Stornoway Port Authority
Stornoway Deep Water Port / Arnish Industrial Site EIA Scoping Report

December 2017

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1 INTRODUCTION

1.1 Background

EnviroCentre Ltd has been appointed by Stornoway Port Authority (SPA) in respect of Environmental Impact Assessment (EIA) Scoping in relation to a proposed new development, approximately 2km south of Stornoway (as demonstrated within Appendix A: Drawing No 169438-001). The purpose of this report is to seek a Scoping Opinion under the EIA Directive as transposed into relevant Scottish EIA Regulations under The Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017 and the Environmental Impact Assessment (Miscellaneous Amendments Relating to Harbours, Highways and Transport) Regulations 2017. We understand that both Transport Scotland and Marine Scotland are committed to providing a joint response under both Regulations.

A similar request has been made to Comhairle nan Eilean Siar (the Council) in respect of EIA advice under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, and a Scoping Opinion was issued on 10th November 2017.

This Scoping Report has been laid out as follows:

- Section 1 introduces the applicant, the regulatory background to which this Scoping Request is made;
- Section 2 sets out a description of the proposed development upon which to base potentially significant environmental effects upon. This development description will evolve as engineering design progresses;
- Section 3 sets out the approach to EIA based upon the legislative context introduced within section 1;
- Section 4 discusses potentially significant environmental effects on a topic by topic basis, and offers methodologies for the assessment of those environmental topics;
- Section 5 discusses the content and structure of any potential EIA, based upon the findings of section 4; and
- Section 6 concludes the findings of the Scoping Report.

1.2 The Applicant

Stornoway Port is the primary port for the Western Isles and one of the busiest ports on the west coast, north of the Clyde. The Port is central to the economy of the island, facilitating the lifeline ferry service and supporting almost all economic activities from fishing and aquaculture, to construction, retail and marine leisure.

The Port is run by Stornoway Port Authority (SPA), a Trust Port, with a Board contributing a range of skills and experience. SPA's Board is committed to supporting activities that will benefit the local community, both socially and economically.

Stornoway Port Authority take such steps as it may consider necessary or expedient for the conservancy, protection, regulation, maintenance and improvements of the harbour and the navigation thereof and for these purposes the Authority may:

- Manage, regulate, improve and maintain the harbour;
- Do all other things, which in its opinion are expedient to facilitate the proper carrying on or development of the harbour.

1.3 Project Team

This Scoping Report has been prepared by EnviroCentre Ltd with input from other organisations shown in Table 1.1.

Table 1.1: The Project Team

Topic	Specialist
EIA, Ecology, Water, Noise, Air Quality, Traffic & Transport and Other Issues	EnviroCentre Ltd.
Landscape and Visual	Doug Harman Landscape Planning
Cultural Heritage and Archaeology	Headland Archaeology
Engineering Design	Wallace Stone
Planning and Harbour Revision Order	Barton Willmore

1.4 Planning History and Need for the Proposed Development

The proposed development of Stornoway Deep Water Port was identified within the SPAs' Draft Masterplan for Stornoway, dated 26th November 2016. This formed a masterplan which set out proposed land use and a growth strategy in the harbour area for the next 20 years. Whilst this does not represent adopted Supplementary Planning Guidance (SPG) by Comhairle nan Eilean Siar, it represents a positive vision for the future of Stornoway and was subject to public consultation on 13th and 14th December 2016.

SPA is aware that the Port of Stornoway is crucial to the economic future of Stornoway and the Outer Hebrides. The masterplan is driven by economic opportunities for the town, and will support job creation and a sustainable community. Along with the Deep Water Port the first phase of the Masterplan development would also include the development of Bayhead and the Newton Marina redevelopment.

Outer Hebrides Local Development Plan 2012

The Outer Hebrides Local Development Plan identifies the location of development as a safeguarded, first phase, site in the National Renewables Infrastructure Plan (Prop E1a Arnish, Lewis)

The core of the industrial estate is identified as the prime location for energy related development or other appropriate large scale uses that utilise its facilities and/or require a deep water harbour.

Preferred development would be in use classes 4-6:

- Use class 4: Business;
- Use class 5: General industrial; and
- Use class 6: Storage or distribution.

1.5 Scoping under the EIA Regulations

As the proposed development contains elements which are above Mean High Water Springs (MHWS) and below Mean Low Water Springs (MLWS), consents will be required from the Council (for any elements not covered under SPAs' permitted development rights, either currently or as part of any HRO), MSLOT and Transport Scotland for those elements within their jurisdiction. Accordingly, one EIA will be prepared to cover all consenting regimes.

By virtue of its nature, size and location, the proposed development could potentially have (if unmitigated) significant adverse effects on the environment and due to the size and potential impacts generated by the proposed development, the Applicant is committed to providing an EIA.

The purpose of EIA Scoping is to:

- *"Identify the key issues to be considered;*
- *Identify those matters which can be either be scoped out or which need not be addressed in detail; and*
- *Discuss and agree appropriate methods of impact assessment, including survey methodology, where relevant".*

In accordance with EIA Regulations, this Scoping Report is submitted to MSLOT and Transport Scotland with the intention that it should form the basis of their Scoping Opinion. Other statutory consultees, local people and organisations and other stakeholders, are invited to comment on the potential environmental effects to be included within the EIA and the assessment methodologies to be used. As such, it should be noted that this document does not seek to assess the environmental effects of the proposed development as this is the purpose of the EIA which will be carried out once the design has been sufficiently evolved.

1.6 The Legislative Context

The continued management and development of the harbour is subject to European and national legislation of which the following is the principal legislation relevant to the current development programme:

- The Harbours Act 1964, to be determined by Transport Scotland to grant a Harbour Empowerment or Revision Order to empower Stornoway Port Authority to undertake works or vary its existing harbour powers;
- The Town and Country Planning (Scotland) Act 1997, as amended by the Planning etc. (Scotland) Act 2006 – any applications for Planning Permission will be determined by the Council;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017
- The Environmental Impact Assessment (Miscellaneous Amendments Relating to Harbours, Highways and Transport) Regulations 2017; and
- The Marine (Scotland) Act 2010 (Marine Licences) – to be consented by MSLOT.

Marine (Scotland) Act 2010.

A Marine Licence would be required for the deposit or removal of a substance or object below the mean high water springs mark. Marine Scotland stipulate that any associated dredging works taking place, that involves disposal at sea, then a Marine Licence for Sea Disposal may also be required.

Under Section 20(1) of the Marine (Scotland) Act 2010 (from 0 -12nm) and Section 65(1) of the Marine and Coastal Access Act 2009 (from 12 – 200nm)[1], a marine licence from Scottish Ministers is required if organisation intends to carry out certain acts in the Scottish marine area. These acts can include:

- The deposit of substances or objects into the sea or onto the sea bed;
- The removal of substances or objects from the sea bed;
- Construction, alteration and improvement works;
- Dredging; or

[1] Circular 1/2015 The Relationship Between the Statutory Land Use Planning System and Marine Planning and Licencing - http://www.gov.scot/Publications/2015/06/5851/4

- The deposit or use of explosives.

1.7 Consultation and Stakeholders

The Applicant recognises the importance of consultation and community involvement throughout the project development process in line with "PAN 3/2010 Community Engagement" (PAN 3/2010). PAN 1/2013 also reinforces the importance of public involvement in the Scoping process and makes it clear that the EIA process is intended to ensure that consultation bodies and the public have opportunity to express their opinion on both the proposed development and the ES.

The Applicant has held informal pre-application discussions with local stakeholders during consultation events in December 2016 and has sought pre-application advice from Comhairle nan Eilean Siar, Transport Scotland and MSLOT. This advice has been reflected in this Report and will be taken forward to design of the proposed development as appropriate.

2 THE PROPOSED DEVELOPMENT

2.1 Site and the Surrounding Area

2.1.1 The Site

The site is located approximately 1.5 - 2km south of Stornoway, on the Isle of Lewis. The site consists of Arnish Point Industrial Estate, including a quayside, fabrication yard and an area of coast on two sides of a peninsula. The site is accessed from the west via the junction at the A859.

SPA, on behalf of Highlands and Islands Enterprise, operates the deep-water pier at Arnish which is regularly used by offshore construction vessels delivering cargo to the Arnish fabrication yard. The Arnish fabrication facility, operated by BiFab, is currently used to manufacture and assemble oil and gas equipment. It is also likely to continue to be used for both onshore and offshore wind and tidal arrays. The yard is modest by industry standards with a 100 metre quay, 60,000 m^2 of open storage assembly halls covering 17,400 m^2. The proposed development is adjacent to the BiFab yard, but no proposals are contained within it.

A deep water berth and more quayside space are required, as well as improved road access. Further details are contained within section 2.2.1.

2.1.2 The Surrounding Area

Stornoway Port Authority (SPA) is the primary port for the Western Isles and one of the busiest ports on the west coast, north of the Clyde. The Port is central to the economy of the island, facilitating the lifeline ferry service and supporting almost all economic activities from fishing and aquaculture, to construction, retail and marine leisure. The Port is run by SPA, a Trust Port, with a Board contributing a range of skills and experience. SPA's Board is committed to supporting activities that will benefit the local community, both socially and economically

There is a strong marine tourism sector in Stornoway that provides a solid foundation for future growth. Stornoway is the focus of the £53 million per year tourism sector in the Western Isles. The town and surrounding area have a good offer for marine leisure and other tourists. This includes the newly renovated Lews Castle and grounds, Harris Tweed, Callanish Standing Stones, golf, distillery, blackhouses, beaches, sailing, etc. In addition, Stornoway is an established port of call on the cruise circuit, attracting 66 scheduled calls in 2016. Stornoway attracts relatively few large cruise vessels as those over 156 metres in length cannot berth at the Port and passengers are brought ashore by tender. This is increasingly unpopular, and impractical in bad weather.

Growth in the cruise market around Scotland is strong, especially for large vessels. To maintain and grow the cruise market in Stornoway, a facility for berthing cruise ships of 300 metres or more is needed.

Stornoway Port has been used as a service base for survey vessels exploring the waters west of the Hebrides and is the natural choice for a home port for developers working in that area. The port is the closest to the Atlantic shelf, and with the close proximity of the airport with direct flights to Aberdeen, Inverness, Glasgow and Edinburgh, together with a regular thrice daily ferry service, both personnel, equipment and stores can be delivered to the island quickly and efficiently.

The Port regularly handles specialist cargos of fuel, aviation fuel, gas, coal, road salt, cement, wind turbines, transformers, fish farm equipment and feed, and a variety of other general cargo items. The proposed development by the Applicant at Goat Island, in respect of Newton Marina, is situated approximately 1.5km to the north-east.

2.2 The Proposed Development

2.2.1 Outline Description

A new multi-purpose Deep Water Port is proposed on the west shore of Glumaig Bay, a few kilometres south of Stornoway Harbour. It is estimated that construction would commence in either 2019 or 2020.

Four phases are intended, with Phase 1 being detailed now and the remaining three phases to be detailed at a later date (however an outline element of detail will be provided for Phases 2 to 4 to allow for a planning permission in principle application to be lodged alongside marine licencing and Harbour Revision Order). The first phase of the proposals provides 430m of quay with 10m water depth at lowest tide; a new freight ferry berth 150m long at 8m water depth, a marshalling area, a heavy lift area, 10ha of laydown, storage and development land behind the quay. The proposals also incorporate a 25m wide access corridor around the south side of Glumaig Bay, connecting Arnish Yard to the new quay.

The main quay would consist of 250m of solid quay wall, with a 180m finger pier extending to the north. The finger pier would be 20m wide, supported on steel tube piles and will accommodate the freight ferry on its western face, leaving the 430m main quay free for cruise liners and other activities.

The proposals are designed to provide the following:

- Alongside berthing for cruise liners of all sizes;
- Waiting and turning area for buses serving cruise liner passengers;
- Ferry berth, linkspan and marshalling area (freeing up the current car ferry to provide an additional daily sailing);
- Extensive laydown and storage area with dedicated heavy lift area – to service renewables and decommissioning projects;
- Berthing and unloading gantries for oil delivery vessels, with pipelines to new storage tanks nearby (moving oil storage out of Stornoway town); and
- Dedicated area for leisure activities buildings and rock climbing wall.

The project also provides improvements to the current access road to Arnish Yard from the main Stornoway/Tarbert road (A859) with a direct access to the Deep Water Port.

Phases 2, 3 and 4 will be installed in the future to increase the berthing length and laydown area.

2.2.2 Earthworks

At the heart of the project is the excavation of 600,000m^3 of rock from the steep slopes behind the quay, to provide the infill material to build the reclamation, and to add in the cleared area beneath the excavation.

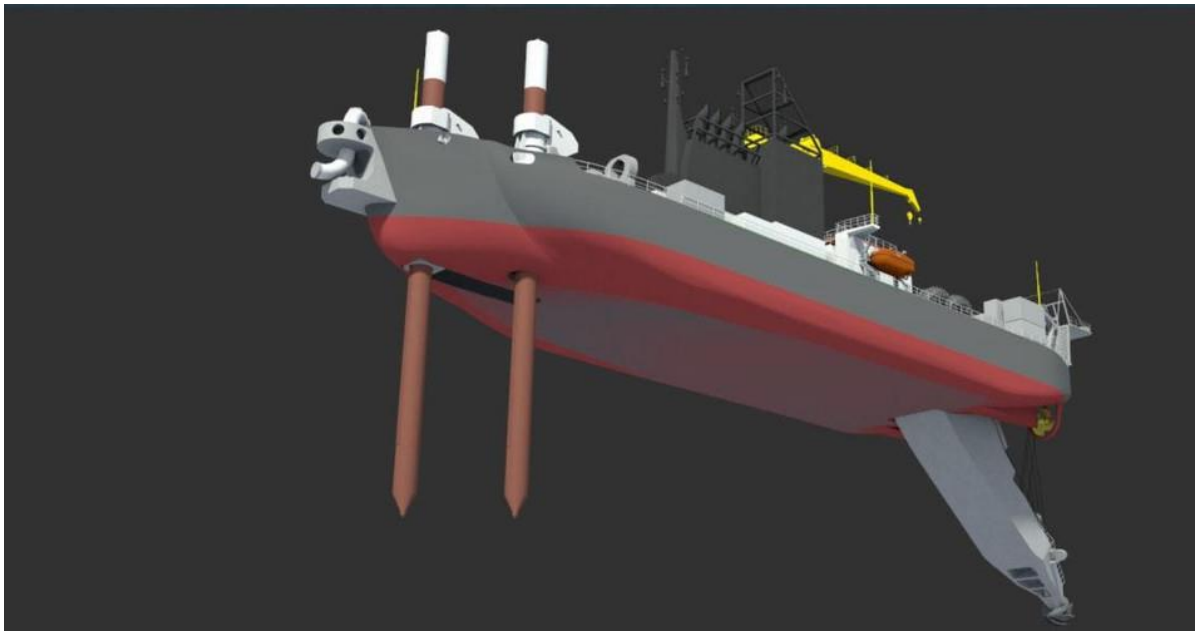
The rock would be prepared by bulk blasting, before being loaded onto a fleet of dumper trucks, moved to the adjacent reclamation area, tipped, spread and compacted. Using material produced so near at hand is very efficient, as is the freeing up of additional ground beneath the excavated rock.

2.2.3 Dredging

A large area of sea bed (approximately 200,000m^2) adjacent to the new quay requires to be dredged to provide access to the quay and berthing alongside in all tides for vessels drawing up to 10m. The dredge volume is estimated at 440,000m^3.

A recent seismic survey has confirmed that no rock will be in the dredge and the material, which is expected to consist of sediments, sands and gravels, and should all be dredgable without any blasting. Marine boreholes are currently being undertaken to confirm the findings of the seismic survey and provide more information on which to assess the most suitable method of dredging.

Figure 2-1 Cutter Suction Dredger



It seems likely that the bulk of the material will be suitable for incorporation in the reclamation. The material may also allow dredging by cutter suction dredger, as above (Figure 2-1), with the uprisings delivered to the reclamation site along a pipe supported on floats (Figure 2-2).

Figure 2-2 Pipe Delivery System

This method, if feasible, would lead to substantial savings in cost for the project. The dredging could also be conducted after completion of the quay wall, greatly reducing the sediment plume around the deposit site.

If the material is not suitable for cutter suction dredging and pumping ashore, the most efficient method would involve the use of a large backhoe dredger on a spud leg barge, feeding self-propelled hopper barges, which would move inshore and dump the material, through bottom opening doors, in the reclamation area.

Figure 2-3 Typical Backhoe Dredger and Self-Propelled Hopper Barge

This method would take a longer time to complete, and would be more expensive.

Whatever method was used, as much dredged material as possible would be used in construction of the reclamation. Any material that was unsuitable for use in the works would require to be disposed of at sea at a licenced disposal site.

2.2.4 Piling

The main 250m long quay wall will be of steel sheet piles with a reinforced concrete capping beam, tied back with steel tie bars to buried steel sheet pile anchor walls.

The quay walls will be of the 'combi-wall' type, with large diameter (estimated at 2.2m) steel tubes at 3 metre centres grouted into sockets drilled into the sea bed strata and bedrock. The gaps between the tubes, which will be equipped with standard clutches, are filled with conventional sheet piles, which are forced into the sea bed, a few metres only, with a vibrating pile driver.

All of the quay wall piles will be equipped with cathodic protection anodes, and painted with epoxy paint above the mid-tide level, to protect against corrosion. The tie rods will be wrapped in denso tape before burial to protect them from corrosion. There will be an estimated 4,700 tonnes of steel in the piles and 700 tonnes in the tie rods.

The tubular steel bearing piles for the 180m finger pier will be installed as far as possible by vibrating pile driver. Once they reach rock, or the driving becomes too much for the vibrating hammer, impact driving will be used to reach a set. Bearing piles are also required at the linkspan abutment and dolphins, and at the heavy lift area, with steel tube piles installed for the finger pier.

There are an estimated 2,900 tonnes of tubular bearing piles in total. These piles will be provided with cathodic protection anodes and a suitable paint system above mid-tide level as described for the quay wall piles.

Wherever piles require to be driven by impact hammer, a marine mammal observer will be on duty and piling will be suspended wherever sightings or acoustic monitoring indicates the presence of cetaceans in the area. Soft-start techniques will be used to minimise the impact upon any cetaceans that are in the area and unnoticed.

Figure 2-4 Example Quay Wall Construction Method

Figure 2-5 Cathodic Protection Anodes

Figure 2-6 Tie Rods

2.2.5 Reclamation

The reclaimed material, from dredging uprisings and from the excavated rock to landward, will be compacted from mid-tide upwards to minimise any settlement, and the wall tie rods placed inside oversized ducts over the outer five metres, to allow for the small amount of settlement that might occur over time (Figure 2-7).

Drainage will be arranged to allow collection of all surface water, and, in areas where there is any risk of oil spillage, interceptors will be used to prevent pollution of the sea.

Services ducts will be buried to allow easy installation of pipes and cables after completion of the reclamation. At this stage it is envisaged that a substantial strip of the area behind the main quay wall will be capped with a heavy concrete slab, while the storage and development areas further back will have a well finished crushed rock surfacing.

Figure 2-7 Reclamation

2.2.6 Armouring

The south end of the reclamation, where it joins the future phase 2, will be graded to a suitable slope, and the face protected with rock armouring. The armouring will consist of secondary armour, small enough to prevent any loss of reclamation through its voids, and primary armour, large enough to resist the incident wave action while preventing any loss of secondary armour through its voids (Figure 2-8).

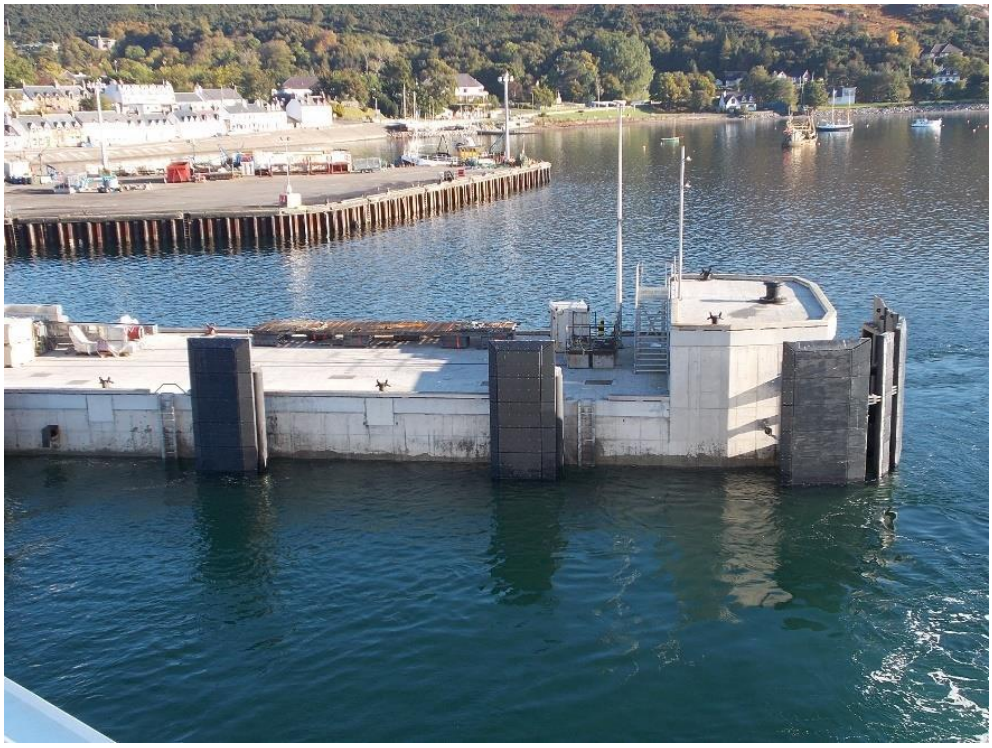
Figure 2-8 Rock Armour

2.2.7 Fendering

The main quay will be equipped with fendering suitable for all the vessel types likely to berth there. In the absence of full details of the target vessel, we have assumed panel fenders (contact panels 6m x 2.5m), each with a rubber cone fender at two levels (deck level and mid-tide level) and the necessary restraint chains (Figure 2-9).

The fenders on either corner will require to be of larger capacity, as the full mass of the vessel may impact on its centre of gravity at those locations. The freight ferry berth will be accommodating frequent berthing manoeuvres and the ferry will have side belting which projects up to 300mm from the vessel's side and ensures that all berthing loads are directed into the car deck, which is extremely strong. Due to the geometry of this berthing arrangement, hull contact with either the top or bottom of the fender panel is likely using a two level cone design. The freight ferry berth would be equipped with parallel motion fenders which keep the fender panel vertical at all times during berthing operations.

Figure 2-9 Quay Fendering



2.2.8 Access Roads

A new link to the Phase 1 development will be installed from the existing access road to Arnish Yard, providing a relatively straight route with no steep gradients. Some improvements to the existing Arnish access road to the A859 will also be required. The new access road to Arnish Yard from the Phase 1 works around the south end of Glumaig Bay, will be constructed using material won from rock excavation and/or dredging, its appearance softened where possible with landscaping using material from the link road overburden.

Wherever the road line requires an exposed seaward face, rock armouring will be used to protect against erosion. The access road will be 25m wide and will facilitate renewables and decommissioning projects at Arnish Yard by providing easy, level-gradient access from the deep water berth to and from the yard.

2.2.9 Indicative Areas

For the purposes of quantifying the relative areas of the engineering features described above, indicative areas of reclamation, access road and armouring are detailed below. These may change should development design progress throughout the pre-application period.

Table 2.1: Indicative Areas

Engineering feature	**Area in m²**
Phase 1	
Area of reclamation below MHWS	52,228m²
Area of reclamation below MLWS	48,647m²

Engineering feature	**Area in m²**
Area of rock armoured slopes below MHWS	7,342m²
Area of rock armoured slopes below MLWS	7,264m²
Area of access road currently below MHWS	3,110m²
Area of access road currently below MLWS	3,350m²
Area of access road rock armoured slopes below MHWS	1,535m²
Area of access road rock armoured slopes below MLWS	1,535m²
Phase 2	
Area of reclamation below MHWS	46,307m²
Area of reclamation below MLWS	40,962m²
Area of rock armoured slopes below MHWS	3,390m²
Area of rock armoured slopes below MLWS	3,350m²
Phase 3	
Area of reclamation below MHWS	44,621m²
Area of reclamation below MLWS	38,245m²
Phase 4	
Area of reclamation below MHWS	35,486m²
Area of reclamation below MLWS	28,493m²
Area of rock armoured slopes below MHWS	1,614m²
Area of rock armoured slopes below MLWS	768m²

3 APPROACH TO EIA

3.1 Introduction

The objectives of an EIA are to:

- Establish the availability of the baseline data;
- Request that statutory consultees provide any relevant environmental information relating to the site and the surrounding area;
- Define a survey and assessment framework from which a comprehensive overall assessment can be produced; and
- Provide a focus for the consenting authorities and the consultees' considerations – in terms of:
    - Potential impacts to be assessed;
    - Assessment methodologies to be used;
    - Other areas that should be considered; and
    - Any other environmental issues of perceived concern.

The aim of the Scoping Report is to assist MSLOT and its consultees to form an opinion as to the likely effects of the proposed development. It describes the proposed development and provides information with regard to the environment.

It seeks to identify potential environmental impacts of the proposed development and most importantly to reach agreement on which of the impacts could lead to significant environmental effects. The EIA will be focussed on assessing the potentially significant effects and propose mitigation measures to reduce the residual effects on the environment. The scoping process will eliminate those environmental issues which do not require further consideration.

3.2 General Approach to Assessment

The project team benefits from significant experience and technical expertise in environmental assessment and development of housing projects and will ensure that the EIA will be carried out in accordance with the EIA Regulations.

The potential environmental impacts during construction, operation and decommissioning will be identified and assessed in the ES, based upon the recommendations of the technical EIA team, consultation with statutory consultees, other interested parties and local communities. Topic assessments will be undertaken using best practice methodology, following industry guidelines whenever appropriate and carried out by specialists with relevant professional experience.

Schedule 4 of the EIA Regulations states the information to be included within the EIA. Each assessment will consider these criteria and assess them whenever appropriate to the proposed development. This also highlights that the emphasis of the EIA process should be on assessing likely significant effects, rather than every environmental effect associated with a development.

Impartial professional consultants (as set out in Table 1.1) will assess the likely significant environmental effects identified. These specialist assessments will generally incorporate:

- Site visits;
- Collection of baseline data regarding the site and surroundings;
- Identification of the likely significant effects of the proposed development; and

- Recommendations on how these effects could be avoided or reduced.

For each topic the proposed methodology to be used within technical topics is set out within Section 4 of this Scoping Report. Cumulative effects will be assessed within each ES chapter as appropriate, at a scale appropriate to that subject and in line with best practice guidance currently available.

It is essential that the methodology used for assessing the significance of environmental effects is set out clearly and transparently within an EIA Report and is justifiable. Significance is generally determined through a combination of the sensitivity of a receptor or resource to an effect and the magnitude of the change resulting from the proposed development, however where this differs the full methodology is explained within the relevant section as appropriate.

Significant effects are more likely to be predicted where important resources, or numerous or sensitive receptors, could be subject to impacts of considerable magnitude. Effects are unlikely to be significant where low value or non-sensitive resources, or a small number of receptors, are subject to minor impacts. The assessment of significance of an environmental effect resulting from the proposed development will have regard to the following:

- Sensitivity, importance or value of the resource or receptor;
- Extent and magnitude of the effect;
- Duration of the effect;
- Nature of the effect;
- Performance against environmental quality standards; and
- Compatibility with environmental policies.

The methods for predicting the nature and magnitude of any potential impacts vary according to the subject area. Quantitative methods of assessment can predict values that can be compared against published thresholds and indicative criteria in Government guidance and standards. However, it is not always possible to ascribe values to environmental assessments and thus qualitative assessments are used. Such assessments rely on previous experience and professional judgement. The methodologies used for assessing each topic area will be described within the individual chapters of the ES and will follow best practice guidelines where applicable.

3.3 Mitigation

The EIA Regulations state that the EIA Report must contain a "*description of the measures envisaged in order to prevent, reduce and where possible, offset any significant adverse effects on the environment*."

As outlined in PAN 1/2017 there is a widely accepted strategy for mitigation which will be followed when considering the environmental effects of the proposed development. This comprises (in order of preference): avoidance, reduction, compensation and remediation. In addition, consideration will be given to providing the opportunity for enhancement. Mitigation and, if appropriate, monitoring proposals, will be described clearly within the ES. The mitigation will be achievable and will be delivered through appropriate mechanisms.

3.4 Requirements of the EIA Regulations

In addition to those items explained above, the EIA Report will either include discussion of, or scope out via section 4 of this Scoping Report, the following items:

- A description of the development, including description of the location, its physical characteristics, land-use requirements during construction and operation, a description of characteristics of the operational phase, and an estimate of the types and quantities of expected residues and emissions;

- A description of reasonable alternatives, including development design, size, scale, and a justification of the project choices made;
- A description of the baseline environmental situation and an outline of the likely evolution thereof without implementation of the proposed development;
- An assessment of the environmental baseline for each environmental topic scoped into the EIA, with reference to those items specified within Schedule 4 (5) of the EIA Regulations;
- A description of mitigation and monitoring measures (where applicable); and
- A description of any expected adverse impacts in relation to the vulnerability of the proposed development to risks of major accidents and/or disasters which are relevant to the project.

4 POTENTIALLY SIGNIFICANT ENVIRONMENTAL EFFECTS

4.1 Introduction

This section discusses potentially significant effects. Each of the environmental topics discussed within this section could have the potential to be impacted by the proposed Deep Water Port development at Arnish, or conversely environmental features may impact upon the proposed development. By establishing the extent of potential impacts and subsequent effects, the topic can be scoped into the ES, or scoped out of the ES.

4.2 Landscape and Visual

4.2.1 Introduction

This section addresses the potential direct and indirect effects of the proposed development on landscape resources and visual receptors. These are defined respectively within paragraph 3.21 of the Guidelines for Landscape and Visual Impact Assessment (GLVIA)[2] as:

"*…the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape*"

and

"*…the people who will be affected by changes in views or visual amenity at different places*".

To help inform the scope of a Landscape and Visual Impact Assessment as part of the EIA process, an initial landscape and visual appraisal was undertaken as a desk study exercise to identify the following:

- the landscape character of the site and surrounding area;
- the seascape character of the site and surrounding area;
- the coverage of any landscape designations across the site and surrounding area;
- important views and viewpoints towards the site from the surrounding landscape/seascape;
- any potentially significant landscape and visual effects during construction and post-completion;
- recommendations for mitigating any potentially significant adverse effects; and
- recommendations for further study.

4.2.2 Baseline Conditions

The purpose of the baseline desk study is to record the existing landscape and visual resources, against which the potential effects of the proposed development, can be judged. To inform this, the following baseline conditions have been identified and described:

- landscape character;
- seascape character;
- landscape designations; and
- key views and visual receptors.

[2] Landscape Institute and Institute of Environmental Assessment (2013). *Guidelines for Landscape and Visual Impact Assessment.* Third edition.

Landscape character

As detailed in the *Western Isles landscape character assessment*[3], the site of the proposed development is located within the *Rocky Moor* LCT landscape character type (LCT). To the east of Stornoway, the landscape is characterised by a *Crofting* LCT and to the north of the harbour, *Boggy Moor* LCT.

The *Rocky Moor* landscape is characterised by '*smooth dip slopes which combine with rocky convexities to create a rocky and stepped landscape. Inland rocky moor tends to merge with boggy moor or mountain massif and where it extends to the shoreline, it forms a coastline of convex landforms dipping into deep water*'.

Although information on landscape character provides a useful framework in which to describe the landscape and predict effects, the information provided in the landscape character assessment is relatively broad brush. Furthermore, given the coastal location of the site, the character of the seascape is also an important factor to consider.

Seascape character

Seascape character is made up of physical characteristics of hinterland, coast and sea plus a range of perceptual responses to the seascape, as well as visual aspects. Although no detailed sescape characrer assessment has been undertaken for the study area, a regional/national coastal character assessment was undertaken in support of a study on the sensitivity and capacity of the Scottish seascape in relation to windfarms[4]. As detailed within this study, the site of the proposed development is located within the *Low Rocky Islands Coast* seascape character type (SCT) which exhibits the following key characteristics:

- low rocky coastline, cliffs and fragmented coastline in places backed by moorland;
- sparsely settled, small crofting settlements along coastline, large settlement at Stornoway with some industrial development, airport and busy port;
- views of the Minch and beyond views of distant hills on mainland particularly distinctive Assynt; and
- parts of this landscape feel remote except Stornoway area.

In assessing sensitivity to wind turbines, the study identifies the following seascape sensitivities and these provide a sound framework in which to assess the potential impacts of the proposed development.

Table 4-1 Sensitivity Criteria

Sensitivity criteria	Analysis
Scale and Openness	Fairly open and large – medium scale apart from to the north of this area where the landscape is more contained and smaller scale.
Form	Horizontal emphasis particularly to the north of Stornoway and on the Eye Peninsula, gently undulating with cliffs at coast. The form becomes more complex further south with a more fragmented and contained seascape.
Settlement	Sparse settlement in the north, major settlement including some industry around Stornoway and crofting settlements elsewhere. Some uninhabited areas.
Pattern/Foci	Foci and pattern varied. Foci include views to Assynt on clear days, important headlands and peninsulas e.g. Tolsta and the Eye peninsula.
Lighting	Stornoway is lit but the rest of the seascapes and out at sea are dark.
Movement	Busy port at Stornoway but generally the rest of the area is fairly quiet including some uninhabited areas to the north of Tolsta.

[3] Scottish Natural Heritage (1998). *Western Isles landscape character assessment*.
[4] Scottish Natural Heritage (2005). *An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms*.

Sensitivity criteria	Analysis
Aspect	Easterly aspect across sea. From settlement, roads, ferries. There is a heritage trail from Tolsta to the North of Lewis and open sea views over to Skye are important here.
Modification/Remoteness /Sense of Naturalness	There is modification in parts, around Stornoway and some telecommunications masts etc. The crofting patterns, whilst traditional, can in places appear in contrast to the rougher, wilder and more natural surroundings. Generally though a largely natural and remote area, particularly in the hinterland of Lewis.
Exposure	Feels exposed to the north of this area where coastline becomes more linear, hinterland is flatter and sheltered areas are fewer.

Landscape designations

None of the site is covered by any landscape designations although *Lews Castle and Lady Lever Park* is a Garden and Designed Landscape (GDL) designation that covers a relatively large part of the western bank of the Bayhead River where it meets the harbour. It is located approximately 2km to the north of the site at its closest point.

As detailed in the designation citation[5], the GDL is '*a prime example of a mid-late 19th century ornamental and estate landscape, rare on Lewis, laid out with coastal and riverside carriage drives and walks. The designed landscape comprises a series of distinctive wooded parklands contrasting dramatically with the prevailing openness of the island landscape'.* It is also noted that GDL makes an '*outstanding contribution to the setting of Stornoway'*.

The closest National Scenic Area (NSA) is the *South Lewis, Harris and North Uist* NSA, which is located approximately 26 km south-west of Stornoway. Two parts of this NSA are also identified as Wild Land Areas[6].

Key views and visual receptors

Although no detailed analysis of the zone of theoretical visibility has been undertaken at this stage, it is evident that views of the site are relatively localised. In general, these are restricted by nearby containing rising ground, large areas of woodland to the west of the harbour and extensive built development across the town.

However, as the site of the proposed development is located south west of Stornoway harbour, there is a relatively large number of nearby receptors with open views towards it. This includes residents and visitors in Stornoway, and recreational users in and around the harbour. Daily ferries from Stornoway to Ullapool also pass in very close proximity to the site.

Situated on the north-west side of Stornoway Harbour overlooking the town, Lews Castle commands panoramic views and is prominent on the sea approach to Lewis. The Castle is situated mid-way on the east-facing, heavily wooded hillside and dominates views from Stornoway. Views from Lews Castle and Lady Lever Park overlook Stornoway, the inner harbour and town. Extensive views are also obtained from the summit of Cnoc Croich across to Lews Castle, the island's hinterland and the harbour. Similar views of the site are also experienced from areas of low rising moorland to the south of the harbour.

There is a dense network of Core Paths across the *Lews Castle and Lady Lever Park* GDL and several other 'wider footpaths' to the north and east of the town. The nearest National Cycle Network (NCN) route is NCN 780 which passes approximately 7.5 km to the south-west of the site at its closest point.

[5] http://portal.historicenvironment.scot/designation/GDL00263
[6] http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/

4.2.3 Potentially Significant Effects during Construction

As noted previously, the site benefits from a relatively contained setting whereby areas of low-rising ground and headlands, extensive woodland cover across *Lews Castle and Lady Lever Park* and built development in Stornoway is likely to restrict the extent of landscape and visual impacts to the local area.

During the construction phase, the presence and operation of plant machinery, delivery vehicles and the construction of infrastructure is likely to significantly affect the views of some nearby residents, road users and recreational boat users in the harbour. The views of recreational users from Lews Castle and Lady Lever Park (and associated Core Path Network) could also be significantly affected.

In addition to the likely localised extent of effects, the presence of nearby industrial development and activity will also help to limit the nature of landscape and seascape effects during construction. Nonetheless, it likely that some short term direct and indirect significant effects on the character of the harbour during construction would result, particularly on nearby areas of the coast that have an undeveloped and peaceful character.

In order for the potential impacts to be fully identified, further survey work is required which is likely to focus on the following:

- local landscape character;
- local seascape character;
- Lews Castle and Lady Lever Park GDL;
- views and amenity of nearby residents;
- views of and amenity nearby road users;
- views and amenity of Core Paths users; and
- views and amenity of ferry passengers and other recreational boat users.

4.2.4 Potentially Significant Effects post-Completion

At this stage, the potential for significant landscape and visual effects post-completion is somewhat dependent on the quality of design of the Deepwater Port at Arnish and associated infrastructure. During the iterative design process, it will be important to consider the landscape and seascape setting of the harbour and ensure where possible, important views are protected and enhanced through the provision of a high quality development. Until the design is finalised, it assumed that some localised significant landscape and visual impacts could result and these will be explored through further field survey on the following receptors:

- local landscape character;
- local seascape character;
- Lews Castle and Lady Lever Park GDL;
- views and amenity of nearby residents;
- views and amenity of nearby road users;
- views and amenity of Core Paths users; and
- views and amenity of ferry passengers and other recreational boat users.

4.2.5 Inclusion or Exclusion from EIA

Based on the findings of this desk-based appraisal and the potential for significant effects during construction and post-completion as detailed above, it is recommended that a full Landscape and Visual Impact Assessment (LVIA) is undertaken as part of an EIA.

4.2.6 Design and Mitigation

Where any significant landscape and visual effects are identified as part of the LVIA process, recommendations for mitigation which could be implemented in order to avoid, reduce or remedy adverse effects will be identified. As part of this, a series of landscape designs aims will be suggested to help ensure that as far as possible, the proposed development minimises its impact and integrates positively with its sensitive harbour setting.

4.2.7 EIA Assessment Methodology

As part of the EIA process, a full Landscape and Visual Impact Assessment would be undertaken in accordance with the *Guidelines for Landscape and Visual Impact Assessment* (GLVIA), version 3 (Landscape Institute and the Institute of Environmental Management and Assessment 2013). The LVIA would be based on the following methodology.

Evaluation of the Existing Environment – the Baseline

The baseline review for the landscape and visual resource has three elements:

1. Description – a systematic review of existing information and policy relating to the existing landscape and visual resource;
2. Classification – analysis of the data to subdivide the landscape/seascape resource into discrete areas of recognisable character and identification of the visual receptors; and
3. Evaluation – Use of professional judgement to apply sensitivity criteria to a landscape/seascape or visual resource with reference to specified criteria.

The baseline review is undertaken through desk-based data review followed by a site survey to verify the findings, and then analysis of the data. This process is described in detail in the following paragraphs.

Desk Based Data Review

Existing mapping, legislation, policy documents and other written, graphic and digital data relating to the proposal and broader study area is reviewed. This includes the following documents:

- Outer Hebrides Local Development Plan (2012);
- Western Isles landscape character assessment (1998);
- Ordnance Survey maps; and
- Digital sources of mapping and aerial photography.

The desk study also establishes the main users of the area, key viewpoints and key features, thus defining the visual baseline which requires to be verified on site. The potential visual receptors are identified and classified according to their associated use (settlements, footpaths, roads etc.). The aim of the baseline review of visual resources is to ensure that an appropriate range of viewpoints is included in the visual assessment. The potential extent of visibility of the proposed development as identified in the preliminary Zone of Theoretical Visibility (ZTV) provides the basis upon which the potential visual receptors are initially identified.

The desk study informs subsequent site work, which allows the confirmation of the Landscape/Seascape Character Types (LCTs/SCTs) and Landscape/Seascape Character Areas (LCAs/SCAs) where applicable.

Site Survey

Field survey work is carried out to verify and, if required, refine the landscape/seascape character types identified within the study area, and to gain a full appreciation of the relationship between the proposed development, and the landscape.

The baseline visual resource is verified during the survey work and at this time, the validity of the list of representative viewpoints used in the LVIA. Since the ZTV is based on a 1:50,000 digital terrain model, it does not capture local landform. There are times when a viewpoint selected from analysis of the ZTV does not actually have any views to the proposed development. In some instances, this can be remedied by slight adjustments of the grid references, although the location must remain relevant to the particular receptor(s) for which the viewpoint was selected. It is also important to ensure that the viewpoints remain a representative selection of views.

Data Analysis

Analysis and reporting of the baseline resource takes place after the completion of the desk and field surveys. The baseline landscape and visual review provides a description, classification, and evaluation of the landscape and visual resource of the study area.

The baseline review provides a robust description of the landscape and visual resource from which to assess the landscape and visual effects of the proposed development and to advice, in landscape and visual terms, on the development's acceptability in principle and upon its siting, layout and design. This involves identification of all the landscape and visual receptors and analysis of the sensitivity of each of these receptors to the proposed development.

Extent of the Study Area and Viewpoint Selection

Maps of Zone of theoretical visibility (ZTVs) are prepared using digital terrain models based on a maximum height of the proposed development. These represent the 'worst case' area of theoretical visibility where the proposed development may theoretically be seen. The ZTVs are based entirely on topographic factors and do not account for any screening effects provided by vegetation, buildings or minor variations in landform or the orientation of view. Therefore, the extent of any ZTVs tends to be greater than actual visibility and does not take account of climatic factors such as light conditions.

The ZTV for the proposed development is then used as a basis for the further assessment and evaluation of the magnitude of visual impacts.

Through the initial stages of the desk study, viewpoints are selected to represent views experienced from a variety of receptors, within different landscape character types and at a variety distances from the proposed development where the view may be apparent.

A study area centred on a likely 5 km radius from the proposed development will be used for the study of landscape and visual effects. Given the relative scale of the development and the character of the landscape, significant effects are very unlikely to be experienced at distances over 5 km.

Landscape/seascape Susceptibility and Value

The GLVIA indicates that landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of proposal and the value attached to the landscape.

Landscape Susceptibility

This LVIA includes an assessment of factors affecting the susceptibility of the landscape to the changes brought about by the proposed development, in order to identify any variation at the local scale. The following table sets out attributes of landscape/seascape character that are typically considered in assessing susceptibility.

Table 4-2 Susceptibility Criteria

Susceptibility Criteria	***Lower***	***Higher***
Scale	Large-scale or vast	Intimate or small-scale
Enclosure	Open or exposed, windswept	Enclosed or confined, sheltered
Landform	Flat, smooth, regular, rolling, gently undulating, or flowing landform	Dramatic, steep, mountainous, rugged, or complex landform with prominent peaks or ridges
Diversity	Simple or uniform, e.g. Moorland or forestry plantations	Complex or diverse, variety of land cover
Landcover pattern and line	Sweeping lines, or indistinct or irregular patterns	Strong and regular linear features, geometric or rectilinear patterns, or planned landscapes
Settlement and infrastructure	Frequent masts, pylons, industrial elements, modern buildings, infrastructure, settlements or main roads	No obvious modern settlement, buildings, infrastructure or main roads
Perception of landscape change	Modern or clearly dynamic showing obvious land use changes	Little or no land use changes, or with obvious historical continuity
Tranquillity	Busy, with evidence of human activity, noise or regular movement	Remote or tranquil with strong sense of stillness or solitude
Settings and skylines	Low lying areas that do not tend to feature in views from populated areas or main transport routes	Areas with topographic features that define the setting, backdrop, outlook or skyline of populated areas or main transport routes

Landscape Value

The assessment takes as its starting point the recognised value of the landscape, for example, as identified by landscape designations.

In addition, the assessment considers the following factors, in order to identify how the relative landscape value may vary at the local scale. The factors set out in the following table are adapted from paragraphs 5.28-5.31 of the GLVIA and other guidance (Scottish Natural Heritage and Countryside Agency 2004 Figure 1b).

Table 4-3 Landscape Value

Factors affecting Landscape value	
Condition/intactness	The degree to which the landscape is unified or intact
Scenic quality	The extent to which the landscape appeals, primarily to the visual senses
Perceptual aspects	The degree to which the landscape is recognised for perceptual qualities, such as its sense of remoteness
Rarity	The presence of unusual elements or features in the landscape or the presence of an unusual LCT
Representativeness	The degree to which the landscape contains important examples of elements or features, or is of a particular character that is considered important
Conservation interests	Cultural or natural heritage interests that add to the value of the landscape and/or are of value in themselves
Recreational value	Evidence of recreational activity where experience of the landscape is important, such as recognised scenic routes
Associations	Recognised cultural or historical associations that contribute to perceptions of the natural beauty of the landscape

Sensitivity of Visual Receptors

The sensitivity of each visual receptor is assessed in terms of susceptibility to change in views or visual amenity as well as the value attached to particular views.

Susceptibility to Change

People generally have differing responses to views and visual amenity depending on the context (e.g. location, time of day, degree of exposure), and their purpose for being in a particular place (e.g. whether for recreation, travelling through the area, residence or employment). Susceptibility to change is therefore a function of:

- The occupation or activity of people experiencing the view or visual amenity; and
- The extent to which their attention or interest may be focused on the landscape around them.

The following table illustrates some examples of the relative susceptibility of some of the key visual receptors within the Study Area. Note that different individuals or groups of people at one location may have different levels of susceptibility.

Table 4-4 Susceptibility to Change

High	Medium	Low
Residents within dwellings or curtilage	People at their place of work, where views are an important part of the setting, such as a countryside ranger	People at their place of work whose attention is likely to be focused on their work or activity, not on their surroundings
Users of recognised national trails, whose attention or interest is likely to be focused on the landscape or on particular views	N/A	People engaged in active outdoor sports or recreation and less likely to focus on the view
Road users where appreciation of the landscape is an important part of the experience, such as recognised scenic routes	Road users likely to be travelling for other purposes than just the view, such as commuter routes	N/A
Visitors to heritage assets or to other attractions, such as recognised beauty spots, where views of the surroundings are an important part of the experience	N/A	N/A

Value attached to particular views

Judgments are also be made about the value attached to views, based on the following considerations:

- Recognised value – such as views from heritage assets or designated landscapes;
- Inclusion in guidebooks or on tourist maps, the facilities provided for visitors or references to the view in literature or art; and
- The relative number of people who are likely to experience the view.

People that are more susceptible to change at viewpoints of recognised value are more likely to be significantly affected by any given change.

Assessing Effects

The impact assessment aims to identify all the potential landscape and visual effects of the development taking account of any proposed mitigation measures. This is carried out by:

- Assessing the magnitude of change brought about by the proposed development on each of the receptors identified in the baseline review;
- The effect is then predicted by combining the sensitivity and importance of the receptor (as identified in the baseline review) with the magnitude of change; and
- Lastly, the significance of the predicted effect is assessed in a logical and well-reasoned analysis.

The assessment aims to describe the changes in the character and the landscape resources that are expected to result from the proposed development. It covers both landscape effects (changes in the fabric, character and key defining characteristics of the landscape); and the visual effects (changes in available views of the landscape and the significance of those changes on people).

Magnitude of Landscape Change

Each effect on landscape receptors is also assessed in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility.

Size or Scale of Effect

This is judged using the factors set out in the following table:

Table 4-5 Magnitude of Change

Rating	Criteria
Very large	Highly obvious change, affecting the majority of the key characteristics and defining the experience of the landscape
Large	Obvious change, affecting many key characteristics and the experience of the landscape
Medium	Noticeable but not obvious change, affecting some key characteristics and the experience of the landscape
Small	Minor change, affecting some characteristics and the experience of the landscape slightly
Negligible	Little perceptible change

Geographical Extent of Effect

The geographical area over which the landscape effects would be experienced (regional, local or restricted to the site) is also taken into account. This is distinct from the scale of the change. For example, a small change to the landscape over a large geographical area could be comparable to a very large change affecting a much more localised area.

Magnitude of Visual Effect

Visual effects result from the changes in the content or character of views and visual amenity, due to changes in the landscape. The assessment of visual effects takes account of both the sensitivity of the visual receptors (individuals or groups of people) and the magnitude of the change on their views and visual amenity.

The magnitude of the visual effect resulting from the Proposed Development is evaluated in terms of size or scale, geographical extent, duration and reversibility.

Size or Scale of Effect

This is based on the interpretation of a combination of a range of factors. Some of these are largely quantifiable and include:

- Distance and direction of the viewpoint from the Proposed Development;
- Extent of the Proposed Development visible from the viewpoint
- Scale of the change in the view, including the proportion of the field of view occupied by the Proposed Development;
- Degree of contrast with the existing landscape elements and characteristics in terms of background, form, pattern, scale, movement, colour, texture, mass, line or height;
- The relative amount of time during which the effect would be experienced and whether views would be full, partial or glimpses; and

- Orientation of receptors in relation to the Proposed Development, e.g. whether views are oblique or direct.

Table 4-6 Scale of Effect

Rating	Description	Appearance in field of vision
Very high	Dominant	Commanding, controlling the view Creation/removal of a dominant visual focus Highly uncharacteristic elements or pattern introduced Most of the view affected
High	Prominent	Major change to the view, striking, sharp, unmistakeable, easily seen Creation/removal of major visual focus Uncharacteristic elements or pattern introduced Large proportion of the view affected
Medium	Conspicuous	Noticeable change to the view, distinct, clearly visible, well defined Creation or removal of a visual focus that may compete Some elements of the Proposed Development fit the existing pattern Some of the view affected
Low	Apparent	Minor change to the view but still evident Little change to focus of the view Fits intrinsic visual composition Little of the view affected
Negligible	Inconspicuous	No real change to perception of the view Weak, not legible, hardly discernible

Geographical Extent

The extent over which the changes would be visible is also taken into account.

The magnitude of visual change arising from the Development is described as High, Medium, Low or Negligible based on the overall extent of visibility. For individual viewpoints it will depend upon the combination of a range of factors:

- The distance of the viewpoint from the development;
- The duration of effect;
- Extent of the development visible from the viewpoint;
- The angle of view in relation to main receptor activity;
- The proportion of the field of view occupied by the development;
- The background to the development; and
- The extent of other built development visible.

Other factors may also influence the visual effect. These relate to both human perception and to the physical environment itself. Factors which tend to reduce the apparent magnitude include the following:

- An absence of visual clues;
- A complex and varied scene; and
- Low relative elevation of view

Factors which tend to increase the apparent magnitude include the following:

- Visual clues;
- A simple scene; and
- High relative elevation of view.

Sequential Visual Effects

Sequential visual effects typically occur when moving along a linear route, as the observer moves from one point to another and gains views of other developments or a different view of the same development.

Significance of Effects on Landscape and Visual Receptors

The assessment of significance is based on professional judgement, considering both the sensitivity of the receptor and the predicted magnitude of effect resulting from the Proposed Development.

Major loss of landscape features or characteristics across an extensive area that are important to the integrity of a nationally valued landscape are likely to be of greatest significance. Short-term effects on landscape features or characteristics over a restricted part of a landscape of lower value are likely to be of least significance

The degree of significance of effects on visual receptors is determined from a combined evaluation of the sensitivity of the visual receptor and the magnitude of the visual effect.

Effects are more likely to be significant on people who are particularly sensitive to changes in views and visual amenity, or who experience effects at recognised and important viewpoints, or from recognised scenic routes. Large scale changes which introduce new, discordant or intrusive elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

The significance of any identified landscape or visual effect is assessed as Major, Moderate, Minor or Negligible effect. These categories have been determined by consideration of viewpoint or landscape sensitivity and predicted magnitude of change as described above, with the table below used as a guide to correlating sensitivity and magnitude to determine significance of effects. It should be noted that this is a guide only, and there will be times when the combination of sensitivity and magnitude yield a slightly different result from that predicted by the table. Where this discrepancy leads to prediction of significant effect, it is explained in the text.

Table 4-7 Significance of Effect

Magnitude of Change				
Sensitivity	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major to moderate	Moderate	Moderate to minor
Medium	Major to moderate	Moderate	Moderate to minor	Minor
Low	Moderate	Moderate to minor	Minor	Minor to none
Negligible	Moderate to minor	Minor	Minor to none	None

Assessment of significance of landscape and visual effects

Where overall effects are predicted to be *major* (shaded dark grey) these are considered to be equivalent to significant effects, as referred to in the *Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations* 2017. Overall effects of moderate to major (shaded light grey) may be significant if experienced over an extensive proportion of a receptor, area or route. Changes of moderate or less are not likely to result in significant effects.

4.3 Ecology

4.3.1 Introduction

The assessment of ecology will consider the geographical area potentially affected by the development of a deep water port at Arnish. Particular attention will be given to:

- Terrestrial ecology, protected habitats and species;
- Birds; and
- Marine mammals and fish.

The proposals have the potential to affect ecology in the immediate vicinity of the development footprint in terms of direct habitat losses. It is also envisaged that a range of other effects on ecology in the wider area could occur, these include but are not limited to, ecological interactions and changes in hydrodynamic regime, physical disturbance during construction and operation of the port, and underwater noise and pollution arising from construction activities. These areas will all be considered in the assessment. Impact of the development on the water environment including hydrology, hydrogeology, water quality and coastal processes will be considered in the Water section of the EIA.

Each area of ecology listed above will be considered in turn.

4.3.2 Baseline Conditions

Terrestrial Ecology

In order to determine an ecological baseline for terrestrial ecology at the proposed deep water port a Preliminary Ecological Appraisal (PEA) was undertaken in May 2017.

The main objectives of the PEA were as follows:

- Identify and map the broad habitats present on the site;
- Search for field evidence of a range of protected or notable faunal species which may frequent the survey area;
- Identify suitable habitat for protected or notable faunal species in the survey area;
- Evaluation of the site based on the habitats or faunal species found;
- Identify the potential impacts to protected or notable faunal species, vegetation and habitats and outline appropriate mitigation methods; and
- Make recommendations for any further survey and/or species licensing requirements.

Desk study

To anticipate the potential ecological sensitivities at the site, a desk study was conducted in April 2017 in advance of the field studies. This included a review of:

- Existing data on statutory designated sites available through SNH Sitelink website[7] (up to 5km from the site);
- Existing data on non-statutory designated sites available through the Western Isles (Comhairle nan Eilean Siar) Council Local Development Plan (LDP)[8] (up to 2km from the site);
- Records of Ancient Woodland available through Sketchmap[9] (up to 2km from the site);
- Records from the Western Isles (Comhairle nan Eilean Siar) Council Biodiversity Officer
- Records from Scottish Badgers
- The UK Biodiversity Action Plan (UKBAP)[10] and the Western Isles (Comhairle nan Eilean Siar) Local Biodiversity Action Plan (LBAP)[11]; and
- The Scottish Biodiversity List[12].

Designated sites

Two statutory designated sites were found within 5km of the proposed deep water port. These are summarised in Table 4-8:

Table 4-8 Terrestrial designated sites

Site Name	Designation[13]	Distance and Orientation	Comment
Tong Saltings	SSSI	Approximately 2.35km north east of the site boundary of Deep Water Port.	Designated for breeding bird assemblages, mudflats, saltmarsh and sand dunes
Lewis Peatlands	SAC / SPA / RAMSAR	Approximately 4.29km west of the site boundary of Deep Water Port.	Designated as an SAC primarily for three Annex 1 habitats present on site 1) oligotrophic to mesotrophic standing waters with vegetation and Littorelletea uniflorae and/or of the Isoeta-Nanojuncetea. 2) Natural dystrophic lakes and ponds 3) Blanket Bogs Designated as a RAMSAR site for blanket bog features, the breeding bird assemblage, and the breeding bird population of Dunlin (*Calidris alpina schinzii*).

[7] SNH Sitelink here: https://gateway.snh.gov.uk/sitelink/. Accessed in April 2017
[8] The Western Isles Council LDP here: http://www.cne-siar.gov.uk/planningservice/localdevplan.asp Accessed in April 2017.
[9] Sketchmap available here: http://sketchmap.co.uk/. Accessed in April 2017
[10] The UKBAP here: http://jncc.defra.gov.uk/page-5717. Accessed in April 2017
[11] Western Isles LBAP here http://www.cne-siar.gov.uk/biodiversity/documents/Biodiversity%20Audit%202002.pdf Accessed in April 2017
[12] The Scottish Biodiversity List here: http://www.biodiversityscotland.gov.uk/advice-and-resources/scottish-biodiversity-list/. Accessed in April 2017
[13] SSSI (Site of Special Scientific Interest), SAC (Special Area of Conservation), RAMSAR (Ramsar convention on Wetlands), SPA (Special Protection Area),

There were no non-statutory designated sites were found within 2km of the site development.

Ancient woodland inventory

No ancient woodland was found within the site boundary of the proposed deep water port, and none were found to be located within 2km of the proposed development boundary.

Biodiversity action plan species

Species potentially relevant to the development site and listed in the LBAP for the Western Isles are summarised in Table 4-9. The LBAP also lists various invertebrate and plant species of conservation concern.

Table 4-9 Western Isles LBAP Species

Species	LBAP	UKBAP	SBL
Common Pipistrelle Bat *Pipistrellus pipistrellus*	✓	✓	✓
Natterer's Bat *Myotis nattereri*	✓	-	✓
Daubenton's bat *Myotis daubentonii*	✓	-	✓
Otter *Lutra lutra*	✓	✓	✓

Biodiversity action plan habitats

The Western Isles LBAP identified 10 priority habitats that were deemed potentially relevant to the development site. These habitats are listed in Table 4-10.

Table 4-10 Western Isles LBAP Habitats

Habitat	LBAP	UKBAP	SBL
Coastal sand dunes	✓	✓	✓
Machair	✓	✓	✓
Coastal vegetated shingle	✓	✓	✓
Seagrass	✓	✓	-
Coastal saltmarsh	✓	✓	✓
Mud in deep water	✓	✓	-
Maerl beds	✓	✓	-
Upland heathland	✓	✓	✓
Fens	✓	✓	-
Blanket bog	✓	✓	✓

Records from the Western Isles Council Biodiversity Officer were requested by email 'enquiries@cne-siar.gov.uk' on 26/04/2017, however none were received at the time of writing.

Field Surveys

In order to determine an ecological baseline for the deep water port development a Phase 1 habitat survey and a protected species survey were undertaken in May 2017.

A Phase 1 Habitat Survey is a method that rapidly records vegetation and wildlife habitat over large areas. The information is used to identify ecologically sensitive features, inform additional species surveys and, ultimately, recommend mitigation and enhancement measures in connection with a proposed development.

The Phase 1 Habitat Survey was undertaken according to the standard Joint Nature Conservation Committee method (JNCC, 2010). Field work was carried out on Thursday 4th May 2017. Weather conditions were favourable for fieldwork with bright and sunny conditions and temperatures between 10°C -13°C .

A total of six Phase 1 habitat types including buildings were recorded on the site:

- D5 Dry Heath
- G1 Standing Open Water
- H8.4 Coastal Grassland
- H3 Boulders / Rocks
- H2 Shingle/ Cobbles
- J3.6 Buildings

The main habitats are described in Appendix B: Habitat Information and Site Photography. In addition to this a map illustrating the findings of the survey is located in Appendix A (Drawing No. 169438-003).

Protected species

The field survey for protected species was undertaken in accordance with CIEEM guidelines (CIEEM, 2013). The survey focussed on faunal species that are most likely to be found in the habitats which make up the wider landscape, or where suitable habitat is available. However, all UK protected or notable species are considered when undertaking a field survey of this nature in order to assess how valuable the surveyed area is in terms of resources. Species that were searched for and survey methods applied included, but were not limited to:

- Bats (various species);
- Otter (*Lutra lutra*);

As West European hedgehog (*Erinaceus europaeus*), brown hare (*Lepus europaeus*) and amphibian species are listed on the Scottish Biodiversity List, a search for suitable habitat and presence of these species was also included.

Bats

No records of bats were received during the desk study. No bats or evidence of bats was found during the field survey. The habitats within the survey area offer negligible features on site for commuting and foraging bats. There is very little connectivity to the wider environment. The River Creed and Lews Castle grounds are located immediately to the north of the site boundary and would provide suitable habitat for bats including mature woodland, parkland and gardens but this area is not directly connected to the site for development.

Otter

No records of otter were received during the desk study. A boat was chartered to survey the coastline at low tide along with searches on the mainland. No otter resting places or other field evidence of otter were identified during the survey.

Birds

A search of the Western Isles LBAP provided the following list of birds deemed Priority species (Table 4-11):

Table 4-11 Western Isles LBAP Priority Bird Species

Species	Scientific Name
Common Scoter	*Melanitta nigra*
Spotted Flycatcher	*Muscicapa striata*
Red-throated Diver	*Gavia stellata*
Black-throated Diver	*Gavia arctica*
Great Northern Diver	*Gavia immer*
Slavonian Grebe	*Podiceps auritus*
Storm Petrel	*Hydrobates pelagicus*
Leach's Storm Petrel	*Oceanodroma leucorhoa*
Gannet	*Morus bassanus*
Cormorant	*Phalocrocorax carbo*
Whooper Swan	*Cygnus cygnus*
Greenland White-fronted Goose	*Anser albifrons flavirostris*
Greylag Goose (Scottish)	*Anser anser*
Barnacle Goose	*Branta leucopsis*
Shelduck	*Tadorna tadorna*
Wigeon	*Anas penelope*
Pintail	*Anas acuta*
Shoveler	*Anas clypeata*
Eider	*Somateria mollissima*
Merlin	*Falco columbarius*
Peregrine	*Falco peregrinus*

Species	Scientific Name
Ringed Plover	*Charadrius hiaticula*
Golden Plover	*Pluvialis apricaria*
Grey Plover	*Pluvialis squatarola*
Lapwing	*Vanellus vanellus*
Sanderling	*Calidris alba*
Purple Sandpiper	*Calidris maritima*
Dunlin	*Calidris alpina schinzii*
Bar-tailed Godwit	*Limosa lapponica*
Redshank	*Tringa totanus*
Whimbrel	*Numenius phaeopus*
Greenshank	*Tringa nebularia*
Arctic Skua	*Stercorarius parasiticus*
Common Tern	*Sterna hirundo*
Arctic Tern	*Sterna paradisaea*
Little Tern	*Sterna albifrons*
Razorbill	*Alca torda*
Short-eared Owl	*Asio flammeus*
Dipper	*Cinclus cinclus*
Twite	*Carduelis flavirostris*
Snow Bunting	*Plectrophenax nivalis*

The habitats recorded on site do not provide optimal conditions for the vast majority of bird species noted as Priority species. There is the potential for the site to support small numbers of over-wintering waders such as Ringed Plover and Purple Sandpiper where rocky foreshore habitat exists. The harbour itself could support numbers of diver and grebe species, although the Birds of the Outer Hebrides website[14] states that the main wintering areas for these species on Lewis are Broad Bay, Valtos and Braigh, the nearest of which is ~3.5km from the proposed development.

[14] http://www.western-isles-wildlife.com/Templates/birds_status_outer_hebrides.html

Several of the species noted above are qualifying species for the Lewis Peatlands SPA, which is located ~4.3km from the proposed development. Disturbance to these species from the proposed development is therefore considered not significant.

Marine Mammals and Fish

Developments in marine environments have the potential to affect key physical processes over wide areas. The EIA will assess potential direct and indirect impacts arising from the proposed deep water port development on marine mammals, their prey species, and fish species (specifically salmonids).

Marine Mammals

A desk study of the marine environment in the vicinity of the proposed deep water port development identified two areas with nature conservation designations (Table 4-12). In addition to these sites all species of dolphin, porpoise and whale are European Protected Species (EPS). Marine mammal species included in the Western Isles LBAP and UK BAP (UKBAP) are listed in Table 4-13 they are also UK priority species and as such should be included in the EIA. All the species are UK priority species and have been recorded in the coastal waters off Stornoway.

Table 4-12 Marine Designated Sites

Site Name	Designation	Distance and Orientation	Comment
Inner Hebrides and Minches	Special Area of Conservation (SAC)	Approximately 1.4km north east of the proposed deep water port	Harbour Porpoise
North East Lewis	Proposed Marine Protected Area	Less than 1km east of the proposed deep water port	Risso's Dolphin

Table 4-13 Marine mammal LBAP species

Common name	Scientific name
Harbour Porpoise*	*Phocoena phocoena*
Northern Right Whale	*Balaena glacialis*
Minke Whale*	*Balaenoptera acutorostrata*
Sei Whale	*Balaenoptera borealis*
Blue Whale	*Balaenoptera musculus*
Fin Whale	*Balaenoptera physalus*
Humpback Whale	*Megaptera novaeangilea*
Bottle-nosed Dolphin*	*Tursiops truncates*
Risso's Dolphin	*Grampus griseus*
White-beaked Dolphin*	*Lagenorhynchus albirostris*
Atlantic White-sided Dolphin*	*Lagenorhynchus acutus*

Common Dolphin	*Delphinus delphis*
Striped Dolphin	*Stenella coeruleoalba*
Northern Bottlenose Whale	*Hyperodoon ampullatus*
Cuvier's Beaked Whale	*Ziphius cavirostris*
Sowerby's Beaked Whale	*Mesoplodon bidens*
True's Beaked Whale	*Mesoplodon mirus*
Killer Whale	*Orcinus orca*
Long-finned Pilot Whale**	*Globicephala melas*
Sperm-Whale**	*Physeter macrocephalus (P. catodon)*

Recent records *http://www.magic.gov.uk/MagicMap.aspx
**http://seawatchfoundation.org.uk/legacy_tools/region.php?output_region=14

Further baseline data on marine mammals will be gathered during the EIA process by means of a more detailed desktop study.

Fish

During the Stornoway Masterplan consultation concern was raised by the Outer Hebrides Fisheries Trust (OHFT) and the Stornoway Angling Association (SAA) to the potential impact on migratory salmonids, (Atlantic Salmon (*Salmo salar*) and Sea Trout (*Salmo trutta*)) using the Stornoway harbour area and migration routes of fish through the proposed deep water port development area. The mouth of the River Creed a few hundred metres north of the boundary of the proposed deep water port. In 2017 the River Creed was classified by Marine Scotland Science (MSS) as a Grade 1 watercourse. This grading is based on data collected between 2011-2015, the data includes reported catches; estimated age composition and egg content of returning salmon; estimated stock levels; and areas of salmon habitat and the probability of achieving conservation limits (Science, 2017). The grading means that the River Creed is currently considered to have an 80% probability of meeting its conservation limits; this also recognises the effectiveness of existing non-statutory local management interventions. There are limitations to the data used to extrapolate the grading of Scottish rivers but the methods are well established and recognised internationally. If there are other empirical data available on the River Creed this will be sorted and used to assess the impact on salmonids in the area.

The Deep Water Port development lies in the direct migratory path of the salmon entering the River Creed.

4.3.3 Potentially Significant Effects

It is anticipated that the development of a deep water port at Arnish will comprise activities with the potential to impact on ecology in the area. Based on existing knowledge of the development it is envisaged that those activities will include:

- Direct loss of tidal and subtidal habitat over the footprint of the development;
- Underwater acoustic noise and shock during piling leading to altered behaviour, this could include lethal and sub lethal impacts on animals and their prey species;
- Visual light disturbance to intertidal and sub tidal species during the hours of darkness through the use of artificial lighting during construction and throughout the life of the port;
- Visual light disturbance to migratory routes during the hours of darkness through the use of artificial lighting during construction and throughout the life of the port;

- Blasting for navigation channels creating noise and vibration in the immediate area during construction;
- Temporary increase in suspended sediment and/or deposition from dredging and construction creating physical disturbance in the marine environment;
- Release of contaminants from disturbed sediments during construction;
- Environmental incidents and accidents and potential pollution from fuels, oils etc. potential source of pollution in the marine environment during construction and from ships using the deep water port;
- Seabed excavation works during construction;
- Indirect impacts through interruption of changes to coastal processes including tidal flows, local current and sediment movement during construction and as a result of the created deep water; and
- Increased vessel numbers post construction causing disturbance in the marine environment.

Terrestrial Ecology

The baseline data gathered from the ecological survey and desk study provides sufficient information to place the site in context with regard to ecological and conservation value. Based on our current understanding of the proposed development of a deep water port at Arnish and the field and desktop surveys, it is not anticipated that there will be any significant impacts during construction on terrestrial ecology; protected or notable faunal species, vegetation and habitats or any impacts post completion that need to be considered further.

Birds

Given the habitats on site, and from a review of relevant literature, it is considered that the proposed development would not result in any significant impacts on ornithology. Therefore ornithology can be scoped out of further assessment.

Marine Mammals and Fish

Underwater noise generated during the construction of the development should be highlighted as an area with the highest potential to impact the marine ecology in the area. Underwater noise can have an adverse effect on marine mammals and fish affecting movements, timing of migrations and foraging behaviours. Another area of risk to marine biodiversity is from pollution directly originating from construction.

Following the construction work and during the life of the deep water port impacts on marine biodiversity may be seen as a result of the construction leading to changes in hydrodynamic regime in the area.

It is recognised that Atlantic Salmon face a number of pressures during their life cycle that include but are not limited to predation, poor water quality, disease and parasites, barriers to migration, poor physical habitat quality, food availability, changes in the marine environment. Atlantic Salmon are listed on Annex 5 of the Habitats Regulations 1994 which implements the species protection requirements of the Habitats Directive in Scotland. Therefore based on existing available data and our current understanding of the proposed development it is our view that Atlantic Salmon should be considered further and scoped in.

In addition to this River Lamprey (*Lampetra fluviatilis*) and Sea Lamprey (*Petromyzon marinus*) together with the critically endangered European Eel (*Anguilla Anguilla*), are all UK BAP species and the impact of the proposed works on these species will also be considered in the EIA.

4.3.4 Assessment Methodology

The assessment of potential impacts will be undertaken against a baseline and the significance of these assessed using standard EIA criteria (i.e. as developed by the Institute of Environmental Management and Assessment (IEMA)) and professional judgement in line with Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2010) guidelines.

The methodology for the Ecological Impact Assessment (EcIA) will follow the Guidelines for Ecological Impact Assessment in the UK and Ireland: Marine and Coastal, by CIEEM (CIEEM, 2010) and the Guidelines for Ecological Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal by CIEEM (CIEEM, 2016). The British Standard Biodiversity: Code of Practice for Planning and Development (BS 42020:2013) cites the CIEEM EcIA Guidelines as the acknowledged reference on ecological impact assessment. The guidelines are consistent with the British Standard, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.

Any assessment should include all direct and indirect, lethal and non-lethal impacts on ecology that could reasonably occur during construction work and in operation of the new deep water port.

Terrestrial Ecology

Based on the results of the baseline survey no further targeted surveys of terrestrial ecology are required.

Birds

No further assessment of birds is required.

Marine Mammals and Fish

The assessment of the potential direct and indirect impacts on marine ecology will draw on the findings of the hydrodynamic studies and the conclusions for the impacts on water and sediment quality assessments. This will in turn determine the potential area of risk.

A desktop study to review current existing literature and data sets for marine mammals in the local area will be conducted. When detailed proposals for construction and operation of the deep water port become available specific requirements for survey will be identified. This may include surveys to determine presence/absence, abundance and other behavioural aspects of marine mammals using the area proposed for the deep water port. Any requirement for additional surveys will be agreed through discussion with SNH and Marine Scotland. The deep water port area is not within any sites designated for marine mammals but connections to the wider area will be considered. The need to include underwater noise studies will be discussed with the competent authority, Marine Scotland.

It is anticipated that a Marine Mammal Observation Protocol (MMOP) will be required so that the proposed construction works, particularly piling, dredging and disposal, do not cause unnecessary disturbance to marine mammals (cetaceans and seals). This is likely to incorporate the use of suitably qualified Marine Mammal Observers (MMOs) and Passive Acoustic Monitoring (PAM) Operators, competent in the identification of marine mammals, being present during construction. The MMOs will undertake observation for marine mammals during high sound producing activities (piling and heavy engineering activities), and during dredging and disposal operations. The PAM Operators will set up monitoring stations/transects and listen for the presence of marine mammals within the mitigation zone before and during high sound producing activities. It is likely that a MMOP will be incorporated into a Marine Mammal Protection Plan (MMPP).

If mitigation is not possible or appropriate and an impact on European Protected Species (EPS) is envisaged then it may be appropriate to apply for an EPS licence from the licensing authority, Marine Scotland.

All available data on fish movements in the deep water port area and the River Creed will be collated. The need to include underwater noise studies will be discussed with the competent authority, Marine Scotland. It is considered that no fisheries surveys are required to assess direct impacts on the River Creed, in addition to those already undertaken by the Fisheries Trust.

4.4 Cultural Heritage and Archaeology

4.4.1 Introduction

This section of the EIA Scoping Report outlines the baseline archaeological and cultural heritage conditions at the site and considers the likely significant potential effects from the proposed development on heritage assets.

4.4.2 Baseline Conditions

There are 19 known heritage assets within the Site (Table 4-14, and Appendix A: Drawings).

Table 4-14 Heritage Assets within the Site Boundary

Asset	Description	NGR
SM5347	WW2 gun emplacements	NB 43100 30500
102813	Wreck, unknown	NB 42320 30840
102824	Wreck, The Arnish	NB 42640 30740
102825	Wreck, Bjorn	NB 42810 31040
102826	Wreck, Andalina	NB 42780 31110
102827	Wreck, Alabama	NB 42380 31550
102828	Wreck, Portugal	NB 42720 31580
102846	Wreck, Marjory	NB 42540 31120
142506	Abandoned boat, unknown	NB 42223 31476
142507	Dyke, Arnish	NB 42312 30585
142509	Factory, Arnish	NB 42573 30284
142510	Engineering Workshop, Arnish	NB 42768 30520
142511	Field System, Arnish	NB 42850 30976
142516	Field System, Arnish	NB 43010 30769
142524	Sea Defences, Arnish	NB 42948 30409
142525	Dyke, Arnish	NB 42801 30278
142526	Sea defences, Arnish	NB 42698 30263
142527	Dyke, Arnish	NB 42629 30257
142528	Dyke, Arnish	NB 42613 30230

These range in date from the post-medieval to the modern period, with the majority being of late post-medieval date. There is one Scheduled Monument within the Site, with the remainder being undesignated HER entries. The Scheduled Monument comprises a Second World War coastal gun battery on Arnish Point (SM5347). The undesignated Historic Environment Record (HER) entries include seven shipwrecks within Cala Ghlumaig, as well as onshore post-medieval field systems, sea defences and dykes, and the factory and engineering workshop on Arnish Point.

The HER does record six other entries within the Site boundary. However, none of these survives as an archaeological feature and they are not considered heritage assets in this Scoping Report. They include the sites of three shipwrecks destroyed in the 1970s during the land reclamation works associated with construction of the Arnish fabrication yard, documentary records of two ships grounded in the nineteenth century but subsequently refloated, and a record of the approximate location of a stone object (likely to be a fishing weight) discovered on Arnish Point.

Within 1km of the Site boundary there are a further two Scheduled Monuments, both from the prehistoric period; an Iron Age dun (SM5397) in Loch Arnish and a chambered cairn (SM6550) in the grounds of Lews Castle. There are also two Listed Buildings; one Category B (Arnish lighthouse and attendant buildings) and one Category C (a monument, commemorating Prince Charles Edward Stuart's journey here in 1746, after Culloden). The Inventory Garden and Designed Landscape (IGDL) comprising the grounds of Lews Castle and Lady Lever Park (GDL00263) is located to the north-west and some of the IGDL is within 1km of the Site.

4.4.3 Potentially Significant Effects during Construction

Groundworks comprising onshore excavation and offshore dredging and land reclamation required for the proposed development have the potential to impact directly upon known heritage assets present within the Site. Impacts will potentially be of high magnitude as they could result in the complete destruction and removal of archaeological remains. Particular heritage assets potentially subject to direct impacts include four of the shipwrecks in Cala Ghlumaig (102813, 102826, 102828, 102846), and the abandoned boat (142506) and dyke (142507) onshore. It is understood that the scheduled gun battery (SM5347) will be outside the proposed construction footprint and will be subject to no direct impacts.

In addition to possible impacts upon known heritage assets, the proposed development has the potential to impact upon hitherto unknown buried archaeological remains. The level of effect will be dependent upon the finalised masterplan and construction methods associated with the proposed development.

4.4.4 Potentially Significant Effects post-Completion

The proposed development has the potential to affect the settings of designated heritage assets including Scheduled Monuments, Listed Buildings and an Inventory Garden and Designed Landscape.

Designated heritage assets up to 1 km distant from the Site have been identified. Given the local topography and the character of the heritage assets, it is unlikely that significant setting effects will occur.

4.4.5 Inclusion or Exclusion from EIA

Cultural heritage and archaeology will be scoped into the EIA.

The potential for direct effects upon heritage assets within the proposed Deep Water Port development will be assessed in the EIA. This will be informed by desk-based assessment and a walkover survey. The methodology to be employed in assessing direct effects is outlined below in Section 4.4.7.

The potential for indirect effects upon the setting or character of designated heritage assets will also be assessed in the EIA. The potential for impacts upon all designated heritage assets within 1 km of the Site boundary will be considered. The assessment will also consider the potential for non-visual settings effects, such as that which could potentially result from elevated traffic, lighting and noise. The methodology to be employed in assessing indirect (setting) effects is outlined below in Section 4.4.7 and will be informed by guidance notes published by HES.

4.4.6 Design and Mitigation

Where significant effects are identified, the ES chapter will put forward mitigation proposals. These proposals will seek to avoid or reduce identified effects. Where it is impossible to avoid or reduce the level of effect the ES chapter will consider the potential to offset any significant effects. Comhairle nan Eilean Siar's Archaeology

Service and Historic Environment Scotland (HES) will be consulted in order to in establish appropriate design responses or mitigation measures required to avoid, minimise or offset significant effects.

4.4.7 EIA Assessment Methodology

Baseline Assessment

The primary source of information for the presence and significance of known assets within the Site is contained within the National Record of the Historic Environment (as held by HES), the Comhairle nan Eilean Siar HER and the designated asset data sets held by HES. All heritage assets within 1km of the Site boundary will be identified to allow for an assessment of direct impacts and identify assets beyond the Site boundary which may be subject to setting impacts. A walkover survey will also be undertaken in order to more fully understand the historic environment baseline conditions at the site and inform the impact assessment.

The ES chapter will fully describe the baseline historic environment conditions, collating the results of desk-based data gathering and a walkover survey. It will identify areas where the proposed development may impact upon heritage assets and include a constraints map for direct impacts.

Designated heritage assets within a distance of up to 1km from the Site boundary have been assessed from a desk-based perspective for the purposes of this Scoping Report. Six designated heritage assets are located within 1 km of the Site. However, the majority of these are located beyond the Site boundary and given the topography of the Site and the character of the heritage assets significant setting effects are not anticipated.

Assessment of Significance / Assessment Criteria

This sub-section sets out the methodology for assessing direct and indirect effects upon heritage assets. It takes account of Scottish Planning Policy (SPP) (Scottish Government 2014), Historic Environment Scotland Policy Statement (HESPS) (HES 2016) and PAN 2/2011: Planning and Archaeology (Scottish Government 2011). HES's guidance notes on setting (HES 2016a), contained within the series *Managing Change in the Historic Environment,* will also be considered.

The Assessor

Headland Archaeology Ltd conforms to the standards of professional conduct outlined in the Chartered Institute for Archaeologists' Code of Conduct, the CIfA Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology, the CIfA Standards and Guidance for Historic Environment Desk Based Assessments and Field Evaluations.

Headland Archaeology Ltd is a Registered Archaeological Organisation of the Chartered Institute for Archaeologists. This status ensures that there is regular monitoring and approval by external peers of our internal systems, standards and skills development.

Headland Archaeology Ltd is ISO 9001:2008 accredited, in recognition of the Company's Quality Management System.

Heritage Assets

A heritage asset (or historic asset) is any element of the historic environment which has cultural significance. Both discrete features, and extensive landscapes defined by a specific historic event, process or theme, can be defined as heritage assets; and assets may overlap or be nested within one another.

Designated assets include Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas. Other assets may also be locally designated through policies in the Local Plan.

The majority of heritage assets are not designated. Some undesignated assets are recorded in Historic Environment Records or Sites and Monuments Records (HERs/SMRs) maintained by local authorities and other agencies. However, many heritage assets are currently unrecorded, and the information contained in HERs and SMRs is not definitive, since they may include features which, for instance, have been entirely removed, or are of uncertain location, dubious identification, or negligible importance. The identification of undesignated heritage assets is therefore to some extent a matter of professional judgement.

Some heritage assets may coincide with visual receptors or landscape character areas, which are addressed in Section 4.2 (Landscape and Visual), and in such cases it is important to recognise the difference in approach between these two topics. Cultural heritage assessment addresses effects on the cultural heritage significance of heritage assets, which may result from, but are not equivalent to, visual impacts. Similarly, an effect on a landscape character area does not equate to an effect on the cultural heritage significance of heritage assets within it.

Heritage importance, cultural significance and sensitivity

Cultural heritage impact assessment is concerned with effects on *cultural significance*, which is a quality that applies to all heritage assets, and as defined in 'Historic Environment Scotland Policy Statement 2016' (Annex 1, paragraph 3), may be artistic, archaeological, architectural, historic, traditional, aesthetic, scientific or social, and may be 'inherent in the monument itself, its fabric, setting, use, associations, meanings, records, related monuments and related objects'. This use of the word 'significance', referring to the sum of the values we attach to an asset because of its heritage interest, should not be confused with the usage in EIA terminology where the significance of an effect reflects the weight that should be attached to it in a planning decision.

The *importance* of a heritage asset is the overall value assigned to it based on its cultural significance, reflecting its statutory designation or, in the case of undesignated assets, the professional judgement of the assessor (Table 4-15). Assets of national importance and international importance are assigned a high and very high level respectively. Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas are, by definition, of national importance. The criterion for Listing is that a building is of 'special architectural or historic interest'; following HESPS Note 2.17, Category A refers to 'buildings of national or international importance', Category B to 'buildings of regional or more than local importance', and Category C to 'buildings of local importance'. Conservation Areas are not defined as being of national importance, and are therefore assigned to a medium level. Any feature which does not merit consideration in planning decisions due to its cultural significance may be said to have negligible heritage importance; in general, such features are not considered as heritage assets and are excluded from the assessment.

Table 4-15 Criteria for Assessing the Importance of Heritage Assets

Importance of the asset	Criteria
Very high	World Heritage Sites and other assets of equal international importance
High	Category A Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields, Historic Marine Protected Areas and undesignated assets of national importance
Medium	Category B Listed Buildings, Conservation Areas, and undesignated assets of regional importance
Low	Category C Listed Buildings and undesignated assets of lesser importance

Cultural significance is assessed in relation to the criteria in HESPS Annexes 1-6, which are intended primarily to inform decisions regarding heritage designations, but may also be applied more generally in identifying the 'special characteristics' of a heritage asset, which contribute to its cultural significance and should be protected, conserved and enhanced according to SPP paragraph 137. Annex 1 is widely applicable in assessing the cultural significance of archaeological sites and monuments, for instance, while the criteria in Annex 2 can be used in defining the architectural or historic interest of buildings, whether listed or not.

The special characteristics which contribute to an asset's cultural significance may include elements of its setting. Setting is defined in 'Managing Change in the Historic Environment: Setting' (HES 2016, Section 1) as 'the way the surroundings of a historic asset or place contribute to how it is understood, appreciated and experienced'. The setting of an asset is defined and analysed according to Stage 2 of the three-stage approach promoted in 'MCHE: Setting', with reference to factors listed on pages 9-10. The relevance of these factors to the understanding, appreciation and experience of the asset determines how, and to what extent, an asset's cultural significance derives from its setting. All heritage assets have settings; however, not all assets are equally sensitive to impacts on their settings. In some cases, setting may contribute very little to the asset's cultural significance, or only certain elements of the setting may be relevant.

Assessment of the magnitude of impacts on cultural significance

The magnitude of an impact is a measure of the degree to which the cultural significance of a heritage asset will be increased or diminished by the development. This definition of magnitude applies to impacts on the setting, as well as impacts on the physical fabric, of an asset. Impacts on the settings of heritage assets are assessed with reference to the factors listed in 'MCHE: Setting' Stage 3 (evaluate the potential impact of the proposed changes, pages 10-11). It is important to note that the magnitude of an impact resulting from an impact on setting is not a direct measure of the visual prominence, scale, proximity or other attributes of the development itself, or of the extent to which the setting itself is changed; therefore, Landscape and Visual Impact Assessment criteria for scale/magnitude cannot be applied directly in determining the magnitude of effect on the setting of a heritage asset. It is also necessary to consider whether, and to what extent, the characteristics of the setting which would be affected contribute to the asset's cultural significance.

Magnitude is assessed as high/medium/low, and adverse/beneficial, or negligible, using the criteria in Table 4-16 as a guide. In assessing the effects of a development, it is often necessary to take into account various impacts which affect an asset's significance in different ways, and balance adverse impacts against beneficial impacts. For instance, there may be adverse impacts on an asset's fabric *and* on its setting, offset by a beneficial impact resulting from archaeological investigation. The residual effect is an overall measure of how the asset's significance is reduced or enhanced.

Table 4-16 Criteria for Assessing the Magnitude of Impacts on Heritage Assets

Magnitude of Impact	**Guideline Criteria**
High beneficial	Elements of the asset's physical fabric which would otherwise be lost, severely compromising its cultural significance, are preserved in situ; or Elements of the asset's setting, which were previously lost or unintelligible, are restored, greatly enhancing its cultural significance.

Magnitude of Impact	Guideline Criteria
Medium beneficial	Elements of the asset's physical fabric which would otherwise be lost, leading to an appreciable but partial loss of cultural significance, are preserved in situ; or Elements of the asset's setting are considerably improved, appreciably enhancing its cultural significance; or Research and recording leads to a considerable enhancement to the archaeological or historical interest of the asset.
Low beneficial	Elements of the asset's physical fabric which would otherwise be lost, leading to a slight loss of cultural significance, are preserved in situ; or Elements of the asset's setting are improved, slightly enhancing its cultural significance; or Research and recording leads to a slight enhancement to the archaeological or historical interest of the asset.
Negligible	The asset's fabric and/or setting is changed in ways which do not beneficially or adversely affect its cultural significance.
Low adverse	Elements of the asset's fabric and/or setting which are of very limited relevance to its significance are lost or changed, resulting in a very slight loss of cultural significance; or Elements of the asset's fabric and/or setting which contribute to its cultural significance are minimally affected, resulting in a very slight loss of cultural significance.
Medium adverse	Elements of the asset's fabric and/or setting which contribute to its significance are affected, but to a limited extent, resulting in an appreciable but partial loss of the asset's cultural significance.
High adverse	Key elements of the asset's fabric and/or setting are lost or fundamentally altered, such that the asset's cultural significance is lost or severely compromised.

Assessment of the significance of effects

The significance of an effect (EIA 'significance') on the cultural significance of a heritage asset, resulting from a direct or indirect physical impact, or an impact on its setting, is assessed by combining the magnitude of the impact and the importance of the heritage asset. The matrix in Table 4-17 provides a guide to decision-making but is not a substitute for professional judgement and interpretation, particularly where the importance or impact magnitude levels are not clear or are borderline between categories. EIA significance may be described on a continuous scale from negligible to major; it is also common practice to identify effects as significant or not significant, and in this sense major and moderate effects are regarded as significant in EIA terms, while minor effects are 'not significant'.

Table 4-17 Criteria for Assessing the Significance of Effects on Heritage Assets

Asset importance	Magnitude of Impact			
	High	**Medium**	**Low**	**Negligible**
Very high	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Major to moderate	Negligible
Medium	Major	Major to moderate	Moderate to minor	Negligible
Low	Major to moderate	Moderate to minor	Minor	Negligible

Cumulative Effects

Cumulative effects relating to cultural heritage are for the most part limited to indirect effects upon the settings of heritage assets. As there are no specific guidelines with regard to undertaking cumulative assessment for heritage assets, this assessment will follow the criteria for assessing setting impacts as set out above. The assessment of cumulative effects will consider whether there would be an increased impact upon the setting of heritage assets as a result of adding the proposed development to a baseline, which may include existing, under construction, consented or proposed developments as agreed with the planning authority.

Those heritage assets which are included in the detailed setting assessment, under indirect effects for the proposed development, will also be considered when assessing the potential for cumulative effects. However, only those assets which are judged to have the potential to be subject to significant cumulative effects will be included in the detailed cumulative assessment provided. In assessing cumulative effects operational, under construction, consented and proposed developments will be considered. While all of these developments and development proposals will be considered, only those specific developments which would contribute to, or have the possibility to contribute to, cumulative effects on specific heritage assets will be discussed in detail in the text.

4.5 Noise

4.5.1 Introduction

The noise assessment will consider the potential for noise generated by the development to impact upon existing residential receptors. The significance of any noise impacts will also be predicted. The effects of construction noise on marine life shall be considered as part of the Ecology EIA assessment.

4.5.2 Baseline Conditions

Part of the proposed site is currently occupied by BiFab who operate an engineering / fabrication yard and quay. There is therefore a component of industrial noise present in the current noise environment at Arnish.

The port is otherwise located in a rural location, the closest residential receptors being across the water in Stornoway, greater than 1km to the north-west at its closest point

Outside of the site boundary sources that may generate noise include industrial/commercial activities in and around Stornoway. Considering the distances involved (greater than 1km), these are not considered to be significant.

4.5.3 Potentially Significant Effects during Construction

The noise from certain construction activities has the potential to impact upon existing noise sensitive receptors. Construction details have not been finalised at this stage. The degree of impact during the construction phase will depend upon;

- The nature of construction activities being carried out; this includes the type and size of machinery/plant involved, combinations of activities happening simultaneously and HGV routes in and around the site;
- Location of construction activities relative to the closest noise sensitive receptors;
- Duration of proposed activities;
- Construction site operating times; and
- Extent of noise mitigation measures in place.

Noise generating activities during the construction phase are understood to include;

- Bulk blasting of rock from slopes behind the quay;
- Dredging of an area of the sea bed adjacent to the new quay. It is understood this may be carried out by a cutter suction dredger or large backhoe dredger on a hopper barge;
- Land reclamation using material from rock blasting and dredging;
- Piling of steel tubes into the sea bed as part of the main quay wall / side wall of the ferry berth construction;
- Road improvement works; and
- HGV and construction plant movements in and around the site.

4.5.4 Potentially Significant Effects post-Completion

Certain activities during the operational phase have the potential to generate noise, these include;

- Loading / unloading activities within the heavy lift area;
- Berthing and unloading gantries for oil delivery vessels;
- Loading / unloading and berthing activities from cruise liners and freight ferries;
- Engineering and fabrication works; and
- Increased road traffic on the newly upgraded link road between the site and the A859.

4.5.5 Inclusion or Exclusion from EIA

Construction Noise;

Details of construction activities have not been finalised at this stage. When this information is known, construction noise from these activities shall be assessed as part of the EIA. Details on the specifications, locations and durations of potentially noise plant and equipment shall be obtained from the contractor and used to determine the most exposed sensitive receptors to construction noise. Baseline noise surveys pre-construction shall be carried out to determine the existing noise climate.

Noise from construction activities shall be predicted at the most exposed residential receptors following guidance provided in *BS5228-1:2009; Code of Practice for Noise and Vibration Control on Construction and Open Sites.* Predicted increases in levels above baseline shall be assessed in order to determine the significance of effects. The results of the assessment can be used to inform a construction noise management plan, to help mitigate any effects at the most exposed sensitive receptors.

Operational Noise;

The site is located in a rural location, the closest residential receptors being in Stornoway, greater than 1km to the north-east at its closest point. Due to the distances involved, and that there is currently industrial noise present at the site, significant noise impacts are not anticipated.

An assessment of operational noise at the closest residential receptors requires detailed information of activities, items of plant/machinery, along with durations involved. When such information is known in more detail a desktop assessment shall be carried out to determine if there is a noise impact at the closest residential receptors in Stornoway. If sufficient information is available to make this assessment it may be included as part of the EIA, otherwise it may be provided as a stand-alone assessment at a later date.

4.5.6 EIA Assessment Methodology

A desktop assessment of operational noise shall be carried out; as mentioned in Section 4.5.5; due to the distances of greater than 1km between source and receivers this is not likely to be significant. If sufficient information is available to carry out the desktop assessment it may be included as part of the EIA, otherwise it may be provided as a stand-alone assessment at a later date.

The construction noise assessment shall be carried out following the guidance outlined below.

BS5228-1:2009; Code of Practice for Noise and Vibration Control on Construction and Open Sites.

Methods for calculating noise produced by construction and open sites such as quarries are provided in BS5228-1:2009. The document gives source data for different types of noise source, as well as methods for calculating noise from stationary and mobile plant. Specific advice on noise from sources such as piling is provided. BS5228 does not give full guidance on noise limits, however, guidance is provided on setting appropriate day and night-time limits. Recommendations for basic methods of noise control relating to construction and open sites where activities/operations generate significant noise levels are provided.

The construction noise impact assessment will comprise the following elements;

- Measurement of existing baseline noise environment at a sample of 2-3 areas representative of the most exposed noise sensitive receptors surrounding the development. Measurement positions will be agreed with Comhairle nan Eilean Siar Council Environmental Health Department.
- Review of construction activities, locations, noise data and identification of sensitive receptors to be considered in the assessment (to be agreed with Comhairle nan Eilean Siar Environmental Health Department)
- Calculation and assessment of construction noise at most exposed sensitive receptors; comparison to baseline noise levels.
- If necessary, provide advice on potential mitigation measures necessary to reduce the significance of the construction noise impact.

Sensitive receptors to be included in the assessment are likely to include residential properties on Newton Street, Builnacraig Street and Battery Park Road.

The potential for cumulative interaction has been considered in relation to the Applicant's other proposed development i.e. Newton Marina. Although the Applicant will seek a Scoping Opinion for both sites, at this stage, it has not been determined whether or not both will proceed at the same time, and therefore it is impossible to determine if there are likely to be cumulative noise impacts at this stage. Should both developments proceed simultaneously, given the primary receptors of cumulative effects would be those residential properties specified above, construction noise impacts from the Port development would be partly mitigated by the intervening

distance and it is unlikely that peak construction activity would occur simultaneously. At this stage, it is proposed to scope out cumulative noise assessment.

4.6 Air Quality

4.6.1 Introduction

The development has the potential to impact local air quality in a number of ways with the key issues in relation to air quality being traffic emissions from the local road network both surrounding and accessing the site and dust emissions during the construction phase.

4.6.2 Baseline Conditions

In order to inform the Scoping Report, the relevant 1km background air quality concentration maps were obtained from the Scottish Air Quality and DEFRA websites. The 2016 measured annual average concentrations of NO_2, PM_{10} and $PM_{2.5}$ are 4.19µg/m^3, 7.38µg/m^3 and 4.62µg/m^3 respectively for background square (142500, 930500). This indicates the good air quality within the area of the site with the concentrations well below the relevant National Air Quality Objectives of 40µg/m^3, 18µg/m^3 and 10µg/m^3 respectively.

The 2016 Air Quality Progress Report for Comhairle nan Eilean Siar Council (the most up-to-date report available) does not identify any Air Quality Management Areas (AQMAs) within the council area.

Comhairle nan Eilean Siar Council does not currently operate any automatic air quality monitoring stations within their boundary and monitoring via diffusion tubes is limited to within Stornoway circa 1.38miles to the north and therefore not representative of conditions at the proposed development.

4.6.3 Potentially Significant Effects during Construction

Potential exists for certain construction activities to generate dust and impact existing residents. Impacts can arise at various construction phases including Earthworks, Demolition, Construction and Trackout and have the potential to cause dust soiling, human health and ecological impacts if not managed appropriately.

4.6.4 Potentially Significant Effects post-Completion

Potential exists for an increase in traffic in the vicinity of the surrounding road network and in turn increases in the pollutants NO_2, PM_{10} and $PM_{2.5}$ which are most commonly associated with traffic emissions. This has the potential to impact both existing and future residents.

4.6.5 Inclusion or Exclusion from EIA

The primary long-term concern in relation to air quality is the emissions generated by traffic and the subsequent impact on the local ambient air quality at residential and public areas located within the vicinity of the main road network. The main pollutants of concern associated with road traffic emissions are NO_2, PM_{10} and $PM_{2.5}$.

It is estimated that the development will not lead to a significant increase in road traffic on the surrounding roads. Further to this, with data indicating that air quality is good in the vicinity of the site it is anticipated that any increase in exhaust emissions would have a negligible effect on air quality at sensitive receptors. This will therefore not be assessed as part of the EIA.

Construction of the proposed development is considered to be a temporary impact and can be controlled through developing a site-specific Dust Management Plan as part of a Construction Environmental Management Plan (CEMP). The dust impact assessment requires specific information on site operations during construction, including preparatory earthworks, general construction and the potential for trackout during construction of the proposed development. Currently this information is still being finalised. It is therefore proposed to defer the construction dust assessment and formulation of a construction dust management plan until such time as details on construction have been finalised.

Accordingly, there is no requirement for a specific air quality EIA Report chapter. The findings of the construction dust assessment will be incorporated into the Other Issues chapter.

4.7 Water Environment

4.7.1 Introduction

The water environment is considered to encompass hydrology, hydrogeology and water quality, whilst coastal processes are considered to encompass tides, waves and sediment transport processes. This section of the EIA will therefore address all of these subject areas, in addition to geology. The associated interactions between the water environment, ecology and fisheries will be considered within the ecology section of the EIA.

The Water Framework Directive (WFD) (Council Directive 2000/60/EC) aims to protect and enhance water bodies within Europe and covers all estuarine and coastal waters out to 1 nautical mile. This requires that there is no deterioration in the quality of surface or groundwater bodies and aims to achieve good ecological status or potential. The implications of the WFD must be considered when assessing this project and the details of how compliance will be achieved provided in the EIA.

The development proposals for the deep water port at Arnish have the potential to cause changes to the baseline hydro(geo)logical conditions and the ongoing coastal processes at the site, and in the wider area. Given the importance of water as a valued resource, coastal processes to the surrounding environment, and of ensuring sustainable development, an assessment of the water environment and coastal processes is considered essential.

4.7.2 Baseline Conditions

The proposed deep water port development site lies within the coastal inlet of Cala Ghlumaig, located on the north-eastern shore of Arnish Point at the mouth of Stornoway Harbour. The tidal embayment of Stornoway Harbour extends up to 3km in length, and around 1.5km in width at its widest point, covering an area of just over 3km^2.

Geology

The site is partially underlain by Protocataclasite (Outer Hebrides Thrust Complex), with Gneiss (Lewisian) present immediately to the west, and Conglomerate (Stornoway) to the north and east. There are no significant superficial deposits mapped within the vicinity of the site (BGS, n.d.).

Coastal Processes

Tidal currents within the Stornoway Harbour embayment are insignificant. The wave climate is dominated by locally generated wind waves, whilst standing wave oscillations (seiches) can occur within the harbour (up to 0.5m in amplitude) when atmospheric depressions pass northwards. A small quantity of silt and peat is deposited in Stornoway Harbour from the Bayhead River during high flow events. Maintenance dredging of this material is infrequently required (once a decade) as a result (Ramsay & Brampton, 2000). The European Nature Information

System (EUNIS) seabed habitat map shows the dominant seabed habitat within the harbour embayment to be rock or other hard strata, present within a low energy environment (EMODnet, 2017).

Tidal Water Levels

Tidal levels at Stornoway Harbour as presented within the Admiralty Tide Tables (UKHO, 2017) are shown in . The mean tidal range at Stornoway is 4.1m during spring tides and 1.7m during neap tides.

Table 4-18 Tidal Range at Stornoway

Tide Condition	Chart Datum (mCD)	Ordnance Datum (mOD)
Highest Astronomical Tide (HAT)	5.5	2.79
Mean High Water Spring (MHWS)	4.8	2.09
Mean High Water Neap (MHWN)	3.7	0.99
Mean Low Water Neap (MLWN)	2.0	-0.71
Mean Low Water Spring (MLWS)	0.7	-2.01

Extreme sea levels have been predicted around the whole UK coastline and published by the Environmental Agency/Department for Environmental Food and Rural Affairs report (McMillan et al., 2011). These extreme levels include the effects of both tides and storm surge but not the effect of amplification within estuaries or sea lochs. In order to provide better estimates around the Scottish coastline, SEPA have updated the original estimates. The SEPA derived extreme sea levels, predicted at a point within Stornoway Harbour, are 3.4m Above Ordnance Datum (AOD) for the 1 in 200 year return period event and 3.51mAOD for the 1 in 1,000 year return period event .

Hydrology

The two main inflows of freshwater to the Stornoway Harbour embayment are the Bayhead River, which enters at the northern (inland) tip of the harbour, and the Abhainn Ghrioda, which enters the harbour on the western shore, opposite Goat Island. Bayhead River is a minor watercourse with a catchment area of under 8km^2. The Abhainn Ghrioda is a larger watercourse, with a catchment area of around 50km^2, however the inflow of freshwater remains insignificant relative to the much larger volume of seawater exchanged within the harbour embayment.

There is a single mapped inflow of freshwater to Cala Ghlumaig, the Allt Poll a' Choire enters the bay at the north-western corner. This is a minor watercourse originating from a small lochan a few hundred metres to the south-west. It is considered likely that there may also be some local discharges from piped drainage systems, particularly in the vicinity of the fabrication yard.

Water Quality

The coastal waters of Stornoway Harbour are classified under the Water Framework Directive (WFD) monitoring programme as a coastal waterbody. The waterbody is classified as being of overall 'Good' status in 2015, with a hydromorphological status of 'High'. Of the watercourses discharging to Stornoway Harbour only the Abhainn Ghrioda is large enough to be classified, with an overall status of 'High' in 2015 (SEPA, n.d.).

4.7.3 Potentially Significant Effects during Construction

The proposed development will involve construction activities in and near the water environment, including land reclamation, new quay walls and seabed dredging. The key potential environmental impacts on the water environment and coastal processes during construction and operation have been identified and are outlined below:

- Potential changes in the local wave climate;
- Potential changes in local flood risk and drainage;
- Potential contamination of coastal water and sediments through spillages and/or sediment transfer (oil, fuels and suspended solids); and
- Potential interactions between water environment impacts and associated ecology.

4.7.4 Potentially Significant Effects post-Completion

Potentially significant effects arising from the post-completion phase (i.e. once the development has been built), are likely to arise from the same potential impacts as highlighted above within section 4.7.3.

4.7.5 Inclusion or Exclusion from EIA

The nature of the proposed works, including land reclamation, new quay wall construction and capital dredge requirement, raises the potential for impacts on the local wave climate, and associated impacts on the local fishing fleet, ferry transport link and other harbour users. A wave modelling study is therefore proposed in order to assess the potential impact of the proposed works on the wave climate within Stornoway harbour.

Given the absence of significant tidal currents, sediment input and transport within the harbour, and the prominence of bedrock around the foreshore, it is considered unlikely that there would be any significant impact from the proposed development on tidal currents or sediment processes. It is proposed that a desk based study of local hydrodynamic conditions within the harbour embayment should be undertaken to confirm this understanding.

Site investigation will be required within the proposed works area, particularly the dredge pocket, in order to determine the nature of the substrate, the likely implications for the project, and licencing requirements.

Assessment of the potential for particulate and chemical contamination of water will be central to the assessment. The prevention of pollution during construction and operational phases will be a specific focus of the EIA and recommendations made for the adoption of good working practices, including suitable drainage measures, in line with appropriate guidance and not to the detriment of existing conditions.

The proposed development will be considered in light of potential flood risk, including wave overtopping and surface water drainage.

4.7.6 Design and Mitigation

Where any significant effects on the water environment or coastal processes are identified as part of the EIA process, recommendations for design alteration or mitigation which could avoid, reduce or remedy the adverse effects will be identified.

4.7.7 EIA Assessment Methodology

The assessment will follow standard EIA procedures and will include:

- Desk based review of the design of the proposed development in relation to the local water environment and coastal processes;
- Consultation with key stakeholders to obtain relevant information and to ensure their concerns are addressed within the study;
- Establishing the existing baseline conditions:

- Review topography and ground conditions at the site and environs;
- Review of hydrology, catchment characteristics, local drainage and water quality conditions;
- Review of coastal processes including bathymetry, tidal levels, river and tidal flow currents, wave action, bed sediment type and distribution, sediment transport and deposition, geology;
- Site investigation within proposed dredge pocket to establish nature of dredge material;
- Wave modelling study to establish baseline and design conditions;
- Flood risk assessment, including wave overtopping and surface water drainage with climate change scenarios; and
- Reporting of baseline conditions to provide a basis for assessment of the potential impact.

- Impact Assessment:
  - Identification of sensitive receptors and environmental constraints;
  - Identification of potential impacts;
  - Assessment of impact significance;
  - Identification and assessment of mitigation measures to reduce or avoid any potential impacts of the proposed development; and
  - Statement of residual impacts.

Potential impacts arising from the development will be predicted and evaluated by comparison with environmental quality standards, sediment quality standards, and water and sediment quality objectives. The observed baseline data will initially be used along with expert opinion to qualitatively assess the potential impacts and the significance to receptors.

4.8 Traffic and Transport

4.8.1 Introduction

The transport related issues associated with the proposed development have been assessed against national and local policies set out in the following documents:

- National Planning Framework (NPF) 3;
- Planning Advice Note 75 Planning for Transport;
- Outer Hebrides Local Development Plan (LDP) 2 – Working Towards A New Plan (2012);
- The Transport Strategy for the Highlands and Islands – Hitrans (2008 – 2021);

The principal objective of the policies in the above documents is to support the promotion of accessibility by all modes of travel in order to support sustainable economic growth.

National Planning Framework (NPF3) states plans and decisions should take account whether:

- The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
- Safe and suitable access to the site can be achieved for all people; and
- Improvements can be undertaken within the transport network that cost effectively limits the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts are severe.

Outer Hebrides Local Development Plan (LDP) 2 supports sustainable developments that

- Support development that reflects the scale and function of Stornoway,

- Promotes opportunities for economic growth,
- Ensure the sustainability of settlements by reducing the emissions which cause climate change and adapting to its effects; and
- Maximise the re-use of previously developed land, in the built out areas.

The Transport Strategy for the Highlands and Islands sets out the thirteen-year transport strategy for the area from 2008 to 2021. The Plan is produced by the Highlands and Islands Transport Partnership (HITRANS) on behalf of the five local authorities (Argyll and Bute, Highland, Moray, Orkney Islands and Comhairle nan Eilean Siar).

The Transport Strategy for the Highlands and Islands is focused on ways to address challenges within three key areas:

- Supporting economic development and regeneration;
- Addressing climate change;
- Supporting safe and sustainable communities

Dredged material will be used as an infill, and as such will alleviate the need for HGVs. There may be a limited number of vans and HGVs delivering. It is anticipated that staff will be transported to the site in company vehicles in order to minimise disruption to local residents during the construction period, however, there will also a number of staff who travel using their own vehicle.

4.8.2 Baseline Situation

Site Access

The A859 is the main road from Stornoway on Lewis to Leverburgh (An t-Ob) on Harris and then on to the end of the island at Rodel. The A859 starts at a roundabout with the A857 to the north of Stornoway, and slowly turns round to take its south-westerly course across Lewis.

Access to the proposed development site at Arnish is approximately 1km North of Loch Cnoc a' Choilich via a single track road from the junction with the A859. The Deep Water Port at Arnish will be approximately 3.5km from main spinal route.

Data Sources

Traffic flow data for the A859 recorded during 2015 (the most recent information available) was obtained from the Department for Transport website (DfT, 2013).

The main period of traffic generation will potentially be during the construction period. It is likely that most of the dredge material will be reused as infill material, and only a limited volume will be taken of site for treatment/ disposal.

The delivery of goods and materials, as well as the transport of construction personnel to and from the site will result in additional traffic on the network. Construction traffic has the potential to affect other road users, such as drivers, cyclists and pedestrians, as well as people living and working close to the affected road network. The following types of impacts will be assessed: changes in traffic conditions and their potential for delays and congestion; pedestrians and cyclist conditions and their potential conflict with road traffic; and changes in traffic related noise levels.

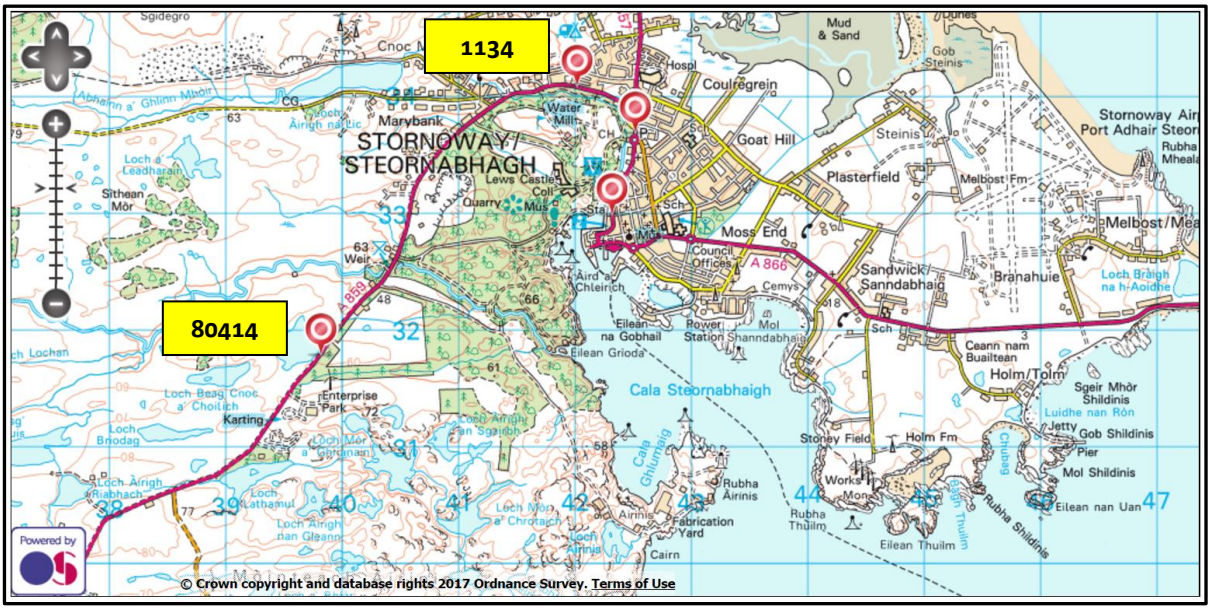
The Department for Transport holds annual average daily flow (AADF) traffic data from automatic traffic counters on the A859 in the vicinity of the site1. The hourly flow profile (with class breakdown) for the count undertaken in 2015 has been used as baseline traffic flow data. Table 4-19 summarises this data, while Figure 4-1 highlighting the traffic count points.

Table 4-19 Traffic Flow Information (ADDF) 2015 Data

Count point id:	Road	Grid Ref.	Start Junction	End Junction	Annual average daily flow (All Motor Vehicles)	Total HGV
80414	A859[15]	139800, 931800	A858	A859	656	67
1134	A858[16]	142000, 934100	B8060	A858	6964	205

The road approaching Arnish from Stornoway relatively lightly used, and is currently used by vehicles accessing the unclassified road Arnish Industrial Estate.

Figure 4-1 Traffic Point



Road Safety

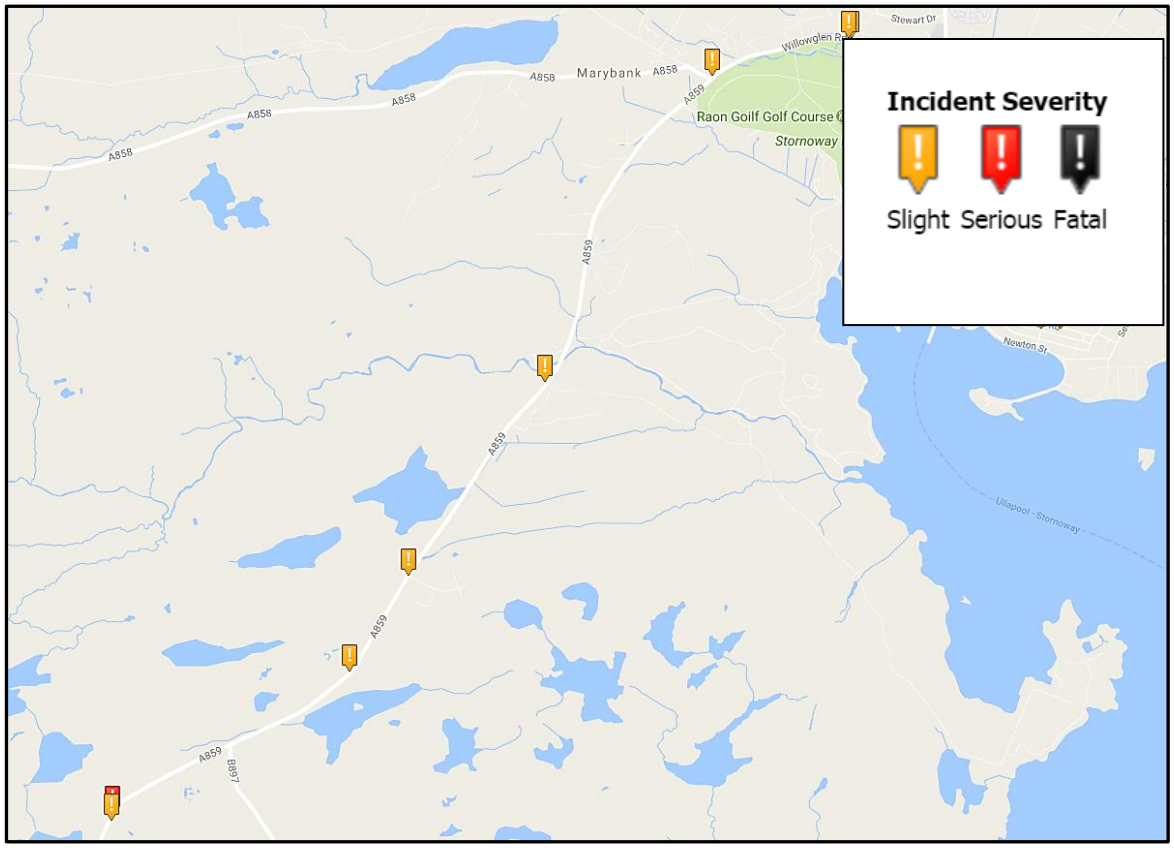
CrashMap[17] was interrogated to identify the number of road traffic incidents within the vicinity of the proposed Deep Water Port. CrashMap uses data collected by the police about road traffic incidents on British roads where someone is injured which is then compiled in to an easy to use format showing each incident on a map. Incidents are plotted to within 10m of their location. Table 4-20 indicates that there have been 8 Incidents in the five years up to, and including, 2016. Figure 4.2 shows the location of the incidents.

Table 4-20 Road Traffic Incidents

Year	Slight	Serious	Fatal
2012	1	0	0
2013	2	0	0
2014	1	0	0
2015	2	1	0
2016	1	0	0
Total	**7**	**1**	**0**

[15] https://www.dft.gov.uk/traffic-counts/cp.php?la=Comhairle+nan+Eilean+Siar#80414
[16] https://www.dft.gov.uk/traffic-counts/cp.php?la=Comhairle+nan+Eilean+Siar#1134
[17] http://www.crashmap.co.uk/search#

Figure 4-2 Road Traffic Incidents



4.8.3 Potentially Significant Effects during Construction

The following are considered to be the key potential effects with respect to traffic and transport during construction:

- Effects upon the levels of traffic experienced at the existing harbour;
- Effects upon the condition/structure of the road network;
- Environmental effects resulting from associated noise, vibration, and air pollution impacts;
- Effects upon pedestrians and other similar users in terms of delays and severance/amenity impacts (due to physical barriers or the effects of increased traffic flows);
- Road safety and the potential for accidents;
- The effects of heavy/abnormal loads on the road network;
- Ensuring the safe operation of the harbour with particular respect to existing marine traffic during harbour operation.

With respect to marine traffic, during construction there is the potential for incidents to occur as a result of the presence of dredging and other construction plant in the water. As with all construction works taking place in the marine environment, standard measures will need to be put in place to reduce the navigation risk to other vessels; for example, the construction works would need to be appropriately marked, construction plant be appropriately lit, and notices to Mariners issued, etc.

4.8.4 Potentially Significant Effects post-Completion

During the operational phase the Deep Water Port it is not considered likely to be a significant traffic generator. Although traffic associated with Arnish Industrial Estate is already present; any significant increase in activities has the potential to increase traffic on the local road network.

4.8.5 Inclusion or Exclusion from EIA

Details of construction activities, including the source and transportation method used to deliver incoming construction materials have not been finalised at this stage. When this information is known, construction traffic generated as a result of these activities shall be assessed as part of the EIA. Details on the specifications, locations and duration of traffic movements shall be determined from the contractor. Baseline traffic surveys pre-construction shall be carried out to determine existing traffic conditions.

4.8.6 EIA Methodology

The assessment will be broadly based on the Institute of Environmental Assessment (IEA)[18] *Guidelines for the Environmental Assessment of Road Traffic*. A site visit will be undertaken to observe background transport conditions and identify access constraints/ opportunities.

This guidance is the only document available which sets out a methodology for assessing potentially significant traffic-related environmental impacts where a proposed development is likely to give rise to changes in traffic flows.

The receptors that will be assessed are the users of local roads and the occupiers and users of land that front the local roads. This is because a change in characteristics, such as an increase in traffic and composition of HGVs, could adversely affect them.

The following rules, summarised from the IEMA guidelines, be used as a screening process to define the scale and extent of this assessment.

- Rule 1: Include roads where traffic flows are predicted to increase by more than 30% (or where the numbers of HGVs are predicted to increase by more than 30%).
- Rule 2: Include any specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

The IEMA guidelines elaborate on Rule 1 stating that projected changes in traffic of less than 10% create no discernible environmental impact, given that daily variations in background traffic flow may fluctuate by this amount, and that a 30% change in traffic flow represents a reasonable threshold for including a highway link within the assessment.

The IEMA guidelines also identify groups, locations and areas which may be sensitive to changes in traffic conditions and which should be considered for assessment. Groups, locations and areas could, for example, include pedestrians, cyclists, shopping areas, schools and accident hotspots. Where traffic flows are predicted to increase by 10% or more, those relevant sensitive groups, locations and areas will be assessed. It should also be noted that the IEMA guidelines also state that other affected parties could be added if the assessor considers it appropriate.

[18] Now the Institute of Environmental Management and Assessment (IEMA)

The potential impacts resulting from construction and development traffic likely to be generated by the proposed development will be considered in relation to the following areas:

- Traffic generation;
- HGV accessibility;
- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian Amenity, Fear and Intimidation; and
- Accidents and Safety, including driver distraction.

4.9 Other Issues

4.9.1 Introduction

This section incorporates those issues which are relevant to the proposed development however to do merit or justify a full chapter within the EIA Report, or similarly where there is no standard methodology. As discussed within section 3.4 of this Scoping Report, the changes to the EIA Regulations include requirement to consider climate change and natural disasters. This section also discusses cumulative assessment in relation to other elements of a proposed Masterplan for Stornoway, and air quality considerations as referred to within section 4.6.5.

4.9.2 Climate Change

Climate change has taken a prominent position within policy and legislation at a national level, with the Climate Change (Scotland) Act 2009 creating a long-term framework for ensuring reduction in Scottish greenhouse gas emissions of 80% by 2050.

Under Schedule 4(4), the EIA Regulations require "*a description of the factors specified in 4(3) likely to be significant affected by the development…(including) climate (for example greenhouse gas emissions, impacts relevant to adaption*)". In addition, Schedule 4(5)(f) of the EIA Regulations requires a "*description of the likely significant effects of the development on the environment resulting from…the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change".*

It is considered at the Scoping stage that the proposed development would not result in a significant effect upon climate given the nature of the development. Any increase in emissions created during either construction or operation is likely to be negligible, and pollution and emissions control would be discussed within a detailed Construction Environmental Management Plan (CEMP). Discussion of the vulnerability of the project to climate change is primarily concerned with the water environment, including flood risk and wave overtopping due to increases in sea level. This would be covered within the modelling and impact assessment within the Water Environment chapter.

4.9.3 Natural Disasters

The proposed development is not located within an area of significant seismic activity, nor are climatic factors prone to creating disasters such as tsunamis, hurricanes or catastrophic flooding. Accordingly consideration of natural disasters is scoped out of the EIA.

4.9.4 Air Quality

Air Quality would form part of the Other Issues chapter as discussed within section 4.6.5, in particular reference to dust.

4.9.5 Cumulative Assessment

Those environmental topics which are considered to require cumulative assessment are included within the relevant sections of section 4. It is not proposed to incorporate a separate cumulative assessment elsewhere within the EIA Report. It is acknowledged that the proposed development is part of a larger Masterplan for the area which has been promoted by the Applicant. It is also acknowledged that a separate Masterplan is in the early stages of being promoted by Comhairle nan Eilean Siar. It is also acknowledged that the SSE interconnector building, to the south of the site, is consented however the cable linkages are not.

Cumulative assessment would be considered between the Deep Water Port and the Newton Marina where concurrent environmental effects are apparent. It is not proposed to incorporate cumulative assessment of the Council's masterplan for the town.

5 CONTENT AND STRUCTURE OF THE ENVIRONMENTAL STATEMENT

5.1 Content and Structure

Following the rationale set out within the above sections, it is proposed that the final ES is set out within the following structure:

- Volume 1: EIA Report, containing:
  - Preface
  - Chapter 1: Introduction
  - Chapter 2: EIA Methodology and Scoping
  - Chapter 3: The Proposed Development
  - Chapter 4: Planning Policy Context
  - Chapter 5: Landscape and Visual
  - Chapter 6: Ecology
  - Chapter 7: Cultural Heritage and Archaeology
  - Chapter 8: Noise
  - Chapter 9: Water Environment
  - Chapter 10: Traffic and Transport
  - Chapter 11: Other Issues
  - Chapter 12: Schedule of Mitigation
  - Chapter 13: Conclusions
- Volume 2: Figures, containing relevant supplementary figures and drawings relevant to Volume 1 chapters;
- Volume 3: Technical Appendices, including reports and technical background documents which support the main assessments contained within Volume 1; and
- A standalone Non-Technical Summary (NTS).

6 CONCLUSIONS

It is anticipated that the proposed development will fall under Schedule 1 of the 2017 EIA Regulations, it is appropriate to request a Scoping Opinion from Comhairle nan Eilean Siar under Regulation 17(1). Sufficient baseline information has been provided regarding the proposed development and the surrounding and receiving environment upon which to base a decision.

The information and methodologies contained within this report allow the Council, Marine Scotland and other consultees to advise and approve the scope of work and add relevant information and guidance as required. We would be very grateful to receive a formal Scoping Opinion within a 5 week period and are committed to working with all consultees to deliver a proportionate, robust EIA that benefits the Western Isles.

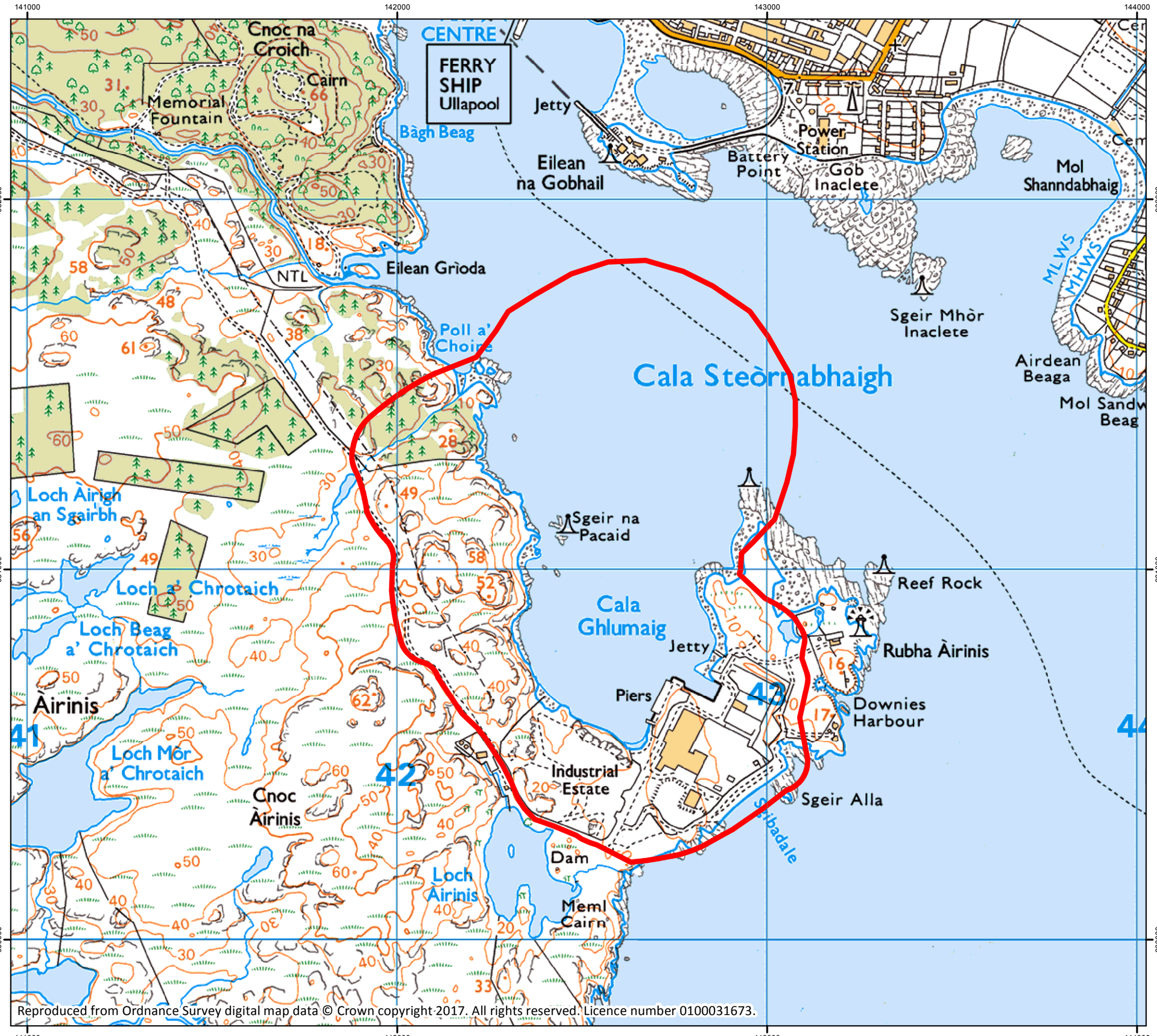
For the benefit of doubt, the environmental topics we propose to scope **in** to the EIA Report are:

- Landscape and Visual;
- Ecology;
- Cultural Heritage and Archaeology;
- Noise;
- Water Environment; and
- Traffic and Transport.

It is proposed that all other topics, including air quality, are scoped out.

APPENDICES AND DRAWINGS

A DRAWINGS



Legend

Stornoway Deep Water Port / Arnish Industrial Site Boundary

Do not scale this map

Client
Stornoway Port Authority

Project
Stornoway Deep Water Port / Arnish Industrial Site

Title
Stornoway Deep Water Port / Arnish Industrial Site Boundary

Status
FINAL

Drawing No.
169438-001

Revision

Scale
1:10,000

A3

Date
7 Dec 2017

Drawn
SMC

Checked
IB

Approved
GF

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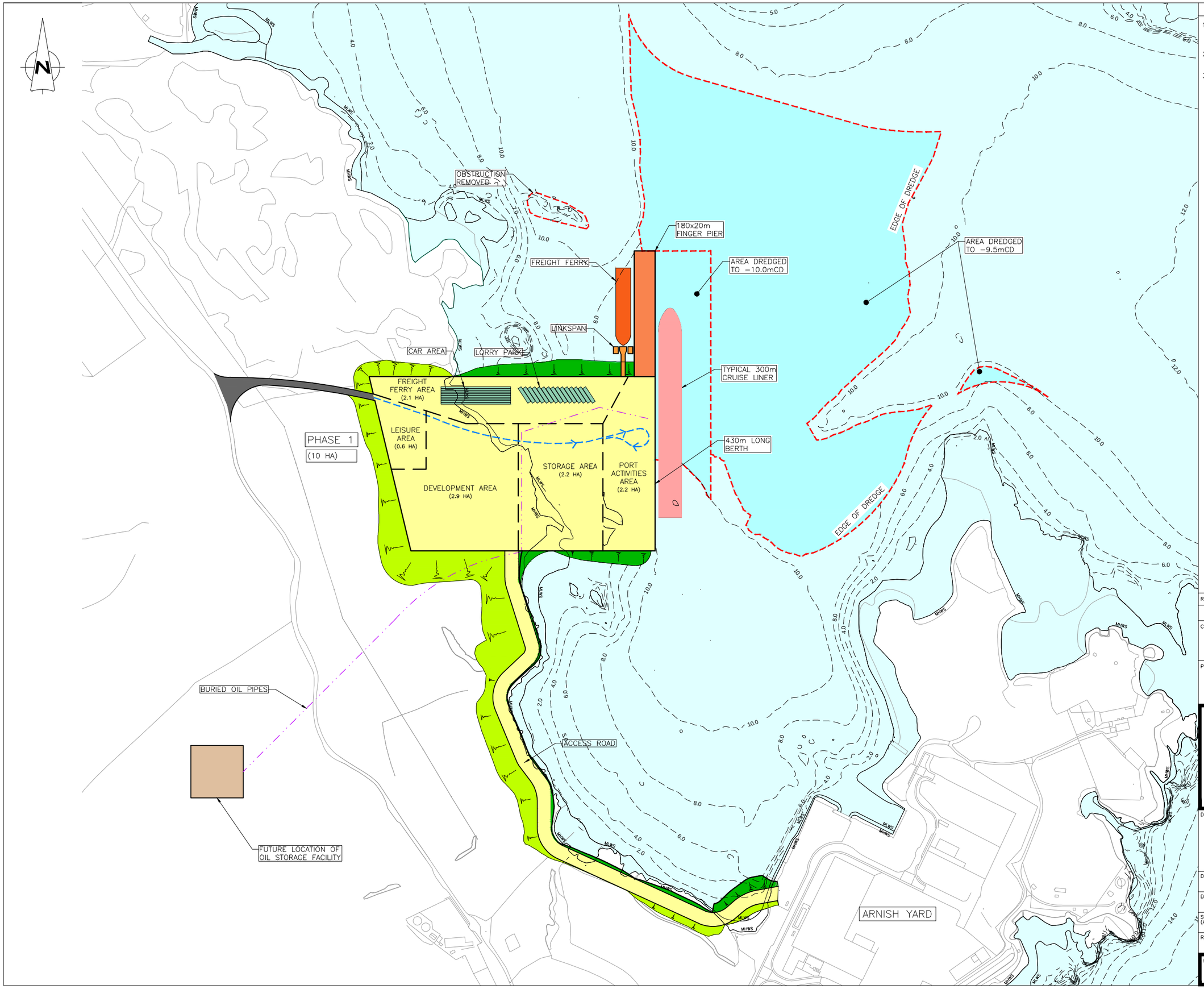

GENERAL NOTES

1. ALL LEVELS ARE IN METRES AND RELATE TO CHART DATUM, UNLESS NOTED OTHERWISE.
2. CHART DATUM IS 2.71m BELOW ORDNANCE DATUM.
3. TIDE LEVELS:−

HAT=	+5.5mCD	(+2.79mOD)
MHWS=	+4.8mCD	(+2.09mOD)
MLWS=	+0.7mCD	(−2.01mOD)
LAT=	0mCD	(−2.71mOD)

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D

AMENDMENTS

CLIENT

STORNOWAY PORT AUTHORITY

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DEEP WATER PORT

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DRAWING TITLE

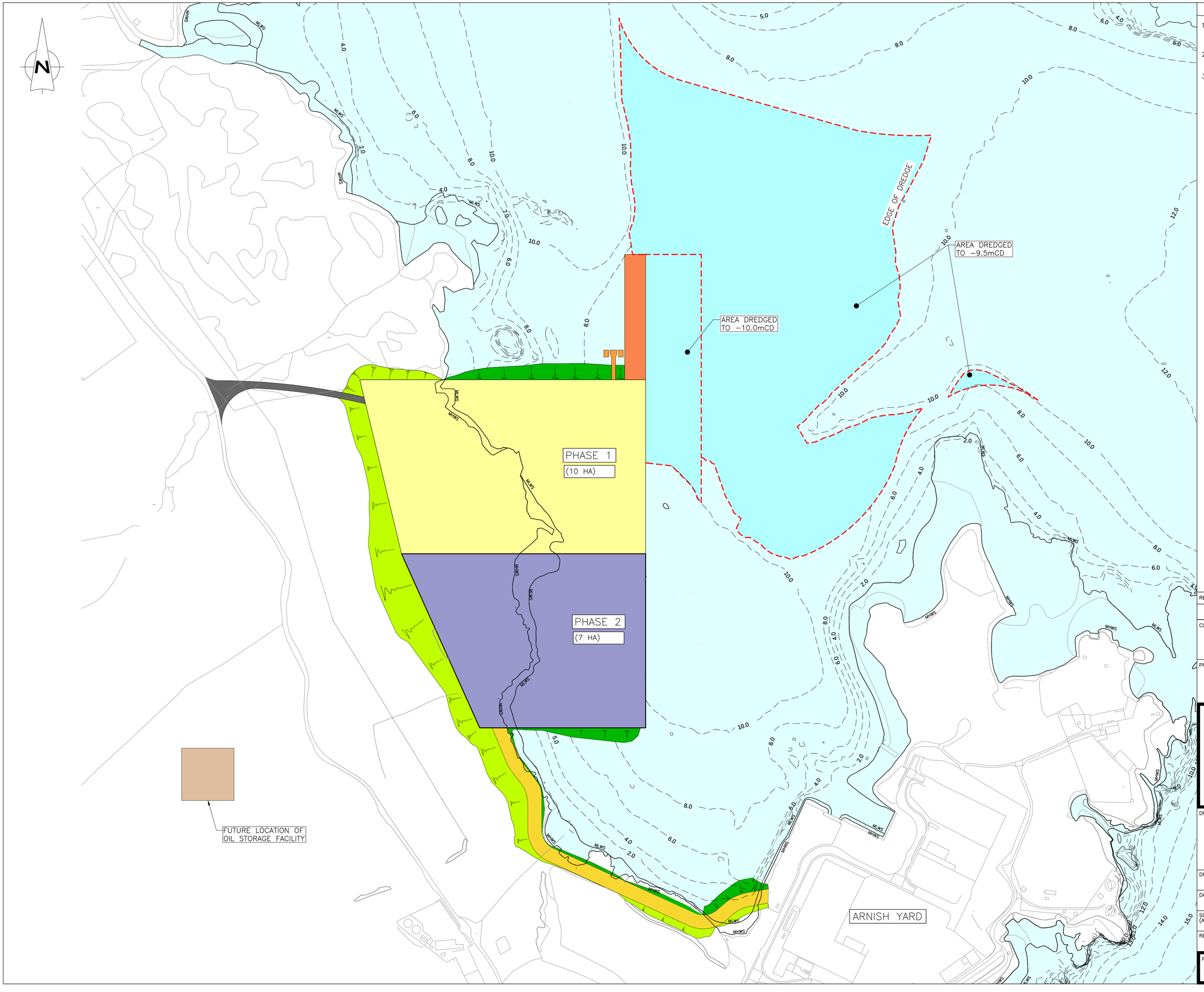
PHASE 1 LAYOUT

DRAWN	CHECKED	APPROVED
AB	RD	JP
DATE	DATE	DATE
NOV'17	NOV'17	DEC'17

SCALE (A1)	STAGE
1:2500	INFORMATION

REVISION

PROJECT No.	DRAWING No.
1980	901



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REV	DATE	DETAILS	DRAWN	CHK'D	APP'D

AMENDMENTS

CLIENT

STORNOWAY PORT AUTHORITY

PROJECT

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DRAWING TITLE

PHASE 2 LAYOUT

DRAWN	CHECKED	APPROVED
AB	RD	JP
DATE	DATE	DATE
NOV'17	NOV'17	DEC'17

SCALE (A1)	STAGE
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REVISION

PROJECT No.	DRAWING No.
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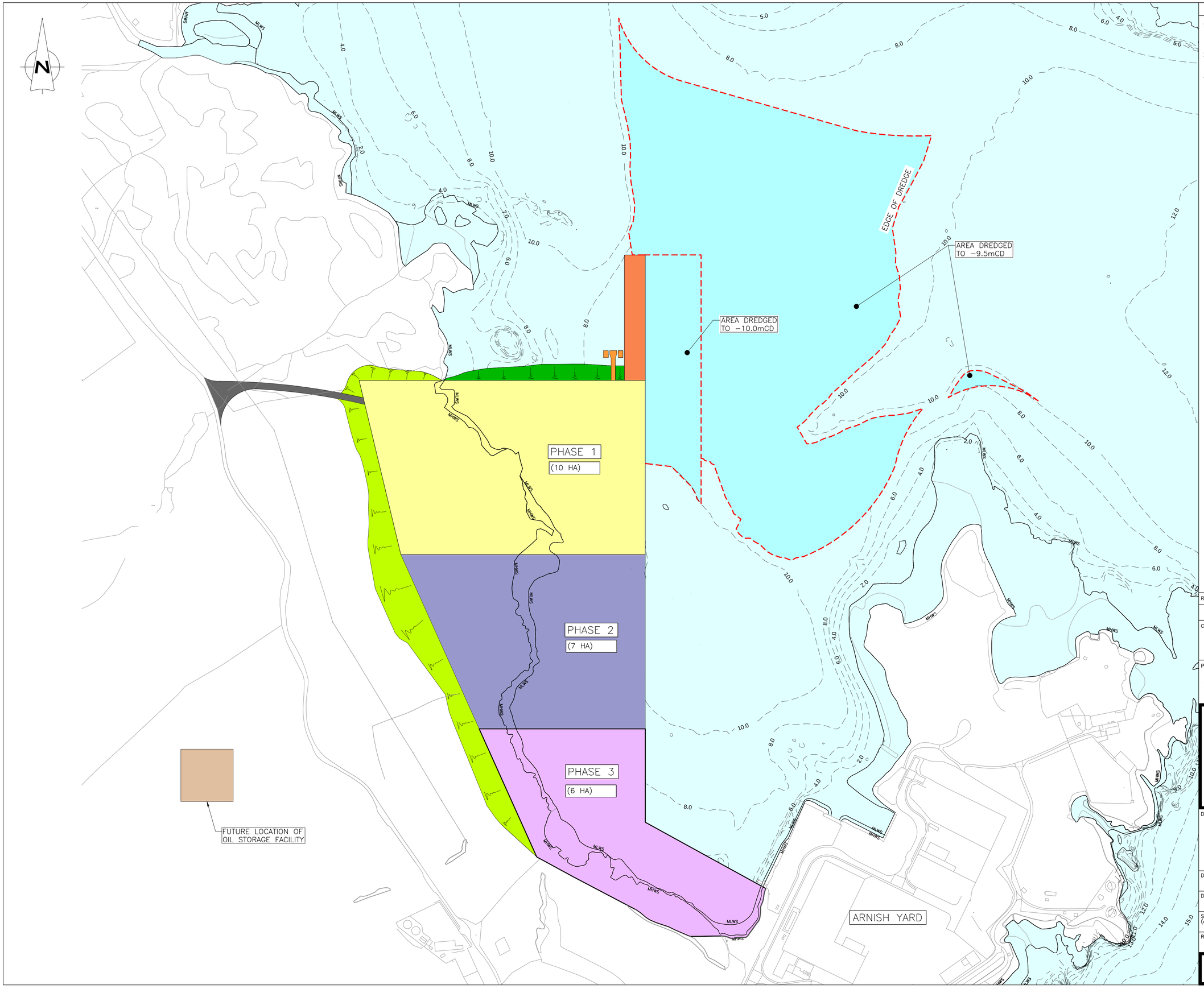

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MLWS=	+0.7mCD	(−2.01mOD)
LAT=	0mCD	(−2.71mOD)

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D

AMENDMENTS

CLIENT

STORNOWAY PORT AUTHORITY

PROJECT

STORNOWAY PORT MASTERPLAN

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DRAWING TITLE

PHASE 3 LAYOUT

DRAWN	CHECKED	APPROVED
AB	RD	JP
DATE	DATE	DATE
NOV'17	NOV'17	DEC'17

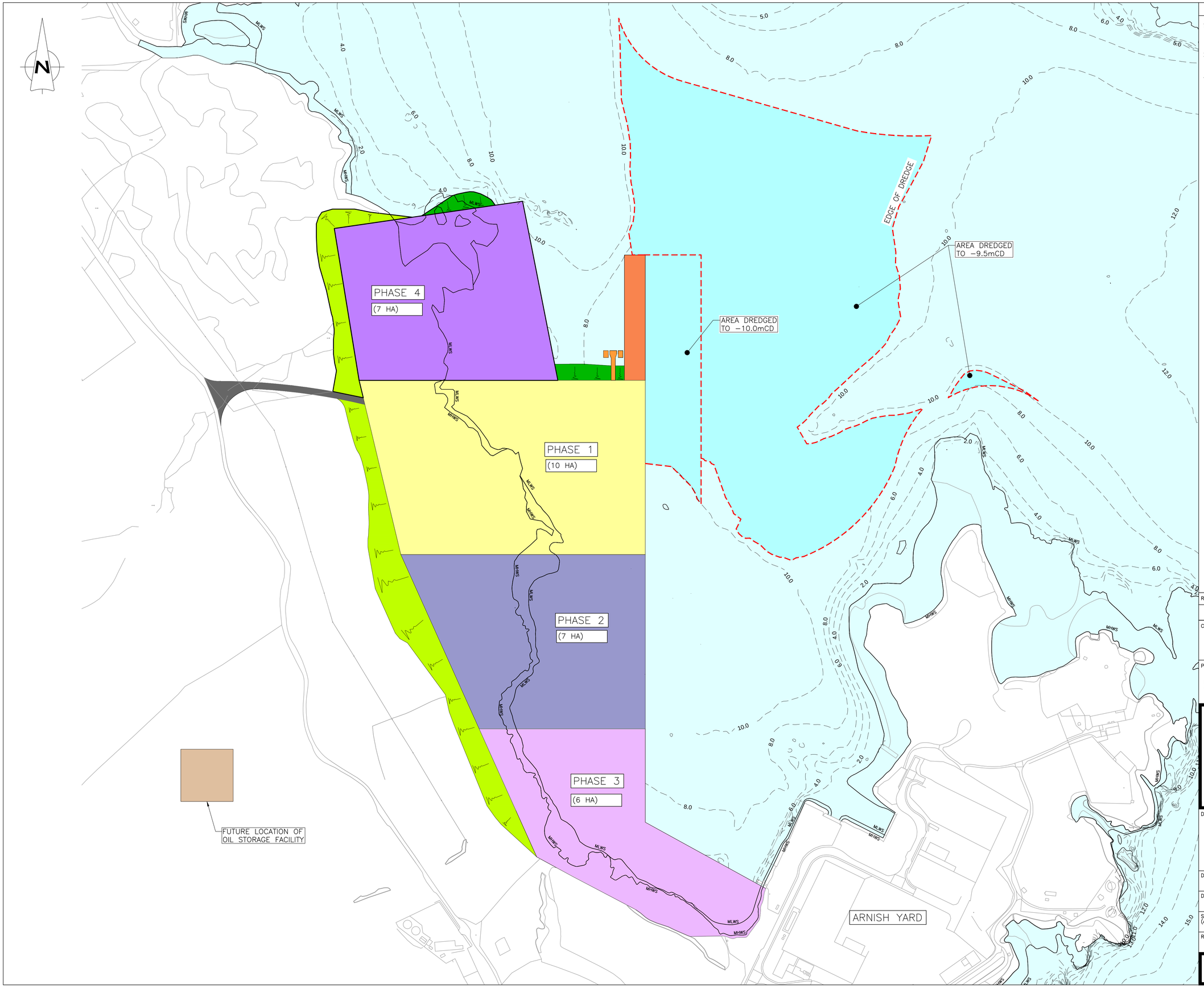
SCALE (A1) 1:2500

STAGE INFORMATION

REVISION

PROJECT No. 1980

DRAWING No. 903



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MLWS=	+0.7mCD	(−2.01mOD)
LAT=	0mCD	(−2.71mOD)

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D

AMENDMENTS

CLIENT

STORNOWAY PORT AUTHORITY

PROJECT

STORNOWAY PORT MASTERPLAN

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DRAWING TITLE

PHASE 4 LAYOUT

DRAWN	CHECKED	APPROVED
AB	RD	JP
DATE	DATE	DATE
NOV'17	NOV'17	DEC'17

SCALE (A1) 1:2500

STAGE INFORMATION

REVISION

PROJECT No. 1980

DRAWING No. 904

Legend

- Stornoway Deep Water Port / Arnish Industrial Site Boundary
- 50m Buffer

Do not scale this map

Client: Stornoway Port Authority

Project: Stornoway Deep Water Port / Arnish Industrial Site

Title: Stornoway Deep Water Port / Arnish Industrial Site Boundary and 50m Buffer

Status: FINAL

Drawing No.	Revision
169438-001	A

Scale		Date
1:10,000	A3	7 Dec 2017

Drawn	Checked	Approved
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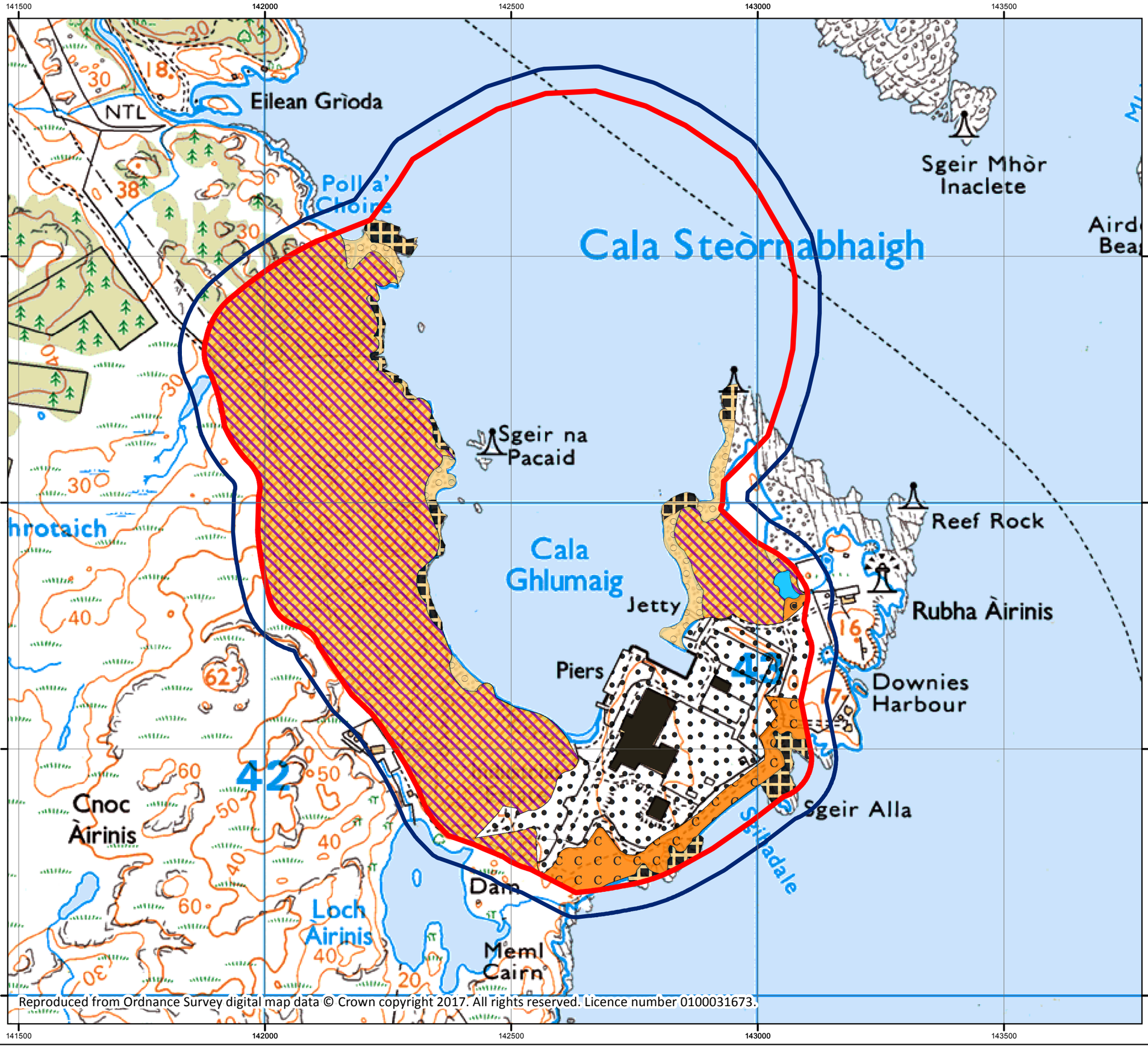

Legend

- Stornoway Deep Water Port / Arnish Industrial Site Boundary
- 50m Buffer

JNCC Habitat Code

- D6 Dry Heath
- G1 Standing Open Water
- H1.2 Shingle
- H1.3 Rock Outcrop
- H8.4 Coastal Ground (C)
- J3.6 Buildings
- J4 Bare Ground

Do not scale this map

Client: Stornoway Port Authority

Project: Stornoway Deep Water Port / Arnish Industrial Site

Title: Phase 1 Habitat Map

Status: FINAL

Drawing No.: 169438-003

Revision:

Scale: 1:7,500

A3

Date: 7 Dec 2017

Drawn	Checked	Approved
GV	CP	GF

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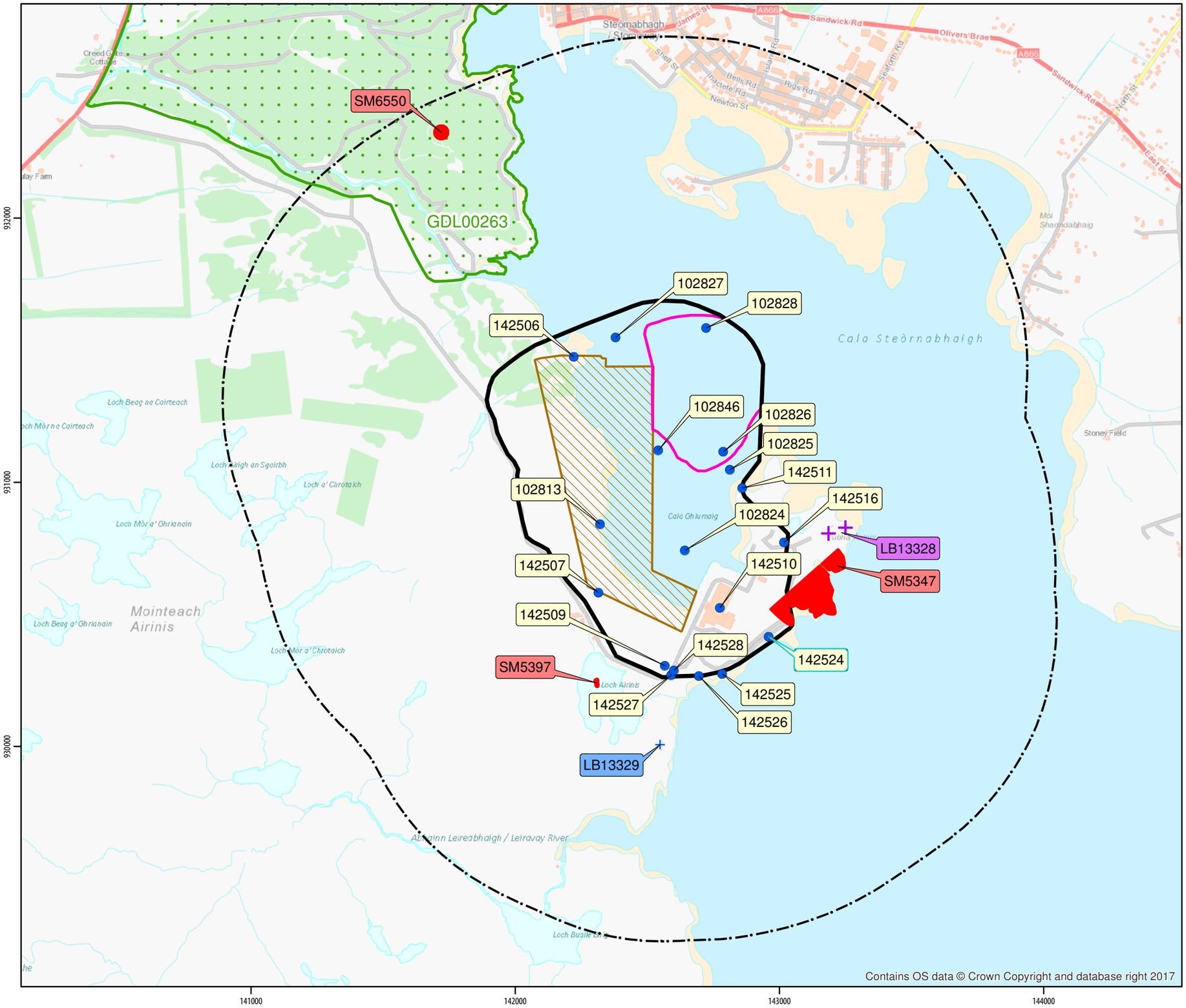

HEADLAND ARCHAEOLOGY
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Edinburgh EH6 5HE
0131 467 7705
www.headlandarchaeology.com

KEY

- HER Entry
- Scheduled Monument
- Category B Listed Building
- Category C Listed Building
- Inventory Garden and Designed Landscape
- Site Boundary
- Proposed Dredging
- Proposed Reclamation
- 1km Radius

HER information
derived from Pastmap data
dated 15/05/17 © Crown Copyright

Scheduled Monument, Listed Building and Inventory Garden and Designed Landscape area information derived from Historic Environment Scotland data dated Jan 2017.

N

1:15,000 @ A3

0 360m

FIGURE XX Heritage Assets within Study Area

B HABITAT INFORMATION AND SITE PHOTOGRAPHY

Phase 1 Habitat Survey

A total of six Phase 1 habitat types including buildings were recorded on the site:

- D6 Wet Heath
- G1 Standing Open Water
- H8.4 Coastal Grassland
- H1.3 Boulders / Rocks
- H1.2 Shingle/ Cobbles
- J3.6 Buildings

D6 Wet Heath

Wet heath is located along the western boundary of the site. The area is dominated by *Erica tetralix*, *Calluna vulgaris*, grasses sedges and sphagnum bog mosses.

G1 Standing Open Water

A small area of open water of Loch Airinis is located within the buffer area of the phase 1 habitat survey in the south east of the site.

H8.4 Coastal Grassland

Grassland which includes maritime species and was found on shallow slopes and level areas by the sea, and along the cliff tops. Species include*, Plantago maritima* and *Armeria maritima. Festuca rubra* was the dominant species. Other species included, *Anthyllis vulneraria*, *Lotus corniculatus*.

H1.3 Boulders / Rocks above high- tide mark

H1.2 Shingle / Cobbles above high-tide mark

6.1.1 J3.6 Buildings

Buildings associated with previous and existing industrial use are marked on the map.

Photo 1: Coastline of the east of the site, photograph shows coastal grassland and the rocky outcrops

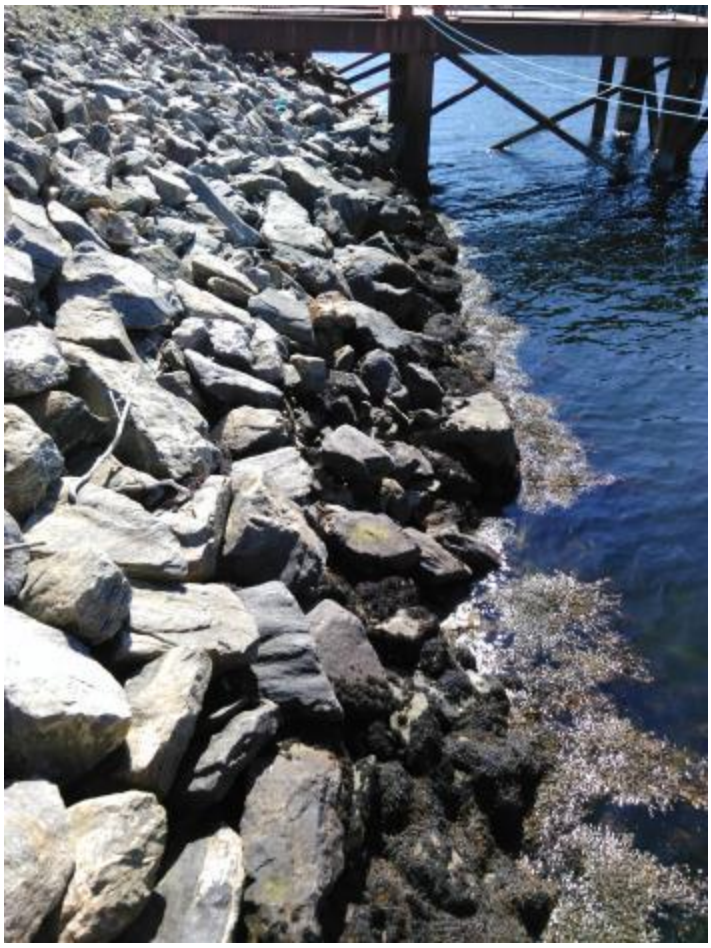

Photo 2: Rock armour of the piers and jetty located within the site

Photo 3: Existing industrial units on site

Photo 4: Coastline searched by boat for signs of protected species specifically otter

Photo 5: Rocks along coastline and coastal grassland eastern boundary of site