar at the South of Gualan. It is proposed that 0.6 m depth of sediment be removed from this area, giving approximately 98,000 $m^3$ of sediment

### Liniclate flood protection bund and Dune Management

1.6.6 The proposed flood bund and dune management at Liniclate is to supplement the protection afforded by an extensive beach and dune system, defending the Dark Island Hotel, Liniclate school, a sports centre and a wind turbine. In recent years, inundation from South Ford has become an issue with water outflanking the dunes and inundating through tidal channels. In the short to medium term, this represents a risk of flooding of these properties and facilities. The flood bund is proposed to mitigate this inundation

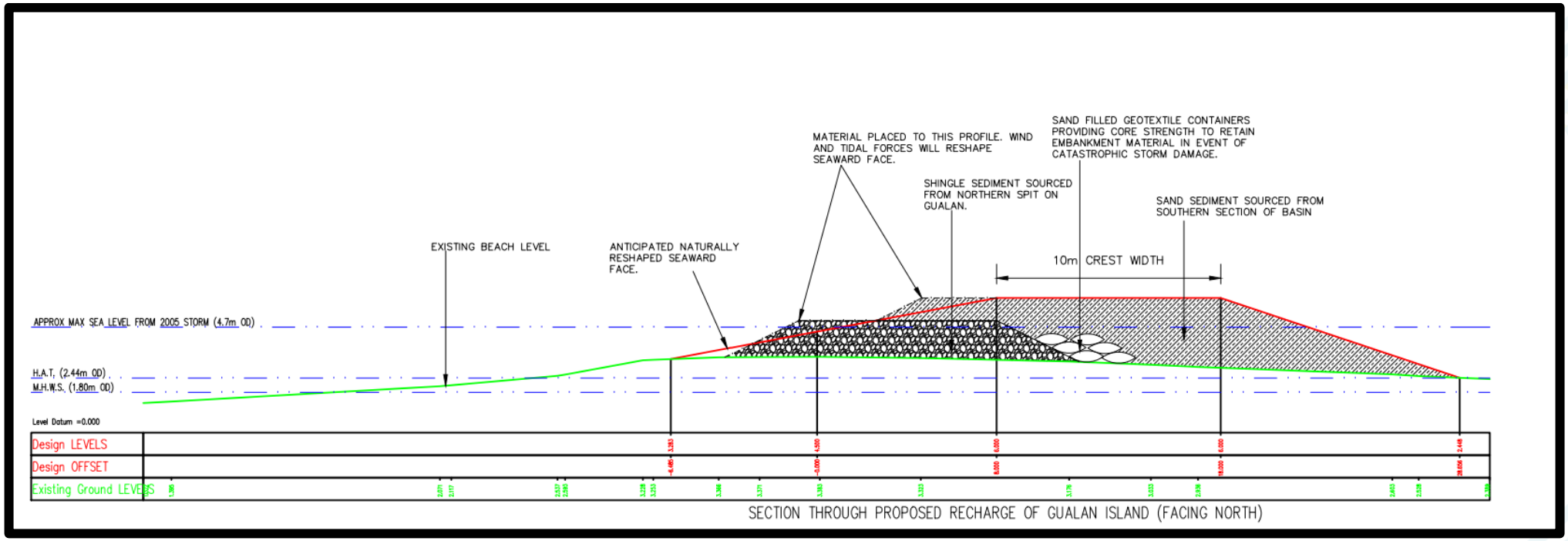


**Figure 1-6: Proposed Gualan Island beach recharge scheme**

## 1.7 Legislation, Policy, and Guidance

1.7.1 The following sections describe the legislation, policy and guidance that are relevant to the proposed South Ford Flood Risk Management Scheme and which will inform the EIA screening and scoping.

### National Planning Framework 3

1.7.2 Scotland's Third National Planning Framework (NPF3)[12] forms the basis of development plan making in Scotland and is a material consideration in planning decisions. The NPF3 details the Government requirements for the planning system, as well as providing a framework within which councils and local communities should produce planning documents, reflecting the priorities and needs of the relevant community.

1.7.3 A core theme of the NPF3 is the delivery of sustainable development and it confirms the three dimensions to sustainable development as economic, social and environmental. Paragraph 2.6 emphasises this by stating 'Our strategy aims to ensure that all parts of Scotland make best use of their assets to build a sustainable future. Planning will help to create high quality, diverse and sustainable places that promote well-being and attract investment.

1.7.4 The NPF3 is divided into a series of themes in order to achieve its aim of delivering sustainable development. Some of the key themes within the NPF3 that will be considered within this report and the Environmental Statement include meeting the challenge of climate change, flooding, and coastal change, conserving and enhancing the natural environment (which includes habitats and biodiversity, and ground conditions and pollution), conserving and enhancing the historic environment.

1.7.5 There are several pieces of legislation relating to flooding, which are covered by The Flood Risk Management (Scotland) Act 2009[13] and The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010[14]. The requirement of these regulations is to map, assess and manage areas of flood risk for proposed development.

[12] Scottish Government., 2012. National Planning Policy Framework 3. [Online]. Available at: https://www.gov.scot/publications/national-planning-framework-3/ [Accessed October 2022]

[13] Scottish Government., 2009. Flood Risk Management (Scotland) Act 2009. [Online]. Available at: https://www.legislation.gov.uk/asp/2009/6/contents [Accessed October 2022]

[14] Scottish Government., 2010. Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations. [Online]. Available at: https://www.legislation.gov.uk/ssi/2010/426/made [Accessed October 2022]

**Table 1.1: Vision within the NPF3 of relevance to the proposed scheme**

| Vision | Summary | Relationship to the proposed development |
|---|---|---|
| A natural, resilient place | Natural and cultural assets are respected, they are improving in condition and represent a sustainable economic, environmental and social resource for the nation. Our environment and infrastructure have become more resilient to the impacts of climate change. | The proposed scheme would reduce coastal erosion and flood risk to the site, increasing the resilience of communities surrounding South Ford to climate change. |
| | | The proposed scheme would avoid and mitigate significant impacts wherever possible, thorough careful design and good construction practise. Where significant effects to the environment are predicted, they will need to be managed appropriately. |
| | | The proposed scheme would reduce the threat of coastal erosion and damage to listed heritage assets. The proposed scheme has the potential to uncover unknown buried archaeological assets. Where significant to the historic environment are predicted, they will be managed appropriately. |

1.7.6 The latest iteration of Scottish Planning Policy (SPP)[15] was published in 2014 (a further edition of the policy was produced in 2020 but legally overruled in 2021). The SPP guides for the alleviation of the impact of flooding on people and property, and all local planning authorities are required to follow it. It must be taken into account in the preparation of local plans, and, is a material consideration in planning decisions. The SPP sits alongside the National Planning Framework 3[12] , the SPP sets out policy that will help to deliver the objectives of the NPF3.

1.7.7 The SPP is used in conjunction with The Flood Risk Management (Scotland) Act 2009, planning advice note on flooding[16], Delivering Sustainable Flood Risk Management[17] and Surface Water Management Planning Guidance[18], to plan and deliver actions to address flood risk.

1.7.8 The SPP section on flood risk promotes:

- a precautionary approach to flood risk from all sources, including coastal, watercourse (fluvial), surface water (pluvial), groundwater, reservoirs, and drainage systems (sewers and culverts), taking account of the predicted effects of climate change; and
- flood reduction: assessing flood risk and, where appropriate, undertaking natural and structural flood management measures, including flood protection, restoring natural features and characteristics, enhancing flood storage capacity, avoiding the construction of new culverts, and opening existing culverts where possible.

[15] Scottish Government., 2018. Scottish Planning Policy [Online]. Available at: https://www.gov.scot/publications/scottish-planning-policy [Accessed August 2022]

[16] Scottish Government., 2015. Flood Risk: planning advice. [Online]. Available at: https://www.gov.scot/publications/flood-risk-planning-advice/ [Accessed August 2022]

[17] Scottish Government., 2011. Delivering Sustainable Flood Risk Management https://www.gov.scot/publications/flood-risk-management-scotland-act-2009-delivering-sustainable-flood-risk/pages/0/ [Accessed October 2022]

[18] Scottish Government., 2013. Surface Water Management Planning Guidance. [Online]. Available at: https://www.gov.scot/publications/surface-water-management-planning-guidance/pages/0/ [Accessed August 2022]

### Scotland's National Marine Plan

1.7.9 Marine planning matters in Scotland's inshore waters are governed by the Marine (Scotland) Act 2010[19], an Act of the Scottish Parliament, and in its offshore waters by the Marine and Coastal Access Act 2009[20], an Act of the UK Parliament. Under the Marine (Scotland) Act 2010, Scottish Ministers must prepare and adopt a National Marine Plan covering Scottish inshore waters.

1.7.10 The National Marine Plan (NMP)[21] sets out strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles. The core strategic objective of the NMP is to integrate both the ecosystem approach and the guiding principles of sustainable development to deliver a robust approach to managing human impact on Scotland's seas.

1.7.11 The NMP lays out the Scottish Minister's policies for the sustainable development of Scotland's seas and provides General Planning Principles (GENs). GENs of relevance to the proposed scheme include:

- GEN 3 Social benefit: Sustainable development and use which provides social benefits is encouraged when consistent with the objectives and policies of the NMP.
- GEN 5 Climate change: Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.
- GEN 6 Historic environment: Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.
- GEN 7 Landscape/seascape: Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.
- GEN 8 Coastal process and flooding: Developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding.
- GEN 9 Natural heritage: Development and use of the marine environment must: (a) Comply with legal requirements for protected areas and protected species.

  (b) Not result in significant impact on the national status of Priority Marine Features.

  (c) Protect and, where appropriate, enhance the health of the marine area.
- GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.
- GEN 14 Air quality: Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits.
- GEN 19 Sound evidence: Decision making in the marine environment will be based on sound scientific and socio–economic evidence.
- GEN 21 Cumulative impacts: Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation.

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[19] Scottish Government., 2010. Marine (Scotland) Act 2010. [Online]. Available at: https://www.legislation.gov.uk/asp/2010/5/contents [Accessed August 2022]

[20] Scottish Government., 2009. Marine and Coastal Access Act 2009. [Online]. Available at: https://www.legislation.gov.uk/ukpga/2009/23/contents [Accessed August 2022]

[21] Marine Scotland., 2015. Scotland's National Marine Plan A Single Framework for Managing Our Seas. [Online]. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2015/03/scotlands-national-marine-plan/documents/00475466-pdf/00475466-pdf/govscot%3Adocument/00475466.pdf [Accessed August 2022]

### Marine Licence

1.7.12 Under The Marine (Scotland) Act 2010 a number of activities listed in Part 4, Section 21 of the Act require a Marine Licence issued by the Marine Scotland Licensing Operations Team. This includes any activity where the project intends to do any of the following below the Mean High-Water Spring:

- Remove substances or objects from the seabed; or
- Dredging activity.

### The Outer Hebrides Local Development Plan

1.7.13 In addition, the Local Development Plan (LDP)[22] set out by Comhairle nan Eilean Siar in 2018 contains a strategy for the plans of future developments in the Outer Hebrides for the next 10- 20 years. The LDP stated that the plan will *'encourage and facilitate sustainable economic growth and help build confident and resilient communities'.* The following policies are relevant to the proposed scheme:

- EI1 Flooding – defines when a flood risk assessment is necessary, including potential need for flood risk assessment or flood management mitigation measures;
- EI3 Water Environment – defines when developments require further assessment of likely effects to the water environment, such as Habitat surveying of wetland or boggy areas;
- EI6 Coastal Erosion – defines the assessment requirement for developments which are liable to coastal erosion;
- NBH1 Landscape – outlines how development proposals should relate to the specific landscape and visual characteristics of the local area, ensuring that the overall integrity of landscape character is maintained;
- NGH2 Natural Heritage – outlines when a development proposal with a likely significant effect on a Natura site will require an Appropriate Assessment by the Comhairle;
- NGH4 Build Heritage – defines when developments require further assessment of likely effects to built heritage (listed buildings, commemorative sites etc.); and
- NBH5 Archaeology – defines when developments require further assessment of likely effects to heritage assets of archaeological significance.

### Water Environment Regulations (Surface water)

1.7.14 The Water Environment and Water Services (Scotland) Act 2003[23] requires the environmental assessment of water bodies and legal requirements to protect and improve the water environment. This 2003 Act gave Scottish Ministers the powers to introduce regulatory controls over activities which may affect the water environment in Scotland through The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) and their amendments in 2013 and 2017.

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22 Comhairle nan Eilean Siar., 2018. *Outer Hebrides Local Development Plan*. [Online]. Available at: https://www.cne-siar.gov.uk/planning-and-building/planning-service/development-planning/development-plan/local-development-plan/ [Accessed August 2022]

23 Scottish Government., 2003. *The Water Environment and Water Services (Scotland) Act 2003*. [Online]. Available at: https://www.legislation.gov.uk/asp/2003/3/contents [Accessed August 2022]

### SEPA Policy 41

1.7.15 Scottish Environment Protection Agency (SEPA) Policy 41 'Development at Risk of Flooding: Advice and Consultations' outlines the principles to be followed by SEPA and planning departments of local authorities regarding advice and consultation on flood risk matters. It outlines the requirements for Flood Risk Assessments in order for decisions to be made on proposed development.

### Guidance

1.7.16 SEPA Guidance on Water Regulations provides guidance on developments which affect the hydrology of surrounding environments including Pollution Prevention Guidelines (which are in the process of being updated).

1.7.17 Other policy, regulatory and best practice guidance of relevance to this assessment includes the following:

- Construction Industry Research and Information Association (CIRIA) Report C532: Control of Water Pollution from Construction Sites (Ref 44);
- CIRIA Report C502: Environmental Good Practice on Site (Ref 6); and
- CIRIA Report 515: Groundwater Control – design and practice (Ref 7).

# 2 EIA Screening and Scoping Methodology

## 2.1 The EIA Process

2.1.1 EIA is defined as '*a systematic process to identify, predict and evaluate the environmental effects of proposed actions and projects*'[1]. Its aim is:

> "*to protect the environment by ensuring that a local planning authority, when deciding whether to grant planning permission for a project which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision-making process' and 'to ensure that the public are given early and effective opportunities to participate in the decision making procedures*'[2]".

2.1.2 Regulation 4 of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, sets out that the environmental impact assessment is a process consisting of:

> *'(1) (a) the preparation of an environmental report by the developer…[which]*
>
> *(2) …must identify, describe and assess in an appropriate manner, in light of the circumstances relating to the proposed development, the direct and indirect significant effects of proposed development on the factors specified in paragraph (3) and the interaction between those factors.*
>
> *(3) The factors are—*
>
> > *(a) population and human health;*
> >
> > *(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC(1) and Directive 2009/147/EC(2);*
> >
> > *(c) land, soil, water, air and climate;*
> >
> > *(d) material assets, cultural heritage and the landscape.*

2.1.3 Regulation 5 of The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, sets out that the environmental impact assessment is a process consisting of:

> *'(1) (a) the preparation of an environmental report by the applicant…[which]*
>
> *(2) …must identify, describe and assess in an appropriate manner, in light of the circumstances relating to the proposed works, the direct and indirect significant effects of proposed works on the factors specified in paragraph (3) and the interaction between those factors.*
>
> *(3) The factors are—*
>
> > *(a) population and human health;*
> >
> > *(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC(1) and Directive 2009/147/EC(2);*
> >
> > *(c) land, soil, water, air and climate;*
> >
> > *(d) material assets, cultural heritage and the landscape.*

The EIA process is closely aligned with the design process (

2.1.4 Figure 2-1)[24] and comprises the following three stages:-

[24] IEMA., 2016. Environmental Impact Assessment Guide to Shaping Quality Development. [Online]. Available at: https://www.iema.net/assets/uploads/iema_guidance_documents_eia_guide_to_shaping_quality_development_v7.pdf [Accessed August 2022]

2.1.5 **Screening** - the developer decides if EIA is required based on whether the proposed development falls under the descriptions or thresholds in Schedule 1 and 2 of the Regulations and if there is the potential for significant effects on the environment. If it does, an EIA Screening Opinion should be sought from the appropriate authority by the developer. This should be based on clear project objectives and a reasonably well-defined conceptual design, including an indicative site boundary. Suitable project alternatives should also be considered at this early stage, including those with no or lesser potential environmental impacts.

2.1.6 **Scoping** – if the screening concludes that there is the potential for significant effects on the environment, a scoping report is prepared which considers each of the topics listed in the Regulations (listed above in Section 2.1.2) and identifies the potential significant environmental impacts associated with the proposed scheme and the assessment methodologies to be applied. The scope of an EIA and, therefore an ES should include all environmental issues that are likely to be significantly affected by the proposed scheme. There may be some environmental topics where there will be no significant impacts or effects from the development and hence where there is no need for further investigation to be undertaken – these topics are then 'scoped out'.

2.1.7 When EIA Screening is likely to conclude that a statutory EIA is required, EIA Scoping is undertaken at the same time. This combined approach expands upon the environmental baseline information collated for the EIA Screening Opinion request, to consider the scope of further detailed environmental impact assessment work required.

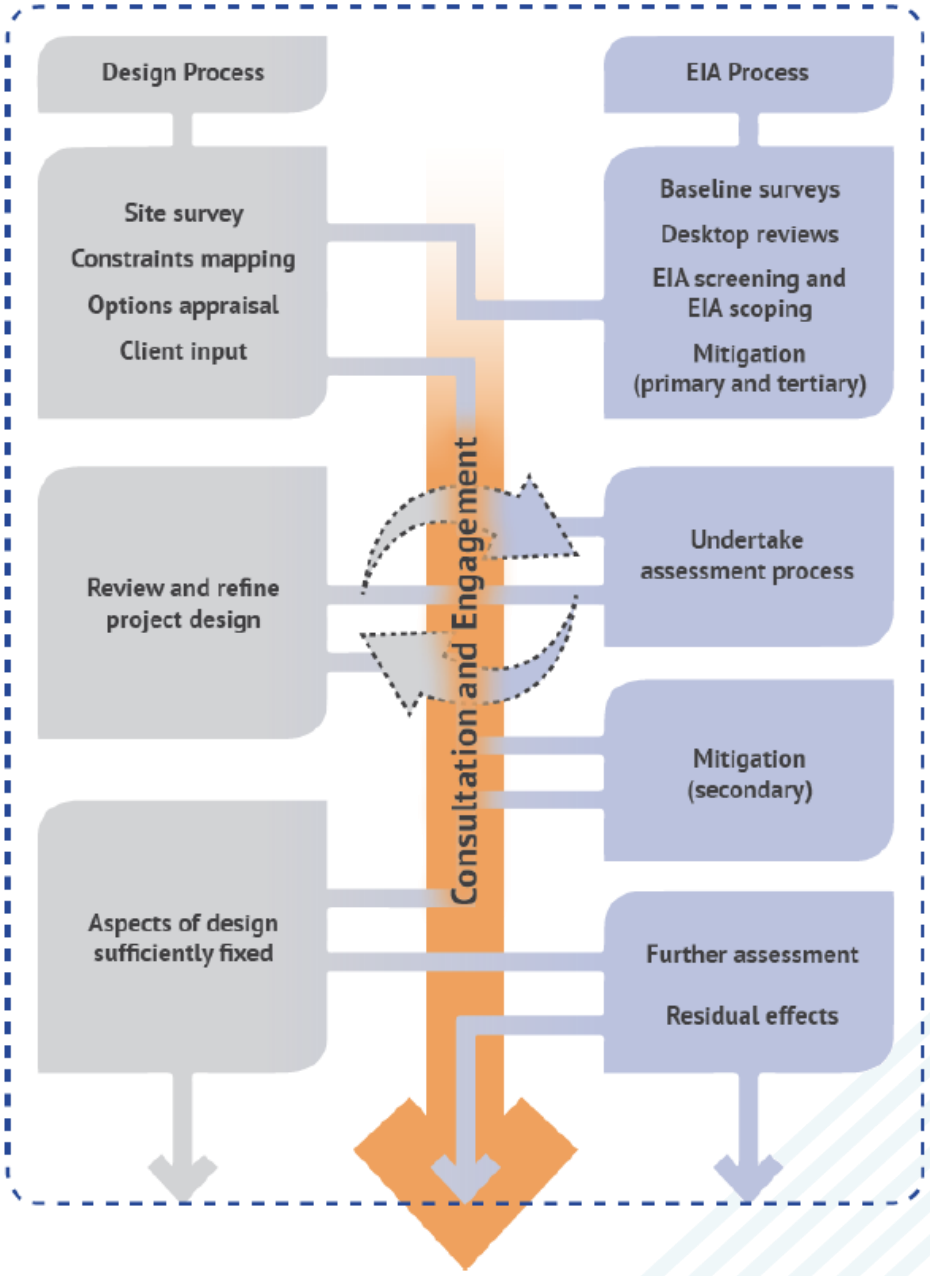


**Figure 2-1: The interaction of design and EIA processes**

2.1.8 **Environmental Statement** (ES)- The purpose of the ES is to provide the local planning authority, statutory bodies and other consultees with the necessary environmental information on the proposed scheme to enable the planning application to be determined. On the basis of the EIA Scoping Opinion response, further detailed baseline information (e.g. site surveys) is collected if required, to inform the detailed impact assessments. The assessments involve firstly characterising the potential impacts, and then assessing the significance of those impacts in order to determine the 'likely significant effects'. Based on initial assessment work, primary, secondary, and tertiary mitigation can be recommended to reduce or eliminate significant effects. This is an iterative process, whereby impact assessment process and design of the development process interact with one another to produce a mutually acceptable, and

therefore more sustainable, solution. This can also involve stakeholder engagement of the emerging design, to help identify mitigation.

2.1.9 The results of the EIA process are documented in the Environmental Statement (ES). The ES is supplemented with a Non-Technical Summary (NTS) in printed and digital format, which is intended to make the findings of EIA more publicly accessible.

2.1.10 With reference to the Institute of Environmental Management and Assessment (IEMA) (2016) a summary of the steps involved in the EIA process is set out as follows:

1 Identify aspects of environment likely to be significantly affected (preliminary baseline)
2 Propose primary mitigation (impact avoidance measures)
3 Define impact assessment methodology
4 Collect environmental baseline
5 Assess impacts and the likely significance of the effects
6 Propose secondary mitigation (iterate design to reduce or eliminate effects)
7 Report residual effects (in the relevant ES chapter)
8 Set out follow-up measures (tertiary measures and environmental management plan)

## 2.2 EIA Screening

2.2.1 EIA Screening has been informed by a desk-based review of environmental constraints identified within up to 3 km from the midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008) where relevant, on the basis of a review of readily available environmental information. Environmental constraints for the purpose of EIA Screening and Scoping are summarised in Table 2.1. Where relevant further consideration is given to these environmental constraints within the baseline section of each of the EIA topic chapters.

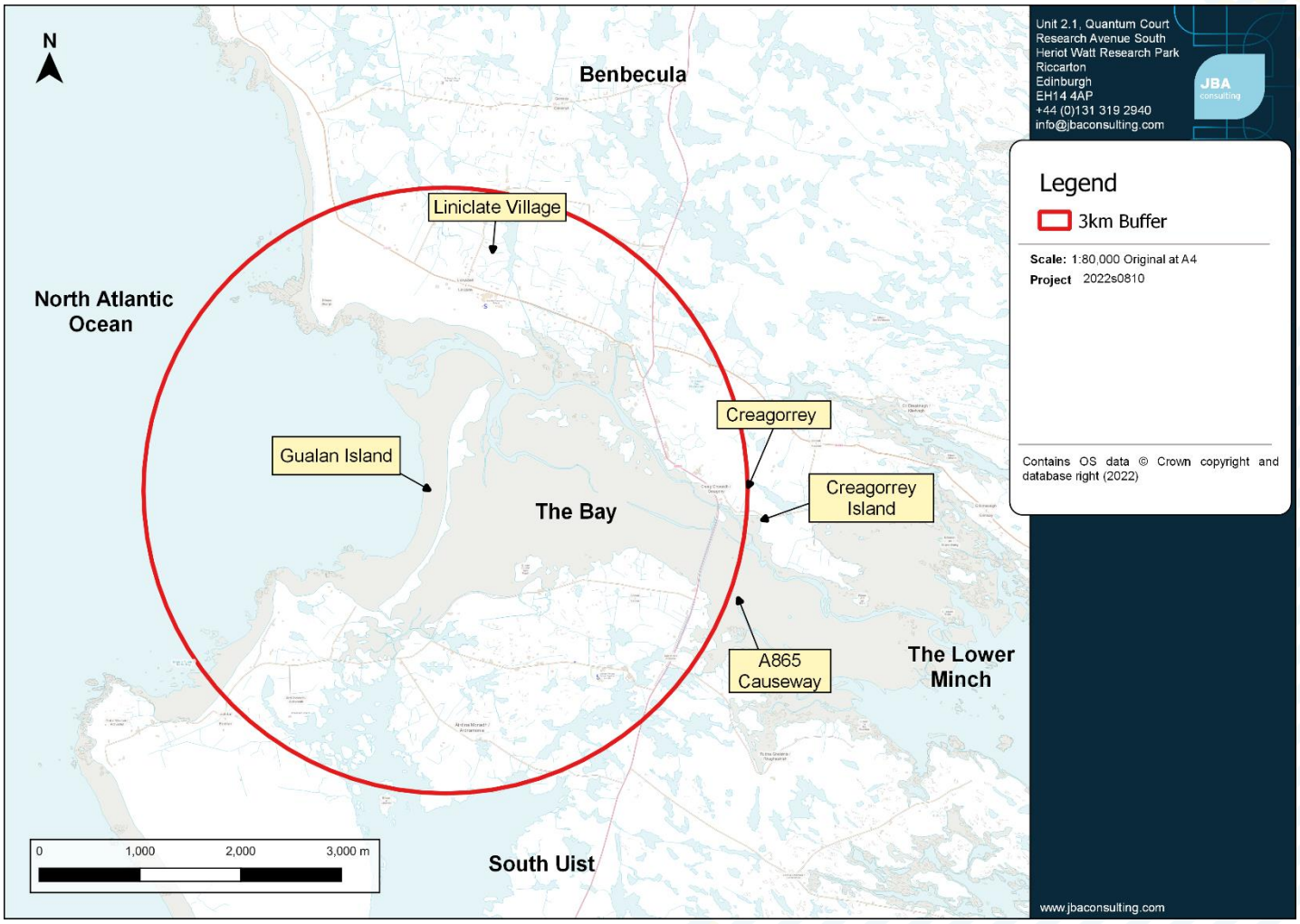


**Figure 2-2: South Ford 3km buffer**

**Table 2.1: Environmental constraints identified within up to 3 km from the site**

| EIA Topic | Environmental Constraint | Description | Distance from Site (km) |
|---|---|---|---|
| Biodiversity and nature conservation | Special Protection Areas (SPA) | *West Coast of the Outer Hebrides* | <0.3 |
| | | *South Uist Machair and Lochs* | <0.5 |
| | | *Aird and Borve, Benbecula* | <1.0 |
| | Special Area of Conservation (SAC) | *South Uist Machair* | 1.0 |

| EIA Topic | Environmental Constraint | Description | Distance from Site (km) |
|---|---|---|---|
| | Ramsar sites | South Uist Machair and Lochs | <0.5 |
| | Sites of Special Scientific Interest (SSSI) | Loch Bee | <0.5 |
| | | West Benbecula Lochs | 2.1 |
| | | Loch Bee Machair | 2.3 |
| | Biodiversity Action Plan Habitats | Saline lagoon, Shingle, sand dune and saltmarsh. | <0.5 |
| | Protected Species | Grey and Harbour seals | <0.5 |
| | | Otter | <0.5 |
| | | Breeding corncrake, little tern and dunlin (all annex 1[25] species) and breeding waders and wintering waders (ringed plover, redshank, oystercatcher and sanderling), being populations of European importance. | <0.5 |
| Cultural heritage | Conservation Area | None present within 5km | - |
| | Listed buildings | Residential properties: Corrodale Cottage, 99 An Càrnan, and 51 Baile Gharbhaidh | <0.5 |
| | Scheduled monuments | Two Identified within area: Borve Castle and Teampull Bhuirgh chapel and settlement | <0.1 |
| | Historic Environment Records | Canmore points Maritime and terrestrial identified<br>Over 10 terrestrial designations on coastline<br>Two marine records of maritime ship remains. One near sediment source area. | <0.5 |
| | Registered Parks and Gardens | None present within 5km | - |
| Water environment | Water Framework Directive water body | Sound of Monach is a coastal water body (ID: 200132) | Within site boundary |
| | | Bagh nam Faoilean is a coastal water body (ID: 200478) | Within site boundary |
| | Flood Risk | High likelihood of coastal flooding to residential properties, infrastructure and land (10% AP (1 in 10 year) flood event) | Within site boundary |
| Geomorphology | Nationally important coastal | Ardivachar to Stonebridge Geological Conservation Review (GCR) | <0.5 |

[25] UK Government.,1994. *The conservation of Habitats and Species Regulations 2017- Regulation 12.* [Online]. https://www.legislation.gov.uk/uksi/2017/1012/regulation/12/made [Accessed November 2022]

| EIA Topic | Environmental Constraint | Description | Distance from Site (km) |
|---|---|---|---|
| | geomorphology | Borve GCR | <0.5 |
| Geology and Soil | Bedrock | Lewisin Complex Metasedimentary rock | Within site boundary |
| | Hydrogeology | Benbecula and South Uist groundwater bodie | Within site boundary |
| Population and socio-economics | Local residents | Liniclate and Creagorry residents on Isle of Benbecula<br>Bualadubh residents on Isle of South Uist | <0.1 |
| | Local businesses | Uist Adventure; Scottish Celtic Jewellery | <0.1 |
| | | Anglers Retreat Bed and Breakfast<br>Hebridean Crafts | <0.2 |
| | | Lovats Supermarket - Carnan, South Uist<br>Jakki'z Hairdressing<br>Co-op Food – Creagorry<br>Creagorry hotel | <0.5 |
| | Human Health | Local residents adjacent to transport links (A865 and Bualadubh road). | <2.0 |
| | Traffic | A865 Main connection across islands<br>Bualadubh road connecting to island | - |
| | Recreation and amenity | St Michael the Archangel's Catholic Church | <0.9 |
| | | Iochdar School | <0.5 |
| Landscape and Visual | Landscape Character Types (LCTs) | Machair | Within site boundary |
| | | Linear Crofting | Within site boundary |
| | National Scenic Areas | South Uist | >2km |
| | | South Lewis, Harris and North Uist | >2km |
| | Visual Receptors | Beach recharge: Scattered Residential properties along the B892 facing south and those along the A865 facing west across South Ford Inlet on Benbecula; scattered Residential properties on the local road travelling west from the A865, facing north across the inlet on South Uist.<br>Bund: Visual receptors at Dark Island Hotel and Liniclate School. | <1.0 |
| | | Pedestrian and cyclist receptors along the Hebridean Way travelling around | <1.0 |

| EIA Topic | Environmental Constraint | Description | Distance from Site (km) |
|---|---|---|---|
| | | the inlet, with views facing south and west (Bund and Beach recharge). | |
| | | Road users along the local road network travelling around the inlet. | <1.0 |
| Air and Climate change | Air Quality | Residents, businesses and biodiversity and nature conservation areas. | Within site boundary |
| | Climate change | Flood protection to residential properties, land and infrastructure within the west coast of the Outer Hebrides, in the South Ford area. | Within site boundary |

2.2.2 The development was screened in October 2020 under The Environmental Impact Assessment (Scotland) Regulations 2017 by Comhairle nan Eilean Siar[26].

2.2.3 The development falls under the description of Schedule 2 development, specifically paragraph 2 table '*Infrastructure Projects (M) - Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works*' of The Environmental Impact Assessment (Scotland) Regulations 2017 and The Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017.

As set out in the Schedule 3 Selection Criteria for Screening Schedule 2 works, consideration has been given to the potential for likely significant environmental effects. The development is considered under Schedule 3 selection criteria for the following reasons:

- The development is located within the coastal zone and marine environment of South Ford is a tidal inlet in the Outer Hebrides. The scheme intends to use naturally occurring sediment resources from Gualan Island, approximately 111,600 m3 of sediment is proposed to be extracted from this location for the beach recharge activities. The proposed works would have a direct impact on the coastal geomorphology of the South Ford tidal inlet.
- The development is located within an Environmentally Sensitive Area increasing the potential for likely significant effects on the environment. The site falls within a Designated Seal Haul-Out site and is within 0.3km a SPA that is designated for natural coastal processes and biodiversity. The proposed works would have a direct impact on the natural coastal processed and habitats that support the environmentally sensitive areas located within the South Ford tidal inlet.

2.2.4 Therefore, we conclude that a statutory EIA would be required under both The Environmental Impact Assessment (Scotland) Regulations 2017 and The Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017, due to the development site exceeding this threshold and because the development may have significant effects on the local environment by virtue of factors of its size, nature and location.

[26] Ferguson, M., 2020. Environmental impact assessment - screening opinion. Comhairle nan Eilean Siar.

# 3 EIA Scoping

## 3.1 The EIA Scoping Process

3.1.1 The objective of EIA Scoping, as set out within Regulation 14 of the EIA Regulations for both Town and Country Planning and Marine Works, is to consider the scope and level of detail of the information to be provided in the ES, identify the potential significant environmental impacts associated with the proposed scheme and to state the assessment methodologies to be applied. Although it is not a statutory requirement to undertake EIA Scoping, it allows agreement on approach to be sought from the statutory environmental consultees at an early stage in the EIA process. Early engagement through EIA Scoping also encourages an iterative approach to design development, whereby any environmental concerns raised during consultation can be used to inform the emerging design proposals and mitigate any significant environmental effects.

3.1.2 Schedule 4 of the Town and Country Planning EIA Regulations sets out the requirements for information to be included in the ES. This includes 'a description of the factors specified in regulation 4(3) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape'.

3.1.3 Schedule 4 of the Marine works EIA Regulations sets out the requirements for information to be included in the ES. This includes 'a description of the factors specified in regulation 5(3) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape'.

3.1.4 On the basis of a review of the extent of project information available, and readily available environmental baseline information, supported where relevant by initial informal consultation with key environmental stakeholders, the following broad environmental topics areas have been selected for further consideration of the EIA scope:

- Biodiversity and nature conservation (Chapter 3)
- Geomorphology and Coastal Processes (Chapter 4)
- Water Environment (Chapter 5)
- Cultural Heritage and archaeology (Chapter 6)
- Landscape and Visual (Chapter 7)
- Population and Human Health (Chapter 8)
- Climate change (Chapter 9)
- Other Construction Related Effects (Traffic, noise, dust, light etc) (Chapter 10)
- Cumulative Effects (Chapter 11)

3.1.5 The key environmental topics described in the proceeding chapters of the Scoping Report are set out to the following structure:

- Baseline – provides a description of the aspects of the environment likely to be significantly affected by the project
- Potential Impacts – considers the likelihood of the aspects of the environment to be significantly affected, to the extent of the information available
- Proposed Methodology – proposes how the likely significant effects would be assessed in detail as part of the EIA

3.1.6 Environmental aspects that are 'scoped in' require further detailed technical studies undertaken to inform the ES. Where environmental aspects are 'scoped out,' these would not be considered further unless there is a material change in the scheme proposals as they are developed following the Scoping Opinion. These are summarised in the concluding chapter of the Scoping Report in Table 13.1. However environmental issues can be scoped in or out at any stage of EIA, which would be definitively reported in the ES.

## 3.2 EIA Method of Assessment

3.2.1 Regulation 5(1) of the Town and Country Planning EIA Regulations stipulates requirements for the ES which need to be considered during scoping:

*'An EIA report is a report prepared in accordance with this regulation by the developer which includes (at least)—*

*(a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development;*

*(b) a description of the likely significant effects of the proposed development on the environment;*

*(c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*

*(d) a description of the reasonable alternatives studied by the applicant or appellant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment;*

*(e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and*

*(f) any additional information specified in Schedule 4 relevant to the specific characteristics of the development and to the environmental features likely to be significantly affected.'*

3.2.2 Regulation 6(1) of the Marine Works EIA Regulations stipulates requirements for the ES which need to be considered during scoping:

*'An EIA report is a report prepared in accordance with this regulation by the applicant which includes (at least)—*

*(a) a description of the works comprising information on the site, design, size and other relevant features of the works;*

*(b) a description of the likely significant effects of the works on the environment;*

*(c) a description of the features of the works and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*

*(d) a description of the reasonable alternatives studied by the applicant, which are relevant to the works and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the works on the environment;*

*(e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and*

*(f) any other information specified in schedule 4 relevant to the specific characteristics of the works or of the types of works in question and to the environmental features likely to be affected.'*

3.2.3 The requirements of information for inclusion in Environmental Statements is set out in Schedule 4 of the EIA Regulations for both Town and Country Planning and Marine Works. Where information about the proposals is not sufficiently known to inform these requirements, the premise of the Rochdale Envelope is employed (referring to a judgement made on the planning law case R. v Rochdale MBC ex parte Milne in 2000). This follows that the more detailed the proposal, the easier it will be to ensure compliance with the Regulations, but where such detail is unavailable, 'appropriate parameters' would need to be defined for the purpose of EIA.

3.2.4 In defining the methodology for EIA, cognisance is made to the current practice guidance:

- Government Guidance for EIA from the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government[2]
- Guidelines for Environmental Impact Assessment (IEMA, 2004) and 2006 Updates[27]
- IEMA (2011) State of Environmental Impact Assessment Practice in the UK Special Report[28]
- IEMA (2016) Environmental Impact Assessment Guide to Shaping Quality Development[24].
- IEMA (2016) Environmental Impact Assessment Guide to Delivering Quality Development[29].

3.2.5 Other environmental topic-specific guidance is detailed in the methodology section of each EIA topic chapter of the Environmental Statement.

### Proportionate EIA

3.2.6 EIA is widely recognised as delivering valuable and accessible information that positively influences development design and consenting to the benefit of developers, communities and the environment. However, as noted in the IEMA Proportionate EIA Strategy[30], it is also becoming increasingly recognised that EIA needs to be more effective and more proportionate to deliver these benefits.

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[27] Institute of Environmental Management and Assessment., 2004. *Guidelines Environmental Impact Assessment*.

[28] Institute of Environmental Management and Assessment., 2011. *State of Environmental Impact Assessment in the UK*. IEMA Special Report.

[29] Institute of Environmental Management and Assessment., 2016. *Environmental Impact Assessment Guide to Delivering Quality Development*. [Online]. Available at: https://www.iema.net/assets/newbuild/documents/Delivering%20Quality%20Development.pdf [Accessed August 2022]

[30] Institute of Environmental Management and Assessment., 2016. *Delivering Proportionate EIA.* [Online]. Available at: https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia [Accessed November 2022].

3.2.7 The assessment of the scope of likely significant effects needs to be considered carefully to ensure that disproportionate or irrelevant environmental information are not scoped into EIA, and to minimise duplication of assessment with other consents processes.

### Sufficient Expertise

3.2.8 The Town and Country Planning EIA Regulation 5(5) stipulates that ' In order to ensure the completeness and quality of the EIA report— (a) the developer must ensure that the EIA report is prepared by competent experts; and (b) the EIA report must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.'

3.2.9 The Marine Works EIA Regulation 6(5) stipulates that 'In order to ensure the completeness and quality of the EIA report— (a)the applicant must ensure that the EIA report is prepared by competent experts; and (b)the EIA report must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of those experts.'

3.2.10 Where an EIA deliverable contributes towards statutory EIA, it must be technically reviewed and approved by the relevant 'competent expert', who is defined here as a chartered member equivalent of a relevant professional institution and therefore up to date with relevant continuing professional development. A statement on those involved in the technical review of EIA will be provided in the ES.

### Defining the temporal and spatial scope of EIA

3.2.11 The Town and Country Planning EIA Regulation 5(2) states that the ES includes at least '(a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development…'

3.2.12 The Marine Works EIA Regulation 6(5) states that the ES includes at least '(a) a description of the works comprising information on the site, design, size and other relevant features of the works…'

3.2.13 The temporal scope of the EIA is considered in terms of the following principal stages of development:

- existing conditions (baseline)
- construction dates
- operation (including maintenance) of the development over the next 100 years
- future decommissioning of the development (beyond the 100 year scheme design life)

3.2.14 Operation of the scheme would be defined on the basis of engineered design life of the scheme, and the length of time it would provide resilience to the effects of climate change.

3.2.15 The spatial scope of the EIA is considered on the basis of:

- the physical extent of the proposed works, as defined by the limits of land to be acquired or used (temporarily or permanently);
- the nature of the existing baseline environment, including the location of sensitive receptors;
- the geographical extent of impacts beyond the site, e.g. effects on traffic, or watercourses that might extend some distance from the development site; and

- the geographical boundaries of the political and administrative institution and authorities, which provide the planning and policy context for the project.

### Defining impacts and effects

3.2.16 With reference to the selection criteria for screening Schedule 2 development as set out in Schedule 3 of The Town and Country Planning (Scotland) and The Marine Works EIA Regulations, the requirement for EIA is based on a preliminary assessment of the following:

1. the characteristics of the development
2. the location of the development
3. the types and characteristics of the potential impact

3.2.17 Paragraph 1 of the above considers the nature of the development being proposed. Paragraph 2 considers the environmental sensitivity of geographical areas likely to be affected by the development. Paragraph 3 considers the likely significant effects of the development on the environment in relation paragraphs 1 and 2 taking into account the following:

*(a) the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);*

*(b) the nature of the impact;*

*(c) the transboundary nature of the impact;*

*(d) the intensity and complexity of the impact;*

*(e) the probability of the impact;*

*(f) the expected onset, duration, frequency and reversibility of the impact;*

*(g) the cumulation of the impact with the impact of other existing and/or approved development;*

*(h)the possibility of effectively reducing the impact.*

3.2.18 The requirement for EIA is therefore based on the characteristics of the development proposals that could impact on the environment as set out in paragraph 1, the value, sensitivity or importance the environment as defined in paragraph 2, and likely significant effect quantified by the characteristics of the potential impact as set out in paragraph 3. Distinction is drawn between characteristics of the 'potential impacts' and the significance of any resultant 'likely effects'. This is because not all potential impacts identified using paragraph 1 and 2 will necessarily have a likely significant effect on the environment when assessed against the criteria set out in paragraph 3.

3.2.19 For the purpose of EIA impacts and effects may be further distinguished from one another using the following definitions:

- *Impacts* are the predicted changes to valuable, sensitive or important aspects of the baseline environment which are attributable to the development proposals;
- *Effects* are the consequences of the changes to the baseline environment resulting from the types and characteristics of the potential impact attributable to the development proposals.

3.2.20 A matrix approach is often used in EIA to assist with the quantification of likely significant effect, as illustrated in Table 3.1. The matrix approach assists in the judgement of the scale of significance, by enabling a direct comparison to be made

between the scale of magnitude, intensity, irreversibility etc of potential impacts Table 3.3, and the scale of the value, sensitivity or importance of the impacted environmental resource or receptor Table 3.2. The matrix-based approach helps to provide consistent significance scoring terminology by pre-defining the relationship between significance scoring terms. For consistency throughout the ES these significance scoring terms will be used where possible, with any topic specific scoring terminology set out in individual ES chapter methodologies where this deviates from the general approach. Where significance scores derived using the matrix approach fall between terms (i.e. slight or moderate; moderate or large), then a professional judgement is made by the assessor upon which score should reasonably apply.

**Table 3.1: Matrix for quantifying significance of effect scoring terms**

| **Receptor Value/Sensitivity** | **Magnitude of impact** | | | | |
|---|---|---|---|---|---|
| | **No Change** | **Negligible** | **Minor** | **Moderate** | **Major** |
| **Very High** | Neutral | Slight | Moderate or Large | Large or Very Large | Very Large |
| **High** | Neutral | Slight | Slight or moderate | Moderate or Large | Large or Very Large |
| **Medium** | Neutral | Neutral or slight | Slight | Moderate | Moderate or Large |
| **Low** | Neutral | Neutral or slight | Neutral or slight | Slight | Slight or moderate |
| **Negligible** | Neutral | Neutral | Neutral or slight | Neutral or slight | Slight |

3.2.21 For each of the sensitive receptors identified, a level of value or sensitivity will be assigned in accordance with the criteria presented in Table 3.2.

**Table 3.2: Criteria for assessing environmental value (sensitivity)**

| **Value (sensitivity) of receptor/resource** | **Typical description** |
|---|---|
| Very High | Very high importance and rarity, international scale and very limited potential for substitution. |
| High | High importance and rarity, national scale, and limited potential for substitution. |
| Medium | Medium or high importance and rarity, regional scale, limited potential for substitution. |
| Low | Low or medium importance and rarity, local scale. |
| Negligible | Very low importance and rarity, local scale. |

3.2.22 The potential impacts of the proposed project will be reported within environmental assessments. Each of the potential impacts reported will be assigned a level of impact magnitude in accordance with criteria presented in Table 3.3.

**Table 3.3: Criteria for assessing magnitude of impacts**

| Magnitude of impact (change) | | Typical Description |
|---|---|---|
| Major | Adverse | Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements. |
| | Beneficial | Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality. |
| Moderate | Adverse | Loss of resource, but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements. |
| | Beneficial | Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. |
| Minor | Adverse | Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. |
| | Beneficial | Minor benefit to, or addition of, one (maybe more) key characteristic, feature, or element; some beneficial impact on attribute or a reduced risk of negative impact occurring. |
| Negligible | Adverse | Very minor loss or detrimental alteration to one or more characteristic, feature, or element. |
| | Beneficial | Very minor benefit to, or positive addition of, one or more characteristic, feature, or element. |
| No change | | No loss or alteration of characteristics, features or elements; no observable impact in either direction |

3.2.23 Schedule 4 of the Town and Country Planning EIA Regulations sets out the requirements for information to be included in the ES includes:

> *'a description of the factors specified in regulation 4(3) likely to be significantly affected by the development… The description of the likely significant effects on the factors specified in regulation 4(3) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development…'*

3.2.24 Schedule 4 of the Marine Works EIA Regulations sets out the requirements for information to be included in the ES includes:

> *'a description of the factors specified in regulation 5(3) likely to be significantly affected by the works… The description of the likely significant effects on the factors specified in regulation 5(3) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the works…'*

3.2.25 These types of effect are defined herein for the purpose of this EIA using the following terms:

- *Direct effects* – arise from the impact of activities that form an integral part of the project

- *Indirect or secondary effects* – arise from the impact of activities that do not form part of the project, but are a consequence of it
- *Cumulative effects* – result from multiple impacts or effects on a particular environmental resource or receptor, which would otherwise not occur or would be less severe
- *Short-term, medium-term or long-term effects* – refer to the temporal scale of an effect
- *Permanent effects* – result from an irreversible change to the baseline environment or which persist for the foreseeable future
- *Temporary effects* – persist for only a limited period or which may disappear due to natural recovery of the environment or assimilation into it
- *Positive effects* – have a beneficial influence on environmental receptors and resources
- *Negative effects* – have an adverse influence on receptors or resources

3.2.26 Consideration of transboundary effects is also a requirement of Schedule 4 of The Town and Country Planning and The Marine Works EIA regulations, which in the UK are considered with regard to the geographical boundaries of the political and administrative institution and authorities that provide the planning and policy context for the project (refer to section 3.2.11).

### Mitigation, enhancement and reporting of residual effects

3.2.27 Schedule 4 of The Town and Country Planning and The Marine Works EIA Regulations sets out the requirement for inclusion in the ES:

*'A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases'.*

3.2.28 Mitigation measures should be both reasonable and practicable, taking account of the following criteria:

- current best practice guidance
- precedents set by similar projects
- the effectiveness of different technical solutions
- their feasibility in construction and operational terms
- their incremental costs

3.2.29 When identifying the best possible design measures available to achieve the required mitigation within a scheme, the principles of the hierarchy of mitigation should be employed as follows (in order of preference):

- Avoidance – making changes to the project's design to avoid or prevent adverse effects on an environmental feature
- Reduction – where avoidance is not possible, adverse effects can be reduced through sensitive environmental treatments/design
- Remediation – where adverse effects are unavoidable; management measures can be introduced to limit their influence

- Compensation – where avoidance on reduction measures are not available, it may be appropriate to provide compensatory measures to seek to offset the adverse effect with a comparable positive one

3.2.30 Consideration to mitigation should be undertaken from the earliest possible design stage, after the baseline data has been collected, and throughout the EIA process. EIA mitigation can also therefore be characterised depending on the stage of the assessment when it is considered[28].

- *Primary* – Changes made in the pre-application phase of the development, that modify the location or design of the development. This mitigation has the greatest ability to avoid impacts. They are the most effective when applied as early as possible, as it is often difficult to act on primary mitigation measures as the design begins to stabilise.
- *Secondary* – Actions that require activity to achieve a desired mitigation. These can be imposed in the ES in order to achieve planning consent.
- *Tertiary* – Actions that would have been undertaken regardless of the EIA process, due to other legislative requirements or standard practices. This mitigation is the least flexible – either the legislation exists to create the mitigation or does not (i.e. Protected Species Licencing).

3.2.31 Where positive effects can be voluntarily introduced without the requirement to mitigate an effect, this is termed 'enhancement'.

3.2.32 Any environmental effects that remain significant after mitigation are termed 'residual effects'. Residual effects are a convenient way of reporting the overall significance of environmental effects of a proposed development scheme and would therefore be reported in the ES conclusion and non-technical summary.

## 3.3 EIA Topics for Scoping

3.3.1 The statutory EIA topic areas are discussed in Section 2.1. Table 3.4 below outlines the EIA topics used in this scoping report in compliance with The Town and Country Planning and The Marine Works EIA Regulations.

**Table 3.4: EIA topic definitions used in this scoping report**

| Statutory EIA Topic | South Ford and Gualan EIA Topics Used |
|---|---|
| population and human health | Population and Human Health |
| biodiversity | Biodiversity and Nature Conservation |
| land, soil | Geomorphology and Coastal Processes |
| water | Water Environment and Flood Risk |
| air | Construction Related Effects – Air Quality |
| climate | Sustainability and Climate Change |
| material assets | Climate Change<br>Construction Related Effects – Material Assets |
| cultural heritage | Historic Environment |
| landscape | Landscape and Visual |
| the interaction between the above factors | To be addressed within topic chapters as relevant to EIA guidance (e.g. historic landscape), or as 'cumulative effects' in the future ES. |

# 4 Biodiversity and nature conservation

## 4.1 Scoping Baseline

4.1.1 Environmental constraints have been identified within up to 3 km from the midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008).

### Designated sites

4.1.2 A preliminary desk-based study indicates that the site is located within and adjacent to several internationally and nationally designated conservation sites. Likely biodiversity and nature conservation receptors located within located within 3 km of the site midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008) have been listed within Table 4.1 below.

**Table 4.1: Designated sites identified within 3 km of the site**

| Designated sites within 3 km | Site Description | Distance from Site midpoint(km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| Lùib Bhàn - Designated Seal Haul-Out site | Protects any species of seal, all year round.<br>The site is included under a seal conservation area for Common or Harbour seal *Phoca vitulina.* | Within site boundary | Medium |
| West Coast of the Outer Hebrides SPA | Covers an area of 132,170.04 ha, the SPA comprises calcareous sandy shores backed by the machair plain. The shallow inshore waters support a diverse range of plant and animal communities, and high densities of some species, making them productive feeding areas for many species of waterfowl and seabirds.<br>Regularly supported non-breeding Annex I[25] species present as qualifying feature for selection of this site are:<br>• Great northern diver *Gavia immer*<br>• Black-throated diver *Gavia arctic*a<br>• Slavonian grebe *Podiceps auratus*<br>Annex I species present as qualifying feature for selection of this site during breeding season are:<br>Red-throated diver *Gavia stellata*.<br>Article 4.2 qualifying feature for regularly supporting populations of European importance migratory species:<br>• Common eider *Somateria mollissima*<br>• Long-tailed duck *Clangula hyemalis*<br>• Red-breasted merganser *Mergus serrator* | <0.3 (low water mark) | High |
| South Uist Machair and Lochs SPA and Ramsar site. | Covers an area of 5072.31 ha, the SPA comprised of transitional habitats from acidic moorland to the calcareous coastal plain, and for the transition from freshwater habitats to saltwater habitats. The complex includes | <0.5<br>(connected at Loch Bee) | High |

| Designated sites within 3 km | Site Description | Distance from Site midpoint(km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| | outstanding examples of wet and dry machair with eutrophic machair lochs, freshwater marsh, saltmarsh, coastal dunes and sandy and rocky shores.<br>Regularly supported breeding Annex I species present as qualifying feature for selection of this site are:<br>• Corncrake *Crex crex*<br>• Little Tern *Sternula albifrons*<br>• Dunlin Calidris *alpina schinzii*<br>Article 4.2 qualifying feature for regularly supporting populations of European importance migratory species:<br>• Ringed Plover *Charadrius hiaticula*<br>• Redshank *Tringa totanus*<br>• Oystercatcher *Haematopus ostralegus*<br>• Sanderling *Calidris alba* | | |
| South Uist Machair SAC. | Covers an area of 3437.71 ha, the SAC comprises 52% Coastal sand dunes, Sand beaches, Machair, 21% Inland water bodies (Standing water, Running water), 10% Bogs, Marshes, Water fringed vegetation, Fens, 8.7 % Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins), 5% Improved grassland (5%) and 3.3 % Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites).<br>Habitat Regulations Annex I habitats that are a primary reason for selection of this site are:<br>Annex I habitats that are a primary reason for selection of this site are:<br>• Machairs<br>• Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)<br>• Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*<br>• Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.<br>• Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation<br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site are:<br>• Coastal lagoons<br>• Annual vegetation of drift lines<br>• Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") | <0.5 (connected at Loch Bee) | High |

| Designated sites within 3 km | Site Description | Distance from Site midpoint(km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| | • Fixed coastal dunes with herbaceous vegetation ("grey dunes")<br>• Humid dune slacks<br>Annex II species that are a primary reason for selection of this site are:<br>• Slender naiad *Najas flexilis*<br>Annex II species present as qualifying feature. But not a primary reason for selection of this site are:<br>• Otter *Lutra lutra* | | |
| Loch Bee SSSI. | Covers an area of 1105.66 ha, the SSSI comprises of one of the most complete machair systems in Scotland. Lock Bee is the largest Saline lagoon in the Western Isles and is connected with the sea at its north-west and south-east extremities.<br>The saline lagoon is an important habitat for the brackish water cockle *Cerastoderma glaucum*. Loch Bee and its margins support internationally important numbers of non-breeding mute swans and a diverse assemblage of breeding birds.<br>Loch Bee SSSI is part of South Uist Machair SAC and is part of South Uist Machair and Lochs SPA. Designated habitats and species listed above. | <0.5<br>(connected) | Medium |
| Aird and Borve Benbecula SPA | Covers an area of 363.88 ha, the SPA comprises two areas near the west coast of the island of Benbecula. The Aird section extends south to Nunton and consists of sand dunes, cultivated machair and croftland. The area also consists of wet machair and marsh with some reedbeds and iris beds, and two small lochs.<br>Regularly supported non-breeding Annex I species present as qualifying feature for selection of this site are:<br>Corncrake *Crex crex.* | <1.0 | High |
| West Benbecula Lochs SSSI | Covers an area of 118.93 ha, the SSSI comprises of four connecting lochs and their surrounding land.<br>The site supports nutrient-rich (eutrophic) machair lochs contain various pondweeds, such as the nationally scarce slender-leaved pondweed *Potamogeton filiformis* and fennel pondweed *Potamogeton pectinatus*. The fens that surround the lochs are dominated by emergent open water vegetation, such as common reed and greater tussock sedge.<br>The site supports nationally important breeding birds including wigeon *Anas penelope*, tufted duck *Aythya fuligula*, shoveler *Anas clypeata*, | <2.0 | Medium |

| Designated sites within 3 km | Site Description | Distance from Site midpoint(km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| | dunlin *Calidris alpina*, redshank *Tringa totanus*, and corncrake *Crex crex*. | | |

### Habitats

4.1.3 A preliminary ecological walkover survey was carried out in September 2022 and identified the presence of the following habitats.

4.1.4 The intertidal habitats are divided into the outer face of the Gualan spit, which is open ocean and the more sheltered bay between the causeway and Gualan. The dune system on the south coast of Benbecula is very tall, with a combination of both wind-blown sand piling onto the top of the dunes and strong tidal current and wave effects at the toe. This results in a steep face with limited vegetation cover. Above this face is a well-vegetated semi-fixed dune system which grades into a more fixed Marram dune system behind. This acts as a significant barrier and protects much of the village of Liniclate from direct impacts from the Atlantic. There is little evidence of human disturbance within these dunes, with the Hebridean Way footpath being directed onto the beach at the toe. There, some dune hollows evident along the front of the dunes, which are actively regenerating blow outs. Hollows further back in the dune system may hold dune slack communities.

4.1.5 The seaward face of Gualan shows a typical shingle spit with clear zonation in the vegetation types. These transition from washed up seaweeds on the tide line, into shingle communities dominated by Sea Sandwort *Honkenya peploides*, Spear-leaved Orache *Atriplex prostrata* and Babington's Orache *Atriplex galbriusculata*. Where there is space and a stable shingle ridge, this gives way to narrow bands of mobile dune and semi-fixed dune vegetation. In areas of recent breaches, the shingle community extends up to and beyond the crest, with no further zonation. At the northern end of Gualan, the impacts of currents, waves and wind has resulted in a steep and largely unvegetated dune face, beyond which is a shingle spit orientated eastwards, into the bay.

4.1.6 Gualan itself has a varied range of coastal habitats, depending on shelter from tides, wave action and wind. The south channel has become blocked in recent years and Gualan is no longer a tidal island. Where the southern channel used to be, there was a vegetated sand and shingle bank which is approximately 1 m higher than the highest visible tide line at the time of the visit. This contained a mix of shingle vegetation, dune vegetation and some improved grassland and was grazed by sheep. The bay side of Gualan consists of two wider areas and a narrow spit connecting them. In the larger areas, there is a wide semi-fixed dune system which grades into saltmarsh, with a narrow ribbon of strandline vegetation marking the division. The dunes at the northern end are of a similar height to those across the tidal channel to the north.

4.1.7 The sediments which make up Gualan sit on a low ridge of cobbles and it is notable that vegetation cover is of differing ages and structure, showing evidence of regular historical breaching and recolonisation. Some recent recolonisation is the result of *ad hoc* defences constructed presumably by local crofters. Attempts at beach reinforcement have been made using fishing nets laden with cobbles, piles of wooden pallets, bales and farmyard manure. Some of these have influenced the vegetation composition and allowed stands of Stinging Nettle *Urtica dioica*, and other indicators of nutrient enrichment to dominate.

4.1.8 The main tidal bay between the causeway and Gualan constitutes wide open mudflats with a number of tidal islands. The majority of the bay is completely covered at high tide, but braided with channels, which presumably shift over time running across and round the mudflats at low water. The islands provide roost sites for large numbers of birds at high tide, and the mudflats are used by foraging birds at low water.

4.1.9 The largest islands form a line along the northern half of the bay, with the largest hosting a Machair vegetation above rocky shores.

4.1.10 The southern half of the bay is composed mostly of intertidal mudflats. These grade into saltmarsh in the more sheltered areas behind Gualan, particularly along the coast between Iochdar and Balgarve. This area also contains the inflows to Loch Bee and the saline lagoon of Oban na Buail'-uachdraich.

4.1.11 Loch Bee is a protected site and is the largest saline lagoon in Scotland. The main inlet at the north end passes under the minor road near the croft at Clachan via two square stone culverts. Even at low tide in the bay, water was passing north to south into the loch and it appears that this is due to water driven in Oban na Buail'-uachdraich draining this way as tidal waters recede. Aerial images suggest the outflow from here heads westwards before turning south to the culvert. These entry channels are very shallow, even at high tide. Historical aerial imagery (Google Earth) from 2004 and historical mapping shows a clear channel passing to the south of Gualan from Loch Bee, and potentially the culverts were tidally dependent with bi-directional flows. By 2017, the south channel is silting up and flow patterns appear to trend towards Loch Bee. There is a corresponding increase in visible sediment forming a delta into Loch Bee. It is likely therefore that the silting up of the south channel at Gualan has already had an impact on waters in Loch Bee.

4.1.12 Much of the southern coastline of the bay from Iochdar to the causeway is of a rocky shore with only isolated areas of saltmarsh. Some reclamation of these coastal areas has taken place and the pastures are coastal grazing marsh. Where the coast is rockier, the land is less improved and is largely machair, with some peat bog intrusion.

4.1.13 The causeway area consists largely of mudflats covered at high water, with the exception of Creagorry Island at the north. This island sits at the south end of the single bridge allowing tides to flow in both directions through South Ford. The channel is deep and at the time of the site survey, water velocity was high in both directions, depending on tidal state. At low water, this deep channel held water in a trough in the sediments to the west. This was fed only by a small number of channels through the sand.

4.1.14 The northern side of the bay, from the causeway to Liniclate is comprised of a narrow strip of rocky machair, largely grazed, sandwiched between the road (A865 and B892). The shoreline is largely rocky with a number of islands. These formed high tide roosts for wading birds, wildfowl and gulls.

4.1.15 The habitats immediately to the east of the Dark Islands Hotel at Liniclate is much more varied. Currently, there is a low-lying bay which is largely composed of saltmarsh. This appears to mark the former connection between the sea and Oban Liniclate. Oban is usually a term given to a bay rather than the current lochan and it appears that historically this would have been tidally inundated before an artificial diversion channel was cut slightly to the east. This rock cut channel is now tidal up to the road and acts as the main drainage outlet from the lochan. To the east of this bay is the previously discussed rocky foreshore, while to the south and west are sand dunes and coastal grasslands.

4.1.16 The saltmarsh is composed of typical vegetation and is inundated at the highest tides. Beyond the coastal strip the ground here is noticeably peatier and less mineral. However, most of this is covered in windblown sand, and the vegetation is dominated by Marram

Grass *Ammophila maritima* with machair grassland behind. At the time of the survey, a large area here was observed to have been mown and potentially improved, but still retains coastal plant species. Fields have been formed between the hotel and this low-lying area and during the survey were grazed by sheep and cattle. It is at the south west corner of this area that the wind turbine is located.

4.1.17 The southern part of this area, called Tortumbeg on Ordnance Survey maps, is a transitional habitat between the sand dunes at Liniclate and the rockier shores to the east. There are a couple of rocky knolls, but otherwise this is lower-lying than the sand dunes, which decrease in height markedly around this headland. Historical aerial imagery shows a large area of sand deposits in 2007, suggesting some loss of coastal machair habitat following the 2005 storm event, which had largely been revegetated by 2017 and today is represented by a low range of dunes. The coastal strip here is dominated by small rocky ridges extending through the dunes and across the low-tide beach, to the main channel. These ridges all share the same orientation and form a series of small headlands pushing into the sea at high tide.

4.1.18 Beyond the wind turbine, and isolated from the dunes is a large area of improved grassland surrounding the school. Much of this is composed of Perennial Rye-grass *Lolium perenne* and Bent grasses *Agrostis* sp..

### Species

4.1.19 Potential for protected species within and adjacent to the scheme area have been identified through the preliminary ecological walkover survey and desk study findings (detailed in Table 4.1).

4.1.20 There are currently no aquaculture sites registered with Marine Scotland Science located in the vicinity of the works proposed by the council, or at any location along the west coast of Benbecula or the Uist Islands. There are currently no aquaculture sites registered with Marine Scotland Science located in the vicinity of the works proposed by the council, or at any location along the west coast of Benbecula or the Uist Islands.

4.1.21 The bay and rocky islands are designated as a seal haul out, and good numbers of both harbour and grey seals are present. At low tide many exposed rocks are used for seals hauling out. During the survey, grey seals were more commonly seen on rocks at the mouth of the bay, with harbour seals seen regularly on rocks within the channel closer to Gualan. As the tide came in, seals were seen to ride the tidal flow through the channel between Liniclate dunes and Gualan. Seals were not seen at high water and may have been feeding in the bay, or even passing through the narrow channel to the opposite side of the islands. However, many were seen to surf back through the main channel on falling water. Often small groups of seals were seen leaving when the water levels dropped rapidly, and seemed to leap over obstructions or shallow areas.

4.1.22 Otter *Lutra lutra* are known to frequent the islands in good numbers, and although no sightings were made during the initial visit, a spraint was discovered within the dunes at Liniclate, and footprints along the base of the dunes and on the inner side of Gualan.

4.1.23 The initial site walkover was undertaken in September 2022, and breeding bird populations had departed. No evidence of terns was observed, but the shingle spit at the northern end of Gualan could easily support nesting little tern *Sterna albifrons* and common tern *Sterna hirundo*, in addition to waders such as oystercatcher *Haematopus ostralegus* and little ringed plover *Charadrius dubius*. Other breeding birds likely to be found in the area include corncrake *Crex crex*, for which the nearby Aird and Borvie SPA is designated, as well as being known from around Iochdar, and red-necked phalarope *Phalaropus lobatus*, which

has been recorded foraging around South Ford and breeds on remote lochans across the islands.

4.1.24 A range of gull species were observed, especially during high tide when several species were seen roosting on exposed islands and the shingle bars. These were often in accompaniment with wading birds. Oystercatcher and curlew *Numenius arquatus* were seen foraging and loafing in large numbers, with redshank *Tringa totanus*, ringed plover *Charadrius hiaticula*, knot *Calidris canuta* and dunlin *Calidris alpina* also being seen gathering in large numbers. Snipe *Gallinula gallinula* were seen in double figure counts from wet grasslands and saltmarsh areas around the bay.

4.1.25 White-tailed eagle *Haliaeetus albicilla*, hen harrier *Circus cyaneus* and kestrel *Falco tinnunculus* were seen around the bay, with short-eared owl *Asio flammeus* seen hunting near Loch Bee and golden eagle *Aquila chrysaetus* seen over the hills just south of the Loch Bee causeway.

4.1.26 Foreshores and machair grassland were supporting foraging passerine species and many swallows *Hirundo rustica*, house martin *Delichon urbicum* and wheatear *Oenanthe oenanthe* among many species feeding up ahead of migration. Other passerine species seend in good numbers were the finches goldfinch *Carduelis carduelis*, linnet *Linaria cannabina* and twite *Linaria flavirostris*. The machair and dunes also supported very large numbers of starling *Sturnus vulgaris*.

4.1.27 The Machair system and saline lagoon provide foraging and roosting habitat for a diverse assemblage of breeding birds. The machair and associated marshes support exceptionally high densities of breeding waders, many of which are qualifying features of the surrounding SSSI and SPA designations.

**Table 4.2: Bird species observations during initial site walkover September 2022**

| Common Name | Scientific Name | Comments |
|---|---|---|
| Canada Goose | *Branta canadensis* | Feeding on farmland and in flight |
| Greylag Goose | *Anser anser* | Large flocks |
| Pink-footed Goose | *Anser brachyrhynchus* | Group resting on fields near Liniclate |
| Mute Swan | *Cygnus olor* | Loch Bee |
| Shelduck | *Tadorna tadorna* | Few seen in bay |
| Shoveler | *Spatula clypeata* | Loch Bee |
| Gadwall | *Mareca strepera* | Loch Bee |
| Wigeon | *Mareca penelope* | Large no.s on Loch Bee |
| Mallard | *Anas platyrhynchos* | Loch Bee |
| Teal | *Anas crecca* | Loch Bee |
| Tufted Duck | *Aythya fuligula* | Large no.s on Loch Bee |
| Eider | *Somateria mollissima* | In bay |
| Common Scoter | *Melanitta nigra* | Couple near Gualan |
| Goldeneye | *Bucephala clangula* | Loch Bee |
| Red-breasted Merganser | *Mergus serrator* | In South Ford |

| Common Name | Scientific Name | Comments |
|---|---|---|
| Rock Dove | *Columba livia* | Along coast |
| Woodpigeon | *Columba palumbus* | Liniclate |
| Collared Dove | *Streptopelia decaocto* | Liniclate and Iochdar |
| Little Grebe | *Tachybaptus ruficollis* | Loch Bee |
| Great Crested Grebe | *Podiceps cristatus* | Loch Bee |
| Oystercatcher | *Haematopus ostralegus* | Large numbers |
| Lapwing | *Vanellus vanellus* | In fields and Loch Bee |
| Golden Plover | *Pluvialis apricaria* | In fields |
| Grey Plover | *Pluvialis squatarola* | On Gualan |
| Ringed Plover | *Charadrius hiaticula* | Along beaches |
| Curlew | *Numenius arquata* | South Ford |
| Black-tailed Godwit | *Limosa limosa* | South Ford |
| Turnstone | *Arenaria interpres* | South Ford |
| Knot | *Calidris canutus* | Gualan |
| Ruff | *Calidris pugnax* | Gualan |
| Curlew Sandpiper | *Calidris ferruginea* | Gualan |
| Sanderling | *Calidris alba* | Gualan |
| Dunlin | *Calidris alpina* | Gualan |
| Snipe | *Gallinago* | On farmland |
| Common Sandpiper | *Actitis hypoleucos* | Gualan |
| Redshank | *Tringa totanus* | South Ford and Loch Bee |
| Greenshank | *Tringa nebularia* | Gualan |
| Kittiwake | *Rissa tridactyla* | Over the sea |
| Black-headed Gull | *Chroicocephalus ridibundus* | Lots |
| Common Gull | *Larus canus* | Roosting Gualan |
| Greater Black-backed Gull | *Larus marinus* | South Ford |
| Herring Gull | *Larus argentatus* | Widespread |
| Lesser Black-backed Gull | *Larus fuscus* | Gualan |
| Great Skua | *Stercorarius skua* | One in South Ford |
| Guillemot | *Uria aalge* | One in South Ford |
| Great Northern Diver | *Gavia immer* | One near Causeway |
| Fulmar | *Fulmarus glacialis* | Over the sea near Gualan |
| Cormorant | *Phalacrocorax carbo* | Around South Ford |
| Shag | *Gulosus aristotelis* | Rocks near Gualan |

| Common Name | Scientific Name | Comments |
|---|---|---|
| Grey Heron | *Ardea cinerea* | South Ford |
| Golden eagle | *Aquila chrysaetos* | Near Loch Bee |
| Hen Harrier | *Circus cyaneus* | Liniclate machair |
| White-tailed Eagle | *Haliaeetus albicilla* | Near causeway |
| Buzzard | *Buteo* | Over machair |
| Short-eared Owl | *Asio flammeus* | Near Loch Bee/Iochdar |
| Kestrel | *Falco tinnunculus* | Hunting over the dunes |
| Hooded Crow | *Corvus cornix* | Near Creagorry |
| Raven | *Corvus corax* | Loch Bee |
| Skylark | *Alauda arvensis* | Widespread |
| Sand Martin | *Riparia* | 2 near Liniclate |
| Swallow | *Hirundo rustica* | Widespread around coast |
| House Martin | *Delichn urbicum* | Few near Liniclate |
| Sedge Warbler | *Acrocephalus schoenobaenus* | One near Iochdar |
| Wren | *Troglodytes* | Liniclate and Creagorry |
| Starling | *Sturnus vulgaris* | Widespread |
| Song Thrush | *Turdus philomelos* | Liniclate |
| Blackbird | *Turdus merula* | Iochdar |
| Stonechat | *Saxicola rubicola* | On machair and dunes |
| Wheatear | *Oenanthe* | Common along beaches |
| House Sparrow | *Passer domesticus* | Near Liniclate |
| Dunnock | *Prunella modularis* | In scrub near buildings |
| Citrine Wagtail | *Motacilla citreola* | On beach at Liniclate |
| Pied wagtail | *Motacilla alba* | Widespread around coasts |
| Meadow Pipit | *Anthus pratensis* | Feeding on machair and beaches |
| Rock Pipit | *Anthus petrosus* | Feeding on strandlines |
| Chaffinch | *Fringilla coelebs* | Liniclate |
| Greenfinch | *Chloris chloris* | Liniclate |
| Twite | *Linaria flavirostris* | Liniclate |
| Linnet | *Linaria cannabina* | On machair |
| Goldfinch | *Carduelis carduelis* | Around Liniclate |
| Reed Bunting | *Emberiza schoeniclus* | Iochdar |

## 4.2 Potential Impacts of the Proposed Scheme

### Designated sites

4.2.1 Table 4.3 below provides a screening assessment of designated sites in the study area – where screened in, there is the potential for impacts, and this potential would be considered as part of the assessment stage of EIA.

**Table 4.3: Screening of designated sites for potential impacts**

| Site | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Lùib Bhàn - Designated Seal Haul-Out site | Grey and Harbour Seals | Very High | Disturbance (e.g. visual, noise) Plant and machinery on Gualan will impact upon seals hauled out and passing during tidal flows. | ✓ | ✓ |
| West Coast of the Outer Hebrides SPA | Non-breeding birds – Great Northern Diver, Black-throated Diver and Slavonian Grebe | Medium | Disturbance (e.g. visual, noise) - Dependent on timing of works. Designated species using South Ford as feeding area. | ✓ | ✓ |
| | Breeding Birds – Red-throated Diver | Negligible | None | ✓ | ✓ |
| | Passage Birds – Eider, Long-tailed Duck and Red-breasted Merganser | Medium | Disturbance (e.g. visual, noise) - Dependent on timing of works, these species will use South Ford as a feeding area | ✓ | ✓ |
| South Uist Machair and Lochs SPA and Ramsar site. | Habitats – transitional habitats (acid moorland to calcareous coastal plain and freshwater to saltwater), machair, marshes, dunes and shores | Medium | Habitat loss / habitat community simplification<br>Physical Changes in physical regime/surface water flooding<br>Flow rates damage/disturbance<br>Changes in water chemistry/Turbidity.<br>Impacts on transitional habitats and to coastal processes within the SPA | ✓ | ✓ |
| | Breeding Birds – Corncrake, Little Tern and Dunlin | High | Disturbance (e.g. visual, noise) - Dependent on project timing. Little Tern breeding on Gualan and Corncrake breeding on South Uist close to Gualan, and potentially around Liniclate | ✓ | ✓ |

| Site | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| | Passage Birds – Ringed Plover, Redshank, Oystercatcher and Sanderling | High | Disturbance (e.g. visual, noise) - Dependent on project timing<br>South Ford provides feeding areas for passage birds. | ✓ | ✓ |
| Aird and Borve Benbecula SPA | Breeding Birds – Corncrake | High | Disturbance (e.g. visual, noise) - Dependent on project timing. Corncrake breeding on South Uist close to Gualan, and potentially around Liniclate | ✓ | ✓ |
| South Uist Machair SAC. | Habitats – Primary: Machairs, Oligotrophic waters, Oligotrophic to mesotrophic standing waters, hard oligotrophic waters and natural eutrophic lakes. Non-primary: Coastal Lagoons, drift lines, shifting dunes, fixed dunes, humid dune slacks | Medium | Habitat loss/Habitat/community simplification<br>Physical Changes in physical regime/surface water flooding<br>Flow rates damage/disturbance<br>Changes in water chemistry/Turbidity.<br>Potential for changes to salinity in Loch Bee. | ✓ | ✓ |
| | Species – Primary: Slender Naiad. Non-primary: Otter | High | Changes in water chemistry/Turbidity<br>Disturbance (e.g. visual, noise).<br>Slender Naiad is dependent on appropriate water chemistry and changes in Loch Bee could affect populations. Otter at risk from construction disturbance | ✓ | ✓ |
| Loch Bee (SSSI, SPA and RAMSAR site) | Machair | Negligible | None | ✘ | ✘ |
| | Saline Lagoon | High | Changes in water chemistry/Turbidity.<br>Potential for changes to Loch Bee inflow | ✓ | ✓ |
| | Breeding Bird assemblage | Medium | Disturbance (e.g. visual, noise).<br>Birds breeding on the SSSI are known to use the mudflats at the south east of Gualan. | ✓ | ✓ |
| | Mute Swan (non-breeding) | Low | Disturbance (e.g. visual, noise) | ✓ | ✓ |

| Site | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| | | | Disturbance to Mute Swan populations, due to project timing | | |
| | Brackish Water Cockle | High | Changes in water chemistry/Turbidity<br>Variations and changes to salinity in Loch Bee could cause population impacts. | ✓ | ✓ |

### Habitats

4.2.2 Table 4.4 below provides a screening assessment of habitats in the study area – where screened in, there is the potential for impacts, and this potential would be considered as part of the assessment stage of EIA.

**Table 4.4: Screening of habitat types for potential impacts**

| Habitat | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Dune systems | Active dune system processes - Liniclate | High | Physical damage/disturbance.<br>Change possible through dune improvement and protection in some areas may have knock on effect elsewhere causing loss of dunes or swamping of other habitats. | ✓ | ✓ |
| Saltmarsh | Saltmarsh areas at Liniclate and in lee of Gualan | High | Habitat loss/Habitat/community simplification.<br>Potential for some loss at Liniclate due to bund alignment and at Gualan through vehicle movements and re-deposition of sediments | ✓ | ✓ |
| Mudflats | Mudflats in lee of Gualan | Low | Changes in physical regime/surface water flooding.<br>Potential for some minor impacts at Gualan | ✘ | ✘ |
| Coastal (Saline) Lagoons | Loch Bee | Very High | Changes in water chemistry/Turbidity.<br>Any change to inflow rates at Loch Bee could result in habitat damage and/or loss | ✓ | ✓ |

### Species

4.2.3 Table 4.5 below provides a screening assessment of species in the study area – where screened in, there is the potential for impacts, and this potential would be considered as part of the assessment stage of EIA. This would be considered conjunction with the assessment of geomorphology and coastal processes, since the removal of sediment from the south of Gualan Island will allow for a greater ingress of saline water to Loch Bee (as shown in Figure 5-1), with the potential for the island to be disconnected from South Uist to result in a loss of species movement).

**Table 4.5: Screening of species for potential impacts**

| Species | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Seals | Grey and Harbour Seal haul outs and foraging | Very High | Disturbance (e.g. visual, air quality, noise).<br>Construction disturbance, particularly at northern source area, could directly affect hauled out seals or seals passing through the channel. | ✓ | ✓ |
| Otter | Foraging territory and resting sites | High | Habitat loss/Habitat/community simplification<br>Disturbance (e.g. visual, air quality, noise).<br>Otters known to be present on Liniclate dunes and on Gualan. Both habitat fragmentation (Liniclate) and direct construction disturbance could be significant. | ✓ | ✓ |
| Breeding Birds | Little Terns, Corncrake, waders, wildfowl, gulls and passerines | Very High | Habitat loss/Habitat/community simplification<br>Disturbance (e.g. visual, air quality, noise).<br>Any tern colonies on Gualan are likely to be directly affected by potential construction. | ✓ | ✓ |
| Non-breeding Birds | Wintering bird assemblage | High | Disturbance (e.g. visual, air quality, noise).<br>Wintering birds using South Ford for foraging or loafing could face direct disturbance during construction. | ✓ | ✓ |
| Passage Birds | Waders and wildfowl | High | Disturbance (e.g. visual, air quality, noise)<br>Passage birds using South Ford for foraging or loafing could face direct disturbance during construction. | ✓ | ✓ |
| Coastal Vegetation assemblage | Shingle, sand dune and saltmarsh | High | Physical damage/disturbance Habitat loss/Habitat/community simplification<br>Potential for direct impacts during bund construction and works along Gualan, | ✓ | ✓ |

| Species | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| | communities | | including access and parking for plant | | |
| Saline lagoon vegetation | Slender Naiad | Very High | Changes in water chemistry/Turbidity<br>Any change in flow rates into and out of Loch Bee at the south end of Gualan could have significant impacts | ✓ | ✓ |

## 4.3 Proposed Assessment Methodology

4.3.1 The following measures will be undertaken to ensure that the sensitive habitats and species identified within and adjacent to the proposed flood scheme are not impacted upon.

- Ecological Impact Appraisal, including assessment of Groundwater Abstraction and Groundwater Dependant Terrestrial Ecosystems (refer to paragraph 6.1.9)
- National Vegetation Classification mapping
- Habitat survey using methodologies set out by SNIFFER[31]
- Desk-based assessment of known data
- Seal surveys
- Breeding/wetland bird survey
- Habitats Regulations Assessment SAC, SPA and RAMSAR (and Countryside and Rights of Way Act)
- Noise and physical disturbance assessment

## 4.4 Assumptions and Limitations

4.4.1 This chapter is based upon the proposed scheme description (Section 1.1).

4.4.2 The scope of work for assessing biodiversity and nature conservation impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

4.4.3 The exact locations of construction compounds, traffic and transport routes, material and waste stores are currently not known but will be considered as appropriate in the ES.

4.4.4 To date, no biological record information has been made available and therefore additional impacts could be identified. It will be included in the future baseline considerations of the ES.

4.4.5 The ecological baseline surveys detail the conditions and species identified from available desk study information and initial site walkover relating to the proposed scheme and its vicinity. No information has been provided on the duration of the proposed scheme construction activities, phasing of works or plant requirements. Consideration for the impact of this will be included in future baseline and impact considerations of the ES.

[31] SNIFFER., 2009. WFD95 - A Functional Wetland Typology for Scotland

# 5 Geomorphology and Coastal Processes

## 5.1 Scoping Baseline

5.1.1 South Ford is formed as a wide intertidal area linking the Atlantic ocean and the Lower Minch sea channel; the wide-open water to the east of the Outer Hebrides separates the islands from mainland Scotland. Gualan Island is a barrier ridge extending 2.6 km across the western entrance of the South Ford, enclosing the large shallow inner estuary. Gualan Island is an important coastal defence dissipating wave energy from Atlantic swell waves and providing a protective function to the areas in lee of the island, this includes the constructed raised causeway (A865) that connects the island of Benbecula, at Creagorry, with South Uist, at Carnan. The 850 m causeway plays an important role in the hydrodynamic regime of South Ford. It bisects the bay and restricts tidal flow only allowing water to pass via a single 15 m concrete culvert. A site walkover in September 2022 indicated that the impounding effect of the causeway prolongs tidal inflow through the culvert into the eastern side Bàgh nam Faoileann. The impounded head of water on the southwestern side of the causeway meant tidal flow was still entering the bay via the culvert one hour after high water. The differing water level either side of the causeway was also visually apparent.

5.1.2 The morphology of South Ford and Gualan Island is known to be extremely variable, complex and highly dependent on prevailing conditions. The mobility of sediment in the basin and the high energy wave environment of Gualan Island have caused the general recession of the western facing frontages at Gualan Island and Liniclate between 2005 and 2018. To the north there are accretion patterns as sediment is transported along the frontage. In the centre of the island, overwash of the barrier has occurred and eroded sediments from the dune face and deposited in the lee. The southern channel that previously separated Gualan Island from the settlement at Baile Gharbhaidh has since been subject to increased sedimentation[11]. The significant accretion of sediment within the channel has increased in recent years. Site inspection undertaken in September 2022 identified the channel as being complete infilled and densely vegetated allowing the area to be actively grazed. The increased sedimentation and subsequent connectivity to the land means that Gualan is no longer an isolated island landform; it now presents as a land-tied island.

5.1.3 The accumulated sediment infilling the channel has cut-off the flow of tidal water at this location altering the hydrodynamic regime of water entering Loch Bee. The point of entry remains via the culverted inlets at Clachan although inflow is now limited to the channels in lee of Gualan Island. The impacts of sedimentation of the channel by natural processes on Loch Bee are as yet unknown. The salinity gradients within the Loch may have already been modified as a result of the channel infilling. The complex hydrology and connectivity/drainage to and from adjoining waterbodies in Loch Bee provide a range of habitats that promote biodiversity. This also reportedly makes the Loch highly resilient to changes in future sea level rise.[32] Changes in sedimentary processes affecting Loch Bee are also expected as a result of the channel infilling.

5.1.4 The extension of the spit at the north of Gualan Island has been progressive rather than a result of one event. Comparative assessments of aerial imagery suggest the spit has extended over 200 m between 1946 and 2005.[33] This has increasingly put pressure on the Liniclate dunes to the north as the channel flow between landform features is more

[32] Angus, S. (2017). Scottish saline lagoons: Impacts and challenges of climate change. *Estuarine, Coastal and Shelf Science*, *198*, 626-635.

[33] Dawson, A. G., Gómez, C., Ritchie, W., Batstone, C., Lawless, M., Rowan, J. S, and Muir, D. (2012). Barrier island geomorphology, hydrodynamic modelling, and historical shoreline changes: an example from South Uist and Benbecula, Scottish Outer Hebrides. *Journal of Coastal Research*, *28*(6), 1462-1476.

constrained, leading to erosion.[34] The landward rollback of the Liniclate dune system directly opposite Gualan Island has seen the dunes recede approximately 130 m between 1946 and 2005[33].The Liniclate sand dunes rise above the active beach front at the northern inlet opposite Gualan Island. They are elevated between 0.5 m to 2 m above the beach level at the eastern end becoming progressively higher in elevation moving west. The dunes are backed by dense dune vegetation (Marram). To the rear of the dunes is an area of amenity with a local school and popular hotel. To the east the habitat transitions to the low-lying grassy machair, overlaying the Lewisian Gneiss bedrock. The site walkover identified areas of humic-rich peat in lee of the eastern dune network.

5.1.5 The dune tops are densely vegetated with the exception of a few gaps in vegetation. The largest of which is a low point 100 m south of the wind turbine. The 10 m gap in the dunes appears to be the main point of access to the beach for members of the public and patrons of the nearby hotel. The pedestrian path leads directly to this point. An attempt has been made to infill this area with straw bales which appears to have had limited success. Wind-blown sands are accumulating in small pockets and are, in places, supporting vegetation. However, continued access use prevents the continuous accumulation of sand and subsequent habitat colonisation.

5.1.6 The fronts of the sand dunes are well-vegetated at the western end of the beach, which is more protected from the prevailing, west, north-westerly wave activity. Moving east the dune elevation decreases and proximity to the intertidal beach increases. This increased exposure to both wave and onshore wind results in removal of sand from the dune front leading to undermining and an increased dune slope gradient. At the eastern end of the dune system this is evident as a steep dune scarp. Beneath the scarp large clumps of detached dune grass are accumulating, perhaps providing a protective function to the dune behind. Despite the dissipative flat beach that fronts the dunes future increases in sea level are likely to accelerate erosion of the dune front, particularly at the eastern end where a visible tide line extends beyond the grass line.

5.1.7 At low water the beach fronting the Liniclate dunes reveals a variety of mixed substrates. Outcrops of the metamorphic gneiss of the Lewisian complex are evident with large, detached blocks scattering the lower foreshore. These range in size from fine boulders (>0.25 m) up to coarse boulders (>2.0 m). These are generally angular to sub-rounded in form. Where rocky scarps and sizable deposits of detached boulders are located these provide a dissipative function reducing incoming wave energy protecting the landward dunes. These outcrops have resulted in an accumulation of sand-sized sediment in lee of these exposures creating a series of small cuspate-like embayments.

5.1.8 An outcrop of bedrock located within the tidal inlet to the lagoon has trapped approximately six coarse-sized boulders (>2.0 m) which are imbricated against the outcrop orientated in the direction of inflowing water. The size of the boulders and the nature of imbrication suggests they have been entrained during a high-magnitude, low-frequency storm event.

5.1.9 Towards the western end of the beach, the low water mark is populated with a mix of coarse pebbles (>0.02 m) to cobbles (<0.25 m) overlaid on sand. These are generally sub-angular to rounded in form demonstrating a greater degree of entrainment and attrition. Moving landward the foreshore is extensively comprised of sand with particulates at the lower foreshore being coarser than those that form the dune system. This process of landward fining is indicative of coastal sand dunes with well-sorted, wind-blown sands forming the dune network.

[34] Guthrie. G., Lawton. P., and Davies. G., 2014. Gualan Island and South Ford; Coastal Review. Comharile nan Eilean Siar

5.1.10 Bedrock outcrops can also be seen on aerial imagery on the seaward side of Gualan Island. In these areas the outcrops alter the bathymetry of the seabed and ensure that incoming waves break when they interact with the rocky substrate. This was observed during the September site visit, although the timing of when waves break is contingent on tidal state (water level) and wave size. However, these outcrops will provide a dissipative function reducing wave energy to certain areas of Gualan Island.

5.1.11 Gualan Island is an arcuate barrier island that extends over 2.6 km from the northern tip to the southern base. It provides a valuable function, protecting communities and local infrastructure from the full force of Atlantic swell waves. The island displays three notable sections, the northern and southern sections present well established dune systems behind a mixed sand and shingle beach. To the rear of the backdune the relatively quiescent of the bay provides suitable conditions for saltmarsh habitat.

5.1.12 The northern section of the island is over 200 m wide, at its widest point narrowing to the north as it terminates at the tidal inlet. The dune elevation is greatest towards the northern end of the island, matching those across the inlet in Liniclate. The dune front is actively eroding with the removal of all beach vegetation other than that located on the dune crests. During the site walkover the outgoing tide had undermined the dune front and long stretches (tens of meters) of the seaward dunes were displaying sediment loss. The removal of sand revealed the underlying shingle matrix that supports the islands dune system.

5.1.13 The spit at the northern end of the island is known to be accumulating sediment which is transported via littoral drift along the west-facing beach. This accretion of sediment has seen the spit develop considerably in the last 150 years. The interpretation of aerial imagery and historic maps suggests the northern extent of Gualan has extended approximately 450 m over that relatively short timescale[33]. The crescent shaped spit has a base of well-rounded gravels that are overlain with fine sands, the low-lying dune crest is sparsely vegetated.

5.1.14 The southern section of the island has a similarly well-established dune system, although this is lower in elevation and narrower compared with the northern section. Maximum dune widths are approximately 130 m, narrowing to less than 30 m moving towards the central section of the island. The foreshore on the seaward side of the dunes is wide and low lying with extensive areas of vegetation at the rear. The sandy foreshore is also strewn with clumps of seaweed which further trap wind-blown sands. These factors have most likely contributed to reducing flow and trapping sediments resulting in the progressive infilling of the channel as previously mentioned.

5.1.15 Moving towards the central section of the island the dune crest lowers and the substrate becomes dominated by rounded shingle and cobbles. Suggesting the winnowing and removal of finer-grained sands. Dune width is reduced to a maximum of 10 m although this diminishes further in areas that are devoid of dune vegetation. Foredune vegetation is sparse and generally limited predominantly to the dune crests. Rudimentary methods have been employed to limit erosion with limited success, these include the placement of large cobbles in nets which are scattered along the foredune and dune crests of the central section. Alternative methods have been used on the backdune with wooden pallets being placed to trap sediment mobilised during periods of overwashing. The continuous erosion of this section reveals a bedded matrix of gravels that underpin the dunes.

5.1.16 The central section of Gualan Island was impacted by a severe storm that occurred in January 2005. The storm coincided with a particularly high spring tide and the resulting storm surge from an exceptionally low-pressure weather system. The combined conditions

reportedly resulted in a joint probability significantly higher than a 0.5% AP (1 in 200 year) event.[35]

5.1.17 The increased sea levels that resulted from the 2005 storm led to overwashing and breaching of the central section of Gualan Island. The current dune crest is now undulating with a series of breaches each intersected by marginal clumps of dune marram vegetation. These low points within the central section appear to be subject to periodic overwashing. Field evidence from the site walkover indicated that overwashing is not exclusive to extreme weather conditions. The presence of overwash fans on the leeward side of the island and clumps of seaweed were deposited in such a manner as to suggest recent overland flow. The continued removal of sediment from this area will compromise the protective function that the island provides to the community, infrastructure and habitats that the area supports.

5.1.18 Predictions of increased sea level and increased winter storminess suggest the central part of Gualan Island will be overtopped more frequently. Modelling breach scenarios of Gualan Island show increased wave heights at the east of South Ford beside the causeway under a breached Gualan scenario[36]. Gualan Island was previously identified as nationally important for its coastal geomorphology. Gualan Island is a dynamic landform complex that is evolving, it represents the later stage of the machair landscape succession and has been identified as a key indicator to understanding future sea-level changes.

5.1.19 A preliminary desk-based study indicates that the site is adjacent to several receptors. Likely coastal receptors located within 3 km of the site midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008) have been listed within Table 5.1 below.

**Table 5.1: Sensitive coastal receptors within 3km of the site boundary**

| Receptor | Description | Distance from Site midpoint (km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| Geological Conservation Review sites | Ardivachar to Stoneybridge, South Uist (not designated SSSI) | <0.1 | Medium |
| | Borve (not designated SSSI) | <0.4 | Medium |
| Site of Special Scientific Interest | Loch Bee (SSSI, SPA and RAMSAR site) - the largest Saline lagoon in the Western Isles and is connected with the sea at its north-west and south-east extremities. | <0.5 | Medium |

[35] Richards, L. A. R., and Phipps, P. J. (2007). Managing the impact of climate change on vulnerable areas: A case study of the Western Isles, UK. *Landslides and Climate Change: Challenges and Solutions*, 435-442.

[36] Muir. D., and Tracey, J., (2012)., South Ford Hydrodynamics Study Report. Comharile nan Elilean Siar

## 5.2 Potential Impacts of the Proposed Scheme

5.2.1 The removal of inter-tidal sand from South Ford has the potential to alter in-flow and out-flow rates at the inlets to Loch Bee (SSSI, SPA and RAMSAR site). This could result in changes to salinity levels affecting the saline lagoon feature.

5.2.2 Sand extraction immediately adjacent to the Ardivachar to Stoneybridge GCR site (as shown in Figure 5-1 below) could alter tidal flow between the Balgarva shore and Gualan Island.

5.2.3 Long-term consequences of sediment removal to create the flood bund and maintenance of beach replenishment at Gualan Island may impact the local geomorphology.

5.2.4 Removal of accreted sediment within the bay will alter the hydrodynamic regime altering rates of sediment deposition and erosion within the area.

5.2.5 Recharge activities represent a potential smothering hazard for habitats and the species that they support. Potential impact to designation through geomorphology and coastal processes change.

5.2.6 Construction impacts relating to the operation of heavy machinery operating in and/or around sensitive sites may cause damage, impacting on morphology of dunes, beach and machair. Construction could lead to the more permanent connection of the island which would open the island species to increased risk of predation. At the design stage consideration would be required to avoid the creation of permanent access to the island.

5.2.7 Construction impacts on the wider environment via the possible increased mobilisation of sediments into adjacent waterbodies.

5.2.8 Figure 5-1 below provides an illustration of the potential impacts of the proposed scheme to coastal receptors within the study area.

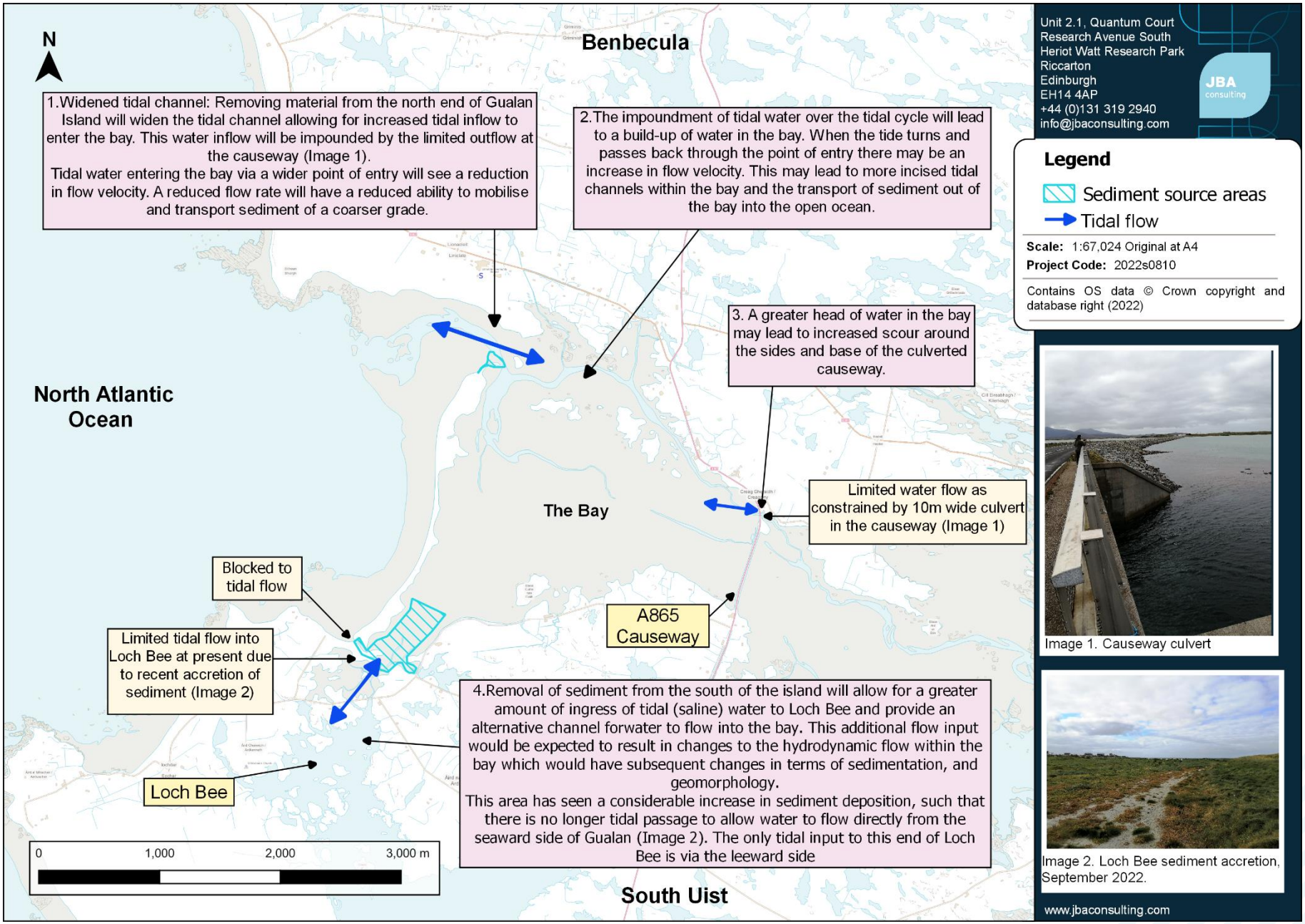


**Figure 5-1: Potential impacts to coastal receptors as part of proposed scheme.**

**Table 5.2: Screening of sensitive receptors for potential impacts**

| Environmental Constraint | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Loch Bee (SSSI, SPA and RAMSAR site) | Saline Lagoon | Medium | Alteration in salinity<br>Changes in sedimentation rates<br>Changes in hydrological regime | ✓ | ✓ (?) |
| GCR designations | Machair habitat | High | Loss of machair habitat<br>Loss of sand dune habitat | ✓ | ✓ (?) |
| Geomorphology of Gualan Island-development of land-tied island | Supported species and habitat | High | Habitat loss/Habitat/community simplification<br>Physical Changes in physical regime/surface water flooding | ✓ | ✓ (?) |

## 5.3 Proposed Assessment Methodology

5.3.1 The ES will present an assessment of the potential short, and long-term impacts of beach recharge on Gualan Island and associated sensitive receptors (designations, habitat etc.). This, and any additional impacts relating to the scheme will be addressed by drawing upon existing datasets, e.g., modelled data, published reports and qualitative interpretation. Appropriate mitigation measures will be proposed to reduce the risk to the SSSI and GCR designated features.

5.3.2 An assessment will be conducted which considers:

- effects of proposed sediment excavations on flood risk and on changes in hydrology and sediment dynamics within the area of the scheme
- the long-term viability of the scheme, considering the potential for further failure and/or fragmentation of the Gualan Island ridge
- the impacts on sedimentation and changes in water chemistry within Loch Bee
- topographic monitoring of Gualan Island and the Liniclate dunes to determine any change in topography as a result of the scheme
- the impacts of construction relating to the operation of heavy machinery operating in and/or around sensitive sites

## 5.4 Assumptions and Limitations

5.4.1 This chapter is based upon the Proposed Scheme description (Section 1.1).

**5.4.2** The scope of work for assessing geomorphology and coastal processes impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

# 6 Water Environment and Flood Risk

## 6.1 Scoping Baseline

6.1.1 Environmental constraints have been identified within up to 2 km from the midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008).

### Hydrology

6.1.2 The proposed development is situated between the Benbecula coastal catchment and South Uist coastal catchment. Benbecula coastal catchment has a catchment area of 75.7 square kilometres. South Uist coastal catchment has a catchment area of 307.7 square kilometres. The catchment is entirely rural and predominantly consists of Machair, low-lying coastal dune areas and agricultural grazing systems. There are several lochs and water systems within the catchment area, most notably Lock Bee located within the South Uist costal catchment, south of Gualan Island.

### Waterbody classification under the Water Framework Directive

6.1.3 A summary of the Water Framework Directive (WFD) (Directive 2000/60/EC) waterbodies present within 2km of the site boundary is provided in Table 6.1. No reasons for not achieving good status were detailed.

**Table 6.1: WFD water body classifications within 2km of the site boundary**

| WFD water body | Condition | Distance from Site Boundary (km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| Sound of Monach is a coastal water body (ID: 200132) | High | Within site boundary | High |
| Bagh nam Faoilean is a coastal water body (ID: 200478) | High | Within site boundary | High |
| Loch Bee. South Uist is a coastal water body (ID: 200418) | Good | <0.5 | Medium |
| Benbecula Main Drain is a river (ID: 20818) | High | <2km | High |

### Geology

6.1.4 The British Geological Survey (BGS) online mapping[37] indicates that the majority of the site area is underlain by bedrock deposits of gneiss from the Lewisian Complex. The coastline of Benbecula coastal and South Uist are underlain by the Lewisin Complex Metasedimentary rock and Scourian Gneiss ortho-amphibolite.

6.1.5 Superficial deposits have not been mapped within the site area. Bedrock outside the site area is overlain by peat, till, or brown sand superficial deposits and cover the majority of the catchment area.

6.1.6 There are no BGS borehole records found within 2km of the site boundary.

[37] British Geological Survey, 2020. GeoIndex Onshore. Available at https://mapapps.bgs.ac.uk/geologyofbritain/home.html [Accessed: October 2022]

### Hydrogeology

*6.1.7* The geological strata have been assessed for their hydrogeological properties using the BGS's geological maps, Scotland's environmental map web portal and local BGS borehole records. The bedrock is classified by the Scottish Environment Protection Agency (SEPA) as a 2C aquifer, meaning a low productivity aquifer with small amounts of groundwater in the near surface weathered zone and within secondary fractures. Groundwater flow is likely to be all through fractures and other discontinuities.

*6.1.8* The geological units within the site are included within the groundwater body defined by SEPA as the Benbecula and South Uist groundwater bodies. Both are classified under the WFD as having a 'good' overall status.

*6.1.9* The sand dunes present within the study have the potential to support dune slacks communities which are Groundwater Dependant Terrestrial Ecosystems (GWDTE). GWDTE are a type of wetland specifically protected under the Water Framework Directive.

**Table 6.2: Groundwater body and aquifer classifications for the site area**

| Groundwater body | Groundwater classification | Aquifer classification | Receptor Sensitivity Criteria |
|---|---|---|---|
| Benbecula | Good | Class 2C | Medium |
| South Uist | Good | Class 2C | Medium |

### Flood Risk

6.1.10 The site of the proposed development at Gualan Island and Liniclate is within the indicative limits of high likelihood (10% per year) coastal flooding shown upon the SEPA flood maps.

6.1.11 SEPA identifies Potentially Vulnerable Areas identifying areas where flood risk is considered nationally significant. These are the areas with the greatest current or future flood risk. The scheme is located within two Potentially Vulnerable Areas Benbecula (02/06), and 'South Uist - Lochs Bee and Druidibeag' (02/07)[38].

6.1.12 Benbecula is designated as a potentially vulnerable area due to coastal and surface water flood risk, particularly in Balivanich and around Liniclate. Flooding on Benbecula is predominantly coastal, either directly due to high water levels and wave overtopping or indirectly by impeding the complex pattern of land drainage[37]. There are approximately 110 residential properties and 10 non-residential properties at risk of flooding. The Annual Average Damages are estimated to be £560,000 with the majority caused by coastal flooding. Sea level rise, caused by climate change is expected to significantly increase flood risk. Wave overtopping of the North and South Ford causeways can cut off vital transport links (A865) between the islands[39].

6.1.13 South Uist is designated as a potentially vulnerable area due to the risk of coastal and surface water flooding. The whole of South Uist was designated due to the complex interaction between sea level, groundwater levels and the drainage systems. Coastal and

[38] SEPA., 2021. Flood Risk Management Plan Outer Hebrides Local Plan District. [Online]. Available at: https://www2.sepa.org.uk/frmplans/documents/lpd2-outer-hebrides-frmp-2021.pdf [Accessed August 2022]

[39] SEPA., 2021. Benbecula (Potentially Vulnerable Area 02/06). [Online]. Available at: https://www2.sepa.org.uk/frmstrategies/pdf/pva/PVA_02_06_Full.pdf [Accessed August 2022]

river flooding in the area are concentrated in low lying areas of the lochs, particularly Loch Bee. In the north, the barrier system at Gualan Island is vulnerable to breaching leading to a build-up of water in the South Ford area. The dune systems on the west coast are vulnerable to erosion and breaching leading to flooding on the machair[37]. There are approximately 30 residential properties and fewer than 10 non-residential properties at risk of flooding. The Annual Average Damages are estimated to be £240,000, with the majority caused by coastal flooding[40] .

6.1.14 A hydrodynamic modelling study was undertaken by JBA in March 2010[41]. It was determined that there are three main features of South Ford which influence the local flood risk to coastal storm surge events, these were, Gualan Island, the causeway and changes to South Fords coastal geomorphology. The modelling study investigated how these factors may change after 20 years of geomorphological change, findings of the study are summarised as follows.

6.1.15 The hydrodynamic model indicates that the large build-up of water that occurred within South Ford during the storm of January 2005 would have been significantly reduced if the A865 Causeway was not present. This was because without the causeway the storm surge from the Atlantic would have been allowed to flow through the channel between Benbecula and South Uist largely unopposed.

6.1.16 When the model was run with tidal forcing the model simulations identified that the speed of the tidal current from the Atlantic is higher when the A865 causeway is present. This is because when the causeway is absent substantial water can flow into the South Ford from the Lower Minch, subsequently leading to a smaller hydraulic gradient between the water levels in the South Ford and the Atlantic Ocean during the rising tide. Therefore, it was identified that the presence of the causeway has led to an increased rate of erosion to the north of Gualan Island, leading to the significant erosion around Liniclate between 1984 to 2005.

6.1.17 A high-resolution wave model simulation was run to identify the different scenarios of Gualan Island erosion on hydrodynamic behaviour. It was identified that the waves that propagate through different island breaches experience significant energy losses through depth-limited wave breaking. During moderate erosion scenarios waves along the southern shore of South Ford can reach 0.3m in height.

6.1.18 Model simulations of future scenarios of South Ford geomorphology demonstrate that there was no apparent difference in local flood risk from the 2005 event conditions. Sea level rise predicted over 20 years is small and would result in little increase to the flood risk. However, increases in flood risk were predicted for mean sea level rises by 2095, there would be more frequent low severity storm event leading to a similar degree of flooding experienced during the 2005 event (assuming no change in South Ford geomorphology.

6.1.19 Model simulations demonstrated that significant changes could occur to the tidal flows within South Ford in the future, increased elevations in the middle of South Ford leads to more water being forces through the bay, increasing the current tidal speed over the 2005 values. If a permanent breach of Gualan Island developed tidal currents would have sufficient speed resulting in further erosion and widening of the breach.

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[40] SEPA., 2021. Lochs Bi and Druidibeag (Potentially Vulnerable Area 02/07). [Online]. Available at: https://www2.sepa.org.uk/frmstrategies/pdf/pva/PVA_02_07_Full.pdf [Accessed August 2022]

[41] Batstone, C. and Lawless, M., 2010. Hydrodynamic and Sediment Transport Modelling Study of the South Ford. JBA Consulting.

6.1.20 Modelling scenarios were carried out using the South Ford hydrodynamic model[42]. The scenarios simulated 2005 storm event but varied in terms of the geometry of the South Ford A865 causeway. The simulation indicated that increasing the size of the opening within the causeway leads to a reduction in the water that builds up on to the west of the A865 causeway during the simulated storm event. It was identified that a deep opening of 250m length mead to a reduction in maximum sea-levels of 0.50-0.81cm and a significant alleviation of flooding.

## 6.2 Potential Impacts of the Proposed Scheme

6.2.1 There is potential for operation of heavy vehicles operating in a sensitive environment to cause damage and pollution. Potential environmental impacts could arise from contamination released during construction, or harm caused by sediment movement. Sensitive receptors include SAC, RAMSAR, SPA and SSSI designations, coastal waters and WFD waterbodies.

6.2.2 Pollution during construction due to increased generation and release of sediments and suspended solids, and increased risk of accidental spillage of pollutants such as oil, fuel and concrete associated with construction activities and site storage requirements

6.2.3 Pollution of groundwater and aquifers as a result of construction activities, such as excavation of sediment creating preferential pathways for contamination transmission to groundwaters, and seepage of spillages through ground profiles.

6.2.4 The scheme will improve the level of flood protection for communities within the South Ford area.

6.2.5 The temporary access for machines could consolidate access to the island.

**Table 6.3: Screening of sensitive receptors for potential impacts**

| Environmental Constraint | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Water quality | SAC, SPA, RAMSAR and SSSI designations | High | Contamination and reduced water quality caused by spillages/leaks from machinery operation or equipment refuelling | ✖ | ✖ |
| | | | Sediment disturbance and increased turbidity during recharge activities. | ✓ | ✓ (?) |
| Flood Risk | Communities surrounding site | low | Change in level of flood protection | ✓ | ✓ |
| Water Environment | Coastal WFD waterbodies | Medium | Sediment disturbance and increased turbidity during recharge | ✓ | ✓ (?) |

[42] Batstone, C., 2010. Hydrodynamic and Sediment Transport Modelling Study of the South Ford- Appendix G. JBA Consulting.

| Environmental Constraint | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| | | | activities | | |
| | Underlying bedrock aquifer (2c) | Very low | Contamination and reduced groundwater quality caused by spillages/leaks from machinery operation or equipment refuelling | ✓ | ✓ (?) |
| | Due Slacks communities | Medium | GWDTE. Works may damage or disturb communities if present. | ✓ | ✓ |

6.2.6 The construction contractor would be expected to apply pollution prevention techniques on site based on industry standard pollution control measures and best practice. It is considered that pollution prevention would be sufficiently mitigated through such measures, which would be detailed in an Environmental Management Plan, and is therefore scoped out of further EIA.

## 6.3 Proposed Assessment Methodology

6.3.1 The assessment will involve the following key stages:

- Baseline conditions of the site and surrounding area will be reviewed by desk-based data gathering, using up to date publicly accessible information, as well as reports and investigations previously conducted on the site of the proposed development. This allows identification of sensitive receptors in both the surface water and groundwater environment, which will need consideration during the design of the site.
- The impacts of the proposed development to the baseline conditions for flood extents and risk presented to people and landscape, and their significance, must be determined.
- Consideration would be given in the ES to the potential long term indirect impact of beach recharge. Consideration would be given to both the long and short term impacts, and appropriate mitigation measures would be proposed to reduce the risk to the statutory designated features.
- Identification of measures to avoid, minimise or mitigation predicted impacts upon the water environment.

## 6.4 Assumptions and Limitations

6.4.1 This chapter is based upon the proposed scheme description (Chapter 1).

6.4.2 The scope of work for assessing water environment impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

# 7 Historic Environment

## 7.1 Scoping Baseline

7.1.1 A preliminary desk-based study indicates that the site is located within and adjacent to several listed heritage assets. Likely heritage receptors located within 3 km of the site midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008) have been listed Table 7.1 below.

**Table 7.1: Heritage assets identified within 3 km of the site boundary**

| Asset within 2 km of the site | Designation description | Distance from Site midpoint (km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| Listed buildings | Category B[43]: Cuir na Bhoir, 51 Baile Gharbhaidh, Iochdar, Uibhist a Deas | <0.1 | Low |
| | Category B: Corrodale Cottage, 96 Bualadubh, Iochdar, Uibhist a Deas | <2.0 | Low |
| Scheduled monuments | Teampull Bhuirgh chapel and settlement | <2.0 | Medium |
| | Secular: castle | <2.0 | Medium |
| Canmore points maritime | One Maritime causality site | At site | Low |
| | One Maritime casualty sites | <2.0 | Low |
| Canmore points Terrestrial | Over 30 terrestrial points locates along coastline | <1.0 | Low |
| Unscheduled archaeology | Unknown buried archaeological assets | At site | Low |

7.1.2 There is little recorded evidence of buried archaeological features has been identified within the study area. However, both the wind derived deposits that make up the machair dunes of Gualan Island and the sedimentary deposits from within the marine zone, have the potential to contain unknown buried archaeological features of either terrestrial or maritime origin. There remains significant potential for archaeological remains of terrestrial or marine origin within the study area.

## 7.2 Potential Impacts of the Proposed Scheme

7.2.1 There is potential for the Scheme to directly impact previously unrecorded archaeological remains within the area of works. Work to implement the Gualan Island beach recharge scheme has the potential to disturb unknown buried archaeological assets through the removal of sediment from Gualan source north and south which may cause a moderate or minor impact to the archaeological receptors.

7.2.2 The proposed Liniclate flood bund and Gualan Island beach recharge scheme is likely to have a negligible impact Scheduled Monuments due to the designations being located approximately 2 km away from proposed scheme. At this distance, the potential for significant impact is considered unlikely and it is proposed that Scheduled monuments are scoped out of the Historic Environment Chapter.

[43] Historic Environment Scotland., 2022. What is listing- Categories of listing., [Online]. Available at https://www.historicenvironment.scot/advice-and-support/listing-scheduling-and-designations/listed-buildings/what-is-listing/#categories-of-listing_tab [Accessed November 2022]

## 7.3 Proposed Assessment Methodology

7.3.1 The assessment methodology is based on the Principles for Cultural Heritage Impact Assessment (IEMA/CIfA/IHBC, 2021). The basis for assessing impacts on the historic environment is an understanding of the heritage assets that might be affected by a proposal. Planning policy and guidance emphasise the need to understand the cultural significance of heritage assets, including their setting, reflecting that the primary purpose is to preserve significance rather than no change. The process of gaining this understanding can be broken down into three distinct stages.

7.3.2 The first stage is Description: research leading to a preliminary factual statement that establishes the location, nature and setting of the asset.

7.3.3 The second is Cultural significance: analysis of what we value about the asset and the contribution made by its setting, leading to a statement of cultural significance. Cultural significance is not scaled but can be expressed in terms of four key 'heritage values' as outlined in Scottish historic environment policy:

- Evidential value: the potential of a place to yield evidence about past human activity. Sites of evidential value will include those which have archaeological interest.
- Historical value: the ways in which past people, events and aspects of life can be connected through a place to the present. Heritage assets can either illustrate, or be associated with, past people and events.
- Aesthetic value: the ways in which people draw sensory and intellectual stimulation from a place. Aesthetic value can arise from conscious design or fortuitously from the way the heritage asset has evolved.
- Communal value: the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

7.3.4 The third stage is Importance: a conclusion regarding the level of protection or consideration that the asset merits in planning policy and cultural heritage legislation. A judgement on importance is scaled and can therefore be expressed in terms of the criteria shown in Table 7.2.

**Table 7.2: Importance criteria for cultural heritage assets**

| Importance | Examples |
|---|---|
| Very High | • World Heritage Sites<br>• Places of international importance due to their 'outstanding universal value'. |
| High | • Scheduled Monuments<br>• Category A or B Listed Buildings<br>• Battlefields<br>• Gardens and Designed Landscapes<br>• Historic Marine Protected Areas<br>• Places or structures of national importance<br>• Non-designated heritage assets of equivalent national importance or potential to contribute significantly to national research objectives |
| Medium | • Category C Listed Buildings<br>• Conservation Areas<br>• Non-designated assets of regional or high local importance with potential to contribute significantly to regional and local research objectives. This includes assets which have |

| Importance | Examples |
|---|---|
| | particular regional associations or may have important associations at a local level (e.g. they have significance to local population or embody something of the special identity of a locality). |
| Low | • Locally Listed Buildings<br>• Non-designated assets which are relatively poorly preserved or have limited importance at a local level and low potential to add to local and regional research objectives. |
| Negligible | • Assets that have very limited or no archaeological, historical or cultural importance. |
| Uncertain | • Sites where there is evidence that a heritage asset may exist, but where there is insufficient information to determine its nature, extent and degree of survival given current knowledge. |

7.3.5 Having understood cultural significance, the next step is to understand the proposed change(s) and the impact they would have on cultural significance. The process of evaluating the consequences of change can be usefully broken down into three distinct analytical stages.

7.3.6 The first analytical stage is Change: a factual statement of how a proposal would change an asset or its setting including physical, visual appearance, scale, nature and duration;

7.3.7 The second is Impact: an assessment of the degree to which any changes would increase or decrease the cultural significance of an asset. Impact is scaled and the magnitude of impact is a reflection of the extent to which the cultural significance of an asset is changed by a proposal.

7.3.8 The third is Effect: a conclusion regarding whether an impact matters or not, reflecting the importance of the affected heritage asset. The effect is the measure that brings together the magnitude of the impact and the heritage asset's importance. This a critical stage of the assessment process as this determines the weight that should be given to the matter in either influencing the design of the proposal or ultimately in the test as to whether the proposal will be acceptable and permitted. The effect can be articulated through the use of a matrix which brings together the importance of an asset and the magnitude of impact on the asset's significance. Where there are two options for a level of effect it is a matter of professional judgement which should be articulated in the text description as to the level of effect appropriate:

7.3.9 An Archaeological Desk-Based Assessment will be carried out, to determine all likely significant effects arising from the Scheme on the historic environment in terms of archaeological (i.e. buried) assets. The assessment process will consist of the following key elements:

- Identification of Archaeological Receptors and an Assessment of their Importance
- Assessment of Magnitude of Impact
- Overall Assessment of the Significance of Impact on the Archaeological assets

## 7.4 Assumptions and Limitations

7.4.1 This chapter is based upon the Proposed Scheme description (Chapter 1).

7.4.2 The scope of work for assessing historic environment impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

7.4.3 To date, no Historic Environment Records information has been made available and therefore additional impacts could be identified. It will be included in the future baseline considerations of the ES.

# 8 Landscape and visual

## 8.1 Scoping Baseline

8.1.1 The Gualan beach recharge site is located within Landscape Character Type 321 Machair[44]. The South Ford shoreline has a distinctive low, open and exposed landscape which has a strong visual and physical association to the sea. Open views from the linear roads are characterised by the sweeping curves of coastal beaches, and the low headlands, backed by dune systems, which protect expansive machair grasslands[44]. The Liniclate bund site is located within Landscape Character Type 318 Linear Crofting45 and displays strong linear rectangular field patterns on irregular landform of sweeping concave slopes with rocky knolls sloping down to the shoreline. Land surrounding Liniclate is characterised by landscape dominated by semi-improved grassland fields, limited tree cover and dispersed settlements along access roads or drives [45].

8.1.2 The area surrounding the proposed Liniclate flood bund was surveyed during an initial site walkover undertaken in September 2022, carried out by the ecology team who shared photographs of the site. It was identified that man-made bunds are present in the area surrounding Liniclate School and the Dark Island Hotel which appear to display established improved grassland. A single large scale wind turbine is located within the ground of the Dark Island Hotel.

8.1.3 A preliminary desk-based study has identified no statutory landscape designations within the site or the immediate surrounding area with the closest National Scenic Area (NSA), South Uist Machair NSA, located approximately 10 km to the south of the inlet and South Lewis, Harris and North Uist NSA located approximately 15 m to the north of the inlet.

8.1.4 Likely Landscape and Visual receptors located within 2 km of the site midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008) have been listed within Table 8.1 below.

**Table 8.1: Likely landscape and visual receptors identified within 2 km of the site**

| Receptor | Description | Distance from Site midpoint (km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| Landscape Character Types (LCTs) | Machair | Within site boundary | Medium |
| | Linear Crofting | Within site boundary | Medium |
| National Scenic Areas | South Uist | >2km | High |
| | South Lewis, Harris and North Uist | >2km | High |
| Landform | Undulating Gualan Island and sand dune landform | Within site boundary | Medium |
| Landcover | Sand dune vegetation and typical machair grassland habitat | Within site boundary | Medium |
| Openness | Open and tranquil characteristic of the coastal landscape | Within site boundary | High |

[44] Nature Scotland., 2019. SNH National Landscape Character Assessment LCT 321 MACHAIR. [Online]. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20321%20-%20Machair%20-%20final%20pdf.pdf [Accessed August 2022]

[45]Nature Scotland., 2019. SNH National Landscape Character Assessment LCT 318 LINEAR CROFTING. [Online]. Available at: https://www.nature.scot/sites/default/files/LCA/LCT%20318%20-%20Linear%20Crofting%20-%20final%20pdf.pdf [Accessed August 2022]

| Receptor | Description | Distance from Site midpoint (km) | Receptor Sensitivity Criteria |
|---|---|---|---|
| Residential receptors | Scattered residential properties along the local road network surrounding the South Ford inlet. | 350m at nearest point | High |
| Users of the Public Right of Way | Hebridean Way, other routes and paths identified within the Study Area | 200m at nearest point | High |
| User of the local road network | A865, B892, local road to Baile Gharbhaidh | 250m at nearest point | Medium |

## 8.2 Potential Impacts of the Proposed Scheme

8.2.1 Due to the limited height and extent of the Liniclate bund, and the limited number of sensitive landscape and visual receptors in the immediate area surrounding the proposed site, impacts are likely to be predominantly during the construction phase of the project, with only limited residual effects on completion, concerned mainly with close-range visual receptors. It is expected that these impacts could be fully mitigated in the long term. Due to the height and scale of the beach recharge proposed at Gualan Island, visual effects are likely to be wider in their extent, and predominantly during the construction phase of the project. However, they are still likely to be contained within the existing visual envelope of the South Ford inlet itself, due to the relatively contained nature of the site. A study area will be suggested on completion of a Zone of Theoretical Visibility (ZTV), which will help to guide the likely area over which the proposals will have an influence.

**Table 8.2 : Screening of sensitive receptors for potential impacts**

| Environmental Constraint | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for Operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Landscape Receptors | Landscape Character Types: Machair and Linear Crofting LCTs | Medium | Permanent effect on landscape character resulting from implementation of flood bund | ✓ | ✓ |
| | | | Temporary effects on landscape character resulting from impact upon setting and perceptual quality as a result of construction activity | ✓ | ✓ |
| | Landform | Medium | Temporary effects on landform as a result of construction activity | ✓ | × |
| | | | Permanent effect on landform resulting from implementation of flood bund and beach recharge elements | × | ✓ |
| | Landcover | Medium | Temporary effects upon landcover as a result of | ✓ | × |

| Environmental Constraint | Receptor | Sensitivity | Impact | Screened in for construction | Screened in for Operation |
|---|---|---|---|---|---|
| | | | construction activity | | |
| | | | Permanent effect on landcover resulting from loss or change in habitat | × | ✓ |
| | Perceptual qualities: Tranquillity | High | Temporary effects upon tranquillity as a result of construction activity | ✓ | × |
| Visual Receptors | Residential properties | High | Temporary visual effects as a result of construction activities at close range. Permanent introduction of new elements into the view. | ✓ | ✓ |
| | Users of Public Rights of Way, paths, and other routes | High | Temporary visual effects as a result of construction activities at close range. Permanent introduction of new elements into the view. | ✓ | ✓ |
| | User of the local road network | Medium | Temporary visual effects as a result of construction activities at close range. Permanent introduction of new elements into the view. | ✓ | ✓ |

## 8.3 Proposed Assessment Methodology

8.3.1 A landscape and visual impact assessment will be carried out, appropriate to the nature and scale of the proposed development and in line with the above suggested scope. The assessment of landscape and visual effects will be prepared with reference to the following:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd edition (GLVIA3). The Landscape Institute and the Institute of Environmental Management and Assessment, 2013.
- *An Approach to Landscape Character Assessment*. Christine Tudor, Natural England, October 2014.
- *Visual Representation of Wind Farms.* Scottish Natural Heritage, December 2014.
- Landscape Institute Technical Guidance Note TGN 06/19 Visual Representation of development proposals, 2019.

8.3.2 The landscape and visual impact assessment will determine the effects of the proposal on the landscape and visual resource of the area. The assessment will involve the following key stages:

- Desk-based research to determine the scope of the study and include review of the proposed sites, boundaries, adjacent roads/properties/rights of way and key viewpoints;
- Desk-based research to establish the landscape and visual baseline and identify potential receptor, including production of Zone of Theoretical Visibility (ZTV) to guide the likely study area and potential viewpoints to be considered;

- Site visit and baseline appraisal, to verify desk top research, including site photography, in order to review the proposed site and surrounding landscape character, visual amenity and identify key viewpoints, in line with current industry guidelines, and to identify how the landscape may change;
- Preparation of Landscape and Visual Impact Assessment (LVIA) and production of the LVIA Chapter to form part of the ES, to include:
  - National and Local Policy review;
  - Baseline review of National and Local Landscape Character Assessment and any assessments prepared as part of the evidence base of the Local Plan;
  - Assessment of landscape effects with reference to above, including key elements or landscape features within the site;
  - Assessment of visual effects (based on indicative design with consideration of any proposed mitigation) on rights of way, roads, and residential receptors; and
  - Proposed mitigation and enhancements measures.

## 8.4 Assumptions and Limitations

8.4.1 This chapter is based upon the Proposed Scheme description (Chapter 1).

8.4.2 The scope of work for assessing landscape and visual impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

**8.4.3** The exact locations of construction compounds, traffic and transport routes, material and waste stores are currently not known but will be considered as appropriate in the ES.

# 9 Population and Human Health

## 9.1 Scoping Baseline

9.1.1 A preliminary desk-based study indicates that the site is in proximity to a number of potential community and business receptors, in addition to land in agricultural use. Likely population and human health receptors located within 2 km of the site midpoint between Liniclate village and the southern extent Gualan Island (NGR NF 77592 48008) have been listed within Table 9.1 below.

**Table 9.1: Receptors identified within 2 km of the site**

| Receptor | Description | Distance from site midpoint (km) | Receptor Sensitivity |
|---|---|---|---|
| Local residents | Liniclate and Creagorry residents on Isle of Benbecula<br>Bualadubh residents on Isle of South Uist | <0.1 | Low |
| Local businesses | Uist Adventure<br>Scottish Celtic Jewellery | <0.1 | Low |
| | Anglers Retreat Bed and Breakfast<br>Hebridean Crafts | <0.2 | Low |
| | Lovats Supermarket - Carnan, South Uist<br>Jakki'z Hairdressing<br>Co-op Food – Creagorry<br>Creagorry hotel | <0.5 | Low |
| Highways | A865 Main connection across islands<br>Bualadubh road connecting to island | <0.5 | Medium |
| Recreation and amenity | The Hebridean Way (Stage 4) Howmore to Liniclate walking and cycling route crosses the A865 Causeway and follows the B892 through Liniclate. | <1.0 | Low |
| | St Michael the Archangel's Catholic Church | <0.9 | Low |
| | Iochdar School | <0.5 | Low |

9.1.2 In addition, as discussed in Section 1.3, it is estimated that over 70 people within the vicinity of South Ford are at risk from flooding from a 0.5% AP (1 in 200 year) event, and the main road through the islands, the A865, is also at risk.

## 9.2 Potential Impacts of the Proposed Scheme

9.2.1 The scheme will be passive during operation, and through flood protection will largely benefit the community and businesses. However, construction / implementation could have some temporary adverse impacts on people and businesses. Table 9.2 below identifies the impacts that will be considered in the next stage of EIA.

**Table 9.2: Screening of sensitive receptors for potential impacts**

| Receptor | Impact type | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | | | |
| Local residents and businesses | Noise and vibration receptor | Low | Temporary effects upon noise and vibration receptors through construction related increases in noise levels from works and increased traffic volumes. | ✓ | ✘ |
| | Air Quality | Low | Temporary effects upon air quality as a result of construction related increases traffic volumes. | ✓ | ✘ |
| | Visual receptor | Low | Temporary effects upon in relation to quality of surroundings and sense of place as a result of construction activity | ✓ | ✓ |
| | | | Changed in lighting as a result of construction activity. | ✓ | ✘ |
| | | | Permanent effect upon local landscape character resulting from implementation of flood bund. | ✓ | ✓ |
| | Flood Risk | High | Reduction in flood risk impact on the local community, commercial properties, and highways infrastructure. | ✓ | ✓ |
| | Employment | Low | Assumed construction workers will be from the region and continue to reside within their current locations. Therefore, there is unlikely to be a significant increase in workers moving into the local area and associated increased demand for local services (e.g. education, healthcare, or community facilities) or on recreational / open space. | ✘ | ✘ |
| Highways | Community access | Medium | Disruption to access to residences and community facilities during construction as a result of construction related works. | ✓ | ✓(?) |
| | Driver stress and delay | Medium | Anticipated that there will be increased construction related traffic on main highways, potential to cause temporary increase in driver stress and | ✓ | ✓(?) |

| Receptor | Impact type | Sensitivity | Impact | Screened in for construction | Screened in for operation |
|---|---|---|---|---|---|
| | | | delay if diversions are required. | | |
| Recreation and amenity | Public Open Space, recreational areas, and Public rights of way (The Hebridean Way). | Low | Anticipated that there will be increased construction related traffic on Hebridean way and public open spaces as a result of construction related works. | ✓ | ✓(?) |

## 9.3 Proposed Assessment Methodology

9.3.1 The assessment will be based on a combination of inputs from other EIA topic areas and a desk-based assessment, to determine all likely significant effects arising from the proposed scheme on population and human health receptors. The assessment process will consist of the following key elements that could be affected by the scheme, including firstly construction and land use / landscape changes during operation, and then changes to flood risk (expected to be all benefits, but checking also for any trade-offs where applicable):

- people and how they use land and access that land for use, including:
  - private property and housing
  - community land and assets
  - development land and businesses
  - agricultural land holdings
  - walkers, cyclists, and horse-riders
- human health, including:
  - health profiles of affected communities
  - health determinants (e.g. noise or air pollution)
  - likely health outcomes

## 9.4 Assumptions and Limitations

9.4.1 This chapter is based upon the Proposed Scheme description (Chapter 1).

9.4.2 The scope of work for assessing population and human health impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

9.4.3 The exact locations of construction compounds, traffic and transport routes, material and waste stores are currently not known but will be considered as appropriate in the ES.

# 10 Climate Change

## 10.1 Scoping Baseline

10.1.1 Scotland's Third National Planning Framework[12] recognises that planning plays a key role in helping shape places to secure reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change. In this regard, sustainable development should support the transition to a low carbon future.

10.1.2 The coastal defence scheme is a response to coastal erosion and exposure to extreme weather conditions, which could be seen to be accelerating, in part, due to climate change. However, carbon emissions would result from construction of the scheme, in particular as a result of the transport of materials via heavy vehicle movements. Carbon emissions would also be associated with the operation of construction equipment, and the embodied energy in construction materials.

10.1.3 Although difficult to quantify, the sustainability impact of the proposals is a factor of the benefits afforded from climate change resilience, versus the carbon emissions associated with frequent vehicle movements during construction and maintenance activities.

## 10.2 Potential Impacts of the Proposed Scheme

### Greenhouse Gas Assessment and Mitigation

10.2.1 Much of the raw materials required to conduct the Gualan Island beach recharge scheme would comprise of shingle and sand sediment, which would be sourced from the Northern split on Gualan Island or Southern Section of the basin close to Iochdar.

10.2.2 The Proposed Scheme has the potential to result in GHG impacts at various project lifecycle stages. The following potential construction phase impacts will be considered within the EIA:

- Product Stage: The EIA will consider the manufacture and transportation of raw materials to suppliers (e.g., the supply flood bund materials).
- Construction Process Stage: The EIA will consider the planned construction activities associated with the Proposed Scheme, including:
  - The delivery and laying of materials for the flood bund and beach recharge scheme.
  - Delivery and installation of materials and equipment for construction, compound, barriers, signage, and lighting.
- Operation Stage: The EIA will consider the maintenance requirements of the beach recharge scheme (e.g. delivery of materials, laying of materials etc.)

### Climate Change Resilience and Adaptation

10.2.3 Given that the project is being designed, delivered, and driven in the context of a changing climate, the proposed development will have a pre-determined level of resilience to climate change risks, namely sea level rise, flood risk and storm surges. Climate change is accounted for within the models and other information that inform the design.

10.2.4 Extreme weather events increase the risk of damage, delay, health and safety impacts, increased costs during the construction phase.

10.2.5 As sea level rises, storm surges and storm tides have the potential to impact the Liniclate flood bund and Gualan Island beach recharge scheme sites, which could increase the flood risk to the Causeway and local residents.

10.2.6 . The increase flood risk during operational phase may result in increased maintenance costs to the maintain levels of flood protection.

## 10.3 Proposed Assessment Methodology

10.3.1 It is anticipated that the potential impacts of the Proposed Scheme in respect of climate change will be assessed using the following proposed assessment methodology:

- A greenhouse gas (GHG) impact assessment - to understand the impact of the Proposed Development on the climate, aligned with IEMA (2022) guidance - Assessing Greenhouse Gas Emissions and Evaluating their Significance.
    - It is proposed that GHG assessment will utilise the Environment Agency's e:Mission Carbon Planning Tool. This carbon calculation program predicts the GHG emission impacts of construction, operational and maintenance activities in terms of CO2 equivalence (CO2e). It does this by calculating the embodied CO2e of materials plus the CO2e associated with their transportation. It also considers personnel travel, site energy use and waste management.
    - The tool was developed by the EA, initially for use on its projects that are predominantly fluvial and coastal schemes.
- Consideration of the project's resilience to climate change to understand the impacts of climate change on the Proposed Development itself, aligned with the IEMA (2020) guidance - Climate Change Resilience and Adaption. This includes:
    - Defining the current, alternative, and future (climate) baseline
    - Identifying and determining sensitivity of receptors
    - Reviewing and determining magnitude of the effect
    - Determination of significance
    - Developing additional adaptation/EIA mitigation measures
- A high-level summary of sustainability impacts identified by all environmental disciplines. These summaries will set out actions which could be taken during the lifecycle of the proposed scheme that would further assist in the delivery of sustainability benefits for the local area.

10.3.2 A statement on the impact of the proposals on sustainability and climate change would be provided in the ES. Presently, there is no specific guidance or legal requirement to include sustainability within the EIA process.

## 10.4 Assumptions and Limitations

10.4.1 This chapter is based upon the Proposed Scheme description (Chapter 1).

10.4.2 The scope of work for assessing climate change impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

*10.4.3* At this stage, the absence of available construction data is a limitation, particularly for calculating the embodied carbon of the Proposed Development. Where data has not been

available, estimates (using professional judgment and knowledge from similar coastal developments) will be used.

10.4.4 There are uncertainties with the estimation of GHG emissions associated with the flood defences. It is likely that the assessment will be based on an outline design, therefore will potentially be some inaccuracies with the detailed design. To combat this, a precautionary principal approach will be taken, assuming the worst-case scenario.

# 11 Construction Related Effects

11.1.1 Due to the nature of the proposed scheme, the EIA topics of traffic and transport, noise and vibration, air quality, lighting, material assets and heat and radiation are only anticipated to have the potential for environmental impacts during the construction phase and consequently have been grouped together in this Section 11.

## 11.2 Traffic and Transport

### Scoping Baseline

11.2.1 The proposed coastal protection scheme is located in South Ford, situated between the islands of South Uist and Benbecula coastline. The primary transport link between the islands is via an artificial raised causeway (A865). The existing traffic and transport levels for the study area are currently unknown. The plant requirements for the construction works are not currently known.

### Potential Impacts of the Proposed Scheme

11.2.2 It is anticipated that the main transport impacts will be associated with the movements of heavy goods vehicles travelling to and from the site during the construction phase of the development with regards to transporting materials, equipment, fuel, and waste. There will likely be an increase in traffic and transport on A865 causeway to allow for plant access to Gualan Island and Liniclate. There will likely be a temporary impact to residential access routes surrounding Liniclate flood bund site and the Southern area of Gualan Island.

### Proposed Assessment Methodology

11.2.3 It is anticipated that the potential impacts of the Proposed Scheme in respect of traffic and transport will be minimal and will be assessed qualitatively. Impacts are likely to be avoidable within standard traffic management planning and management measures in place.

11.2.4 An assessment of noise and vibration impacts is proposed – it should focus on noisy construction activities, but where relevant, consider any potential noise and vibration effects of HGV movements, where unavoidable.

## 11.3 Noise and Vibration

### Scoping Baseline

11.3.1 Baseline noise and vibration levels for the study area are not currently known. The plant requirements for the construction works are not currently known.

11.3.2 The EIA will consider the potential impacts of the proposed construction works in relation to sensitive receptors including nearby ecological and social receptors.

### Potential Impacts of the Proposed Scheme

11.3.3 It is currently unclear to what extent the construction works will impact the current noise and vibration baseline. Construction works can lead to short-term increases in noise and vibration, which can impact on a wide range of environmental receptors. Given the nationally and internationally important ecological receptors, there is potential for likely effects as a result of noise disturbance from construction operations, however, the potential noise levels would be minimal given the proposed scheme of works.

11.3.4 It is considered best practice that plant used conforms to the relevant national standards with regards to working noise and vibration (i.e. BS 5228). However, disturbance impacts from construction on specific ecological receptors cannot be ruled out at this stage, and therefore depending on the timing of construction operations, further noise impact assessment may need to be undertaken (refer to Chapter 3 Biodiversity and Nature Conservation). Short-term impacts from construction operation on recreational Population and Health would also need to be considered in the ES.

### Proposed Assessment Methodology

11.3.5 It is anticipated that the potential impacts of the Proposed Scheme in respect of noise and vibration will be assessed using the following proposed assessment methodology:

- Establish baseline for current noise and vibration levels at site
- Identify plant to be used and assess the likely noise and vibration emissions
- Identify the likely zone of influence for noise or vibrations emitted from plant to sensitive receptors
- Consider construction traffic routing and an appropriate level of assessment for HGV movements

## 11.4 Air Quality

### Scoping Baseline

11.4.1 The study area is not within an Air Quality Management Area. Site is located within a rural coastal area with no industrial or heavily developed areas within 5 km of the scheme. Baseline air quality levels for the study area are not currently known.

### Potential Impacts of the Proposed Scheme

11.4.2 It is currently unclear to what extent the construction works will impact the current air quality baseline. Construction works can lead to short-term increases in vehicle emissions through construction related activities and material transportation, which can impact on a wide range of environmental receptors. However, given the rural, sparsely populated context of the study area and the level of works proposed, there is no potential for significant air quality-related human health impacts, and these are scoped out of the assessment.

11.4.3 Given the nationally and internationally important ecological receptors, there is potential for effects as a result of vehicle emission from construction operations. Air quality impacts from construction on ecological receptors cannot be ruled out at this stage.

### Proposed Assessment Methodology

11.4.4 It is considered that the potential air quality effects will be sufficiently covered within the proposed scopes of the Traffic and Transport and Biodiversity and Nature Conservation chapters. Therefore, we do not propose to include a stand-alone Air quality chapter within the ES.

## 11.5 Lighting

11.5.1 It is assumed that there will be no requirement for operational lighting for the proposed scheme. The lighting requirements for the construction works are not currently known. The EIA will consider the potential impacts of the lighting in relation to sensitive receptors including nearby ecological and social receptors.

11.5.2 It is currently unclear to what extent the temporary construction works lighting design will differ from the current baseline. It is anticipated that the potential impacts of the Proposed Scheme in respect of lighting will be considered by the relevant topic chapters in relation to:

- Landscape and visual impacts: where appropriate, the potential for impacts upon amenity value will be considered.
- Biodiversity and Nature Conservation: where appropriate, the potential for impacts upon the local ecology will be considered.
- Population and health: where appropriate, the potential nuisance effects upon people will be considered.

## 11.6 Material assets

11.6.1 As shown in the proposed scheme sketch (Figure 1-6), two different sizes of sediment are required for the recharge – shingle and sand. Approximately 93,000 $m^3$ of sand sediment is proposed to be taken from southern extent of Gualan Island. Approximately 13,600 $m^3$ of shingle sediment is proposed to be extracted from the northern extent of Gualan Island.

11.6.2 It is anticipated that the potential impacts of the Proposed Scheme in respect of material assets will be considered by the relevant topic chapters in relation to:

- Geomorphology and Coastal Processes: where appropriate, the potential effects upon coastal geomorphology will be considered.
- Biodiversity and Nature Conservation: where appropriate, the potential for impacts upon the local ecology and designated sites will be considered.
- Climate change: where appropriate, the sustainability of material usage will be considered.

11.6.3 It is considered that the potential material assets effects will be sufficiently covered within the proposed scopes of the biodiversity and nature conservation, geomorphology and coastal processes and climate change chapters. Therefore, we do not propose to include a stand-alone material assets chapter within the ES.

## 11.7 Heat and Radiation

11.7.1 The potential impact for heat and radiation from a Proposed Scheme must be considered in accordance with the requirements of the EIA Directive (Directive 2011/92/EU). Considering the nature of the proposed coastal management scheme, it is considered unlikely that significant effects will be experienced in relation to the heat and radiation and will therefore be scoped out of the EIA.

## 11.8 Assumptions and Limitations

11.8.1 This chapter is based upon the Proposed Scheme description (Chapter 1).

11.8.2 The scope of work for assessing construction related impacts is based on preliminary information at this stage and will be reviewed and confirmed once improved design information, operational maintenance information and, construction programming information is available (e.g. timing of works, construction equipment, and final extents of designs). Any changes to the scope will be agreed by consultation or otherwise confirmed as additional in the future ES.

11.8.3 The exact locations of construction compounds, traffic and transport routes, material and waste stores are currently not known but will be considered as appropriate in the ES.

11.8.4 The construction noise and vibration assessment will be considered as appropriate in the ES as proposed plant, working methods and phasing information is provided.

# 12 Cumulative Effects

12.1.1 The ES will give consideration to 'cumulative impacts', which are defined as impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed development.

12.1.2 Schedule 4 Part 1 of The Town and Country Planning EIA Regulations requires under regulation 4(3) that a consideration of cumulative effects is included in the Environmental Statement as follows:

> *4. 'A description of the factors specified in regulation 4(3) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.*
>
> *5. The description of the likely significant effects on the factors specified in regulation 4(3) should cover the direct effects and any indirect, secondary, **cumulative**, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the development.'*

12.1.3 Schedule 4 Part 1 of The Marine Works EIA Regulations requires under regulation 5(3) that a consideration of cumulative effects is included in the Environmental Statement as follows:

> *4. 'A description of the factors specified in regulation 5(3) likely to be significantly affected by the works: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.*
>
> *5. The description of the likely significant effects on the factors specified in regulation 5(3) should cover the direct effects and any indirect, secondary, **cumulative**, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the works.'*

12.1.4 Cumulative effects are therefore assessed with regard to (i) inter-relationships between environmental effects considered in the ES, and (ii) the environmental impacts of the Proposed Development when considered cumulatively with the environmental impact of other adjacent developments.

- The spatial and temporal scope of the EIA would take into account the following:
- the physical extent of the proposed works, as defined by the limits of land to be used (temporarily or permanently) as denoted in the planning application by the Red Line Boundary of the Site;
- the nature of the existing baseline environment, including the location of sensitive receptors;
- the geographical extent of impacts beyond the site, e.g. effects from traffic, visual effects and disturbance of ecological receptors;
- the geographical boundaries of the political and administrative institutions and authorities, which provide the planning and policy context for the project; and
- the timing of the works.

12.1.5 Cumulative effects would therefore consider the impacts of any other committed developments where these would coincide with the temporal and spatial scope of the development proposals. The impacts of the respective developments are assessed collectively to determine where this could give rise to likely significant effects on the environment.

12.1.6 The Zone of Influence of the proposed development within which any potential impacts of the proposals may combine with the impacts arising from other developments has been determined on the basis of the maximum study areas of the technical assessments considered within the ES.

12.1.7 A desk study of current and previous planning applications, development plan documents and relevant development frameworks will be undertaken to identify relevant development(s) within the Zone of Influence.

# 13 Conclusions

## 13.1 EIA Scope

13.1.1 The EIA Scoping Report provides an overview of the potential for likely environmental impacts and effects of the proposed development. Based upon this, a professional judgement was made on which these topics or particular aspects of them can be 'scoped in' and those that can be 'scoped out' of the EIA. A summary of the environmental issues which will comprise the technical scope of the EIA and reported in the ES are set out in Table 13.1.

13.1.2 Environmental issues that are 'scoped in', would require further detailed technical studies undertaken to inform the ES. Where environmental issues are 'scoped out' these would not be considered further unless there is a material change in the outline scheme proposals.

**Table 13.1: Summary of environmental issues screened in/out of EIA**

| Environmental Topic | Potential Impact | Construction | Operation |
|---|---|---|---|
| Key: Scoped in (✓), Scoped Out (×), Provisionally Scoped In requiring further information ✓(?) | | | |
| Biodiversity and nature conservation | Disturbance (e.g. visual, noise) to Seal Haul- out site | ✓ | ✓ |
| | Disturbance (e.g. visual, noise) West Coast of the Outer Hebrides SPA | ✓ | ✓ |
| | Habitat loss, physical change and water chemistry changes to habitats within South Uist Machair and Lochs SPA and Ramsar site. | ✓ | ✓ |
| | Disturbance (e.g. visual, noise) to breeding and passage birds designated under South Uist Machair and Lochs SPA and Ramsar site. | ✓ | ✓ |
| | Habitat loss, physical change and water chemistry changes to habitats within South Uist Machair SAC. | ✓ | ✓ |
| | Changes in water chemistry/Turbidity and Disturbance (e.g. visual, noise) to species designated under South Uist Machair SAC. | ✓ | ✓ |
| | Disturbance (e.g. visual, noise), Changes in water chemistry/Turbidity to breeding bird assemblages and Mute Swan designated within Loch Bee (SSSI, SPA and RAMSAR site) | ✓ | ✓ |
| | Impacts to Loch Bee (SSSI, SPA and RAMSAR site) Machair | × | × |
| | Changes in water chemistry/Turbidity and Disturbance (e.g. visual, noise) to Loch Bee (SSSI, SPA and RAMSAR site) Saline Lagoon and Brackish water cockle | ✓ | ✓ |
| | Impacts to Dune systems, saltmarsh and coastal (saline) lagoons | ✓ | ✓ |

| Environmental Topic | Potential Impact | Construction | Operation |
|---|---|---|---|
| | Impacts to mudflats | ✗ | ✗ |
| | Impacts to Seals, otter, breeding birds, non-breeding birds, passage birds and coastal vegetation assemblage. | ✓ | ✓ |
| | Impacts to saline lagoon vegetation | ✓ | ✓ |
| Geomorphology and coastal processes | Impacts to GCR designations | ✓ | ✓ (?) |
| | Impacts to salinity and hydrological regime of Loch Bee (SSSI, SPA and RAMSAR site) | ✓ | ✓ (?) |
| | Impacts to habitat and species supported by Gualan Island | ✓ | ✓ (?) |
| Water environment and flood risk | Impacts to water quality of SAC, SPA, RAMSAR and SSSI designations | ✗ | ✗ |
| | Impacts to flood risk | ✓ | ✓ |
| | Impacts to sediment disturbance and turbidity of coastal waterbodies | ✓ | ✓ (?) |
| | Contamination related impacts to bedrock aquifers | ✓ | ✓ (?) |
| | Disturbance or damage of dune slock communities | ✓ | ✓ |
| Historic Environment | Impacts to unknown archaeological remains | ✓ | ✗ |
| | Impacts to designated<br>Scheduled monuments | ✗ | ✗ |
| | Impacts to designated<br>Listed buildings and Canmore points | ✓ (?) | ✗ |
| Landscape and visual | Temporary effects upon visual receptors from construction activities | ✓ | ✓ |
| | Temporary effects upon landscape character from construction activity | ✓ | ✓ |
| | Permanent effect to landscape character | ✓ | ✓ |
| Population and human health | Reduction / change in flood risk impact on the local community, commercial properties and highways infrastructure. | ✓ | ✓ |
| | Traffic noise, vibration and air quality impacts from delivery and movement of materials during construction | ✓ | ✗ |
| | Temporary effects upon visual receptors from construction activities | ✓ | ✓ |
| | Permanent effect upon local landscape character | ✓ | ✓ |
| | Construction jobs creation in the local area with knock on benefits to local amenity. | ✗ | ✗ |

| Environmental Topic | Potential Impact | Construction | Operation |
|---|---|---|---|
| | Temporary or permanent effects on access to residences, community facilities and greenspace / recreational routes (including changes in flood risk) | ✓ | ✓ |
| Climate change | Greenhouse gas emissions | ✓ | ✓ |
| | Future GHG emissions associated with adapting the proposals beyond the design life | ✓ | ✓ |
| | Impacts relating to climate change adaptation | ✓ | ✓ |
| | Impacts relating to climate change resilience | ✓ | ✓ |
| Construction related effects | Traffic noise, vibration and air quality impacts from delivery and movement of materials during construction | ✓ | ✗ |
| | Noise and vibration impacts on sensitive receptors from noisy construction activities | ✓ | ✗ |
| | Impacts on sensitive receptors as a result of light spill | ✓ | ✗ |
| | Environmental impacts from construction related contamination or pollution event | ✓ | ✗ |
| | Impacts to material assets as result of construction activities | ✓ | ✗ |
| | Impacts to heat and radiation as result of construction activities | ✗ | ✗ |
| Cumulative Effects | Cumulative effect from other proposed developments | ✓ | ✓ |
| | Interrelationship effect on a single resource/receptor when combined with other effects of the proposed scheme | ✓ | ✓ |

## 13.2 Recommended Environmental Statement Content and Structure

13.2.1 The combined EIA Screening and Scoping Report considered the potential for likely significant effects associated with the development proposals. An appropriate scope for assessing the likely significant effects is set out, and the Scoping Request now seeks the views of the Statutory Environmental Consultees. As well as EIA scope, the EIA Screening and Scoping Report also sets out a proposed content and structure of the ES, which is summarised as follows.

13.2.2 In accordance with Regulation 5(1) of the aforementioned Town and Country Planning EIA Regulations (Scotland), and Regulation 6(1) of the Marine Works EIA Regulations (Scotland), the ES shall contain:

> *(a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development;*

*(b) a description of the likely significant effects of the proposed development on the environment;*

*(c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*

*(d) a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;*

*(e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and*

*(f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.*

13.2.3 The Non-Technical Summary (NTS) shall summarise the proposals, its likely significant environmental effects and the proposed mitigating measures in non-technical language. The NTS is intended to inform those who have an interest in the development but who are not concerned with the detail of the technical assessment provided in the ES. The NTS will be provided as a stand-alone document and in an electronic format.

13.2.4 The ES will be organised on an environmental topic basis as set out in Regulation 4 (2). For each environmental topic, a brief overview of the legislative and planning policy context is provided as required to set the context of the topic chapter. The topic-specific baseline conditions are used to inform the assessment, and the potential impacts and likely significant effects of the proposed development on the environment will be determined for each of the 'scoped' in environmental issues, plus any relevant additional information that has come to light. Mitigation measures are proposed to reduce the significance of effects where possible, and the resulting residual effect is reported. The approach to EIA is iterative, whereby the assessment and ongoing consultation with stakeholders influence the design evolution of the development proposals. Further detail on the EIA process is provided in section 2.1.

13.2.5 For consistency and ease of cross reference, each environmental topic chapter presented in the ES will be structured with the following headings:

9 X.1 Introduction
10 X.2 Legislative and Planning Policy Context
11 X.3 Baseline Conditions
12 X.4 Assessment Methodology and Significance Criteria
13 X.5 Potential Impacts and Significant Effects
14 X.6 Mitigation Measures
15 X.7 Residual Effects

13.2.6 The proposed structure of the ES is set out in Table 13.2.

**Table 13.2: Recommended ES structure**

| Ref. No. | Title of Chapter / Section |
|---|---|
| | **Non-Technical Summary** |
| **1** | **Introduction** |
| 1.1 | Overview of the Project |
| 1.2 | Purpose and Legal Basis of the Environmental Statement |
| 1.3 | Scope and Context for the Environmental Statement |
| 1.4 | The Applicant |
| 1.5 | Legislative Framework |
| 1.6 | Competent Expert Evidence |
| **2** | **Development Proposals** |
| 2.1 | Background to the Scheme |
| 2.2 | Scheme objectives |
| 2.3 | The site and its surroundings |
| 2.4 | Scheme description |
| 2.5 | Landscaping and environmental design |
| 2.6 | Temporary and permanent land-take |
| 2.7 | Diversions of transport and utilities |
| 2.8 | Materials |
| 2.9 | Construction programme |
| 2.10 | Maintenance proposals |
| 2.11 | Design uncertainties, limits of deviation and the 'Rochdale envelope' |
| **3** | **Consideration of Alternatives** |
| 3.1 | Alternatives considered |
| 3.2 | Selection of the preferred option |
| 3.3 | Design development |
| **4** | **Consultation** |
| 4.1 | Purpose of consultation |
| 4.2 | Consultation with third parties on EIA matters |
| 4.3 | Consultation with the community |
| 4.4 | Consultation with statutory consultees |
| **5** | **Approach to the Assessment** |
| 5.1 | Legislation and guidance on EIA |
| 5.2 | Outcomes of EIA screening and scoping |
| 5.3 | Study area |

| Ref. No. | Title of Chapter / Section |
|---|---|
| 5.4 | Existing baseline, future conditions and the 'do minimum' scenario |
| 5.5 | Data gathering |
| 5.6 | Identifying potential impacts |
| 5.7 | Significance of impacts |
| 5.8 | Mitigation, enhancement and residual impacts |
| 5.9 | Limitations and Assumptions |
| 6 | **Biodiversity and Nature Conservation** |
| 7 | **Geomorphology and Coastal Processes** |
| 8 | **Water Environment** |
| 9 | **Cultural Heritage and Archaeology** |
| 10 | **Landscape and Visual Impact** |
| 11 | **Population and Human Health** |
| 12 | **Construction-Related Effects** |
| 13 | **Cumulative Effects** |
| 13.1 | Interrelationship Effects Between Topics |
| 13.2 | Cumulative Effects with Other Committed Developments |
| 14 | **Conclusions** |
| 14.1 | Summary of Significant Effects |
| 14.2 | Summary of Mitigation Measures and Residual Effects |
| 14.3 | Follow-up, feedback and Monitoring |
| **Technical Appendices** | |

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